**Subjek : Pakan Ternak**
**Tahun 2004-2008 (504 judul)**

Pierre Beziat, Eric Ceschia, Gerard Dedieu, Carbon balance of a three crop succession over two cropland sites in South West France, Agricultural and Forest Meteorology, Volume 149, Issue 10, 1 October 2009, Pages 1628-1645, ISSN 0168-1923, DOI: 10.1016/j.agrformet.2009.05.004. (http://www.sciencedirect.com/science/article/B6V8W-4WKS6BJ-1/2/66dab29119b7e3346298d02b7cc5e4c4)
Abstract:
Long term flux measurements of different crop species are necessary to improve our understanding of management and climate effects on carbon flux variability as well as cropland potential in terrestrial carbon sequestration. The main objectives of this study were to analyse the seasonal dynamics of CO2 fluxes and to establish the effects of climate and cropland management on the annual carbon balance.
CO2 fluxes were measured by means of the eddy correlation (EC) method over two cropland sites, Aurade and Lamasquere, in South West France for a succession of three crops: rapeseed, winter wheat and sunflower at Aurade, and triticale, maize and winter wheat at Lamasquere. The net ecosystem exchange (NEE) was partitioned into gross ecosystem production (GEP) and ecosystem respiration (RE) and was integrated over the year to compute net ecosystem production (NEP). Different methodologies tested for NEP computation are discussed and a methodology for estimating NEP uncertainty is presented.
NEP values ranged between -369 +/- 33 g C m-2 y-1 for winter wheat at Lamasquere in 2007 and 28 +/- 18 g C m-2 y-1 for sunflower at Aurade in 2007. These values were in good agreement with NEP values reported in the literature, except for maize which exhibited a low development compared to the literature. NEP was strongly influenced by the length of the net carbon assimilation period and by interannual climate variability. The warm 2007 winter stimulated early growth of winter wheat, causing large differences in GEP, RE and NEE dynamics for winter wheat when compared to 2006. Management had a strong impact on CO2 flux dynamics and on NEP. Ploughing interrupted net assimilation during voluntary re-growth periods, but it had a negligible short term effect when it occurred on bare soil. Re-growth events after harvest appeared to limit carbon loss: at Lamasquere in 2005 re-growth contributed to store up to 50 g C m-2. Differences in NEE response to climatic variables (VPD, light quality) and vegetation index were addressed and discussed.
Net biome production (NBP) was calculated yearly based on NEP and considering carbon input through organic fertilizer and carbon output through harvest. For the three crops, the mean NBP at Aurade indicated a nearly carbon balanced ecosystem, whereas Lamasquere lost about 100 g C m-2 y-1; therefore, the ecosystem behaved as a carbon source despite the fact that carbon was imported through organic fertilizer. Carbon exportation through harvest was the main cause of this difference between the two sites, and it was explained by the farm production type. Lamasquere is a cattle breeding farm, exporting most of the aboveground biomass for cattle bedding and feeding, whereas Aurade is a cereal production farm, exporting only seeds.
Keywords: Crop; Carbon balance; Net ecosystem exchange; Eddy covariance; Management; Uncertainties

Kevin V. Donohue, Sayed M.S. Khalil, Elizabeth Ross, Robert D. Mitchell, R. Michael Roe, Daniel E. Sonenshine, Male engorgement factor: Role in stimulating engorgement to repletion in the ixodid tick, Dermacentor variabilis, Journal of Insect Physiology, Volume 55, Issue 10, October 2009, Pages 909-918, ISSN 0022-1910, DOI: 10.1016/j.jinsphys.2009.05.019.

(http://www.sciencedirect.com/science/article/B6T3F-4WM608N-1/2/a1fc0eeafab828c4ba7f92706e0f800a)
Abstract:
Mating in ticks results in profound physiological changes that eventually results in egg production. In the American dog tick, Dermacentor variabilis, mating causes partially blood-fed female ticks to commence rapid engorgement to repletion and eventual detachment from the host and egg laying. The peptidic male pheromone (engorgement factor [alpha]/[beta]) transferred to the female during mating is known only from a single tick species, Amblyomma hebraeum, and was shown to consist of two peptides produced in the testis/vas deferens (TVD) and not in the male accessory gland (MAG). In the current study, we obtained 2704 bp of sequence data for ef[alpha] from D. variabilis, of 7 kb as determined by Northern blot, and show that it is also present in the Southern cattle tick, Rhipicephalus microplus and the deer tick, Ixodes scapularis. Analysis of the male gonad transcriptome by pyrosequencing produced 563,093 reads of which 636 matched with ef[alpha]; none matched with ef[beta]. No evidence of ef[beta] orthologs could be found in any publicly available database including the I. scapularis genome. Silencing ef[alpha] in male ticks failed to significantly reduce the engorgement weight of females compared to controls. Injection of sephadex beads, replete female synganglia, fed male MAG, fed male TVD, or replete female vagina/seminal receptacle (VA/SR), separately, failed to initiate feeding to repletion like that found in normally mated females. However, a small percentage of females injected with VA/SR that fed beyond the arbitrary weight for repletion of 300 mg, produced brown eggs (an indication of vitellogenin uptake by the oocytes). The greatest effect was observed in female ticks injected with a suspension of MAG and TVD combined; 50% fed to repletion and all of these dropped off from the host and laid brown eggs. The effect was abolished if the aqueous fraction of the MAG/TVD homogenate only was injected suggesting that EF in ticks is a non-secreted membrane-bound or intracellular protein. Overall, these data suggest that EF[alpha] in D. variabilis is not an engorgement factor.
Keywords: Engorgement factor; Voraxin; Testis; Male accessory gland; Dermacentor variabilis

Y.R. Montanholi, K.C. Swanson, F.S. Schenkel, B.W. McBride, T.R. Caldwell, S.P. Miller, On the determination of residual feed intake and associations of infrared thermography with efficiency and ultrasound traits in beef bulls, Livestock Science, Volume 125, Issue 1, October 2009, Pages 22-30, ISSN 1871-1413, DOI: 10.1016/j.livsci.2009.02.022.
(http://www.sciencedirect.com/science/article/B7XNX-4VXJW52-1/2/38006642e2c0d98ac97ba330b7008933)
Abstract:
To determine the relationship of infrared thermography (IR) and ultrasound measures (US) with the variation in feed efficiency and daily dry matter intake (DMI), alternative models for calculating residual feed intake (RFI) were tested using DMI, average daily gain (ADG), mid-trial body weight (BW), body surface temperature measured using IR, and mid-trial US (ribeye area, backfat thickness and marbling score) from 154 crossbred bulls. The original model (Koch's model) for RFI (RFIkoch), based on a regression of DMI on BW and ADG had the lowest coefficient of determination (R2; 0.58) and was included as the base model in all the other alternate extended models tested. The residual or error term from the model represents the calculated RFI. RFI calculated including ribeye area (RFIrbea) had the highest R2 (0.62) of all US at mid-trial. RFI including all US traits (RFIusdt) had the same R2 (0.63) but higher, less desirable, Bayesian information criterion (BIC; 456.2 vs. 334.9) than the model where only feet temperature was added to Koch's model. A model combining mid-trial US and feet IR (RFIusir) had the greatest R2 (0.67) and BIC (327.7). RFIkoch was correlated with eye, cheek and feet temperature (0.24 to 0.43) but not with ribs, rear area or scrotum temperature. Bulls were also sorted into RFIkoch groups (high, medium, low). Eye, cheek and feet had lower temperature in low-RFI bulls compared to high-RFI bulls (less efficient). The feed to gain ratio (F:G) and DMI was higher for high-RFI than for low-RFI

bulls. Further analysis demonstrated that 28% of the RFIkoch variation was explained by US (4%) and IR (24%), where feet and cheek were the major IR traits, representing 74% of the IR contribution to the explained variation in RFIkoch. Our results provide evidence that: (1) Koch's model might be improved by adding US traits; (2) US and IR traits are useful to explain the DMI variation; (3) IR of different body locations have distinct relationships with RFI (RFIkock and RFIusdt), and with other efficiency traits and US; and (4) heat production (IR) explains a greater proportion of the variation in RFI than body composition (US). This study demonstrates the potential for improving RFI determination and also the application of IR in the assessment of feed efficiency. Further studies to develop standard procedures for performing infrared imaging might increase the predictability of this technology for assessing feed efficiency, especially residual feed intake, in cattle.
Keywords: Beef cattle; Feed efficiency; Residual feed intake; Skin temperature; Ultrasound

Ricardo N. Araujo, Marcos H. Pereira, Adriana C. Soares, Iancor D.C.A. Pereira, Lileia Diotaiuti, Nelder F. Gontijo, Michael J. Lehane, Alessandra A. Guarneri, Effect of intestinal erythrocyte agglutination on the feeding performance of Triatoma brasiliensis (Hemiptera: Reduviidae), Journal of Insect Physiology, Volume 55, Issue 9, September 2009, Pages 862-868, ISSN 0022-1910, DOI: 10.1016/j.jinsphys.2009.06.002.
(http://www.sciencedirect.com/science/article/B6T3F-4WKJ43N-1/2/9ee6058c76117d82529287766748e927)
Abstract:
Triatoma brasiliensis is an important vector of Trypanosoma cruzi in Brazil. The feeding efficiency on its hosts depends on several parameters including the maintenance of the ingested blood at low viscosity, which could be modulated by the anterior midgut (crop) anticoagulant and haemagglutinant activities. In the present study, we characterized T. brasiliensis crop haemagglutination activity and evaluated its importance in the feeding process. Soluble crop contents (SCC) of T. brasiliensis were able to agglutinate rat, mouse and rabbit eryhtrocytes, but had no activity on cattle and Thrichomys apereoides, a rodent species commonly associated with T. brasiliensis in the wild. The haemagglutination was characterized by the immediate formation of several clusters of erythrocytes connected by flexible elastic-like fibers. The feeding efficiency of T. brasiliensis on rat (agglutinated by SCC) was almost double that from T. apereoides (not agglutinated by SCC). The influence of haemagglutination on feeding was confirmed by artificially feeding bugs on a diet composed of cattle or rat erythrocytes. The bugs fed on cattle erythrocytes had lower ingestion rates in comparison to those fed on rats. The results indicate that, in addition to other parameters, haemagglutination brought about by SCC has an important role in the feeding efficiency of T. brasiliensis.
Keywords: Feeding; Triatoma brasiliensis; Viscosity; Haemagglutination; Thrichomys apereoides

C. Mapiye, M. Chimonyo, K. Dzama, J.G. Raats, M. Mapekula, Opportunities for improving Nguni cattle production in the smallholder farming systems of South Africa, Livestock Science, Volume 124, Issues 1-3, September 2009, Pages 196-204, ISSN 1871-1413, DOI: 10.1016/j.livsci.2009.01.013.
(http://www.sciencedirect.com/science/article/B7XNX-4VP178V-2/2/e1056933f954a91e95e833ea18f63156)
Abstract:
A total of 218 structured questionnaires were administered to determine the influence of production and socioeconomic factors on Nguni cattle farmers' constraints in the smallholder areas of South Africa. Cattle were mainly used for cash, milk and ceremonies. Cattle herd sizes were higher ($P < 0.05$) in the small-scale (23 +/- 5.2) compared to the communal (9 +/- 3.1) areas and mainly composed of cows. Most (75%) of the cattle owners were adult males and were more involved in herd management than adult females and youths. Shortage of feed and

diseases/parasites were ranked by farmers as the most important constraints. The logistic regression model showed that odds ratio estimates of households experiencing cattle feed shortage and disease/parasite challenges were high for rangeland type, production system and gender of the household head. About 40 and 75% of the respondents in the sour and sweet rangelands reported that cattle condition deteriorates during winter, respectively ($P < 0.05$). Tick-borne diseases were the common causes of cattle mortality, especially in summer. Local crossbreds and Nguni were the common cattle breeds in the smallholder areas. African tradition worshippers had higher ($P < 0.05$) Nguni herd sizes (6 +/- 3.2) than Christians (1 +/- 0.5). Breeding season was undefined and mating system was largely uncontrolled in the communal areas. Farmers' socioeconomic and pedo-climatic situations should be considered when planning strategies for cattle development in the smallholder farming systems.
Keywords: Cash; Communal farmers; Fencing; Rangelands; Tick-borne diseases

M.G. Keane, A.P. Moloney, A comparison of finishing systems and duration for spring-born Aberdeen Angus x Holstein-Friesian and Belgian Blue x Holstein-Friesian steers, Livestock Science, Volume 124, Issues 1-3, September 2009, Pages 223-232, ISSN 1871-1413, DOI: 10.1016/j.livsci.2009.02.001.
(http://www.sciencedirect.com/science/article/B7XNX-4VS3P8P-1/2/3f43391b43c40a6a691b437d9aec6e84)
Abstract:
In Ireland, the majority of dairy cows calve in spring and the male progeny are reared for beef as steers. Over half of all dairy calves are beef crosses with Aberdeen Angus and Belgian Blue representing two extremes in maturity type. The objective of this study was to compare different finishing systems in the autumn/winter of their second year for spring-born steers of contrasting maturity type. A total of 80 spring-born calves, 40 Aberdeen Angus x Holstein-Friesian (AA) and 40 Belgian Blue x Holstein-Friesian (BB) were reared together to 16 months of age. They were then blocked on live weight within breed type and assigned to a pre-experimental slaughter group and to four finishing groups namely: (i) pasture only for 94 days to slaughter, (ii) concentrates ad libitum indoors for 94 days to slaughter, (iii) pasture only for 94 days followed by concentrates ad libitum indoors for 95 days to slaughter, and (iv) concentrates ad libitum indoors for 189 days to slaughter. After slaughter, the 6-10th ribs joint was separated into its component tissues and a sample of m. longissimus was chemically analysed. Mean slaughter weights and carcass weights per day from arrival were 922 and 957 (s.e. 10.6)g, and 476 and 511 (s.e. 6.1) g for AA and BB, respectively. Corresponding carcass weights, kill out proportions, ribs joint fat and muscle proportions, and m. longissimus lipid concentrations were 300 and 322 (s.e. 3.9) kg, 515 and 534 (s.e. 2.4) g/kg, 181 and 121 (s.e. 4.2) g/kg, 605 and 666 (s.e. 4.5) g/kg, and 42 and 25 (s.e. 2.5) g/kg, respectively. Mean daily live weight gains for the finishing treatments as listed were 714, 1539, 999 and 1186 (s.e. 32.0) g, respectively. Corresponding mean daily carcass gains, carcass weights, ribs joint fat proportions and m. longissimus lipid concentrations were 416, 901, 645 and 774 (s.e. 24.6) g, 252, 296, 336 and 359 (s.e. 5.5) kg, 76, 165, 154 and 210 (s.e. 5.9) g/kg, and 13, 34, 32 and 55 (s.e. 3.5) g/kg. It is concluded that BB had heavier carcasses of better conformation with less ribs joint fat and less intramuscular lipid than AA. Neither breed type had acceptably finished carcasses after 94 days on pasture, but both breed types had acceptably finished carcasses following concentrate feeding for 94 days. The carcasses of the BB animals on pasture for 94 days and then finished on concentrates were not acceptably finished and m. longissimus lipid concentration was < 25 g/kg. In contrast, the carcasses of the AA animals finished on concentrates for 189 days were over fat and m. longissimus lipid concentration was > 65 g/kg.
Keywords: Cattle; Crossbreeds; Concentrate feeding; Finishing systems; Pasture

G.B. Penner, P. Yu, D.A. Christensen, Effect of replacing forage or concentrate with wet or dry distillers' grains on the productivity and chewing activity of dairy cattle, Animal Feed Science and Technology, Volume 153, Issues 1-2, 26 August 2009, Pages 1-10, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2009.05.006.
(http://www.sciencedirect.com/science/article/B6T42-4WMD2J8-1/2/62d86b4ac04499ebea8b677d0ae14dff)
Abstract:
The objectives of this study were to determine effects of including distillers' grain as either a partial forage replacement or as a partial concentrate replacement on the lactation performance and chewing activity of Holstein cows. Eight multiparous and four primiparous lactating Holstein cows were randomly assigned to one of four dietary treatments in three 4 x 4 Latin squares. The control diet was a standard lactation diet used at the University of Saskatchewan containing 520 g/kg of concentrate and 480 g/kg of forage consisting of barley silage and alfalfa hay. To determine the effect of using distillers' grain as a partial forage substitute, wet wheat/corn distillers' grain (WDG) were included in the diet at a rate of 100 g/kg of dietary dry matter (DM) by replacing barley silage. To determine the effects of using dry distillers' grain as a partial concentrate substitute, dry corn distillers' grain (DCDG) or dry wheat distillers' grain (DWDG), were included at 100 g/kg dietary DM by replacing dietary concentrate. Orthogonal contrasts were used to determine the effect of including WDG as a partial forage substitute (control versus WDG), dry distillers' grain as a partial concentrate substitute (control versus DCDG + DWDG) and to compare the two sources of dry distillers' grains used (DCDG versus DWDG). Dry matter intake was not affected by treatment and averaged 25.5 kg/d. Feeding WDG increased milk yield by 7% and the yield of milk CP by more than 9% compared to the control. Milk fat yield did not differ between cows fed the control and WDG diets, but milk fat concentration was lower for cows fed WDG than for cows fed the control diet (31.4 g/kg versus 34.0 g/kg, respectively). The amount of time spent ruminating and for total chewing activity (min/d, min/kg DM, and min/kg aNDF) were lower for the WDG diet compared to the control diet such that cows fed the WDG reduced ruminating time by 1 h/d. Partial substitution of dietary concentrate with dry distillers' grains did not affect milk yield, milk composition or chewing activity. Similarly the type of distillers' grain (DCDG versus DWDG) did not affect lactation performance or chewing activity. Results indicate that WDG are a good source of crude protein and digestible energy for lactating dairy cows. However, WDG do not promote chewing activity to the same extent as barley silage, and consequently may lower milk fat concentration and increase the risk for ruminal acidosis when used as a partial forage substitute. Furthermore, dry distillers' grains (DWDG and DCDG) can equally and effectively replace 100 g/kg of dietary concentrate without negatively impacting milk yield, milk composition, and chewing activity.
Keywords: Distillers' grain; Dairy cow; Chewing activity

Ariel Shabtay, Yitzhak Hadar, Harel Eitam, Arieh Brosh, Alla Orlov, Yaakov Tadmor, Ido Izhaki, Zohar Kerem, The potential of Pleurotus-treated olive mill solid waste as cattle feed, Bioresource Technology, In Press, Corrected Proof, Available online 15 August 2009, ISSN 0960-8524, DOI: 10.1016/j.biortech.2009.07.044.
(http://www.sciencedirect.com/science/article/B6V24-4X0W4KT-1/2/cf1d874208ece61b494ca102dca23a0f)
Abstract:
The aims of the current study were to follow: (1) the capability of the edible mushroom Pleurotus ostreatus to degrade cell wall components and soluble phenols of the olive mill solid waste (OMSW), and improve it for ruminant nutrition (2) the fate of oil and the lipid-soluble compounds tocopherols, squalene and [beta]-sitosterol in the fermented OMSW. A significant decrease in oil and lipid-soluble compounds with a concomitant shift in the fatty acid profile and degradation of soluble phenols took place already after 14 d. The utilization of lipids by the fungus shifted the degradation of the structural carbohydrates to a later stage, and significantly reduced the

metabolizable energy of the OMSW. We propose that edible fungi with reduced lipase activity would preserve the energy and health promoting ingredients of the oil, and force the fungus to degrade structural carbohydrates, thus improving its digestibility.
Keywords: Pleurotus ostreatus; Olive mill solid waste; Cattle nutrition; Squalene; Phenols

T. Yamada, S.-I. Kawakami, N. Nakanishi, Effects of dietary roughage levels on the expression of adipogenic transcription factors in Wagyu steers, Meat Science, In Press, Accepted Manuscript, Available online 14 August 2009, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.08.023.
(http://www.sciencedirect.com/science/article/B6T9G-4X0PC52-6/2/d3711756fab094b4d0ab763a6e52c789)
Abstract:
We hypothesized that dietary roughage level would alter the expression levels of adipogenic transcription factors in adipose tissue of Japanese black (Wagyu) steers. Steers were fed whole crop rice silage at three levels: (1) high roughage feeding group, fed 8 kg silage and 5 kg concentrate (HR); (2) middle roughage feeding group, fed 5 kg silage and 6 kg concentrate (MR); and (3) low roughage feeding group, fed 2 kg silage and 7 kg concentrate (LR) from 22 to 30 months of age. In subcutaneous adipose tissue, there were no significant differences in the expression of the adipogenic transcription factors and adipocyte size among feeding groups. In mesenteric adipose tissue, the expression of C/EBP[alpha] in the LR and MR groups was significantly higher than that in the HR group. Adipocyte size in the mesenteric adipose tissue of the LR group was significantly larger than that of the HR group. In intermuscular adipose tissue, the expression of C/EBP[beta]-LAP in the LR group was significantly higher than that in the HR group, and the expression of C/EBP[beta]-LIP in the LR and MR groups was significantly higher than that in the HR group. Adipocyte size in the intermuscular adipose tissue of the LR and MR groups was significantly smaller than that of the HR group. These results suggest that dietary roughage revel affects the adipose tissue depot-specific differences in C/EBP family expression pattern and adipocye cellularity in Wagyu steers.
Keywords: C/EBP family; PPAR[gamma]; adipogenesis; roughage; beef cattle

C. Mosnier, J. Agabriel, M. Lherm, A. Reynaud, A dynamic bio-economic model to simulate optimal adjustments of suckler cow farm management to production and market shocks in France, Agricultural Systems, In Press, Corrected Proof, Available online 3 August 2009, ISSN 0308-521X, DOI: 10.1016/j.agsy.2009.07.003.
(http://www.sciencedirect.com/science/article/B6T3W-4WXB55B-1/2/85bd3d6268d035b9c526c604e84ec282)
Abstract:
Tactical adjustments to seasonal weather conditions and beef price may generate additional income or avoid losses in French beef cattle farms. Due to the length of the suckler cow production cycle, adjustment decisions may impact not only on current production and profit but also on future farm outcomes. To better understand the consequences of shocks and subsequent production adjustments on the evolution of farm earnings and production over time, we built a dynamic recursive bio-economic farm model. Our model introduced simultaneously the possibility of adjusting herd size and herd composition, diet composition and diet energy content, as well as crop rotation, haymaking and feed stocks, taking into account both their short- and long-term consequences. An application is provided to test impacts of crop yield and beef price shocks of different intensities. Main simulated adjustments to face unfavourable weather shocks are (1) purchased feed in order to maintain animal production objectives, and (2) area of pasture harvested for haymaking. Very severe beef price shocks induce forced sales. Weather shocks affect farm net profit not only of the current year but also of the following years. Profit losses caused by unfavourable weather conditions are not compensated by gains in favourable ones and this differential is amplified when intensity of shocks rises.

Keywords: Farm management; Livestock production; Recursive model; Tactical adjustments; Risk

D. Cavestany, C. Vinoles, M.A. Crowe, A. La Manna, A. Mendoza, Effect of prepartum diet on postpartum ovarian activity in Holstein cows in a pasture-based dairy system, Animal Reproduction Science, Volume 114, Issues 1-3, August 2009, Pages 1-13, ISSN 0378-4320, DOI: 10.1016/j.anireprosci.2008.08.007.
(http://www.sciencedirect.com/science/article/B6T43-4T5CGSK-4/2/219dd8951be4236cc9ee51ddd172046d)
Abstract:
The hypothesis was that supplementation during the late prepartum period will differentially affect reproductive and productive variables according to parity. Primiparous (n = 22) and multiparous (n = 22) pregnant autumn calving Holstein cows were stratified in two groups according to parity (primiparous or multiparous) and within each group were randomly assigned to two treatments: (a) low supplemented (LS) or (b) high supplemented (HS) prepartum diet. The LS group was offered 5.2 kg/cow/day (DM basis) of wheat silage, and the HS group 4.7 kg cow/day (DM basis)/of corn silage and 3.6 kg (DM basis) of wheat bran + 12 g of urea. Both groups grazed on natural pastures. After calving, all cows received the same diet. The experimental period was from 3 weeks before calving to 7 weeks postpartum (PP); body condition score (BCS) and blood samples for hormonal analyses were obtained weekly and ovarian ultrasonography was conducted three times per week. The loss in BCS around calving was less pronounced in HS cows, but only multiparous supplemented cows maintained BCS throughout the study. Non-esterified fatty acids (NEFA) increased during the prepartum period in the LS but not in the HS cows, with peak values occurring on day 14 PP in all groups. During the remainder of the experiment NEFA was greater in LS than in HS cows. Prepartum treatment did not affect the proportion of cows that had ovulations from the first dominant follicle postpartum, but decreased the interval to first ovulation in multiparous cows (22.9 compared with 38.2 days; $P < 0.05$). This was associated with greater plasma IGF-I concentrations at the time the dominant follicle of the first follicular wave reached its maximum diameter (8.0 compared with 3.6 nmol/L; $P < 0.05$). However, prepartum treatment had no effect on onset of ovarian activity in primiparous cows. Supplementation had no effect on milk production or milk protein percentage but increased milk fat percentage. We conclude that feeding a high-supplemented prepartum diet to multiparous cows allowed them to maintain BCS around calving, and this was associated with greater concentrations of IGF-I and an earlier onset of estrous cycles after calving.
Keywords: Cattle-prepartum supplementation; Ovarian follicular dynamics; Ovarian activity; IGF-I; NEFA

J. Carol Petherick, Vivienne J. Doogan, Richard G. Holroyd, Peggy Olsson, Bronwyn K. Venus, Quality of handling and holding yard environment, and beef cattle temperament: 1. Relationships with flight speed and fear of humans, Applied Animal Behaviour Science, Volume 120, Issues 1-2, August 2009, Pages 18-27, ISSN 0168-1591, DOI: 10.1016/j.applanim.2009.05.008.
(http://www.sciencedirect.com/science/article/B6T48-4WJG8H8-1/2/fce889b6b4952edb120c4c796643ba0d)
Abstract:
Numerous tests have been used to measure beef cattle temperament, but limited research has addressed the relationship between such tests and whether temperament can be modified. One-hundred-and-forty-four steers were given one of three human handling and yarding experiences on six occasions during a 12-month grazing period post-weaning (backgrounding): Good handling/yarding, Poor handling/yarding and Minimal handling/yarding. At the end of this phase the cattle were lot-fed for 78 days, with no handling/yarding treatments imposed, before being transported for commercial slaughter. Temperament was assessed at the start of the experiment, during backgrounding and lot-feeding by flight speed (FS) and a fear of humans test, which

measured the proximity to a stimulus person (zone average; ZA), the closest approach to the person (CA) and the amount the cattle moved around the test arena (total transitions; TT). During backgrounding, FS decreased for all treatments and at the end of backgrounding there was no difference between them. The rate of decline, however, was greatest in the Good group, smallest in the Minimal group with the Poor intermediate. In contrast, ZA was affected by treatment, with a greater reduction for the Good group than the others (P = 0.012). During lot-feeding, treatment did not affect FS, but all groups showed a decrease in ZA, with the greatest change in the Poor group, the least in the Good and the Minimal intermediate (P = 0.052). CA was positively correlated with ZA (r = 0.18 to 0.66) and negatively with TT (r = -0.180 to -0.659). FS was consistently correlated with TT only (r = 0.17 to 0.49). These findings suggest that FS and TT measure a similar characteristic, as do ZA and CA, but that these characteristics are different from one another, indicating that temperament is not a unitary trait, but has different facets. FS and TT measure one facet that we suggest is general agitation, whilst ZA and CA measure fear of people. Thus, the cattle became less agitated during backgrounding, but the effect was not permanently influenced by the quantity and quality of handling/yarding. However, Good handling/yarding reduced fearfulness of people. Fear of people was also reduced during lot-feeding, probably as a consequence of frequent exposure to humans in a situation that was neutral or positive for the cattle.

Keywords: Beef cattle; Temperament; Handling; Fear; Welfare

J. Carol Petherick, Vivienne J. Doogan, Bronwyn K. Venus, Richard G. Holroyd, Peggy Olsson, Quality of handling and holding yard environment, and beef cattle temperament: 2. Consequences for stress and productivity, Applied Animal Behaviour Science, Volume 120, Issues 1-2, August 2009, Pages 28-38, ISSN 0168-1591, DOI: 10.1016/j.applanim.2009.05.009.
(http://www.sciencedirect.com/science/article/B6T48-4WK3YCJ-1/2/1057f40b40645be33c5bee6d7560159d)

Abstract:
This experiment assessed the effects of different quality and quantity of handling and quality of the holding yard environment on the productivity and physiological parameters indicative of stress in beef cattle. One-hundred-and-forty-four steers were given one of three human handling and yarding experiences on six occasions during a 12-month grazing period post-weaning (backgrounding): Good handling/yarding, Poor handling/yarding and Minimal handling/yarding. At the end of this phase the cattle were lot-fed for 78 days, with no handling/yarding treatments imposed, before being transported for commercial slaughter. Temperament was assessed by flight speed (FS) and a fear of humans (FOH) test, which measured the proximity to a stimulus person (ZA), the closest approach to the person (CA) and the amount the cattle moved around the test arena (TT). Mid-way through backgrounding, the Minimal treatment group was heavier than the Good, which was heavier than the Poor (mean weights 207, 201 and 194 kg, respectively; P = 0.05; LSD = 5.4), but by the end of backgrounding there was no difference between treatments and treatment did not affect liveweight during lot-feeding. At the end of backgrounding, plasma cortisol levels were significantly lower (P < 0.001) in the Good treatment group compared to the Poor and Minimal groups but at the end of lot-feeding there was no significant difference between the groups. Treatment affected plasma non-esterified fatty acid levels in backgrounding (P = 0.060) and lot-feeding (P = 0.046) with levels being higher in the Minimal than the Good and Poor groups (backgrounding: 0.52, 0.44 and 0.47 nmol/L, respectively; SE 0.02; lot-feeding: 0.46, 0.41 and 0.41 mmol/L, respectively; LSD = 0.05). Significant weak to moderate (r-value <0.50) negative correlations were found between FS and average daily gain, but there were no consistent correlations between measures from the FOH test and productivity. FS and TT were weakly positively correlated with plasma l-lactate, glucose and cortisol levels, and CA was weakly to moderately negatively correlated with l-lactate and glucose levels. The results indicate that, whilst being imposed, the Good treatment reduced stress and the Poor treatment negatively impacted on

liveweight gain. Minimal handling/yarding appeared to cause the cattle to experience stress, perhaps because of the relative novelty of being handled and confined. This work also confirms previous findings that cattle with high FS have poorer liveweight gains under both pasture and feedlot conditions and FS has some value as a predictor of productivity. Correlations also indicated that agitated cattle show a heightened arousal and stress responses when being handled. Fear of humans, as assessed by ZA, CA and TT, did not adversely affect productivity.
Keywords: Beef cattle; Temperament; Handling; Stress; Welfare; Production

Jenni Maatta, Maarit Hellstedt, Risto Kuisma, Hanna-Riitta Kymalainen, Riitta Mahlberg, Anna-Maija Sjoberg, Effects of chemical and mechanical wearing on the cleanability and surface properties of traditional and new surface materials in cattle barns - a laboratory study, Biosystems Engineering, Volume 103, Issue 4, August 2009, Pages 464-473, ISSN 1537-5110, DOI: 10.1016/j.biosystemseng.2009.02.003.
(http://www.sciencedirect.com/science/article/B6WXV-4WGT631-1/2/7679720f140cc7168aead5fc7d87b7ba)
Abstract:
The cleanability of floorings and feeding surfaces affects the well-being of animals and even food safety. In addition to factors associated with comfort, such as hardness and friction, floorings should withstand strong chemical and mechanical stresses associated with cleaning and use of the flooring. Different modifications and surface coatings have been developed in order to improve the surface properties of concrete. The primary aim of this study was to investigate the effects of chemical and mechanical wearing on cleanability and surface properties of concrete and its coatings and joint materials. In general, the effect of wear on cleanability and surface properties was moderate with the plastic coatings and but clearly greatest with the jointing materials. Treatment with any of the chemical substances tested decreased the cleanability of jointing materials. In general, NaOH affected the contact angles of all surfaces more than acids. Treatment with the alkali improved the cleanability of polyurethane and epoxy coated surfaces. Treatment with lactic acid somewhat improved the cleanability of the epoxy coated surfaces. Mechanical wear decreased the cleanability of all materials but particularly in the case of joints. The results of this laboratory study will be used for selecting materials for a field study in a cattle barn.

J. Feng, Z. Gu, M. Wu, F.C. Gwazdauskas, H. Jiang, Growth hormone stimulation of serum insulin concentration in cattle: Nutritional dependency and potential mechanisms, Domestic Animal Endocrinology, Volume 37, Issue 2, August 2009, Pages 84-92, ISSN 0739-7240, DOI: 10.1016/j.domaniend.2009.03.003.
(http://www.sciencedirect.com/science/article/B6T62-4W6VPFR-2/2/40db0232bf7b2cdcb3f6147718afa15a)
Abstract:
Previous studies on the effect of growth hormone (GH) on serum insulin concentration in cattle had generated seemingly conflicting results, and little was known about the mechanism by which GH affects serum insulin concentration in cattle, if it does. In this study, we determined whether the effect of GH on serum insulin concentration in cattle could be affected by the nutritional levels of the animal and whether GH increased serum insulin concentration in cattle by directly stimulating insulin release or insulin gene expression in the pancreatic islets. Administration of recombinant bovine GH increased serum insulin concentration in nonlactating, nonpregnant beef cows fed a daily concentrate meal in addition to ad libitum hay, but it had no effect in those cows fed hay only. Both GH treatments for 1 and 24 h increased insulin concentrations in cultures of pancreatic islets isolated from growing cattle. Growth hormone treatment for 24 h increased insulin mRNA expression in cultured bovine pancreatic islets. Growth hormone treatment for 16 h increased reporter gene expression directed by a ~1,500-bp bovine insulin gene promoter in a rat insulin-producing [beta] cell line. Taken together, these results suggest that exogenous GH can

increase serum insulin concentration in cattle, but this effect depends on the nutritional levels of fed cattle, and that GH increases serum insulin concentration in cattle by stimulating both insulin release and insulin gene expression in the pancreatic islets.
Keywords: Growth hormone; Insulin; Pancreas; Cattle; Feeding levels

I. Blanco-Penedo, R.F. Shore, M. Miranda, J.L. Benedito, M. Lopez-Alonso, Factors affecting trace element status in calves in NW Spain, Livestock Science, Volume 123, Issues 2-3, August 2009, Pages 198-208, ISSN 1871-1413, DOI: 10.1016/j.livsci.2008.11.011.
(http://www.sciencedirect.com/science/article/B7XNX-4V69JKH-1/2/8b7728d6fe5468ad41202837e187b4bc)
Abstract:
The aim of the present study was to determine how trace metal concentrations in beef-cattle in NW Spain vary between farms (including farms that have intensive, conventional and organic management practices) and to determine what the likely major causes of such variation are. Soil, feed (forage and concentrate) and animal tissue (liver and kidney; n = 165) samples were collected from three neighbouring farms in each of three districts in Galicia (9 farms in total). Trace metal concentrations (Co, Cr, Cu, Fe, Mn, Mo, Ni, Se and Zn) of digested samples were determined by ICP-MS/OES. Farm husbandry practices that involved use of a high proportion of in-farm produced forage and low/no mineral supplementation, as typically practiced by organic farms, were associated with mineral deficiencies or physiological imbalances in calves. Strict management of the feed ration is needed to avoid sub-clinical or marginal deficiencies which are difficult to diagnose clinically but can cause physiological stress and decreased production. The widely practiced mineral supplementation of concentrates on intensive and conventional systems guarantees that the physiological trace element requirements of calves are met, even when concentrates comprise a relatively low proportion of the diet. However, because of the particular susceptibility of ruminants to chronic copper toxicity, particular care must be taken when concentrates are supplemented above physiological requirements.
Keywords: Trace metals; Beef-cattle; Husbandry practices; Concentrate; Trace metal deficiency; Copper toxicity

Muhammad Kasib Khan, Muhammad Sohail Sajid, Muhammad Nisar Khan, Zafar Iqbal, Muhammad Umair Iqbal, Bovine fasciolosis: Prevalence, effects of treatment on productivity and cost benefit analysis in five districts of Punjab, Pakistan, Research in Veterinary Science, Volume 87, Issue 1, August 2009, Pages 70-75, ISSN 0034-5288, DOI: 10.1016/j.rvsc.2008.12.013.
(http://www.sciencedirect.com/science/article/B6WWR-4VH335V-3/2/95d27390a74ce0d5517e19d48026ca75)
Abstract:
The present study reports the prevalence, effects of treatment and cost benefit analysis of bovine fasciolosis in five districts of Punjab Province viz Sargodha, Jhang, Muzaffargarh, Lodhran and Layyah. From each of the five districts, 80 animals were selected and fortnightly screened through standard coprological procedures for a period of one year for the presence of eggs of Fasciola species. Of 4800 faecal samples analyzed, 1222 (25.46%) were found positive for fasciolosis. The occurrence of Fasciola (F.) gigantica (22.40%) was higher ($P < 0.05$) than F. hepatica (3.06%). Highest month-wise prevalence ($P < 0.05$) of fasciolosis was found in winter (39.08%) followed in decreasing order by spring (29.50%), autumn (20.33%) and summer (12.92%). District-wise prevalence of fasciolosis was highest ($P < 0.05$) in Sargodha (40.31%) and lowest in Layyah (11.77%) while other districts were having intermediate values of prevalence of fasciolosis. Species-wise prevalence of fasciolosis was found higher ($P < 0.05$) in buffaloes (30.50%) as compared to cattle (20.42%). However, there were no age and sex-related differences ($P > 0.05$) in prevalence of fasciolosis. A strong positive association of grazing (OR = 1.81), mixed farming of small and large ruminants (OR = 1.39), stagnant pond bathing (OR = 2.24) and river/canal bathing

(OR = 2.06) was found with the prevalence of fasciolosis as compared to stall feeding, separate farming of small and large ruminants and rivers/canal/ tap water bathing, respectively. Post-treatment average milk increase of 0.62 L per animal per day with 0.35% higher fat was observed in fasciolicide-treated animals with the cost benefit ratio of 3.9. The results provided significant data on the epidemiology of five districts of Punjab province which may be helpful for the planners and small holder dairy farmers for control of fasciolosis in the study districts.
Keywords: Prevalence; Fasciolosis; Bovines; F. gigantica; F. hepatica; Determinants; Effects of treatment on productivity; Cost benefit analysis; Punjab; Pakistan

L. Frylinck, G.L. Van Wyk, T.P.L. Smith, P.E. Strydom, E van Marle- Koster, E.C. Webb, M. Koohmaraie, M.F. Smith, Evaluation of biochemical parameters and genetic markers for association with meat tenderness in South African feedlot cattle, Meat Science, In Press, Accepted Manuscript, Available online 30 July 2009, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.07.016.
(http://www.sciencedirect.com/science/article/B6T9G-4WWG396-2/2/bb7bbeeb8066480e8262f52d2657e8c6)
Abstract:
A large proportion of South African feedlot cattle are crossbreds of Brahman (BrX, Bos indicus), and Simmental (SiX, Bos taurus). A sample of 20 grain fed bulls from each of these crossbreeds was used to compare meat quality with that of the small frame indigenous Nguni (NgX, Sanga) by evaluating a variety of biochemical and genetic parameters previously shown to be associated with meat tenderness. Shear force values were generally high (5.6 kg average at 14 d post mortem), with SiX animals higher than BrX or NgX ($P = 0.051$) despite higher calpastatin:calpain ratio in BrX ($P < 0.05$). Calpain activity and cold shortening were both correlated with tenderness for all classes. The sample size was too small to accurately estimate genotypic effects of previously published markers in the CAST and CAPN1 genes, but the allele frequencies suggest that only modest progress would be possible in these South African crossbreds using these markers.
Keywords: Beef crossbreds; tenderness; calpain proteolytic system; genetic markers; cold shortening/toughening

Catherine Molloy, Claire Cagney, Stephen O'Brien, Carol Iversen, Seamus Fanning, Geraldine Duffy, Surveillance and characterisation by Pulsed-Field Gel Electrophoresis of Cronobacter spp. in farming and domestic environments, food production animals and retail foods, International Journal of Food Microbiology, In Press, Corrected Proof, Available online 13 July 2009, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2009.07.007.
(http://www.sciencedirect.com/science/article/B6T7K-4WRV0HX-1/2/b64b50c07512dc217aa6f61b133df353)
Abstract:
Cronobacter spp. (formally Enterobacter sakazakii) has been linked to illness in infants from contaminated powdered infant formula, however, there is limited information on the environmental sources and potential transmission routes of this pathogen. The aim of this study was to establish if food production animals (cattle, pigs), and the wider farm environment were playing a role in the transmission of Cronobacter spp. and also to assess the risk of cross contamination in the home where infant formula is prepared, from the presence of the pathogen on other foods and the general domestic environment. A wide range of samples (n = 518) was collected at dairy farms, meat abattoirs, retail food stores and domestic environs and examined for the pathogen using an adapted ISO/DTS 22964 cultural protocol. The modified method included incubation at 42 [degree sign]C instead of 44 [degree sign]C and serial dilution of the enriched media prior to plating on Druggan-Forsythe-Iversen agar. Presumptive Cronobacter spp. colonies were confirmed by Real Time PCR targeting the dnaG on the MMS operon. All Cronobacter spp. isolated were speciated using biochemical tests, tested for resistance to 8 antibiotics and characterised using pulsed field gel electrophoresis. Cronobacter spp. was not recovered from cattle faeces, farm soil or trough

water but isolates (n = 33) were recovered from a variety of other sample types including cattle feed, pork and beef cuts, beef burgers and beef mince, green vegetables as well as organic breakfast cereals and domestic vacuum cleaner dust. The species recovered included C. Sakazakii (n = 21), C. malonaticus (n = 1) and C. turicensis (n = 1). Of the 33 isolates 51% were resistant to Cephalothin but sensitive to all other 7 tested antibiotics. Sub-typing of the recovered isolates by PFGE showed considerable clonal diversity, though a number of persistent PFGE profiles were observed. In conclusion the study showed that Cronobacter spp. was not carried by food production animals but was present in a range of diverse sample types and environs with particular association with dry environments.
Keywords: Cronobacter spp.; Enterobacter sakazakii; Food animals; Farms; Retail; Domestic; Pulsed-Field Gel Electrophoresis

B. Campion, M.G. Keane, D.A. Kenny, D.P. Berry, Evaluation of estimated genetic merit for carcass weight in beef cattle: Blood metabolites, carcass measurements, carcass composition and selected non-carcass components, Livestock Science, In Press, Corrected Proof, Available online 9 July 2009, ISSN 1871-1413, DOI: 10.1016/j.livsci.2009.06.003.
(http://www.sciencedirect.com/science/article/B7XNX-4WR0D4C-1/2/6fb8fa6243dc651343f3a94682cdef67)
Abstract:
In Ireland, a new beef genetic index has been developed. Growth rate is expressed as expected progeny difference for carcass weight (EPDCWT) and is estimated on an across-breed basis. Cross-breeding of dairy cows with both Aberdeen Angus and Belgian Blue beef sires is widely practised. The objective of this study was to compare blood metabolites, slaughter traits and carcass composition of progeny from Holstein-Friesian dairy cows and Aberdeen Angus (AA), Belgian Blue (BB), Friesian (FR) and Holstein (HO) sires. The AA and BB sires were selected, within breed, to be of either high (H) or low (L) estimated genetic merit for carcass weight. A total of 170 male progeny from spring-calving cows and 42 sires (10 AA, 13 BB, 7 FR and 12 HO) were artificially reared indoors and managed together until the end of their second grazing season when they were assigned to either a Light (560 kg) or Heavy (620 kg) slaughter weight. Blood metabolite concentrations were measured six times throughout life and feed intake was recorded during the first and second winter. Carcass measurements and selected non-carcass components were recorded after slaughter and the right side of each carcass was dissected into lean, fat and bone. Differences in blood metabolite concentrations amongst genetic groups were negligible although there were some effects of the prevailing level of nutrition. M. longissimus area scaled for carcass weight was 0.220, 0.221, 0.260, 0.255, 0.212 and 0.208 (SE 0.004) cm2/kg for AAH, AAL, BBH, BBL, FR and HO, respectively. Carcass measurements scaled for carcass weight were greater for L, AA, HO and the dairy strains than for H, BB, FR and the beef breeds, respectively. There was no effect of estimated genetic merit for carcass weight on carcass composition. Statistically significant interactions between genetic merit and beef breed existed for some traits with the genetic merit effect largely evident for AA only. BB and the beef breeds had more lean, less fat and more high value lean in the carcass than AA and the dairy strains, respectively. It is concluded that genetic group had little effect on blood metabolite concentrations but there were some feeding level effects. Estimated genetic merit for carcass weight affected carcass weight, m. longissimus area and carcass measurements scaled for carcass weight but the effects were confined to AA. There were large effects of beef breed and dairy strain on carcass composition.
Keywords: Beef breeds; Cattle; Carcass composition; Genetic merit; Growth

B. Campion, M.G. Keane, D.A. Kenny, D.P. Berry, Evaluation of estimated genetic merit for carcass weight in beef cattle: Live weights, feed intake, body measurements, skeletal and muscular scores, and carcass characteristics, Livestock Science, In Press, Corrected Proof, Available online 9 July 2009, ISSN 1871-1413, DOI: 10.1016/j.livsci.2009.06.004.

(http://www.sciencedirect.com/science/article/B7XNX-4WR0D4C-2/2/9658b0072fea89409faa65022ec4fd68)
Abstract:
Genetic merit for growth rate, expressed as expected progeny difference for carcass weight (EPDCWT), is available for dairy and beef sires used in Ireland. The once predominantly Friesian (FR) dairy herd has experienced significant introgression of Holstein (HO) genes over the past two decades, and cross-breeding of dairy cows, not required to produce herd replacements, with beef bulls is common. The objective of this study was to compare growth rate, feed intake, live animal measurements and slaughter traits of progeny of Holstein-Friesian dairy cows and bulls of two contrasting maturity beef breeds namely Aberdeen Angus (AA) and Belgian Blue (BB), each selected for either high (H) or low (L) estimated genetic merit for carcass weight. Two dairy strains (FR and HO) were also included giving six genetic groups in total. A total of 170 male progeny from spring-calving cows were artificially reared indoors and subsequently managed together at pasture until the end of their second grazing season when they were assigned to one of two mean slaughter weights (i) 560 kg (Light) or (ii) 620 kg (Heavy). Daily feed intake was recorded during the first winter and during finishing. Body measurements were recorded four times during the animals' life, and linear scoring was carried out at 9 months of age and again at slaughter. Carcasses were graded for conformation and fatness (15 point scale). Slaughter and carcass weights per day of age for AAH, AAL, BBH, BBL, FR and HO were 782, 719, 795, 793, 804 and 783 (SE 12.9) g, and 415, 372, 438, 436, 413 and 401 (SE 5.8) g, respectively. Corresponding values for carcass weight, kill-out proportion, carcass conformation class (15 point scale) and carcass fat class (15 point scale) were 314, 283, 334, 333, 317 and 305 (SE 4.7) kg, 526, 518, 553, 550, 519 and 511 (SE 2.9) g/kg, 6.2, 5.4, 8.0, 7.9, 5.3 and 3.7 (SE 0.26), and 9.8, 9.3, 7.4, 7.2, 9.3 and 8.2 (SE 0.26). There were significant interactions between estimated genetic merit for carcass weight and beef breed with the differences between H and L mainly expressed for AA only. Feed intake differences between H and L animals were negligible and largely attributable to the differences in live weight. Following scaling for live weight, beef breeds of high estimated genetic merit for carcass weight had lower skeletal measurements, indicating greater compactness, with the effect more pronounced in AA. It is concluded that using beef sires of estimated high genetic merit for carcass weight on dairy cows increases growth rate and carcass weight of the progeny but the effect may not be similar for all breeds.
Keywords: Beef breeds; Carcass weight; Cattle; Genetic merit; Growth

K. Bartl, A.C. Mayer, C.A. Gomez, E. Munoz, H.D. Hess, F. Holmann, Economic evaluation of current and alternative dual-purpose cattle systems for smallholder farms in the central Peruvian highlands, Agricultural Systems, Volume 101, Issue 3, July 2009, Pages 152-161, ISSN 0308-521X, DOI: 10.1016/j.agsy.2009.05.003.
(http://www.sciencedirect.com/science/article/B6T3W-4WFGRW4-1/2/d19388a5308022834d34ba7c3c0aa29a)
Abstract:
In four communities in the Peruvian Andes, 56 farmers were interviewed every three months over a period of one year. Information linked to milk and cattle production such as activities, inputs (labour, means of production, capital) and outputs (milk, cheese, animals) were recorded using a closed-ended questionnaire. The communities were divided into two groups with low (LC) and high (HC) level of dependence on income from milk and animal sales. The survey results showed that cattle production on the LC farms was based on less land and a smaller herd (3.32 ha/farm, 1.06 lactating cows) than on HC farms (10.28 ha/farm, 4.19 lactating cows). The data from the survey and the results of the nutritional analyses of 74 feed samples were introduced into a model that applied linear programming techniques in order to estimate the farm household income under the current production systems and evaluate the economic impact of improved forage varieties for hay production. Furthermore, the economic viability of other changes in fodder and herd management

was tested. Both groups were characterised by a dual-purpose system generating a gross income from the sale of both, milk and live animals in the amount of -21 (LC) and +1057 US$/farm and year (HC). Due to higher production costs for forages and better access to markets, LC communities were characterised by an integrated crop-livestock system whereas in the HC group income was mainly based on livestock. Introduction of improved and fertilized barley for hay production, was estimated to increase the annual farm income to 127 and 1257 US$ for LC and HC, respectively. This increase was accompanied by an increment of the animal number. Maintaining the animal number but increasing the milk production/cow by feeding additional forage was a less profitable option generating 50 and 1221 US$ of income per farm and year for LC and HC, respectively. The production of hay was limited by high costs (external labour) in LC communities and the restricted availability of family labour in the HC group. A scenario based on the use of improved cow genotypes led to the highest estimated annual farm income for HC communities (1280 US$) but was less favourable for LC. The modelling results showed that the best development strategy depends on various factors such as production costs, access to the markets and to irrigation and availability of different feed resources.
Keywords: Crop-livestock system; Land use options; Milk production; Modelling; Peru

Chunli Li, Xiying Hao, Walter D. Willms, Mengli Zhao, Guodong Han, Seasonal response of herbage production and its nutrient and mineral contents to long-term cattle grazing on a Rough Fescue grassland, Agriculture, Ecosystems & Environment, Volume 132, Issues 1-2, July 2009, Pages 32-38, ISSN 0167-8809, DOI: 10.1016/j.agee.2009.02.010.
(http://www.sciencedirect.com/science/article/B6T3Y-4VXT0PB-2/2/13c1cf9c9dd1e3f36bafc4ee3002909e)
Abstract:
This study investigated the effect of long-term cattle grazing on herbage production and its nutrient and mineral concentrations over the grazing season. The grazing experiment was conducted on a Rough Fescue (Festuca campestris Rydb.) grassland established in 1949. The three grazing treatments were moderate grazing (MG), heavy grazing (HG), and a non-grazed exclosure (CK) with corresponding stocking rates of 2.4, 4.8, and 0 animal unit months (AUM) ha-1, respectively. Within each of these three treatments four sampling locations were selected as four replications. Herbage biomass (green standing crop [current years' production] and litter biomass [previous years' production]) and its nutrient and mineral concentrations were determined monthly from May to September 2007. The green standing crop increased but litter biomass decreased with grazing and peak green standing crop for MG and HG occurred one month earlier than in the CK. For the green standing crop, total nitrogen (TN) concentration increased with grazing from 28.2 g kg-1 in the CK to 39.9 g kg-1 in the HG treatment in May while increases (12.4-15.7%) in other months were not significant. Total phosphorus (TP) (16.4%) and [delta]15N were higher in the HG than in the CK. For the litter, TN and Ca concentrations decreased with grazing, but TP, [delta]15N, K and Mg concentrations increased. The herbage feed quality also varied over the grazing season with TN, TP, K, and Mg concentrations decreasing over the grazing season while Ca concentration was lowest in spring (3.07 g kg-1) and late fall (4.08 g kg-1). Grazing appeared to accelerate nutrient cycling and improved herbage quality. These grasslands require disturbance for optimal performance but heavy grazing pressure could severely reduce their health.
Keywords: Green standing crop; Litter; Nitrogen; [delta]15N; Phosphorus; Cattle grazing; Grassland

Xiying Hao, Monica B. Benke, Chi Chang, H. Henry Janzen, George W. Clayton, Brett R. Hill, Spatial pattern of ammonia sorption by soil and vegetation downwind of a beef feedlot, Agriculture, Ecosystems & Environment, Volume 132, Issues 1-2, July 2009, Pages 39-47, ISSN 0167-8809, DOI: 10.1016/j.agee.2009.02.007.

(http://www.sciencedirect.com/science/article/B6T3Y-4VY1661-1/2/a4e87bdc56be5379b41591200175e4ef)
Abstract:
In the recent decades NH3 emission from animal production has increased substantially worldwide and there has been indications of its adverse effect on vegetation especially near intensive livestock operations. In this study, the effect of NH3 deposition on soil and on two forage species, crested wheatgrass (CWG) (Agropyron cristatum L. Gaertn.) and timothy grass (TIM) (Phleum pratense L.), was investigated over 3 years near a large feedlot in southern Alberta, Canada. A high NH3 deposition rate of 104 kg N ha-1 year-1 was observed at the feedlot edge, decreasing by 53% 700 m downwind. Most of the NH3 deposited to soil accumulated in the 0-5 cm depth resulting in increased soil NH4+, NO3- and total N (TN) concentrations at this depth. Significantly higher NO3- and TN concentrations were also observed in both vegetation and roots 0 and 20 m downwind of the feedlot operation. The foliar and root biomass of CWG was higher 20, 50 and 100 m downwind than at sites further away. Foliar and root biomass of CWG growing downwind of the feedlot (excluding the 0 m site) was positively related to NH3 deposition, while TIM biomass was not. However, root growth of both species was significantly reduced immediately (0 m) outside the feedlot operation. Foliar damage was also more severe for both species at 0 m than at any other site downwind. Our study indicates that most plant damage occurred immediately outside the feedlot and that, further downwind, atmospheric NH3 deposition could be beneficial. However, N deposition near feedlot operations should be considered when making fertilizer recommendations to reduce input costs and prevent overloading of nitrogen into the environment.
Keywords: Ammonia deposition; Crested wheatgrass; Soil nitrogen; Timothy; Vegetation response; Cattle feedlot

Wu-Zi Dong, Jin-Lian Hua, Wen-Zheng Shen, Zhong-Ying Dou, In vitro production of haploid sperm cells from male germ cells of foetal cattle, Animal Reproduction Science, In Press, Corrected Proof, Available online 1 July 2009, ISSN 0378-4320, DOI: 10.1016/j.anireprosci.2009.06.018.
(http://www.sciencedirect.com/science/article/B6T43-4WNB52R-1/2/e67302ec9767c07573b053ff0b0e7ed3)
Abstract:
The purpose of this study was to isolate the foetal cattle male germ cells (mGCs) and then induce them into sperm cells. The mGCs were purified and enriched by a two-step plating method based on the different adherence velocities of mGCs and somatic cells. The percentage of the vasa and the c-kit positive cells were 95.34 +/- 2.25% and 53.3 +/- 1.03% by using flow cytometry analysis (FCA), respectively. In feeder-free culture system, the half-suspending cells appeared and formed a 16-cell rosary in medium after the mGCs were cultured for 6-8 days. On immunocytochemical staining during the second passage, some single cells adhering to the plate appeared to be both Oct-4 and [alpha]6-integrin positive. During the third passage, the mGCs were induced for 48 h by retinol acid (RA) on Sertoli cell-feeder layer, followed by 5-7 days culture in an RA-free medium. Some elongated sperm-like cells appeared in the medium at this stage. We found that the most effective concentration of RA for the inducement was 10-7 mol l-1 ($P < 0.01$). The haploid cells in suspension were identified by FCA. The elongated sperm-like cells showed proacrosome-like structure and the flagellum with fibre construct under electron microscopy. The mRNA of outer dense fibre-3 (ODF-3) and transcription protein-1 (TP-1) could be detected in the suspended cells by using reverse transcription polymerase chain reaction (RT-PCR). About 23.1% bovine oocytes could be activated to perform cleavage by intracytoplasmic injection with the sperm-like cells, but embryos did not further develop. Our investigation further demonstrated that foetal cattle mGCs could be induced in vitro into haploid sperm in the short term.
Keywords: Foetal cattle; Male germ cells; Retinol acid (RA); Haploid sperm cells

Radhakrishnan Srinivasan, Filip To, Eugene Columbus, Pilot scale fiber separation from distillers dried grains with solubles (DDGS) using sieving and air classification, Bioresource Technology, Volume 100, Issue 14, July 2009, Pages 3548-3555, ISSN 0960-8524, DOI: 10.1016/j.biortech.2009.02.049.
(http://www.sciencedirect.com/science/article/B6V24-4VY168M-7/2/522f2b61db9eac0081e41ac821b8a44d)
Abstract:
Distillers dried grains with solubles (DDGS), the coproduct of fuel ethanol production from cereal grains like corn, is mainly used as cattle feed and is used at low inclusion levels in poultry and swine diets because of high fiber content. Elusieve process, the combination of sieving and air classification (elutriation), was developed in laboratory scale to separate fiber from DDGS to result in a low fiber product which would be more suitable for poultry and swine. In this pilot scale study, DDGS was sieved at a rate of 0.25 kg/s (1 ton/h) into four sieve fractions using a sifter and the three largest sieve fractions were air classified using aspirators to separate fiber on a continuous basis. Results were similar to laboratory scale. Nearly 12.4% by weight of DDGS was separated as Fiber product and resulted in two high protein products that had low fiber contents. Payback period for the Elusieve process in an existing dry grind plant processing corn at the rate of 2030 metric tonnes/day (80,000 bushels/day) would be 1.1 yr.
Keywords: DDGS; Sieving; Elutriation; Elusieve; Distillers dried grains

Mohammad Hosein Movassagh Ghazani, Aflatoxin M1 contamination in pasteurized milk in Tabriz (northwest of Iran), Food and Chemical Toxicology, Volume 47, Issue 7, July 2009, Pages 1624-1625, ISSN 0278-6915, DOI: 10.1016/j.fct.2009.04.011.
(http://www.sciencedirect.com/science/article/B6T6P-4W45WNR-1/2/815f75251466177c34dcc4086030e244)
Abstract:
Aflatoxin M1 (AFM1) appears in milk as a direct result of the ingestion of food contaminated with aflatoxin B1 by cattle. The role of milk in human nutrition is well-known. The aim of this study was to evaluate Aflatoxin M1 contamination in pasteurized milk samples in Tabriz city (Iran) by ELISA (Enzyme Linked Immunosorbent Assay). Fifty pasteurized milk samples from different supermarkets in Tabriz city were collected during 6 months (July to December 2008). AFM1 was found in 100% of the examined milk samples. Sixty-two percent of the samples had AFM1 greater than the maximum tolerance limit (50 ng/l) accepted by European Union. It can be concluded that AFM1 levels in the samples purchased in Tabriz city, appear to be a serious public health problem at the moment. To achieve a low level of AFM1 in milk, dairy cows' feed samples from various cows' herds must be controlled periodically for aflatoxin and kept away from fungal contamination as much as possible.
Keywords: Aflatoxin M1; Pasteurized milk; ELISA; Tabriz

Andrew D. Fisher, Ian G. Colditz, Caroline Lee, Drewe M. Ferguson, The influence of land transport on animal welfare in extensive farming systems, Journal of Veterinary Behavior: Clinical Applications and Research, Volume 4, Issue 4, July-August 2009, Pages 157-162, ISSN 1558-7878, DOI: 10.1016/j.jveb.2009.03.002.
(http://www.sciencedirect.com/science/article/B82Y3-4WM70BN-5/2/a3101d43b18a3daa73b58e73077815ac)
Abstract:
The land transport of animals can have 3 types of influence on their welfare. First, the handling, loading, and novelty of the transport environment and experience can induce a psychological stress response in animals. Second, the withdrawal of feed and water and the need to stand and maintain balance for transport periods can cause a physiological and fatigue challenge to the

animals. Finally, the thermal and physical conditions of the vehicle and journey can present a risk to the physical integrity of the transported animals.
The key determinant of animal welfare is the way in which transport is conducted. The stress response during loading and the initial stages of transport may be minimized by careful handling, good design of facilities, and appropriate stocking densities and driving techniques. Where animals are not fed and watered during land transport, they vary in their ability to cope with periods of feed and water withdrawal, depending on their species, age, physiological state, and pre-transport access to feed and water. Journey conditions can also be an influence, with cold conditions exacerbating the effects of feed withdrawal and hot conditions increasing the risk of dehydration. The facilities containing the animals on the vehicle should minimize the risks of physical injury caused by falls, knocks, bruising, and the protrusion of body parts. Stocking density can also be managed to lessen the influences on animal welfare caused by hot conditions. In a well-ventilated vehicle, it is the stationary periods rather than periods in motion that present the greatest risk of heat stress. The opposite is true for very cold conditions. The land transport of livestock is neither inherently good nor inherently bad for their welfare. Rather, it is the way that it is done, and the management of the risks involved, that determine the level of welfare of the animals involved.
Keywords: cattle; sheep; transport; animal welfare

D. Zapletal, G. Chladek, J. Subrt, Breed variation in the chemical and fatty acid compositions of the Longissimus dorsi muscle in Czech Fleckvieh and Montbeliarde cattle, Livestock Science, Volume 123, Issue 1, July 2009, Pages 28-33, ISSN 1871-1413, DOI: 10.1016/j.livsci.2008.10.002.
(http://www.sciencedirect.com/science/article/B7XNX-4TR97VM-2/2/dba5d089094a97d2af168821f9c2f3c1)
Abstract:
The aim of the experiment was to define the effect of cattle breed on chemical composition and fatty acid profile in intramuscular fat of Longissimus dorsi muscle of Montbeliarde (M) bulls and Czech Fleckvieh (CF) bulls fattened up to the same live weight and/or age. The pure-bred CF bulls (n = 20) and M bulls (n = 10) were divided into three groups: CF bulls -- age (n = 10) fattened up to the age of 572 days; CF bulls -- weight (n = 10) fattened up to the live weight of 706 kg and Montbeliarde bulls (n = 10) fattened up to the age of 572 days with live weight of 707 kg. All the bulls were loose-housed in pens with slatted floors from the age of 6 months (after a two-month preparation period) till slaughter and fed an identical feed ration (ad libitum intake of maize silage and a limited amount of concentrate). In both groups of CF bulls the content of C14:0, C14:1, C16:0 and C16:1 was significantly higher and C18:0 and C20:0 content was significantly lower compared to M bulls. However, the overall content of SFA, MUFA and PUFA was not significantly affected by breed. The values of [Delta]9-desaturase (16) index were significantly higher in CF bulls than in M bulls. The chemical composition of the Longissimus dorsi muscle was not affected by breed.
Keywords: Fatty acids; Czech Fleckvieh; Montbeliarde; Breeds; Beef

T. Gotoh, E. Albrecht, F. Teuscher, K. Kawabata, K. Sakashita, H. Iwamoto, J. Wegner, Differences in muscle and fat accretion in Japanese Black and European cattle, Meat Science, Volume 82, Issue 3, July 2009, Pages 300-308, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.01.026.
(http://www.sciencedirect.com/science/article/B6T9G-4VJM30K-1/2/2907c28d509eafb3b0ee35754ee55489)
Abstract:
The development of different muscles and adipose tissues during growth was investigated in commercial Japanese Black (JB) cattle and compared with breeds of the largest variation to be found in Europe. Animals, reared under typical conditions for Japanese and European beef

production systems, gained similar body weights but different carcass composition at 24 months of age. The carcass of JB contained more adipose tissue and the least proportion of muscle. The longissimus muscle of JB developed extraordinary amounts of 23.3% intramuscular fat (IMF) at 24 months of age, compared from 0.6% to 4.7% in European breeds. The relationships between IMF content in the longissimus muscle and different adipose tissue weights indicate that a large amount of 'waste fat' is accreted with every percent of IMF. However in JB, the good ability of IMF deposition is associated with relatively least development of 'waste fat', as a result of unique breed characteristics combined with special feeding system.
Keywords: Adipose tissue; Marbling; Muscle; European breeds; Japanese Black; Cattle

T. Levital, A.F. Mustafa, P. Seguin, G. Lefebvre, Effects of a propionic acid-based additive on short-term ensiling characteristics of whole plant maize and on dairy cow performance, Animal Feed Science and Technology, Volume 152, Issues 1-2, 10 June 2009, Pages 21-32, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2009.03.010.
(http://www.sciencedirect.com/science/article/B6T42-4W1SGG6-1/2/81b5a4502cf6b4df223313ff6072ef58)
Abstract:
Dairy cattle producers occasionally face situations where it is necessary to open silos before the completion of ensiling process due to feed shortage. The objectives of this study were to determine the effects of a propionic acid additive (i.e., Solution Foin; 700 ml/L propionic acid and 300 ml/L NH4OH) on ensiling characteristics, aerobic stability and feeding value of short-term ensiled forage maize. Chopped whole maize was left untreated or treated with the additive. The additive was added prior ensiling at a rate of 5 L/ton (wet basis). Treated and untreated forages were placed in plastic silo bags, which were opened 1 day after ensiling and sampled daily for 30 consecutive days. Animal performance was determined using lactating cows fed total mixed ration with the major forage portion consisted of untreated or treated maize. The feeding study started 2 day post-ensiling. The additive reduced ($P<0.05$) yeast and mold populations between day 5 and day 14 post-ensiling. The largest differences were observed on day 10, where yeast and mold populations for untreated ensiled maize were 7.86 and 2.51 log colony forming unit/g, respectively, the corresponding values for treated maize were 4.35 and 0 log colony forming unit/g, respectively. The additive improved ($P<0.05$) aerobic stability between day 0 (by 159 h) and day 10 (by 33 h) post-ensiling. No differences in pH or concentrations of organic acids were observed between treated and untreated maize. Dry matter intake (average 23 kg/d) and milk yield (average 29 kg/d) were similar for cows fed treated and untreated maize. Solution Foin can be used to improve the aerobic stability of partially ensiled maize, likely by reducing yeast and mold populations. However, the additive had no positive effects on silage fermentation or dairy cow performance.
Keywords: Maize; Ensiling; Propionic acid; Yeast; Mold; Aerobic stability; Ruminant nutrition

Caroline Lee, John M. Henshall, Tim J. Wark, Chris C. Crossman, Matt T. Reed, Heather G. Brewer, Julian O'Grady, Andrew D. Fisher, Associative learning by cattle to enable effective and ethical virtual fences, Applied Animal Behaviour Science, Volume 119, Issues 1-2, June 2009, Pages 15-22, ISSN 0168-1591, DOI: 10.1016/j.applanim.2009.03.010.
(http://www.sciencedirect.com/science/article/B6T48-4W1SGBF-2/2/4fd360bcff3b3fa1fa7530144e6278fe)
Abstract:
An ability of cattle to readily associate a non-aversive audio cue (conditioned stimulus) with an aversive but non-noxious electric shock (unconditioned stimulus) should enable virtual fences to control cattle in an ethical manner similar to conventional electric fencing. The first study was conducted to identify an effective audio cue. Audio (784 Hz tone) and shock (600 V, 250 mW) stimuli were delivered by remote control to GPS collars on five heifers to prevent access to an exclusion zone surrounding a feed trough. An audio cue was administered when the animal

entered the exclusion zone, followed by a shock if the animal continued to proceed. There was an increase in the proportion of heifers responding favourably to the audio cue by turning, backing up or stopping in sessions 3 and 4 (73%) compared with sessions 1 and 2 (44%). This indicated that cattle associated the audio cue with the electric shock and learnt to avoid the trough. The main study examined whether cattle location can be controlled by an audio conditioned stimulus without the presence of a visual cue. Weeks 1 and 2 tested heifers' learning of the association between an audio conditioned stimulus and an electric shock reinforcer. In week 3, the effect of dispensing with the conditioned stimulus was tested. Heifers were allocated to two treatments (n = 11). Treatment 1 received an audio cue and an electric shock on exclusion zone entry, as in the first 2 weeks. Treatment 2 received no audio cue and only an electric shock on exclusion zone entry. There was a difference in the behaviours shown in response to both the audio and shock stimuli between weeks 1 and 2, with more heifers turning in response to the audio cue in week 2 than in week 1. When the virtual fence was moved in week 2, 80% of animals ignored the first audio cue, but the proportion failing to respond to the second audio dropped to 46%, indicating that animals had learnt to avoid the electric shock by responding to the audio cue alone to remain within the virtual fence boundary. In week 3, heifers received significantly fewer shocks when a conditioned stimulus was used. There were no differences between treatments in scores for effectiveness of the fence, appropriateness of the stimulus and adverse responses. This study demonstrates that the appropriate use of an audio cue is an effective conditioned stimulus for virtual fencing of cattle.
Keywords: Audio cue; Cattle; Conditioned stimulus; Electric shock; Associative learning; Virtual fencing

Paula Martiskainen, Mikko Jarvinen, Jukka-Pekka Skon, Jarkko Tiirikainen, Mikko Kolehmainen, Jaakko Mononen, Cow behaviour pattern recognition using a three-dimensional accelerometer and support vector machines, Applied Animal Behaviour Science, Volume 119, Issues 1-2, June 2009, Pages 32-38, ISSN 0168-1591, DOI: 10.1016/j.applanim.2009.03.005.
(http://www.sciencedirect.com/science/article/B6T48-4W0R39Y-4/2/1290627d33cee3839ddf8a901259e37c)
Abstract:
Automated animal behaviour monitoring systems have become increasingly appealing for research and animal production management purposes. However, many existing systems are suited to measure only one or two behaviour patterns or activity states at a time. We aimed to develop and pilot a method for automatically measuring and recognising several behavioural patterns of dairy cows using a three-dimensional accelerometer and a multi-class support vector machine (SVM). SVM classification models were constructed based on nine features. The models were trained using observations made of the behaviour of 30 cows fitted with a neck collar bearing an accelerometer that recorded horizontal, vertical and lateral acceleration. Measured behaviour patterns included standing, lying, ruminating, feeding, normal and lame walking, lying down, and standing up. Accuracy, sensitivity, precision, and kappa measures were used to evaluate the model performance. The SVM classification models achieved a reasonable recognition of standing (80% sensitivity, 65% precision), lying (80%, 83%), ruminating (75%, 86%), feeding (75%, 81%), walking normally (79%, 79%), and lame walking (65%, 66%). The results were poor for lying down (0%, 0%) and standing up (71%, 29%). The overall performance of the multi-class model was 78% precision with a kappa value of 0.69. Each of the behaviour categories had one or two other behaviour patterns that became confused with them the most. The problematic behaviours were expectedly those that resemble each other in terms of movement. Possible solutions for the problems in classification are presented. In conclusion, accelerometers can be used to easily recognise various behaviour patterns in dairy cows. Support vector machines proved useful in classification of measured behaviour patterns. However, further work is needed to refine the features used in the classification models in order to gain the best possible classification performance. Also the quality of acceleration data needs to be considered to improve the results.

Keywords: Dairy cow; Cattle; Accelerometry; Support vector machine; Behaviour monitoring

M. Takeda, T. Nakamoto, K. Miyazawa, T. Murayama, H. Okada, Phosphorus availability and soil biological activity in an Andosol under compost application and winter cover cropping, Applied Soil Ecology, Volume 42, Issue 2, June 2009, Pages 86-95, ISSN 0929-1393, DOI: 10.1016/j.apsoil.2009.02.003.
(http://www.sciencedirect.com/science/article/B6T4B-4VV1B6R-1/2/ef8ed254ed8f7bcc9a6299a32ae685bd)
Abstract:
In Andosols, available P for crops is limited primarily by sorption and precipitation processes, but application of organic materials may improve the P availability by enhancing organic P mineralization. A field study was conducted during 2005-2007 on a Silandic Andosol in Fukushima, Japan, to investigate whether and how applications of composted cattle manure (0, 61, and 122 or 183 kg P ha-1) and/or cover-crop residue (no cover crop, rapeseed, and cereal rye) would improve P availability to soybean. Cover crops were grown over winter and incorporated into the soil 2 weeks before compost application. Soybean P uptake at flowering was improved by application of compost and/or rye residue. Bray-2 soil P (i.e., readily soluble and desorbable P) increased only in the compost treatment. Soil phosphatase activity and microbial P, both representing the potential of P mineralization, were enhanced in treatments with compost and rye. Rapeseed had minor effects on the soil P parameters. Soil nematode community structure was evaluated as an indicator for soil conditions including decomposition pathways. Compost application increased free-living nematodes, especially fungal-feeding nematodes, implying that fungal decomposition dominated in the soil. The increase in free-living nematodes was less pronounced in the cover-crop treatments than in the compost treatment; only bacterial-feeding nematodes consistently increased after the rye treatment. The different changes in the community composition of soil nematodes and the P parameters indicate that the use of a rye cover crop affected P availability to soybean differently to compost application. The density of Pratylenchidae, the prevailing plant feeder in the soil investigated, declined in the treatments with compost and rye, but increased in the rapeseed treatment. The feeding activity of Pratylenchidae may also have affected root growth and consequently P uptake by soybean.
Keywords: Soil phosphorus; Phosphatase; Microbial biomass; Nematode communities; Compost; Winter cover crops

Cristina P.M. Alfaia, Susana P. Alves, Susana I.V. Martins, Ana S.H. Costa, Carlos M.G.A. Fontes, Jose P.C. Lemos, Rui J.B. Bessa, Jose A.M. Prates, Effect of the feeding system on intramuscular fatty acids and conjugated linoleic acid isomers of beef cattle, with emphasis on their nutritional value and discriminatory ability, Food Chemistry, Volume 114, Issue 3, 1 June 2009, Pages 939-946, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2008.10.041.
(http://www.sciencedirect.com/science/article/B6T6R-4TT36RB-2/2/4954ed6d7b697519da77c0743499fdef)
Abstract:
Thirty two Alentejano purebred bulls were used to investigate the effect of four feeding systems (pasture only, pasture feeding followed by 2 or 4 months of finishing on concentrate, and concentrate only) on meat fatty acid composition (GC-FID), including conjugated linoleic acid (CLA) isomeric distribution (Ag[+]-HPLC-DAD). In addition, meat fatty acids and CLA isomers were used to elucidate the impact of the different feeding regimens on the nutritional value of intramuscular fat and their usefulness as chemical discriminators of meat origin. The diet had a major impact on the fatty acid composition of beef (affected 27 of 36 fatty acids and 10 of 14 CLA isomers), which was independent of the fatty acid concentration. Beef fat from pasture-fed animals had a higher nutritional quality relative to that from concentrate-fed bulls. Finally, meat fatty acid

composition was an effective parameter to discriminate between ruminant feeding systems, including different finishing periods on concentrate.
Keywords: Meat quality; Feeding system; Finishing period; Fatty acids; CLA isomers

I. Ghanem, M. Orfi, Aflatoxin M1 in raw, pasteurized and powdered milk available in the Syrian market, Food Control, Volume 20, Issue 6, June 2009, Pages 603-605, ISSN 0956-7135, DOI: 10.1016/j.foodcont.2008.08.018.
(http://www.sciencedirect.com/science/article/B6T6S-4TDC0BV-2/2/7306046ce7bda897387c80edcfc72fe4)
Abstract:
The incidence of contamination of aflatoxin M1 (AFM1) in milk samples collected from the Syrian market was investigated by using the competitive enzyme linked immunosorbent assay (ELISA) technique. A total of 126 samples composed of raw cow milk (74 samples), raw sheep milk (23), raw goat milk (11), pasteurized cow milk (10) and powdered milk (8) showed that 80% of tested samples were contaminated with various levels of AFM1 ranging from >20 to 765 ng/l. Percentages of AFM1-contaminated samples exceeding the American, Syrian and European tolerance limits were 22%, 38% and 52%, respectively.
The range of contamination was relatively higher in pasteurized milk than in raw cow and sheep milk. 80% of AFM1-contaminated pasteurized cow milk samples exceeded the European tolerance limit with a range of contamination between 89 and 765 ng/l. Percentages of contaminated raw cow, sheep and goat milk exceeding the European tolerance limit were 59%, 24% and 14%, respectively.
Milk powder was almost free of AFM1 contamination with only one sample containing a concentration lower than the European tolerance limit (12 ng/l).
Extrapolation of aflatoxin B1 (AFB1) from AFM1 levels of contamination in milk samples indicates that contamination in dairy cattle feeds may range from 0.5 to 47.8 [mu]g/kg.
Keywords: Aflatoxin M1 (AFM1); Milk; ELISA

J.R. Rhoades, G. Duffy, K. Koutsoumanis, Prevalence and concentration of verocytotoxigenic Escherichia coli, Salmonella enterica and Listeria monocytogenes in the beef production chain: A review, Food Microbiology, Volume 26, Issue 4, June 2009, Pages 357-376, ISSN 0740-0020, DOI: 10.1016/j.fm.2008.10.012.
(http://www.sciencedirect.com/science/article/B6WFP-4TWV4KS-2/2/101a1ffc619dfbf8230b70788ee71652)
Abstract:
This review examines the prevalence of three important pathogens, verocytotoxigenic Escherichia coli (VTEC), Salmonella enterica and Listeria monocytogenes, in cattle and beef from the farm to the final, ready-to-eat product. Factors affecting prevalence of pathogens in the beef chain, such as the season and cattle rearing method, are examined. Data from many key surveys are summarized in table form.
The observed prevalence of pathogens in cattle and beef varies considerably from survey to survey. An indication of relative prevalence of pathogens at different stages can be obtained by calculating average prevalences observed over multiple surveys, weighted by sample number. Based on the data presented in the tables in this review, for E. coli O157 at selected processing stages the mean prevalences (and range of means from individual surveys) are faeces 6.2% (0.0-57%), hides 44% (7.3-76%), chilled carcasses 0.3% (0.0-0.5%), and raw beef products 1.2% (0.0-17%). For Salmonella the mean prevalence data are faeces 2.9% (0.0-5.5%), hides 60% (15-71%), chilled carcasses 1.3% (0.2-6.0%), and raw beef products 3.8% (0.0-7.5%). For L. monocytogenes the mean prevalence data are faeces 19% (4.8-29%), hides 12% (10-13%), and raw beef products 10% (1.6-24%). Seasonal variation was evident in many surveys, faecal prevalences of E. coli O157 and Salmonella generally being higher in the warmer months. The

influence of animal type, animal age, feed and housing on pathogen carriage has also been examined. The significance of non-O157 serotypes of VTEC and their detection and classification are discussed.
Keywords: Verocytotoxigenic Escherichia coli; Salmonella enterica; Listeria monocytogenes; Beef production chain; Review

J.L. Borquez, S.S. Gonzalez-Munoz, J.M. Pinos-Rodriguez, I. Dominguez, J.R. Barcena, G.D. Mendoza, M.A. Cobos, G. Bueno, Feeding value of ensiling fresh cattle manure with molasses or bakery by-products in lambs, Livestock Science, Volume 122, Issues 2-3, June 2009, Pages 276-280, ISSN 1871-1413, DOI: 10.1016/j.livsci.2008.09.009.
(http://www.sciencedirect.com/science/article/B7XNX-4TPWW4G-2/2/5af3c181165ce5399c958ee4bff0eefe)
Abstract:
Ensiling fresh dairy cattle manure (CM), corn stover, molasses (MO) or bakery by-products (BBP), as a viable method to produce good quality silage was evaluated. Silages composition was as follows: 1) molasses silage: CM, corn stover and molasses; and 2) BBP silages: CM, corn stover, and BBP. A low (250 g/kg dry matter) and a high (500 g/kg dry matter) level of CM with MO or BBP silages were incorporated in diets, and compared with a control diet (without CM silage) in lambs. There was a linear increase ($P < 0.01$) of dry matter (DM) intake and a quadratic increase of fiber digestion. Linear decrease ($P < 0.05$) in acetate to propionate ratio was observed with increased concentrations of MO or BBP in silages. Increasing MO silage caused a linear reduction of N intake and retained N, as well as a linear increase of fecal N. There were quadratic effects of BBP silage level on N intake, urine and retained, being the lowest values observed with the low level of BBP silage. Addition of BBP silages (250 or 500 g/kg DM) bring higher DM intake and total tract digestion of fiber, as compared to those diets without CM silage.
Keywords: Cattle manure; Silage; Bakery; Digestion; Ruminal fermentation; Lambs

Saulo da Luz e Silva, Paulo Roberto Leme, Soraia Marques Putrino, Angelica Simone Cravo Pereira, Amaury Camilo Valinote, Jose Carlos Machado Nogueira Filho, Dante Pazzanese Duarte Lanna, Fatty acid composition of intramuscular fat from Nellore steers fed dry or high moisture corn and calcium salts of fatty acids, Livestock Science, Volume 122, Issues 2-3, June 2009, Pages 290-295, ISSN 1871-1413, DOI: 10.1016/j.livsci.2008.09.013.
(http://www.sciencedirect.com/science/article/B7XNX-4TT1G7W-2/2/8ceff6be845f87df95363a1a93d3ecbd)
Abstract:
The purpose of this work was to evaluate the fatty acid composition of the Longissimus muscle from carcasses of Nellore steers fed diets with calcium salts of fatty acids (CSFA) and high moisture corn. Forty eight steers were fed during 70 days four diets containing dry corn (DC), high moisture corn (HM), dry corn plus CSFA (DC-CSFA) or high moisture corn plus CSFA (HM-CSFA). Fatty acid composition of the Longissimus muscle was determined by gas chromatography. Corn type had no effect on the ether extract percentage and in the content of the majority of the fatty acids, although steers fed HMC showed higher levels of polyunsaturated fatty acids and polyunsaturated/saturated ratio. Feeding CSFA increased ether extract percentage but had no effect on total of saturated, unsaturated and saturated: unsaturated ratio. Both high moisture corn and calcium salts of fatty acids increased CLA (cis9, trans11) and total CLA concentrations in intramuscular fat.
Keywords: Beef cattle; Corn ensiling; Calcium soaps; Fat acid profile

M.A. Hoque, M. Hosono, K. Suzuki, Direct and maternal genetic parameters for measures of feed consumption and feed efficiency in young male Japanese Black cattle, Livestock Science, Volume 122, Issues 2-3, June 2009, Pages 333-338, ISSN 1871-1413, DOI: 10.1016/j.livsci.2008.09.018.

(http://www.sciencedirect.com/science/article/B7XNX-4TVJ0CT-1/2/5bed126ae115acc76011186ba0cac8e6)
Abstract:
Direct and maternal genetic parameters for measures of feed consumption and feed efficiency were estimated using data recorded on 514 performance tested young male Japanese Black cattle during the period from 1978-2004. Measures of feed consumption were daily feed intake, concentrate intake, ratio of roughage intake to feed intake, total digestible nutrient intake, digestible crude protein intake (DCPI) and metabolizable energy intake. Feed efficiency traits included feed conversion ratio (FCR), total digestible nutrient conversion ratio (TCR), digestible crude protein conversion ratio (DCR) and residual feed intake. Data were analyzed using three alternative animal models (including direct and direct plus maternal genetic effects (including or excluding covariance between direct and maternal genetic effects)). The direct heritability estimates for all the measures of feed consumption and feed efficiency were moderate to high, suggesting that sufficient genetic variation exists in these traits which should respond to selection. All the measures of feed consumption were genetically more strongly correlated with residual feed intake than with other measures of feed efficiency. Maternal heritability estimates for DCPI, FCR and TCR were not significantly different from zero, while the corresponding estimates for all the studied traits were low (ranged from 0.07 to 0.24). The estimates of direct heritability for measures of feed consumption were reduced up to 34% when maternal genetic effect was considered in the model. An antagonistic relationship existed between direct and maternal genetic effect (ram) for FCR and DCR, which biased the estimates of direct heritability downwards. The results indicate that maternal effects play an important role in measures of feed consumption and most of the feed efficiency traits, which should be accounted for these traits in genetic evaluation system.
Keywords: Feed efficiency; Maternal effect; Variance components; Performance test

A. Benedictus, H. Hogeveen, B.R. Berends, The price of the precautionary principle: Cost-effectiveness of BSE intervention strategies in the Netherlands, Preventive Veterinary Medicine, Volume 89, Issues 3-4, 1 June 2009, Pages 212-222, ISSN 0167-5877, DOI: 10.1016/j.prevetmed.2009.03.001.
(http://www.sciencedirect.com/science/article/B6TBK-4W2M6MP-1/2/c0a167cc0944ac8d06779bfc7271d173)
Abstract:
Since 1996, bovine spongiform encephalopathy (BSE) in cattle has been linked to a new variant of Creutzfeldt-Jakob disease (vCJD), a fatal brain disease in man. This paper assessed the cost-effectiveness of BSE control strategies instituted by the European Commission. In a Monte Carlo simulation model, a non-intervention baseline scenario was compared to three intervention strategies: removal of specified risk materials from slaughter animals, post-mortem testing for BSE and the culling of feed and age cohorts of BSE cases. The food risk in the baseline scenario ranged from 16.98 lost life years in 2002 to 2.69 lost life years in 2005. Removing specified risk materials removal practices, post-mortem testing and post-mortem testing plus cohort culling reduced this risk with 93%, 82.7% and 83.1%. The estimated cost-effectiveness of all BSE measures in the Netherlands ranged from 4.3 million euros per life year saved in 2002 to 17.7 million euros in 2005. It was discussed that the cost-effectiveness of BSE control strategies will further deviate from regular health economics thresholds as BSE prevalence and incidence declines.
Keywords: Bovine spongiform encephalopathy; Cost-effectiveness; Food safety; Stochastic modeling

Carl-Christian Gelfert, Antje Loptien, Nicole Montag, Rudolf Staufenbiel, Duration of the effects of anionic salts on the acid-base status in cows fed different anionic salts only once daily, Research

in Veterinary Science, Volume 86, Issue 3, June 2009, Pages 529-532, ISSN 0034-5288, DOI: 10.1016/j.rvsc.2008.10.009.
(http://www.sciencedirect.com/science/article/B6WWR-4V2X6RT-1/2/f3677e07ca29fa2bd94ae75a6e8eef64)
Abstract:
Seeing the fact that farm managers in Germany feed anionic salts to transition cows once daily, this study set out to evaluate whether the effects on the acid-base status (ABS) and calcium excretion in urine would persist throughout the entire day beyond this feeding practice. Eleven non-lactating, non-pregnant, Holstein-Friesian-cows with a rumen fistula were administered 2Eq of calcium chloride (CaCl2/five cows) or calcium sulfate (CaSO4/six cows) once daily for a period of 1 week. At day 7, blood and urine samples were taken every 4 h starting at 06:00 a.m. before feeding the anionic salts, and then ending at the same time the next day. Feeding anionic salts to the cows induced metabolic acidosis in both of the groups. The changes tended to be greater in CaCl2-cows. After 12 h, the acidosis lessened and the initial values were reached after 24 h. The CaCl2-cows, however, still showed signs of compensated metabolic acidosis. The results of the present study showed that feeding anionic salts once daily confined the risk of an interrupted effect of the anionic salts on the acid-base status as well as calcium metabolism after 12 h.
Keywords: Anionic salts; Calcium; Acid-base status; Feeding frequency; Dairy cattle; Blood analysis; Urine analysis

Bogdan Jaroszewicz, Ewa Piroznikow, Ruth Sagehorn, Endozoochory by European bison (Bison bonasus) in Bialowieza Primeval Forest across a management gradient, Forest Ecology and Management, Volume 258, Issue 1, 30 May 2009, Pages 11-17, ISSN 0378-1127, DOI: 10.1016/j.foreco.2009.03.040.
(http://www.sciencedirect.com/science/article/B6T6X-4W3G62C-5/2/d8ee3d739038b3b128446d0a0edac5f5)
Abstract:
We examined the year-round viable seed dispersal by European bison (Bison bonasus L.) subject to three population management systems (captive, semi-wild, wild) in Bialowieza Primeval Forest. The forest is inhabited by the world's largest free-roaming population of European bison (>450 head). Dung samples were collected approximately fortnightly from September 2005 to September 2006 in each of the management systems. Emergent seedlings were counted for 24 months in greenhouse conditions. A total of 10,807 seedlings, which included 178 plant taxa, emerged from 74 bison dung samples. Species richness and seedling abundance/sample were greatest during August and September, the months of the highest fructification season, and were lowest in May. Twenty-two percent of recorded species were forest plants. The captive bison population had the greatest mean seedling abundance (236 +/- 61/sample), the greatest species diversity (144), and the highest percentage of synanthropic species (29.2%). The gradient of these characteristics decreased with a decrease in management intensity of the bison populations. The results of the regression analysis indicated that in the semi-wild managed system, the number of plant species found in dung samples collected during winter was significantly negatively correlated with snow depth. Number of seedlings and number of plant species dispersed depended on plant phenology and intensity of supplementary feeding. The mean number of seeds/sample dispersed by European bison was 5-15 times lower, and the mean number of species/sample was 2-3 times lower than those published for cattle or horses. In contrast, the total number of plant species dispersed by bison was approximately 2-3 times higher than for wild or domestic large ungulates. These results indicate that European bison are an important dispersal agent of seeds in forest ecosystems. The high percentage of synanthropic species dispersed by bison demonstrated that seeds in the fodder help maintain native and non-native plant diversity of ecosystems. Managers of animal populations must pay proper attention to fodder origin and quality.
Keywords: Dung; Seed dispersal; Supplementary feeding; Ungulate; Winter

Charlotte Vandenberghe, Gina Prior, Nick A. Littlewood, Rob Brooker, Robin Pakeman, Influence of livestock grazing on meadow pipit foraging behaviour in upland grassland, Basic and Applied Ecology, In Press, Corrected Proof, Available online 28 May 2009, ISSN 1439-1791, DOI: 10.1016/j.baae.2009.03.009.
(http://www.sciencedirect.com/science/article/B7GVS-4WD115W-2/2/3a6fa4bf84cfe8cf98904c233b375fc9)
Abstract:
Changes in grazing management are believed to be responsible for declines in populations of birds breeding in grassland over the last decades. The relationships between grazing management regimes, vegetation structure and composition and the availability of invertebrate food resources to passerine birds remain poorly understood. In this study, we investigated the foraging site selection of meadow pipits (Anthus pratensis L.) breeding in high intensity sheep-grazed plots or low intensity mixed (i.e. sheep and cattle)-grazed plots. We sampled above-ground invertebrates, measured vegetation height and density and conducted a vegetation survey in areas where meadow pipits were observed to forage and areas that were randomly selected. Birds foraged in areas with a lower vegetation height and density and in areas containing a lower proportion of the dominant, tussock-forming grass species Molinia caerulea. They did not forage in areas with a total higher invertebrate biomass but at areas with preferred vegetation characteristics invertebrate biomass tended to be higher in foraging sites than random sites. The foraging distance of meadow pipits was higher in the intensively grazed plots. Our findings support the hypothesis that resource-independent factors such as food accessibility and forager mobility may determine patch selection and are of more importance as selection criteria than food abundance per se. Food accessibility seems to become an even more important selection criterion under high grazing intensity, where prey abundance and size decrease. In our upland grazing system, a low intensity, mixed grazing regime seems to provide a more suitable combination of sward height, plant diversity, structural heterogeneity and food supply for meadow pipit foraging activity compared to a more intensive grazing regime dominated by sheep.
Keywords: Bird feeding; Cattle; Experimental grazing management; Invertebrate abundance; Molinia-tussocks; Plant composition; Prey availability; Scotland; Sheep; Sward structure

G. Cozzi, M. Brscic, B. Contiero, F. Gottardo, Growth, slaughter performance and feeding behaviour of young bulls belonging to three native cattle breeds raised in the Alps, Livestock Science, In Press, Corrected Proof, Available online 22 May 2009, ISSN 1871-1413, DOI: 10.1016/j.livsci.2009.03.011.
(http://www.sciencedirect.com/science/article/B7XNX-4WBR6PV-1/2/a78d11494dd7872601d7cf68f0674cb2)
Abstract:
The study aimed at assessing growth and slaughter performance, feeding and social behaviour of young male stocks belonging to three native cattle breeds raised in the Central-Eastern Italian Alps: Alpine Grey (AG), Burlina (BU), and Rendena (RE) comparing them to the ones of Italian Simmental (IS), a cosmopolite dual purpose breed. Twelve male calves/breed were selected by experts of their breeders association and transferred to the experimental fattening unit at an average age of 113.9 +/- 12.4 days. After a 70-day adaptation period, calves of each breed were assigned to 3 multiple pens of 4 animals each balanced according to their body weight. The experimental fattening period started when the animals had an average live weight of 204 +/- 6 kg and it lasted when all young bulls reached the optimal finishing. The animals were fed ad libitum the same fattening diet distributed as total mixed ration once a day in the morning. The average daily gain of IS was 1.40 kg/day and it resulted significantly higher than AG and BU (1.16 and 1.20 kg/day respectively), while RE were intermediate (1.24 kg/day). Dry matter intake (DMI) of AG (6.34 kg/day) was lower than IS (7.45 kg/day), while the other two native alpine breeds showed

intermediate values (BU = 7.12; RE = 6.99 kg/day). However no breed effect was observed for feed conversion ratio as well as for the number of medical treatment days. On average, the young bulls spent 215 min/day eating and 405 min/day ruminating and there was no breed effect on these activities neither when they were expressed per hour nor per unit of DMI. Regardless of the breed, more than 70% of DMI was ingested during the first 8 h after diet delivery. Rumination was instead prolonged during the evening hours and overnight. Feed selection indexes did not show any significant difference among breeds. Bulls of AG and RE reached the optimal finishing status at a younger age than BU and IS. Carcass weight of IS was the highest (336.2 kg) while the three native alpine dual purpose breeds had similar values (AG = 284.3; BU = 290.9 and RE = 300.9 kg). No breed effect was recorded for carcass dressing percentage, SEUROP and fatness scores. Based on these findings, the use of these native cattle breeds in the Alpine area should be encouraged not only for cattle biodiversity issue but also for the interesting opportunity given by their dairy and beef production.
Keywords: Alpine cattle breeds; Beef production; Feeding behaviour

Srimathie P. Indraratne, Xiying Hao, Chi Chang, Frauke Godlinski, Rate of soil recovery following termination of long-term cattle manure applications, Geoderma, Volume 150, Issues 3-4, 15 May 2009, Pages 415-423, ISSN 0016-7061, DOI: 10.1016/j.geoderma.2009.03.002.
(http://www.sciencedirect.com/science/article/B6V67-4W14HT1-1/2/f0ffb3e6efabb197f770d37276ef0c38)
Abstract:
Livestock manure application increases soil nutrient levels, enhancing their bioavailability, but potentially increasing environmental concerns. This study investigates the residual effects of long-term cattle feedlot manure applications to continuously cropped fields under semi-arid conditions on soil properties, crop yields and rate of soil recovery after manure application ceases. Solid cattle feedlot manure was applied to a Dark Brown Chernozemic clay loam at 0, 30, 60 and 90 Mg ha- 1 yr- 1 under rain-fed and 0, 60, 120 and 180 Mg ha- 1 yr- 1 under irrigated conditions annually for 14 years (1973-1986) followed by 16 years with no further manure application (1987-2003). Soil samples to 1.5 m were taken and analyzed. Soil organic matter (OM), total nitrogen (TN), NO3-, total P (TP), soil test P (STP), and electrical conductivity (EC) levels remained significantly higher in previously manured treatments than in the Control 16 years after manure application ceased. The average grain yields were similar to the Control while straw yields in irrigated treatments were higher than values for the Control over the 16 years following the last manure application. Based on a three-parameter exponential decay (y = ys + a * e- bx) model, the estimated recovery time for soil to return to the pre-manure treatment state increased with the previous manure application rate and was shorter under irrigation. For soil TN, TP and STP, estimated recovery time ranged from 17 to 99 years for surface soil and 0 to 157 years for the 15 to 30 cm depth, while soil NO3- and EC in the soil profile (0 to 150 cm) requires 182 to 297 years under rain-fed and 24 to 52 years under irrigated conditions. Thus, long lasting N and P enrichment, from excessive long-term cattle manure applications could pose environmental threats long after application ceases.
Keywords: N and P enrichments; Organic matter; Electrical conductivity; NO3-N; Soil test P; Recovery time; Three-parameter exponential decay model

Elizabeth A. Lane, Torres Sweeney, Marion Ryan, James F. Roche, Mark A. Crowe, Relationship between serum gonadotropins and pituitary immunoreactive gonadotropins and steroid receptors during the first FSH increase of the estrous cycle and following steroid treatment in heifers, Animal Reproduction Science, Volume 112, Issues 1-2, May 2009, Pages 66-82, ISSN 0378-4320, DOI: 10.1016/j.anireprosci.2008.04.008.
(http://www.sciencedirect.com/science/article/B6T43-4S9P5PM-1/2/31f552ad141af53d88202f4ce698a760)

Abstract:
The objectives were to determine the effects of (i) time during the first FSH increase of the estrous cycle (time-course study) and (ii) exogenous steroid treatment (steroid feedback study) on the relationship between circulating serum gonadotropins, and the proportions of pituitary cells immunoreactive for gonadotropins and steroid receptors during the estrous cycle in heifers. Pituitaries were collected from heifers (n = 40) slaughtered at 13 h (n = 8), 30 h (n = 24) and 66 h (n = 8) after estrous onset, corresponding to before, during and after the first FSH increase of the estrous cycle. Heifers slaughtered during the FSH increase (at 30 h) either received no treatment (n = 8), or were treated (n = 16) with estradiol benzoate and/or progesterone before slaughter. During the time-course study, the proportion of pituitary cells immunoreactive for FSH increased ($P < 0.05$) during the first transient FSH increase reflecting serum concentrations. The proportion of pituitary cells immunoreactive for LH was unaltered, a reflection of serum LH concentrations. The proportion of estrogen receptors (ER)-[alpha], but not ER-[beta], was decreased ($P < 0.05$) at 30 h compared with at either 13 or 66 h. During the steroid feedback study, exogenous progesterone with or without estradiol suppressed ($P < 0.05$) the proportions of pituitary cells immunoreactive for gonadotropins, serum FSH concentrations and LH pulse frequency. Steroid treatment did not alter the proportion of pituitary cells positive for estrogen receptors ([alpha] and [beta]). While progesterone receptors (PR) were not detected in the anterior pituitary by immunohistochemistry during the early estrous cycle or in response to steroid treatment, quantitative real-time PCR revealed that mRNA for progesterone receptors was expressed at very low levels. The expression of pituitary PR mRNA was decreased ($P < 0.05$) at 30 and 66 h compared with 13 h, and was suppressed ($P < 0.05$) following steroid treatments. Alterations in pituitary steroid receptors are implicated in the differential regulation of gonadotropin secretion during the first transient FSH rise, but not in response to exogenous steroids. The time-course study and steroid feedback responses support the hypothesis that LH pulse frequency is tightly linked to regulation of GnRH pulse frequency. Serum FSH is regulated by its own synthesis, as reflected by pituitary FSH content and perhaps by alterations in pituitary sensitivity to circulating steroids by changes in steroid receptor content.
Keywords: Steroids; Estrous cycle; Gonadotropins; Steroid receptors; Cattle

Sunil S. Adav, Duu-Jong Lee, Aijie Wang, Nanqi Ren, Functional consortium for hydrogen production from cellobiose: Concentration-to-extinction approach, Bioresource Technology, Volume 100, Issue 9, May 2009, Pages 2546-2550, ISSN 0960-8524, DOI: 10.1016/j.biortech.2008.12.014.
(http://www.sciencedirect.com/science/article/B6V24-4VC14VC-3/2/9058764d07794dc2ecc6105925d223dc)
Abstract:
A functional bacterial consortium that can effectively hydrolyze cellobiose and produce bio-hydrogen was isolated by a concentration-to-extinction approach. The sludge from a cattle feedlot manure composting plant was incubated with 2.5-20 g l-1 cellobiose at 35 [degree sign]C and pH 6.0. The microbial diversity of serially concentrated suspensions significantly decreased following increasing cellobiose concentration, finally leaving only two viable strains, Clostridium butyricum strain W4 and Enterococcus saccharolyticus strain. This consortium has a maximum specific hydrogen production rate of 2.19 mol H2 mol hexose-1 at 5 g l-1 cellobiose. The metabolic pathways shifted from ethanol-type to acetate-butyrate type as cellobiose concentration increased from 2.5 to >7 g l-1. The concentration-to-extinction approach is effective for isolating functional consortium from natural microflora. In this case the functional strains of interest are more tolerant to the increased loadings of substrates than the non-functional strains.
Keywords: Functional consortia; Cellobiose; Hydrogen; Hydrolysis

A. Prandini, G. Tansini, S. Sigolo, L. Filippi, M. Laporta, G. Piva, On the occurrence of aflatoxin M1 in milk and dairy products, Food and Chemical Toxicology, Volume 47, Issue 5, Early Awareness of Emerging Risks to Food and Feed Safety, May 2009, Pages 984-991, ISSN 0278-6915, DOI: 10.1016/j.fct.2007.10.005.
(http://www.sciencedirect.com/science/article/B6T6P-4PWKSWD-1/2/71dadb3d06de3af81429cb8ab746f276)
Abstract:
Aflatoxins are toxic fungal metabolites found in foods and feeds. When ruminants eat AFB1-feedstuffs, they metabolise the toxin and excrete AFM1 in milk. To control AFM1 in foods it is necessary to reduce AFB1 contamination of feeds for dairy cattle by preventing fungal growth and AFB1 formation in agricultural commodities intended for animal use. Corn and corn-based products are one of the most contaminated feedstuffs; therefore risk factor analysis of AFB1 contamination in corn is necessary to evaluate risk of AFM1 contamination in milk and milk products. During the corn silage production, the aflatoxins production is mostly influenced by: harvest time; fertilization; irrigation; pest control; silage moisture; and storage practices. Due to the lower moisture at harvest and to the conservation methods, the corn grain is mostly exposed to the contamination by Aspergillus species. Therefore, it is necessary to reduce the probability of this contaminant through choice of: hybrids; seeding time and density; suitable ploughing and fertirrigation; and chemical or biological control. Grains harvested with the lowest possible moisture and conservation moisture close to or less than 14% are necessary to reduce contamination risks, as is maintaining mass to homogeneous moisture. Kernel mechanical damage, grain cleaning practices and conservation temperature are also factors which need to be carefully controlled.
Keywords: AFB1; AFM1; Corn; Milk; Dairy products; Risk factors

A. Mazzenga, M. Gianesella, M. Brscic, G. Cozzi, Feeding behaviour, diet digestibility, rumen fluid and metabolic parameters of beef cattle fed total mixed rations with a stepped substitution of wheat straw with maize silage, Livestock Science, Volume 122, Issue 1, May 2009, Pages 16-23, ISSN 1871-1413, DOI: 10.1016/j.livsci.2008.07.015.
(http://www.sciencedirect.com/science/article/B7XNX-4TC8J6X-3/2/3948fda0a54003548da56ac29d63d7a7)
Abstract:
In order to verify the possibility of using maize silage (MS) as sole forage in beef cattle diets, four isofibrous diets were formulated with stepped substitution of wheat straw (WS) with MS. The four diets, MS0 (20WS:0MS as percentage of dry matter (DM) of the total diet), MS20 (10WS:20MS), MS35 (5WS:35MS) and MS50 (0WS:50MS) were fed as total mixed rations (TMR) to 4 Simmental bulls (384 +/- 45 kg initial live weight) according to a latin square design with periods of 28 days. Diets were isocaloric and isonitrogenous and at the time of their formulation the stepped substitution of WS with MS allowed to progressively reduce the need for energy concentrates increasing the forage:concentrate ratio. The increasing inclusion of MS to replace WS affected also the particle size distribution of the diets with a significant increase of the percentage of particles retained by a 8 mm sieve ($P < 0.001$). However, dry matter intake (DMI) was not affected by these changes in the diet composition and physical characteristics. Bulls' average daily gain (ADG) was not significantly affected by the type of diet. Regardless of the different diets, the animals ate more than 70% of their daily dry matter in the first 8 h after feed delivery. Bulls took longer to consume the diet without silage (MS0) than any other diet while the time spent ruminating was similar across diets. Even when fed only a conventional MS as dietary roughage bulls did not select for the longest particles in the TMR (> 19 mm). Total tract apparent digestibility was influenced by diet type: lower values were recorded for the diets with a higher content of WS (MS0 and MS20) for DM, organic matter, crude protein, NDF, ADF (all $P < 0.001$), and to a lower extent for starch ($P < 0.05$). MS50 diet showed the highest values for all digestibility parameters.

Rumen fluid parameters and blood indicators of acid-base status of bulls were similar across diets and they were at all times within safety range as the risk of acidosis is concerned. The results suggest that MS with a theoretical chopping length of 9 mm at harvest can be used as sole roughage source in beef cattle diets, without adverse effects on DMI, ADG, feeding behavior and health status of the animals.
Keywords: Beef cattle; Fibrous ingredients; Feeding behaviour; Diet digestibility; Rumen fluid; Metabolic parameters

M. Oba, G. Thangavelu, M. Dehghan-banadaky, D.J. Ambrose, Unprocessed whole flaxseed is as effective as dry-rolled flaxseed at increasing [alpha]-linolenic acid concentration in milk of dairy cows, Livestock Science, Volume 122, Issue 1, May 2009, Pages 73-76, ISSN 1871-1413, DOI: 10.1016/j.livsci.2008.07.012.
(http://www.sciencedirect.com/science/article/B7XNX-4T5HJ85-3/2/4b3638ee79dd428380a18747f98d59d6)
Abstract:
Effects of flaxseed processing on the appearance of [alpha]-linolenic acid in milk were evaluated using ten primiparous Holstein cows (153 +/- 30.7 d in milk) in a crossover design with two 14-d periods. We hypothesized that feeding unprocessed whole flaxseed (WF) is as effective as dry-rolled flaxseed (RF) at increasing [alpha]-linolenic acid concentration in milk fat. Experimental diets contained either WF or RF at 100 g kg- 1 of dietary dry matter. Dietary concentrations of neutral detergent fiber, crude protein, and ether extract were 379, 164, and 60 g kg- 1, respectively (dry matter basis). Dry matter intake, milk yield, and concentrations of milk fat, protein, and lactose were not affected by treatments, and averaged 17.5 kg d- 1, 27.5 kg d- 1, 36.0 g kg- 1, 30.0 g kg- 1, 47.3 g kg- 1, respectively. Apparent total tract digestibility of ether extract was lower for WF compared with RF (486 vs. 624 g kg- 1; $P < 0.01$). Moreover, excretion of [alpha]-linolenic acid in feces was greater for WF compared with RF treatment (259 vs. 129 g d- 1; $P < 0.001$). However, [alpha]-linolenic acid concentration in milk was not affected by treatment (8.3 and 8.6 g kg- 1 for WF and RF, respectively), and both treatments had three times as much [alpha]-linolenic acid concentration as the period prior to the experiment (2.6 g kg- 1), during which sunflower seed was fed in place of flaxseed. These data indicate that both WF and RF treatments increased the absorption of [alpha]-linolenic acid to a similar extent despite the lower digestibility for WF treatment, which can be attributed to reduced lipolysis in the rumen or fatty acid biohydrogenation for WF compared with RF. This speculation is supported by that WF treatment decreased concentration of vaccenic acid, a fatty acid intermediate during biohydrogenation, in milk fat compared with RF (19 vs. 30 g kg- 1; $P < 0.01$). Dry-rolling of flaxseed does not necessarily improve the absorption of [alpha]-linolenic acid probably because processing increases the extent of biohydrogenation in the rumen as well as digestibility. Although some intact whole flaxseed appeared in the feces of cows fed unprocessed flaxseed, the EE content was quite low, indicating that the fats present in flaxseed were available to cattle even in the absence of any visible damage to the seed coat.
Keywords: Dairy cows; Flaxseed; Processing; [alpha]-Linolenic acid; Biohydrogenation

Gili Koniak, Imanuel Noy-Meir, A hierarchical, multi-scale, management-responsive model of Mediterranean vegetation dynamics, Ecological Modelling, Volume 220, Issue 8, 24 April 2009, Pages 1148-1158, ISSN 0304-3800, DOI: 10.1016/j.ecolmodel.2009.01.036.
(http://www.sciencedirect.com/science/article/B6VBS-4VT236H-4/2/29c9b927ed41aa8d09c091af3968ff95)
Abstract:
Ecosystems of the Mediterranean basin are characterized by a heterogeneous and dynamic landscape mosaic of vegetation formations. This landscape has been shaped over millenia by disturbances associated with agropastoral land use: clearing, grazing and burning, and by

regeneration processes of the natural woody vegetation. The ability to predict the effects of management decisions on the structure and composition of the vegetation is essential for present and future land management. To improve this ability we developed a hierarchical multi-scale, management-responsive model of vegetation dynamics.
The model was initially developed at two hierarchically nested spatial scales: 'cell' (1 m2) and 'site' (400 m2). The cell model was conceptually derived from a 'States and transitions' framework. Vegetation state in a cell was defined by the identity, age and height of the dominant plant functional type. Biological realism was enhanced by defining transition probabilities not as constants but as functions of variables that represent biological processes: reproduction, colonization, expansion, replacement, aging, mortality, grazing, regrowth after fire, and dispersal. Up-scaling to the site was essentially done by averaging: vegetation state of a site was defined by frequencies of cells in different states. However, there was a feedback from site to cell by seed production and dispersal functions.
The model was parameterized and implemented for a study area in Mediterranean woody vegetation (garrigue) in Israel. The biological components and processes represented in the model are sufficiently general to allow adaptation to similar vegetation in other Mediterranean regions.
A series of simulation experiments over 100 years was carried out under different management scenarios defined by combinations of initial vegetation cover (cleared and control plots), cattle and goat grazing intensity and fire frequency. The results highlight the following trends:
- In most scenarios, initial cover has an effect even after 100 years.
- In the absence of any disturbance, vegetation becomes dominated by the two tallest woody functional types.
- Under extremely intense multiple disturbances (fire + goat grazing), the vegetation becomes dominated by Herbaceous plants.
- Scenarios of intermediate disturbance regimes often result in heterogeneous vegetation composition.
- Under most of the management scenarios examined, vegetation composition had not reached a steady state (or steady cycle of fire-regrowth) even after 100 years.
The model can be a useful tool for land managers by eliminating obviously undesirable scenarios and focusing on a limited set of desirable or acceptable scenarios.
Keywords: State and transition; Simulation; Grazing; Fire; Disturbance; Succession

R.F. Cooke, N. DiLorenzo, A. DiCostanzo, J.V. Yelich, J.D. Arthington, Effects of Fermenten(R) supplementation to beef cattle, Animal Feed Science and Technology, Volume 150, Issues 3-4, 14 April 2009, Pages 163-174, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2008.08.011. (http://www.sciencedirect.com/science/article/B6T42-4TNTN49-1/2/8a336c2a4be6d0c6c40a17636eee1aa6)
Abstract:
Two experiments were conducted to evaluate a commercially available supplemental N source for beef cattle (Fermenten(R); Church & Dwight Co., Inc., Princeton, NJ, USA). The first experiment evaluated kinetics of in vitro NH3-N release using batch cultures of rumen fluid incubated with: control (no N added), soybean meal, urea, and Fermenten(R). Ammonia-N was measured at 0, 0.5, 2, 4, 6, 8, 12 and 24 h after incubation began. A treatment by time interaction ($P<0.01$) occurred in which, during the initial 2 h, Fermenten(R) cultures had the highest ($P<0.01$) NH3-N but, from 4 to 24 h, the highest ($P<0.01$) NH3-N concentrations were with urea-incubated cultures. The total increase in NH3-N concentrations from 0 to 24 h of incubation was less for Fermenten(R) ($P<0.01$) than for the soybean meal and urea. The second experiment assessed effects of Fermenten(R) supplementation on growth, blood parameters, voluntary forage intake and reproductive performance of beef heifers. Sixty heifers, stratified by initial body weight (BW), were randomly allocated to one of two treatments that consisted of iso-nitrogenous grain-based supplements containing either Fermenten(R) (72 g/kg, as-fed) or urea (9.7 g/kg, as-fed).

Supplements were offered three times weekly at a rate of 2.4 kg of dry matter per heifer daily. Shrunk BW was measured on days 0 and 112 for calculation of daily body weight gain. Body volume measurements were completed on days 0, 28, 56, 84 and 112, whereas pelvic area was assessed on days 0, 56 and 112. Blood samples were collected on days 28, 56, 84 and 112 for analysis of metabolites and hormones. On day 56, 2 heifers, which were randomly selected from each pasture, were placed in individual feeding stations for 26 days to determine treatment effects on voluntary forage intake. On day 112, all heifers were grouped by treatment and exposed to bulls for 60 days. Fewer heifers offered the Fermenten(R) supplement attained puberty ($P<0.05$) and became pregnant during the study compared to heifers fed urea (0.60 and 0.93, respectively; $P<0.01$). Addition of Fermenten(R) to batch cultures of rumen fluid rapidly increased NH3-N concentrations, whereas further increases occurred in a slower and steady rate. Beef heifers fed a supplement containing Fermenten(R) had similar growth and development, but inferior reproductive performance, than heifers fed a supplement containing urea.
Keywords: Ammonia; Beef heifers; Development; Fermenten(R); Reproduction

L. Pecetti, P. Annicchiarico, F. Battini, S. Cappelli, Adaptation of forage legume species and cultivars under grazing in two extensive livestock systems in Italy, European Journal of Agronomy, Volume 30, Issue 3, April 2009, Pages 199-204, ISSN 1161-0301, DOI: 10.1016/j.eja.2008.10.001. (http://www.sciencedirect.com/science/article/B6T67-4TY8WGN-2/2/7169a224d9abdb0302684f247adece18)
Abstract:
Legume-based pastures can increase the forage feeding value, the self-provision of protein sources and the sustainability of grazing systems. This 4-year study provided further knowledge on adaptation of forage legume species and cultivars for pasture sowing in extensive livestock systems of inland Italian areas. Three cultivars of lucerne (Medicago sativa L.), two of birdsfoot trefoil (Lotus corniculatus L.) and two of sainfoin (Onobrychis viciifolia Scop.) were evaluated at Casina (northern Apennines) under cattle grazing and at Torricella Sicura (central Apennines) under sheep grazing in farms using rotational grazing with high stocking rates. Semi-erect lucerne and birdsfoot trefoil morphological types, presumably more grazing-tolerant, were compared with erect types. Species showed contrasting adaptive responses, with lucerne at Casina and birdsfoot trefoil at Torricella Sicura being highest ranking for overall dry-matter yield. Lucerne at the former location, and both lucerne and birdsfoot trefoil at the latter one showed the highest final ground cover. The kind of exploitation at Casina (mob-grazing) may have contributed to lower persistence of birdsfoot trefoil. Sainfoin mostly showed potential as a short-term grazing species. Performance of cultivars within species varied with location. Erect cultivars yielded and persisted as well as, or better than, semi-erect cultivars, possibly because of the adoption of rotational grazing and their Italian origin (implying possible better adaptation to local conditions). Erect cultivars of lucerne were specifically adapted to the geographical area in which they were selected. Specific adaptation and targeted intensity of grazing may be the main determinants in the choice of species and cultivars.
Keywords: Birdsfoot trefoil; Extensive livestock; Grazing tolerance; Lucerne; Plant ideotype; Sainfoin

M.G. Keane, M.J. Drennan, Effects of supplementary concentrate level in winter, and subsequent finishing on pasture or indoors, on performance and carcass traits of Holstein-Friesian, Aberdeen Angus x Holstein-Friesian and Belgian Blue x Holstein-Friesian steers, Livestock Science, Volume 121, Issues 2-3, April 2009, Pages 250-258, ISSN 1871-1413, DOI: 10.1016/j.livsci.2008.06.017. (http://www.sciencedirect.com/science/article/B7XNX-4TC8J6X-1/2/b5897165871bd8a0948038519004150e)
Abstract:

Pure bred Holstein-Friesian (FR) and beef breed x FR male calves are used for beef production in Ireland. Beef breeds used for crossbreeding on FR cows include Aberdeen Angus (AA) and Belgian Blue (BB) which represent extremes in terms of maturity. The objective of this study was to compare spring-born steers of FR, AA and BB breed types, offered two feeding levels in their second winter, and subsequently finished on pasture or on a high concentrate diet indoors. Seventy-two steers (24 per breed type) were managed together to the end of their second grazing season. They were then blocked on weight within breed type and assigned to a 3 (FR, AA and BB breed types) x 2 (winter feeding levels) x 2 (finishing systems) factorial experiment. The two winter feeding levels were grass silage ad libitum plus mean daily concentrate levels of 0.91 (L) or 4.0 (H) kg dry matter for 113 days. The two finishing systems were pasture or concentrates ad libitum for a mean period of 94 days. Mean slaughter and carcass weights for FR, AA and BB were 634, 644 and 642 (s.e. 8.1), and 313, 326 and 340 (s.e. 4.7) kg, respectively. Other than bone proportion which was lower for AA, there were few differences in ribs joint composition or in m. longissimus chemical composition between FR and AA. BB had less fat and more muscle in the ribs joint, and more moisture and protein, and less lipid in m. longissimus than both FR and AA. Compared with L, the H winter feeding level increased slaughter weight and carcass weight by 24 and 15 kg, respectively. Indoor finished animals were 63 kg live weight and 39 kg carcass weight heavier than those finished at pasture. They also had more fat and less muscle and bone in the ribs joint and more lipid and less moisture in m. longissimus. It is concluded that except for BB finished at pasture all carcasses were commercially acceptable. Despite the excellent finishing performance on concentrates, this system is not profitable at current concentrate and beef prices.
Keywords: Beef cattle; Crossbreeds; Finishing systems; Pasture

D.L. Robinson, Experimental design for integrated research projects to estimate genetic and numerous treatment effects, Livestock Science, Volume 121, Issues 2-3, April 2009, Pages 300-307, ISSN 1871-1413, DOI: 10.1016/j.livsci.2008.06.027.
(http://www.sciencedirect.com/science/article/B7XNX-4T7445W-1/2/8cdf9ecd16e5093bcfdeb8d8a6bb4625)
Abstract:
There is a trend towards integrated research, where experimenters aim to make the best possible use of available resources, and individuals or institutions pool their expertise, make use of common resources and collaborate towards a common set of scientific goals. This allows a larger number of factors to be investigated, enabling the most influential or important ones to be identified as well as providing information on how the different factors interact or fit together.
The issues involved in generating complex multi-factor designs are described and discussed, using as examples the entire series of experiments in the Australian Beef Cattle CRC and a simpler experiment to estimate genetic marker effects. An algorithm to generate suitable designs is presented. For the genetic marker experiment, the resultant designs were up to 10% more efficient than less sophisticated designs. In the case of the Beef Cattle CRC, achieving the same accuracy of estimating treatment and sire effects without sophisticated designs would have required 5-10% more animals, at a cost of $150,000-300,000 for purchase, transport and feeding of animals. If all additional costs of experimentation were included, the total savings from use of efficient designs were estimated to lie between $0.5 and $1 million.
Keywords: Experimental design; Genetic effects; Genetic markers; Beef cattle; Integrated research

Paul Cusack, Neil McMeniman, Ahmad Rabiee, Ian Lean, Assessment of the effects of supplementation with vitamin E on health and production of feedlot cattle using meta-analysis, Preventive Veterinary Medicine, Volume 88, Issue 4, 1 April 2009, Pages 229-246, ISSN 0167-5877, DOI: 10.1016/j.prevetmed.2008.12.002.
(http://www.sciencedirect.com/science/article/B6TBK-4VF4YMB-1/2/d734a0fb44e87e9d2b57b3231a8f6f42)

Abstract:
Delivery of supplemental antioxidant vitamins to cattle placed in feedlots might be expected to improve health and performance outcomes by reducing the effects of oxidative stress to which these cattle are presumably exposed. Meta-analytic procedures were used in this study to assess published experiments on the effects of vitamin E supplementation in feedlot cattle. The health outcome of morbidity, and the production outcomes of average daily gain (ADG) and gain to feed ratio (G:F), were analysed. The currently available data do not support the use of supplemental vitamin E administered as an injection (morbidity risk ratio = 1.17; P = 0.17). The authors conclude that supplemental dietary vitamin E should be fed within the [NRC, 1996. National Research Council. Nutrient Requirements of Beef Cattle, 7th ed. Natl. Acad. Press, Washington, DC] recommended range.
Keywords: Systematic review; Dietary supplement; Injection

Michael P. Ward, Linda D. Highfield, Pailin Vongseng, M. Graeme Garner, Simulation of foot-and-mouth disease spread within an integrated livestock system in Texas, USA, Preventive Veterinary Medicine, Volume 88, Issue 4, 1 April 2009, Pages 286-297, ISSN 0167-5877, DOI: 10.1016/j.prevetmed.2008.12.006.
(http://www.sciencedirect.com/science/article/B6TBK-4VGDNK6-2/2/591c08101da9e489a87e2339a0e8b31b)
Abstract:
We used a simulation study to assess the impact of an incursion of foot-and-mouth disease (FMD) virus on the livestock industries in an 8-county area of the Panhandle region of Texas, USA. The study was conducted in a high-density livestock area, with an estimated number of cattle on-feed of approximately 1.8 million. We modified an existing stochastic, spatial simulation model to simulate 64 scenarios for planning and decision-making. Our scenarios simulated four different herd types for the index herd (company feedlot, backgrounder feedlot, large beef, backyard) and variations in three mitigation strategies (time-of-detection, vaccine availability, and surveillance during disease control). Under our assumptions about availability of resources to manage an outbreak, median epidemic lengths in the scenarios with commercial feedlot, backgrounder feedlot, large beef and backyard index herd types ranged from 28 to 52, 19 to 39, 18 to 32, and 18 to 36 days, respectively, and the average number of herds depopulated ranged from 4 to 101, 2 to 29, 1 to 15 and 1 to 18, respectively. Early detection of FMD in the index herd had the largest impact on reducing (~13-21 days) the length of epidemics and the number of herds (~5-34) depopulated. Although most predicted epidemics lasted only ~1-2 months, and <100 herds needed to be depopulated, large outbreaks lasting ~8-9 months with up to 230 herds depopulated might occur.
Keywords: Foot-and-mouth disease; Simulation modeling; Texas; Feedlot

R.R. Doce, G. Hervas, A. Belenguer, P.G. Toral, F.J. Giraldez, P. Frutos, Effect of the administration of young oak (Quercus pyrenaica) leaves to cattle on ruminal fermentation, Animal Feed Science and Technology, Volume 150, Issues 1-2, 30 March 2009, Pages 75-85, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2008.08.005.
(http://www.sciencedirect.com/science/article/B6T42-4THJ6D7-1/2/6425e9ea447d5c5e50c2cc27a04ef06a)
Abstract:
Two experiments were conducted to study the effects of feeding young Pyrenean oak leaves (OLs) to beef cattle on in vitro ruminal fermentation. A total of 12 ruminally cannulated Brown Swiss bulls were divided into experimental groups that were fed different quantities of OLs via the ruminal cannula (on average 0, 2.5, 5.2 and almost 10 kg fresh matter/animal per day; the treatments designated control, L-OL, H-OL and VH-OL, respectively). Batch cultures of rumen microorganisms and the in vitro gas production technique were used to study ruminal fermentation

of two substrates (grass hay and OL) incubated with rumen inocula derived from each bull. Results showed not only a dose-dependent negative effect of feeding tannin-containing OL on ruminal fermentation of conventional feeds, such as the grass hay, but also improved fermentation of tannin-containing feeds, such as the OLs, in bulls fed moderate quantities of OLs (i.e., L-OL and H-OL), which suggests adaptation of the rumen microbial population. Detrimental effects of the VH-OL treatment indicate that the high level of tannins in the rumen of bulls on the highest dose of OLs would have exceeded the capacity of the microorganisms to resist or detoxify them.
Keywords: Beef cattle; In vitro gas production; Pyrenean oak; Hydrolysable tannin

Dugald J. MacLachlan, Rajumati Bhula, Transfer of lipid-soluble pesticides from contaminated feed to livestock, and residue management, Animal Feed Science and Technology, Volume 149, Issues 3-4, 16 March 2009, Pages 307-321, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2008.06.007.
(http://www.sciencedirect.com/science/article/B6T42-4T3CR11-1/2/227e25a7ebce293ac2686d3fae193103)
Abstract:
Managing residues of pesticides in livestock requires information on likely residues in the livestock consuming treated or contaminated feed. Simple tools are required by those persons profiling risks to trade in animal commodities in order to screen the large number of chemicals and identify those that require further investigation and/or management strategies to be implemented. A simple model for simulation of residues of lipophilic xenobiotics in growing pigs, cattle and sheep is presented. This model provides pragmatic reasonable upper bound estimates of residues of lipophilic compounds in fat using minimal inputs such as: elimination half-life, fraction absorbed from the diet and, in the case of lactating animals, the ratio of the concentration of pesticide in milk to the concentration in body fat. These estimates from the model can be used in the first tiers of risk assessment, and/or to guide discussions on the management of livestock exposure to pesticides through feed.
Keywords: Model; Lipophilic; Residue; Livestock feed; Risk assessment

P.E. Shewen, L. Carrasco-Medina, B.A. McBey, D.C. Hodgins, Challenges in mucosal vaccination of cattle, Veterinary Immunology and Immunopathology, Volume 128, Issues 1-3, Special Issue: The 8th International Veterinary Immunology Symposium (8th IVIS), 15 March 2009, Pages 192-198, ISSN 0165-2427, DOI: 10.1016/j.vetimm.2008.10.297.
(http://www.sciencedirect.com/science/article/B6TD5-4TPF49G-N/2/c6f718cf0d2bd473189c381279fd5612)
Abstract:
Recognition of the mucosal portal of entry for many infectious diseases and of the relevance of mucosal immune response to protection has encouraged the development of vaccines administered by mucosal routes, principally oral and intranasal, for stimulation of intestinal and nasopharyngeal lymphoid tissues respectively. The oral route is problematic in cattle and other ruminants where antigen degradation in the rumen is likely, prior to transit to the intestine. On the other hand, rumination can be exploited for exposure of nasopharyngeal tissues during cudding if vaccine antigen is expressed by a fibrous feed like alfalfa. An increase in anti-leukotoxin (Lkt) IgA was demonstrated in nasal secretions of calves following feeding of alfalfa expressing a truncated Lkt50 from Mannheimia haemolytica, and there is evidence suggesting that such vaccination may protect against experimentally induced pneumonia. Intranasal vaccination is an alternative approach for use in pre-ruminating calves. Intranasal administration of ISCOMs carrying soluble antigens of M. haemolytica, including native Lkt, induced Lkt specific IgA in nasal secretions after vaccination at 4 and 6 weeks of age. Subcutaneous (s.c.) administration of the same vaccine induced Lkt specific IgG in both serum and nasal secretions, whereas s.c. administration of a commercial M. haemolytica vaccine did not. Regardless of the vaccination strategy employed it is

difficult to assess the immunogenicity of mucosally administered vaccines because production of secreted antibodies tends to be transient, and they do not persist on the mucosal surface in the absence of ongoing antigenic stimulation. An additional challenge is demonstration of vaccine efficacy in response to experimental infection. Protection of the mucosally vaccinated animal will most probably result from recall response, which may not amplify sufficiently to counter the effects of experimental pulmonary delivery of a large bolus of virulent bacteria, even though the response would suffice over the more prolonged and gradual infection that occurs in natural induction of pneumonia.
Keywords: Mucosal immunity; Vaccination; Mannheimia haemolytica; Cattle

W.Z. Yang, J. Laurain, B.N. Ametaj, Neem oil modulates rumen fermentation properties in a continuous cultures system, Animal Feed Science and Technology, Volume 149, Issues 1-2, 2 March 2009, Pages 78-88, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2008.05.004.
(http://www.sciencedirect.com/science/article/B6T42-4SV0STC-1/2/48bb1a15771a8fc25c439ec3bc1efa33)
Abstract:
Neem oil is a commercialized product derived from fruits of the neem tree that has been shown to have antibacterial, antifungal and antiparasitic activities in various animal species. Our objective was to investigate effects of addition of neem oil to a feedlot finishing diet on rumen fermentation, ruminal digestibility and bacterial protein synthesis in a dual effluent continuous culture system. The experiment was designed as a replicated 3 x 3 Latin square with the treatments: control (no neem oil), low (20 g/kg of diet) and high (40 g/kg of diet, dry matter basis) amounts of neem oil. The experimental diet consisted of 872 g/kg of steam-rolled barley grain, 84 g/kg of whole crop barley silage and 44 g/kg of supplement (dry matter basis). Results indicate that concentrations of ruminal volatile fatty acid (VFA), as well as molar proportions of acetate and branch-chained FA, tended ($P<0.10$) to linearly decrease, whereas the proportion of butyrate tended ($P<0.06$) to be higher with increasing neem oil supplementation. Ruminal digestibilities of dry matter (0.79, 0.77 and 0.71), neutral detergent fibre (0.65, 0.64 and 0.56), starch (0.89, 0.85 and 0.82) and degradability of crude protein (0.78, 0.78 and 0.67) for control, low and high neem oil supplementation decreased linearly ($P<0.01$). The amount of bacterial N synthesized (g/day) tended ($P=0.08$) to increase linearly by 24% or 13%, respectively, for low and high neem oil supplementation compared with control. Bacterial N efficiency (g N/kg of ruminal truly fermented organic matter) was improved (linear: $P<0.01$) with neem oil supplementation. Results indicate that supplementation with neem oil supplementation inhibited ruminal microbial activity, possibly due to the bioactive compounds contained in neem oil. However, the lower ruminal digestibility of starch with low neem oil supplementation might be used to alleviate acidosis without having detrimental digestion of fibre and protein in feedlot cattle fed high-grain diets.
Keywords: Neem oil; Fermentation; Digestibility; Feedlot diet; Continuous culture

Varda Shkap, K. Kocan, T. Molad, M. Mazuz, B. Leibovich, Y. Krigel, A. Michoytchenko, E. Blouin, J. de la Fuente, M. Samish, M. Mtshali, E. Zweygarth, E.L. Fleiderovich, L. Fish, Experimental transmission of field Anaplasma marginale and the A. centrale vaccine strain by Hyalomma excavatum, Rhipicephalus sanguineus and Rhipicephalus (Boophilus) annulatus ticks, Veterinary Microbiology, Volume 134, Issues 3-4, 2 March 2009, Pages 254-260, ISSN 0378-1135, DOI: 10.1016/j.vetmic.2008.08.004.
(http://www.sciencedirect.com/science/article/B6TD6-4T8JXDJ-1/2/d4d5a83bba998bb22a4a71f4883586b3)
Abstract:
The cattle rickettsia Anaplasma marginale is distributed worldwide and is transmitted by about 20 tick species, but only Rhipicephalus simus, a strictly African tick species, has been shown to transmit the vaccine strain of A. centrale. The aim of the present study was to examine

transmission of field strains of A. marginale and of the vaccine strain of A. centrale by three tick species - Hyalomma excavatum, Rhipicephalus sanguineus and Rhipicephalus (Boophilus) annulatus - to susceptible calves. Two genetically distinct Israeli field strains of A. marginale, tailed and non-tailed (AmIsT and AmIsNT, respectively), were efficiently transmitted by R. sanguineus, whereas H. excavatum transmitted only the tailed isolate, and R. (Boophilus) annulatus did not transmit A. marginale. None of the three tick species transmitted A. centrale. By means of msp1a primers in PCR assays, amplicons of similar sizes were obtained from either A. marginale-infected calves that were used for acquisition feeding, from R. sanguineus fed on the infected calves, or from calves to which anaplasmosis had been successfully transmitted by these ticks. Although an A. centrale-specific fragment was amplified from salivary glands of R. sanguineus, no transmission to susceptible cattle occurred during 3 months of observation, and anaplasmosis was not induced in splenectomized calves that were subinoculated with blood from calves on which R. sanguineus had fed.
Keywords: Anaplasma centrale; A. marginale; Transmissions; Ticks; Cattle

M.R. Mulvey, E. Susky, M. McCracken, D.W. Morck, R.R. Read, Similar cefoxitin-resistance plasmids circulating in Escherichia coli from human and animal sources, Veterinary Microbiology, Volume 134, Issues 3-4, 2 March 2009, Pages 279-287, ISSN 0378-1135, DOI: 10.1016/j.vetmic.2008.08.018.
(http://www.sciencedirect.com/science/article/B6TD6-4T8SM15-1/2/e77cdc5fb215b460f56bfaa55c795764)
Abstract:
The aim of this study was to determine the molecular epidemiology of cefoxitin-resistance Escherichia coli identified in cattle entering feedlots and determine if there were any similarities to E. coli causing human infections in Canadian hospitals. A total of 51 E. coli were isolated from a total of 2483 cattle entering four feedlots in southern Alberta, Canada. DNA fingerprinting using pulsed-field gel electrophoresis revealed thirty-two unique patterns with two major clusters observed comprised of Cluster A (11 strains) and Cluster B (7 strains). PCR and sequence analysis revealed 38 isolates (74.5%) harboured blaCMY-2, whereas the remainder were found to contain mutations in the promoter region of the chromosomal ampC gene, which has been previously associated with cefoxitin resistance. No resistance to nalidixic acid, ciprofloxacin, or amikacin was observed in the clinical isolates. blaCMY-2 harbouring plasmids were transferred to E. coli DH10B. All of the plasmids carrying blaCMY-2 contained the A/C replicon and also harboured other resistance genes. Plasmid fingerprinting using BglII revealed 17 unique patterns with all but one clustering within 70% similarity. Comparison of the plasmid fingerprints to those isolated from human clinically significant E. coli in Canada during a similar time period [Mulvey, M.R., Bryce, E., Boyd, D.A., Ofner-Agostini, M., Land, A.M., Simor, A.E, Paton, S., 2005. The Canadian Hospital Epidemiology Committee, and The Canadian Nosocomial Infection Surveillance Program, Health Canada. Molecular characterization of cefoxitin resistant Escherichia coli from Canadian hospitals. Antimicrob. Agents Chemother. 49, 358-365] revealed four strains that harboured blaCMY-2 A/C replicon type plasmid with fingerprint similarities of greater than 90% to the ones identified in E. coli from the cattle in this study.
These findings highlight the potential linkage of multidrug resistant organisms in food producing animals and human infections in Canadian hospitals. The plasmids conferred resistance to multiple antibiotics which could limit options for the treatment of infections caused by these strains.
Keywords: Escherichia coli; Cefoxitin resistance; Feedlot; Cattle; CMY-2

Ines Windschnurer, Xavier Boivin, Susanne Waiblinger, Reliability of an avoidance distance test for the assessment of animals' responsiveness to humans and a preliminary investigation of its association with farmers' attitudes on bull fattening farms, Applied Animal Behaviour Science,

Volume 117, Issues 3-4, March 2009, Pages 117-127, ISSN 0168-1591, DOI: 10.1016/j.applanim.2008.12.013.
(http://www.sciencedirect.com/science/article/B6T48-4VKVBR3-1/2/f8f858c3ea04deed8265a0745cb8637b)
Abstract:
In many farm animal species, the relationship to humans affects their welfare considerably. But until now, on-farm studies on fattening bulls have been limited. A feasible, reliable methodology for assessing responses of bulls to humans would be helpful for large scale surveys on this topic. Measuring avoidance distance at the feeding place (ADF) to assess animals' relationship to humans was shown to be a feasible and stable measure in dairy cow herds. So, the main objective of this study was to investigate reliability aspects of measuring avoidance distance at the feeding place towards an unknown experimenter on bull fattening farms. Moreover, we were interested in the potential confounding factor age of animals, and, on a preliminary level, a possible relationship of responsiveness of bulls to farmers' attitudes. With regard to reliability, between-experimenter repeatability - the repeatability of ADF when carried out by different experimenters within short time - was evaluated by two experimenters in a balanced order with 602 fattening bulls on 10 farms. The experimenter was both the stimulus person and the person collecting the data. Between-experimenter repeatability was analysed at an individual and at farm level. We recorded the median and mean values of avoidance distances [ADF median, ADF mean] per farm and the percentages of bulls accepting to be touched [ADF % touch] or showing avoidance distances greater than 20 cm [ADF % > 0.2 m]. Inter-observer reliability, based on individual observations recorded by an experimenter and an observer simultaneously, was tested on six farms. Farmers were asked to complete a questionnaire in order to assess their attitudes (behavioural beliefs and affective attitudes) towards interacting with bulls.
Generally, inter-observer reliability for ADF was high ($r_s > 0.9$, $n = 288/297$). At an individual level, moderate between-experimenter repeatability could be attained ($r_s = 0.6$, $n = 469$). At farm level ($n = 10$), Spearman rank correlation coefficients ($r_s$) for between-experimenter repeatability ranged from >0.4 to 0.7. A low negative correlation was found between ADF and age at an individual level ($r_s = -0.14$, $P = 0.015$, $n = 320$). Despite the rather low range of avoidance distances observed between farms, ADF correlated significantly with some of the farmers' attitudes. ADF was lower in case of farmers expressing more positive affective attitudes towards contacts with the animals (significantly so for the measures ADF mean and ADF % > 0.2 m [$P < 0.05$]).
In conclusion, the use of the avoidance distance test at the feeding place (ADF) is promising for assessing the responses of fattening bulls to humans due to its feasibility, reliability and sensitivity both at an individual and at farm level. Based on a limited number of farms, our first exploration of the relationships between farmers' attitudes and responses of bulls to humans in the home environment suggests possible links that require further investigations.
Keywords: Human-animal relationship; Welfare; Cattle; Tests; Attitude; On-farm assessment

Lindsay Kay Whistance, Liam A. Sinclair, David Richard Arney, Clive Julian Christie Phillips, Trainability of eliminative behaviour in dairy heifers using a secondary reinforcer, Applied Animal Behaviour Science, Volume 117, Issues 3-4, March 2009, Pages 128-136, ISSN 0168-1591, DOI: 10.1016/j.applanim.2009.01.004.
(http://www.sciencedirect.com/science/article/B6T48-4VP129S-3/2/63936165c87133196cc3b92267ec0edd)
Abstract:
Soiled bedding influences cleanliness and disease levels in dairy cows and there is no evidence of an inherent latrine behaviour in cattle. If cows were trained to use a concrete area of the housing system as a latrine, a cleaner bed could be maintained. Thirteen group-housed, 14-16-month-old Holstein-Friesian heifers, were clicker trained with heifer-rearing concentrate pellets as a reward. Training was carried out in four phases. (Phase 1) Association of feed reward with clicker,

criterion: 34/40 correct responses. (Phase 2) Simple task (nose-butting a disc) to reinforce phase 1 association, criterion: 17/20 correct responses. (Phase 3) Association of eliminative behaviour with reward where criterion was four sessions with only one incorrect response: criteria for each heifer in phases 1-3 were set using binomial tests. (Phase 4) Shaping eliminative behaviour to occur on concrete. Possible responses were, eliminating on concrete (C) or straw (S), or moving from one substrate to another immediately before eliminating: C --> S, S --> C. Heifers were rewarded for the desired behaviours C and S --> C and ignored when S and C --> S occurred. If learning was achieved, C should increase as C --> S decreased and S --> C should increase as S decreased: tested with Spearman rank correlations. All heifers achieved criterion by day 4 of phase 1 ($P = 0.001$); day 1 of phase 2 ($P = 0.001$) and day 10 of phase 3 ($P < 0.009$). Responses changed throughout phase 3 beginning with (i) looking at the trainer whilst voiding then moving to trainer after the click, and later including (ii) moving to trainer immediately before- or (iii) during voiding. No relationship was found between S and S --> C ($rs = -0.14$; $P = 0.63$) or C and C --> S ($rs = -0.33$; $P = 0.25$). All group members eliminated more often on concrete (580) than on straw (141) but four heifers with consistently longer lying bouts also showed more C --> S before lying down (Mann-Whitney, $P = 0.007$). The present study is believed to be the first reported work to show that cattle can be trained to show an awareness of their own eliminative behaviour. This was not successfully shaped to latrine behaviour, however, and it is suggested that floor type may not have been a sufficiently salient cue. Voiding on straw occurred largely with response C --> S (0.73) and general behaviour suggested that this was strongly linked to lying patterns of individual heifers.
Keywords: Cattle; Eliminative behaviour; Learning; Clicker training; Clean bedding

Christopher T. Hill, Peter D. Krawczel, Heather M. Dann, Catherine S. Ballard, Russell C. Hovey, William A. Falls, Richard J. Grant, Effect of stocking density on the short-term behavioural responses of dairy cows, Applied Animal Behaviour Science, Volume 117, Issues 3-4, March 2009, Pages 144-149, ISSN 0168-1591, DOI: 10.1016/j.applanim.2008.12.012.
(http://www.sciencedirect.com/science/article/B6T48-4VGMP0B-1/2/82a99dfb260421fd5ae311b241267008)
Abstract:
The objective of this research was to measure the effects of increased stocking density of stalls and headlocks on the short-term behavioural responses of lactating Holstein cows. Multiparous ($n = 92$) and primiparous ($n = 44$) cows were assigned to four pens of 34 cows each and stocking densities (100, 113, 131, or 142%) were imposed in a 4 x 4 Latin square design with 7-d periods. Stocking density was adjusted by altering access to free stalls and headlocks. Activity of the cows was recorded continuously with digital video cameras for the last 2 d at each stocking density and time spent as well as mean percentage of cows engaged in lying, standing, and feeding at each 10 min scan sample was determined. Mean percentage of cows feeding over a 24-h period was approximately 20.5% and cows spent approximately 5 h/d feeding, but the percentage of cows feeding during the first 60 min following return from the milking parlour declined ($P < 0.009$) with increasing stocking density (67.2, 60.4, 55.0, and 54.8% for 100, 113, 131, and 142% stocking density, respectively). Time spent standing in stalls decreased ($P < 0.01$; 2.5, 2.3, 2.2, and 2.1 h) whereas time spent standing idly in an alley increased ($P < 0.001$; 1.7, 1.9, 2.6, and 3.1 h) as stocking density increased above 113%. A linear relationship was observed between stocking density and the percentage of cows lying, standing, and idly standing in an alley. The results of this short-term study indicate that stocking densities of stalls and headlocks greater than 100-113% altered the behaviour of lactating dairy cows.
Keywords: Dairy cattle; Stocking density; Resting behaviour; Feeding behaviour

C. Wang, Q. Liu, W.J. Huo, W.Z. Yang, K.H. Dong, Y.X. Huang, G. Guo, Effects of glycerol on rumen fermentation, urinary excretion of purine derivatives and feed digestibility in steers,

Livestock Science, Volume 121, Issue 1, March 2009, Pages 15-20, ISSN 1871-1413, DOI: 10.1016/j.livsci.2008.05.010.
(http://www.sciencedirect.com/science/article/B7XNX-4SVD1M2-2/2/fa53992d8d21e803b5d8dbd0912f5ca8)
Abstract:
The objective of this study was to evaluate the effects of glycerol supplementation on rumen fermentation, urinary excretion of purine derivatives and feed digestibility in the total tract of steers. Eight ruminally cannulated Simmental steers (450 +/- 12 kg) were used in a replicated 4 x 4 Latin Square arrangement of treatments with experimental period of 21 days long. The treatments were: control (without glycerol), LG, MG and HG with 100, 200 and 300 g glycerol per head per day, respectively. Diet consisted of 60% corn stover and 40% concentrate (dry matter [DM] basis). Dry matter intake (averaged 9 kg/day) was restricted to a maximum of 90% of ad libitum intake. Ruminal pH (range of 6.58 to 6.23) was linearly ($P < 0.05$) decreased, whereas total VFA concentration (range of 93.40 to 99.61 mM) was linearly ($P < 0.03$) increased with increasing glycerol supplementation. Ratio of acetate to propionate decreased linearly ($P < 0.02$) from 4.56 to 3.64 as glycerol supplementation increased due to the increased in propionate production. In situ ruminal NDF degradation of corn stover was improved but the CP degradability of concentrate mix was decreased with increasing doses of glycerol. Urinary excretion of purine derivatives was quadratically ($P < 0.02$) changed with altering glycerol supplementation (65.0, 65.7, 71.1 and 67.2 mmol/d for control, LG, MG and HG, respectively). Similarly, digestibilities of OM, NDF and CP in the total tract were also linearly increased with increasing glycerol. The results indicate that glycerol supplementation potentially improves rumen fermentation with increased propionate production and feed digestibility in the total digestive tract of beef cattle. It suggests that feeding glycerol stimulates the ruminal microorganisms or digestive enzymes in a dose-dependent manner. Under the current experimental conditions, the optimum glycerol dose was about 200 g glycerol per head per day.
Keywords: Glycerol; Rumen fermentation; Purine derivatives; Digestibility; Beef cattle

S.M. Behrends, R.K. Miller, F.M. Rouquette Jr., R.D. Randel, B.G. Warrington, T.D.A. Forbes, T.H. Welsh, H. Lippke, J.M. Behrends, G.E. Carstens, J.W. Holloway, Relationship of temperament, growth, carcass characteristics and tenderness in beef steers, Meat Science, Volume 81, Issue 3, March 2009, Pages 433-438, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.09.003.
(http://www.sciencedirect.com/science/article/B6T9G-4TGHNJ8-2/2/4847e9bc7eb4940f45c16c997d8e10ec)
Abstract:
Relationships of temperament evaluated at different production stages with growth, carcass characteristics and beef tenderness were determined in Bonsmara crossbred steers managed under commercial managent. Temperament was evaluated at weaning and at initiation of the finishing phase. Steers from a Roswell, NM ranch (n = 156) and a Cline, TX ranch (n = 21) were stratified at fall weaning by weight and source and randomly allotted to winter ryegrass at Uvalde or Overton, TX followed by feeding in a commercial feedlot near Batesville, TX. Cattle were observed for temperament (escape velocity, EV, m/s; pen and chute temperament score, PTS and CTS) at weaning and upon entry to the feedlot. Cattle were harvested at approximately 7 mm 12th rib fat. Carcass data was taken approximately 36 hrs post-mortem and 2.5 cm thick steaks were removed from the 13th rib for Warner-Bratzler shear force (WBS) determination. The only measures of temperament significantly related to performance were EV and PTS. Weaning EV appeared to be more related to feedlot ADG ($r = -0.26$, $P < 0.003$), ribeye area ($r = -0.37$, $P < 0.0008$), yield grade ($r = 0.29$, $P < 0.01$) and WBS, $r = 0.27$, $P < 0.005$) than did the later measures of temperament. However, in-feedlot EV was associated with feedlot weights ($r = -0.28$, $P < 0.0004$). Results of this research suggest temperament, particularly at weaning, is related to

feedlot performance, carcass merit, and beef tenderness at a low to moderate level and evaluation of this trait may be a helpful management tool.
Keywords: Cattle; Tenderness; Temperament; Escape velocity

C.E. Realini, M. Font i Furnols, L. Guerrero, F. Montossi, M.M. Campo, C. Sanudo, G.R. Nute, I. Alvarez, V. Caneque, G. Brito, M.A. Oliver, Effect of finishing diet on consumer acceptability of Uruguayan beef in the European market, Meat Science, Volume 81, Issue 3, March 2009, Pages 499-506, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.10.005.
(http://www.sciencedirect.com/science/article/B6T9G-4TN82NC-3/2/45e7a64c89ed40cc20bdc6708b699318)
Abstract:
Eighty Hereford steers were used to evaluate the effect of finishing diet [A: pasture, B: pasture plus concentrate (0.6% live weight), C: pasture plus concentrate (1.2% live weight), D: concentrate] on consumer acceptability of Uruguayan beef in France (FR), United Kingdom (UK), Spain (ES) and Germany (DE). Consumers (200 per country) evaluated overall, tenderness and flavour acceptability of beef (8 point scale: 1 `dislike extremely', 8 `like extremely'). FR and UK rated lower acceptability scores for beef from D compared with A, B, and C. ES showed similar results for tenderness, but flavour scores did not differ between A and D. German consumers preferred beef from B and C. Overall, low levels of supplementation on pasture produced beef with the highest consumer acceptability followed by beef from pasture-fed animals. Feeding cattle with concentrate only may not be necessary to satisfy the EU market resulting in more profitable production systems for Uruguayan producers.
Keywords: Beef; Pasture; Concentrate; Consumer

P.E. Strydom, L. Frylinck, J.L. Montgomery, M.F. Smith, The comparison of three [beta]-agonists for growth performance, carcass characteristics and meat quality of feedlot cattle, Meat Science, Volume 81, Issue 3, March 2009, Pages 557-564, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.10.011.
(http://www.sciencedirect.com/science/article/B6T9G-4TPF4NK-3/2/79cf957e5eeb51fbf81c360bfdbaa5cb)
Abstract:
Forty-eight Bonsmara steers were assigned to three treatment groups and one control group consisting of 12 animals each. The control (C) received no [beta]-agonist, while the three treatment groups received zilpaterol (6 ppm) (Z), ractopamine (30 ppm) (R) or clenbuterol (2 ppm) (Cl) for the last thirty days on feed. Growth performance (final 30 days), USDA quality and yield grades and meat quality (shear force, chemical, histological and biochemical) were compared for the three [beta]-agonist and control groups. Animals responded negatively to Cl treatment during initial stages of supplementation, which was evident in lower feed consumption and initial growth rates. For carcass growth and yield, Cl had greater and more efficient growth rates, higher dressed out yields (proportional), lower USDA yield grades, and reduced marbling compared with C ($P < 0.05$). For meat quality measurements, the M. longissimus (LL) and M. semitendinosus (ST) were sampled. Cl had the greatest effect ($P < 0.05$) on WBSF, especially on the LL, followed by Z. Variation in tenderness and ageing effects corresponded with variation in calpastatin activity and myofibrillar fragmentation between treatment groups. While zilpaterol and ractopamine are currently the only products registered for cattle in different countries, it seems that zilpaterol has an advantage in carcass growth efficiency and yield without showing any adaptation problems for animals such as experienced by the more aggressive [beta]-agonist clenbuterol.
Keywords: [beta]-Agonist; Beef; Tenderness; Drip loss; Beef; Calpain; Myofibril fragment length

S. McDougall, K.I. Parker, C. Heuer, C.W.R. Compton, A review of prevention and control of heifer mastitis via non-antibiotic strategies, Veterinary Microbiology, Volume 134, Issues 1-2, Special

Issue: Heifer and CNS Mastitis, 16 February 2009, Pages 177-185, ISSN 0378-1135, DOI: 10.1016/j.vetmic.2008.09.026.
(http://www.sciencedirect.com/science/article/B6TD6-4TF2J2V-B/2/7e8d2865388ce6ecf629f2b995b15e26)
Abstract:
Clinical and subclinical mastitis is a significant problem in primiparous dairy cattle (heifers) with a higher prevalence and incidence in heifers than cows, especially early in lactation. Differences in management (e.g. nutrition, pasturing, no use of dry cow therapy) as well as differences in physiological status (e.g. continuing growth in heifers) are likely contribute to the observed differences between heifers and cows. These differences may result in the requirement for different approaches for mastitis management in heifers than for cows.
Mastitis is a multifactorial disease, hence control requires an understanding of the risk factors before effective interventions can be defined. Control strategies are aimed at reducing the incidence of new intramammary infections and eliminating existing infections. Potential strategies can include improved environmental and animal hygiene, application of internal and external teat sealants, prepartum application of teat antiseptics, prepartum milking and control of horn fly in environments where it acts as vector. Other less well-proven strategies to control heifer mastitis include management of heifers as a physically separate group from older cows and not feeding mastitic milk to calves.
It is concluded that several well-proven strategies are available to manage heifer mastitis. However, further research is likely to improve understanding of heifer mastitis and lead to novel managerial approaches to mastitis control in this age group.
Keywords: Heifer; Mastitis; Control; Teat sealants

M.D. Fraser, V.J. Theobald, D.R. Davies, J.M. Moorby, Impact of diet selected by cattle and sheep grazing heathland communities on nutrient supply and faecal micro-flora activity, Agriculture, Ecosystems & Environment, Volume 129, Issue 4, February 2009, Pages 367-377, ISSN 0167-8809, DOI: 10.1016/j.agee.2008.10.011.
(http://www.sciencedirect.com/science/article/B6T3Y-4V1FBMJ-1/2/0abafa937293f847e6adfe6788a01e59)
Abstract:
In the UK the funding mechanism for moorland restoration is implemented primarily through agri-environment schemes, yet comparatively little is known of the nutritional consequences of selecting diets from semi-natural vegetation communities. In this study the feed intake and diet digestibility of four groups of animals grazing heathland swards with low (8%) and high (61%) percentages of cover of Calluna vulgaris were estimated using n-alkanes. The impact of diet choice on metabolic status was monitored through blood sampling, and complementary in vitro studies investigating species/breed differences in gut microbial populations were carried out using faecal samples. Two breeds of sheep (Welsh Mountain (WM) and Scottish Blackface (SBF)) and two breeds of cattle (Welsh Black (WB) and Continental cross (CX)) grazed the experimental sites during two separate 14-day sampling sessions, in July and September, respectively. Between-species and between-breed differences in intake and diet digestibility were recorded. Chemical analysis of the main sward components highlighted the poor nutritional value of heathland species to ruminants, with most major plant groups having crude protein concentrations of less than 100 g kg-1 DM and digestible organic matter in the dry matter values of 0.400-0.500 g g-1. Overall, the blood metabolite results indicate that the intake of both energy and protein was less than optimal to supply even maintenance requirements. Low dietary protein intakes were linked to low serum urea concentrations in all animals. The serum non-esterified fatty acid concentrations indicated a feed energy deficit for both sheep and cattle, with the data suggesting that the deficit was greater for cattle than for sheep. While differences in diet composition could be linked to differences in metabolic profile, diet selected had little apparent impact on faecal micro-floral characteristics, with

the gas production data indicating very few significant differences in the activity of microbial populations between different breeds of the same species. Overall the results demonstrate that careful management is required when domestic livestock graze such swards if animal welfare is not to be compromised. They also highlight the poor production potential of such vegetation communities, and the related repercussions with regards to economic sustainability.
Keywords: Calluna vulgaris; Breed; Feed intake; Diet digestibility; Metabolic profile; Gas production

Lloyd B. Owens, Martin J. Shipitalo, Runoff quality evaluations of continuous and rotational over-wintering systems for beef cows, Agriculture, Ecosystems & Environment, Volume 129, Issue 4, February 2009, Pages 482-490, ISSN 0167-8809, DOI: 10.1016/j.agee.2008.11.003.
(http://www.sciencedirect.com/science/article/B6T3Y-4V5GCMS-2/2/6f2859aefe89195280476c8417abb3de)
Abstract:
Over-wintering cattle out of doors can be detrimental to the areas that cattle occupy and cause increased runoff, sediment loss, and nutrient transport. Two systems of over-wintering cattle were evaluated for their environmental impacts over a 12-year period, November 1974-October 1986. In one system, beef cows were moved on 6-7 day intervals among four pastures during the summer growing season (May-October), rotated through hayed areas to eat fall regrowth, and rotated through these areas to feed on the hay made in those areas. In another system, cows were rotated weekly during summer and then fed hay in one winter area during the dormant season (November-April). Vegetative cover in the continuous wintering area frequently decreased to less than 50% by late winter/early spring while it remained at or near 100% in the rotational system. Monthly runoff averages were greater from the continuous wintering system than the rotational wintering system in 9 out of 12 months (annual runoff of 120.4 and 37.5 mm, respectively). Sediment loss was also greater from the continuous system than the rotational wintering system (2.68 and 0.24 Mg ha-1 annual averages, respectively). Surface runoff losses of N were greater during the dormant season (13.2 and 6.7 kg N ha-1 annual averages for the continuous and rotational wintering systems, respectively) than the growing season (4.6 and 1.3 kg N ha-1 annual averages, respectively). Runoff, sediment, and N losses were less with this rotational wintering system than with the continuous occupancy wintering system, but the animal occupancy rate was also much greater in the continuous system compared with the rotational system (1497 and 1860 cow days ha-1 compared with 528 and 576 cow days ha-1). Although a direct comparison cannot be made between these two systems because of differences in vegetation, stocking rate, and fertilization, the rotational wintering system that was evaluated appears to be sustainable. However, more land area per cow was necessary than with the continuous wintering system that was evaluated.
Keywords: Vegetative cover; Surface runoff; Sediment loss; Surface N loss

M. Ajmal Khan, Raziuddin Ansari, Haibat Ali, Bilquees Gul, Brent L. Nielsen, Panicum turgidum, a potentially sustainable cattle feed alternative to maize for saline areas, Agriculture, Ecosystems & Environment, Volume 129, Issue 4, February 2009, Pages 542-546, ISSN 0167-8809, DOI: 10.1016/j.agee.2008.10.014.
(http://www.sciencedirect.com/science/article/B6T3Y-4V2G7BN-1/2/79fa37cec1f1052a40e9e317a5f9643d)
Abstract:
Salinity of soil and water has been a major impediment to plant growth and crop production worldwide, and a viable solution is not forthcoming, at least in the near future. One potential means for addressing this problem lies in cultivating plant species that are able to tolerate the adverse conditions prevailing in such situations. A search among halophytic plant species to find suitable fodder replacement for calves has been successful in identifying a local perennial grass,

Panicum turgidum, with biomass yields of about 60,000 kg/ha/year (fresh weight) when grown in saline soil (EC 10-15 mS cm-1) irrigated with brackish water (EC 10-12 mS cm-1). When grown with a salt accumulator (Suaeda fruticosa) in adjacent rows and with frequent irrigation, this system may be sustainable in terms of soil salt balance, with little change in soil salinity detected. Panicum was used as a complete replacement for maize in a cattle feeding trial and resulted in equivalent growth and meat production. Implementation of this system should allow saline land and brackish water to be used for producing an economically beneficial feed crop.
Keywords: Halophyte crops; Cattle feeding trial; Maize substitute in cattle feed; Sustainable halophyte production; Panicum

J. Carol Petherick, Clive J.C. Phillips, Space allowances for confined livestock and their determination from allometric principles, Applied Animal Behaviour Science, Volume 117, Issues 1-2, February 2009, Pages 1-12, ISSN 0168-1591, DOI: 10.1016/j.applanim.2008.09.008. (http://www.sciencedirect.com/science/article/B6T48-4V2J6F1-1/2/e771be987fcbc23854b81d61d7f60ece)
Abstract:
The amount of space provided to animals governs important elements of their behaviour and, hence, is critical for their health and welfare. We review the use of allometric principles and equations to estimate the static space requirements of animals when standing and lying, and the space required for animals to feed, drink, stand-up and lie-down. We use the research literature relating to transportation and intensive housing of sheep and cattle to assess the validity of allometric equations for estimating space allowances. We investigated these areas because transportation and intensive housing provide points along a continuum in terms of the duration of confinement, (from hours to months) and spatial requirements are likely to increase with increasing duration of confinement, as animals will need to perform a greater behavioural repertoire for long-term survival, health and welfare. We find that, although there are theoretical reasons why allometric relationships to space allowances may vary slightly for different classes of stock, space allowances that have been demonstrated to have adverse effects on animal welfare during transportation correlated well with an inability to accommodate standing animals, as estimated from allometry. For intensive housing, we were able to detect a space allowance below which there were adverse effects on welfare. For short duration transportation during which animals remain standing, a space allowance per animal described by the allometric equation: area (m2) = 0.020W0.66, where W = liveweight (kg), would appear to be appropriate. Where it is desirable for all animals to lie simultaneously, then a minimum space allowance per animal described by the allometric equation: area (m2) = 0.027W0.66 appears to permit this, given that animals in a group time-share space. However, there are insufficient data to determine whether this allowance onboard a vehicle/vessel would enable animals to move and access food and water with ease. In intensive housing systems, a minimum space allowance per animal described by the allometric equation: area (m2) = 0.033W0.66 appears to be the threshold below which there are adverse effects on welfare. These suggested space allowances require verification with a range of species under different thermal conditions and, for transportation, under different conditions of vehicular/vessel stability. The minimum length of trough per animal (L in m) required for feeding and drinking can be determined from L = 0.064W0.33, with the number of animals required to feed/drink simultaneously taken into account, together with any requirement to minimise competition. This also requires verification with a range of species. We conclude that allometric relationships are an appropriate basis for the formulation of space allowances for livestock.
Keywords: Stocking density; Confinement; Transport; Livestock; Animal welfare; Allometry; Behaviour

Bryony A. Tolhurst, Richard J. Delahay, Neil J. Walker, Alastair I. Ward, Timothy J. Roper, Behaviour of badgers (Meles meles) in farm buildings: Opportunities for the transmission of

Mycobacterium bovis to cattle?, Applied Animal Behaviour Science, Volume 117, Issues 1-2, February 2009, Pages 103-113, ISSN 0168-1591, DOI: 10.1016/j.applanim.2008.10.009. (http://www.sciencedirect.com/science/article/B6T48-4V87DGN-1/2/7afd0fa49e0cd7302dabc92c0dfdf7a3)
Abstract:
Eurasian badgers (Meles meles) are implicated in the transmission of bovine tuberculosis (Mycobacterium bovis) to cattle. Here we investigate potential spatio-temporal foci of opportunities for contact between badgers and cattle in farm buildings. We discuss the relative occurrence of different badger behaviours and their potential for facilitating disease transmission, and examine correlates of building use by badgers including availability of specific farm-based resources, badger demography, and environmental variables. In addition, we investigate seasonal variation in home range structure with respect to farm building use. Badger activity and ranging behaviour were monitored intensively on six cattle farms throughout the year between July 2003 and June 2005 using remote surveillance, radio-tracking and faecal analysis. Badgers foraged in buildings, exhibited close, investigative `nose-to-nose' contact with housed cattle and excreted/scent marked on and around feed. A negative correlation was observed between frequency of visits and 24 h rainfall and a positive correlation with minimum temperature. Badgers visited feed stores most intensively and selected cattle `cake' over other available food types. A peak in visits was detected in spring and summer, and male badgers were more likely to visit buildings than females. Management prescriptions for disease prevention centre on reducing opportunities for direct or indirect contact between badgers and housed cattle. It is thus recommended that effort to exclude badgers from buildings should focus on feed stores and cattle housing during spring and summer in warm, dry weather.
Keywords: Badger; Farm buildings; Foraging behaviour; Ranging behaviour; Bovine tuberculosis; Disease transmission

C.E. Schuehle Pfeiffer, D.A. King, L.M. Lucia, E. Cabrera-Diaz, G.R. Acuff, R.D. Randel, T.H. Welsh Jr., R.A. Oliphint, K.O. Curley Jr., R.C. Vann, J.W. Savell, Influence of transportation stress and animal temperament on fecal shedding of Escherichia coli O157:H7 in feedlot cattle, Meat Science, Volume 81, Issue 2, February 2009, Pages 300-306, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.08.005. (http://www.sciencedirect.com/science/article/B6T9G-4T72X2F-2/2/7b97032677e9439908e5f0684998827e)
Abstract:
To test the influence of transportation stress and temperament on shedding of Escherichia coli O157:H7, cattle (n = 150) were classified at various stages of production as Excitable, Intermediate or Calm based on a variety of disposition scores. Presence of E. coli O157:H7 was determined by rectal swabs from live animals and from colons collected postmortem. Percentage of cattle shedding E. coli O157:H7 at arrival at the feedlot was approximately equal among temperament groups. Before shipment to the processing facility, a higher (P = 0.03) proportion of cattle from the Calm group shed E. coli O157:H7 compared to the other temperament groups. When pooled across all sampling periods, cattle from the Calm group had a greater percentage test positive for E. coli O157:H7. Neither the acute stressor of transportation nor a more excitable temperament led to increased shedding of E. coli O157:H7 in cattle.
Keywords: Cattle; Stress; Temperament; Escherichia coli O157:H7

Michael D. Flythe, Kenneth Andries, The effects of monensin on amino acid catabolizing bacteria isolated from the Boer goat rumen, Small Ruminant Research, Volume 81, Issues 2-3, February 2009, Pages 178-181, ISSN 0921-4488, DOI: 10.1016/j.smallrumres.2008.12.004. (http://www.sciencedirect.com/science/article/B6TC5-4VF0XXN-2/2/701007e3fb2045ebc8998898d66aaa1a)

Abstract:
When ruminants consume feed, as much as half of the amino acid nitrogen can be lost due to microbial degradation in the rumen. Hyper ammonia-producing bacteria (HAB) are primarily responsible for amino acid loss in sheep and cattle, and ionophores (e.g. monensin) are used to inhibit the HAB. Ionophores are sometimes included in the diets of meat goats, but the effects on caprine HAB have not been investigated. Five amino acid catabolizing bacteria were isolated from the rumina of Boer goats, which were consuming a supplement that contained monensin. Two of the isolates were most closely related to the bovine HAB, Peptostreptococcus anaerobius, but the other three were more closely related to Peptoniphilus indolicus. When the isolates were exposed to monensin, intracellular potassium was lost, and ammonia production was inhibited. However, the P. indolicus-like isolates demonstrated a greater capacity to overcome this inhibition in growth experiments. These results indicate that the monensin sensitivity of these bacteria can be variable, even when previous exposure to monensin occurred in the rumen environment.
Keywords: Ammonia; Ionophores; Meat goat production; Monensin; Rumen

David Val-Laillet, Vanessa Guesdon, Marina A.G. von Keyserlingk, Anne Marie de Passille, Jeffrey Rushen, Allogrooming in cattle: Relationships between social preferences, feeding displacements and social dominance, Applied Animal Behaviour Science, Volume 116, Issues 2-4, 31 January 2009, Pages 141-149, ISSN 0168-1591, DOI: 10.1016/j.applanim.2008.08.005.
(http://www.sciencedirect.com/science/article/B6T48-4TGPB09-2/2/cecaf1f6e433335bdd206cd374a3d7cb)
Abstract:
The aim of this study was to describe the allogrooming behaviour of group-housed lactating cows (Bos taurus) as it relates to social dominance, friendship, parity and level of feeding competition. We measured the socio-negative (displacements at the feeder and in the lying stalls) and socio-positive interactions (allogrooming and preferential spatial associations) in six groups of eight dairy cows. This experimental model has been shown to be useful in investigating the effects of high social pressure in groups of cattle. The level of social competition was manipulated by halving the access to the feeder. Allogrooming was observed mostly at the feeder after fresh feed delivery and during the night between 12 and 2 a.m. Dominance rank had no effect on the expression of allogrooming. When competition between animals increased, allogrooming declined, especially in low-ranking, primiparous animals. In addition to its role in coat hygiene and potential role in reducing tension between animals competing for feed, we conclude that allogrooming may be a behaviour reflecting friendship in cows, because it is correlated to preferential associations between partners at the feeder. We suggest that primiparous cows are more susceptible to suffer from a lack of hygiene or socio-positive relationships when submitted to high competitive pressure, especially when they are mixed with more experienced animals that could have better coping strategies in a high competition situation.
Keywords: Cattle; Allogrooming; Feeding competition; Dominance; Social preferences; Bonding

Jenny Gibbons, Alistair Lawrence, Marie Haskell, Responsiveness of dairy cows to human approach and novel stimuli, Applied Animal Behaviour Science, Volume 116, Issues 2-4, 31 January 2009, Pages 163-173, ISSN 0168-1591, DOI: 10.1016/j.applanim.2008.08.009.
(http://www.sciencedirect.com/science/article/B6T48-4TKNJ93-1/2/cfc8633075765469ea2dc72802e74a9d)
Abstract:
This study investigated intra-test and inter-test consistency of dairy cattle behavioural responses to a series of tests involving human approach and exposure to novelty. Thirty-six lactating Holstein-Friesian cows were each subjected to three human approach tests and three novel stimuli tests. Flight response score was assessed by an experimenter approaching cows when they were in the passageway of the home-pen (AP), lying down (AL) and at the feedface (FF). Each human

approach test was repeated on each cow three times. The intra-animal repeatability estimates were 0.65, 0.40, 0.27 for AP, AL and FF tests, respectively. Repeatability evaluates an individual's consistency across tests by comparing it to the variation within the group. Cows showed moderate consistency in their flight response scores to the different approach tests ($W35 = 0.56$, $P < 0.01$). Three novel stimuli (water spray, striped boards and flashing light) were individually presented once to each cow. Investigatory and reactivity behavioural responses were assessed. Cows showed the greatest reactivity response to the water spray compared to the striped boards ($U1 = 56$, $P < 0.001$) and flashing light ($U1 = 66$, $P < 0.001$). No statistically significant agreement existed between the novel stimuli reactivity and investigatory responses with the AP flight response scores. In conclusion, consistency over time was demonstrated over a relatively short period for the AP test and consistency between human approach situations was shown, however, consistency between human and novel situations was not found.
Keywords: Dairy cattle; Temperament; Novelty; Human

Peter Schierack, Matthias Filter, Lydia Scharek, Christiane Toelke, David Taras, Karsten Tedin, Karin Haverson, Antina Lubke-Becker, Lothar H. Wieler, Effects of Bacillus cereus var. toyoi on immune parameters of pregnant sows, Veterinary Immunology and Immunopathology, Volume 127, Issues 1-2, 15 January 2009, Pages 26-37, ISSN 0165-2427, DOI: 10.1016/j.vetimm.2008.09.002.
(http://www.sciencedirect.com/science/article/B6TD5-4TGHN73-5/2/1a28c226e43cfef3b0fd067183dbbeda)
Abstract:
Changing immune parameters during pregnancy have previously been reported in humans and cattle, and have been suggested to contribute to increased susceptibility to infections. However, data regarding immune parameters during pregnancy in sows are rare. In this study, we investigated the peripartal immune status of sows using phenotypical (FACS analysis) as well as functional (proliferation assays, cytokine analysis) parameters of peripheral blood mononuclear cells (PBMCs) in pregnant sows. In previous studies, we reported a modulation of the immune system after feed supplementation of the probiotic Bacillus cereus var. toyoi in piglets [Schierack, P., Wieler, L.H., Taras, D., Herwig, V., Tachu, B., Hlinak, A., Schmidt, M.F., Scharek, L., 2007. Bacillus cereus var. toyoi enhanced systemic immune response in piglets. Vet. Immunol. Immunopathol. 118, 1-11]. Here, we extended these previous studies to include investigations of possible probiotic effects on the peripartal immune status of sows and their reproductivity. We show that immune parameters of sows change during pregnancy, the proliferative response of PBMCs to several bacterial antigens in control animals decreased from days 90 to 30 ante partum. Relative numbers (%) of CD3+CD8+, CD4+, cytotoxic T, CD14+ and CD21+ cells were reduced compared to non-pregnant sows. In contrast, the proliferative response of PBMCs of probiotic-treated sows increased during pregnancy. Bacterial antigens primarily stimulated the proliferation of naive CD21+ cells and the relative CD21+ cell numbers were elevated in the probiotic group in the absence of effects on other immune cell populations. The clinical and microbial status of both control and probiotic sows was similar, excluding pre-existing health problems or infections as responsible for the immunological changes, and feed supplementation also had no significant effects on reproductivity. The results suggest that the probiotic B. cereus var. toyoi can alter the proliferative response of lymphocytes and affects the immune cell population ratios of pregnant sows. How and to what extent this may affect health and reproductivity should be the focus of further studies.
Keywords: Immune parameters; Pregnancy; B. cereus var. toyoi; PBMCs; Sow; Proliferation; Lymphocyte populations

M.D. Fraser, V.J. Theobald, J.B. Griffiths, S.M. Morris, J.M. Moorby, Comparative diet selection by cattle and sheep grazing two contrasting heathland communities, Agriculture, Ecosystems &

Environment, Volume 129, Issues 1-3, January 2009, Pages 182-192, ISSN 0167-8809, DOI: 10.1016/j.agee.2008.08.013.
(http://www.sciencedirect.com/science/article/B6T3Y-4TKXD3T-1/2/07b0cb6cb9e3ce157d0f1e00e6bdb25d)
Abstract:
In the UK the funding mechanism for moorland restoration is being implemented primarily through agri-environment schemes, yet to date remarkably few comparative grazing studies with domesticated livestock have been conducted on this type of vegetation community. In this experiment the diet composition of four groups of animals grazing heathland swards with low (8%) and high (61%) percentages of cover of Calluna vulgaris was estimated from faeces profiles of n-alkanes and long-chain fatty alcohols. Two breeds of sheep (Welsh Mountain (WM) and Scottish Blackface (SBF)), and two breeds of cattle (Welsh Black (WB) and Continental cross (CX)) grazed the experimental sites during two separate 14-day sampling sessions, in July and September respectively. Both species were selective feeders, consuming grasses (selectivity indices 0.20-1.0) in preference to dwarf shrubs (selectivity indices 0.20-1.0), but there were significant differences in the proportions of various plant groups within the diets. Although the sheep diets contained significantly more C. vulgaris, the quantities consumed were small (<10% of the diet), even on the High site, reflecting the biomass of the graminoid species present, and hence availability of preferred items. The SBF sheep were the only animal type to increase consumption of C. vulgaris later in the season. There were a number of significant differences in the composition of the diets selected by the two hill breeds of sheep used in the study, with the SBF sheep recorded as consuming more C. vulgaris. These results imply that through choice of breed land managers may be able to meet environmental goals more effectively without compromising returns from conventional production systems. In contrast, the overall diet composition of the two breed types of cattle was similar. This indicates that commercial breeds have the potential to deliver the types of environmental benefits associated with grazing of traditional breeds.
Keywords: Calluna vulgaris; Breed; Diet composition; Dwarf shrub; Ruminants; Resource availability

M. Blanco, D. Villalba, G. Ripoll, H. Sauerwein, I. Casasus, Effects of early weaning and breed on calf performance and carcass and meat quality in autumn-born bull calves, Livestock Science, Volume 120, Issues 1-2, January 2009, Pages 103-115, ISSN 1871-1413, DOI: 10.1016/j.livsci.2008.05.003.
(http://www.sciencedirect.com/science/article/B7XNX-4SV12WY-1/2/19e03b5252a8721dd100070fb5876bf4)
Abstract:
This study assessed the effects of age at weaning (early weaning at 90 d or traditional weaning at 150 d) and breed (Parda de Montana or Pirenaica) on calf performance and carcass and meat quality in autumn-calving beef cattle. At calving, 14 Parda de Montana and 14 Pirenaica cow-calf pairs were randomly assigned to one of two weaning treatments, and kept indoors during lactation. After weaning, calves were fed an intensive diet until slaughter at 450 kg. The interaction between age at weaning and breed was not significant for any of the parameters studied. From 90 d to 150 d, early weaned calves had greater ADG (P = 0.001) and IGF-I concentrations (P = 0.001) than traditionally weaned calves, but their leptin concentrations were similar (P = 0.15). During the finishing phase, performance, daily feed intake, and efficiency did not differ between treatments. Early weaning did not affect age at slaughter, carcass weight, fatness score, fat colour, and meat quality, but improved carcass conformation (P = 0.04). Early weaned calves had greater total DMI (P = 0.002) with greater concomitant feed costs (P = 0.001) and yielded a slightly greater income than traditionally weaned calves; therefore, economic margins did not differ. Parda de Montana calves tended to have greater ADG from birth to 90 d and were heavier at 90 d (P = 0.01) than were Pirenaica calves. From 90 d to 150 d, performance and IGF-I and leptin concentrations did

not differ between breeds; thus, Parda de Montana calves remained heavier at 150 d. During the finishing phase, at times, weight gains of Parda de Montana and Pirenaica calves differed, but the overall performance, feed intake, and efficiency of the two breeds were similar. Pirenaica calves had heavier carcasses (P = 0.04) with greater conformation scores (P = 0.04) than Parda de Montana calves; thus, income per carcass was greater for the former than the latter (P = 0.007). As feed costs were similar for both breeds, the economic margin of Pirenaica calves was greater than that of Parda de Montana calves (P = 0.01). In conclusion, in both breeds weaning strategies had similar effects on performance and carcass and meat quality; however, from an economic point of view, and considering only the costs associated with the calf, raising Pirenaica calves would be more profitable, at either age at weaning.
Keywords: Age at weaning; Breed; Performance; Carcass quality; Meat quality; Beef cattle

P.G. Dunne, F.J. Monahan, F.P. O'Mara, A.P. Moloney, Colour of bovine subcutaneous adipose tissue: A review of contributory factors, associations with carcass and meat quality and its potential utility in authentication of dietary history, Meat Science, Volume 81, Issue 1, January 2009, Pages 28-45, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.06.013.
(http://www.sciencedirect.com/science/article/B6T9G-4SVC5SS-1/2/7be0fb37489e09cffb495d33bdae89f7)
Abstract:
The colour of bovine subcutaneous (sc) adipose tissue (carcass fat) depends on the age, gender and breed of cattle. Diet is the most important extrinsic factor but its influence depends on the duration of feeding. Cattle produced under extensive grass-based production systems generally have carcass fat which is more yellow than their intensively-reared, concentrate-fed counterparts and this is caused by carotenoids from green forage. Although yellow carcass fat is negatively regarded in many countries, evidence suggests it may be associated with a healthier fatty acid profile and antioxidant content in beef, synonymous with grass feeding. Nonetheless, management strategies to reduce fat colour of grass-fed cattle are sought after. Current research suggests that yellow colour of this tissue is reduced if pasture-fed cattle are converted to a grain-based diet, which results in accretion of adipose tissue and dilution of carotenoids. Colour changes may depend on the initial yellow colour, the carotene and utilisable energy in the finishing diet, the duration of finishing, the amount of fat accumulated during finishing and the rate of utilisation of carotene from body fat. Differences in nutritional strategies which cause differences in fatty acid composition may be reflected by differences in fat colour and carotenoid concentration. Fat colour and carotenoids are prominent among a panoply of measurements which can aid the authentication of the dietary history and thus to some extent, the origin of beef, although this potential utility is complicated by the simultaneous rather than discrete use of forages and concentrates in real production systems.
Keywords: Colour; Bovine; Subcutaneous adipose tissue; Carcass fat; Carotenoids

Johanne Ellis-Iversen, Geoff C. Pritchard, Marion Wooldridge, Mirjam Nielen, Risk factors for Campylobacter jejuni and Campylobacter coli in young cattle on English and Welsh farms, Preventive Veterinary Medicine, Volume 88, Issue 1, 1 January 2009, Pages 42-48, ISSN 0167-5877, DOI: 10.1016/j.prevetmed.2008.07.002.
(http://www.sciencedirect.com/science/article/B6TBK-4TK7X4T-1/2/9c01501d0d9f1af9b0bee1a5eabdbb9d)
Abstract:
Campylobacter jejuni and C. coli are the most prevalent causes of bacterial diarrhoea in most of the Western World. In Great Britain, the source remains unknown for the majority of cases, though poultry is considered the main source of infection. Molecular typing methods identify cattle as a potential source of a proportion of the non-source-attributed cases, mainly through direct contact, environmental contamination or milk, but little is known about the epidemiology of Campylobacter

in cattle. A cross-sectional study was undertaken on young cattle 3-17 months of age on 56 cattle farms in England and Wales to identify association between the presence of C. jejuni and C. coli and farm characteristics and management practices. Campylobacter was detected on 62.5% of the farms and the presence of dairy cows (OR: 3.7, CI95%: 1.2; 11.7), indoor housing (OR: 4.6, CI95%: 1.8; 12.0), private water supply (OR: 2.5, CI95%: 1.2; 5.4), presence of horses (OR: 3.2, CI95%:1.5; 6.9) and feeding hay (OR: 2.9, CI95%:1.6; 5.5) were associated with detection. The model's goodness-of-fit was improved when herd size was forced in the model without being statistically significant (p = 0.34).
Keywords: Campylobacter; Cattle; Husbandry; Risk factor; Zoonosis

Marcia Saladini Vieira Salles, Marcus Antonio Zanetti, Evaldo Antonio Lencioni Titto, Renata Maria Consentino Conti, Effect of monensin on performance in growing ruminants reared under different environmental temperatures, Animal Feed Science and Technology, Volume 147, Issue 4, 15 December 2008, Pages 279-291, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2008.01.008.
(http://www.sciencedirect.com/science/article/B6T42-4S26RRR-1/2/b0247507efe30ade2767491951a5bddd)
Abstract:
To evaluate the effect of monensin on the performance of growing cattle under different environmental temperatures, 24 male calves (81.9 +/- 7.7 kg mean weight and 100 days old) were distributed in a 2 x 2 factorial arrangement, contrasting 0 or 85 mg monensin/animal per day at 24.3 or 33.2 [degree sign]C (environmental temperatures). Monensin supplementation increased weight gain (P=0.036), improved feed efficiency (P=0.040), increased ruminal concentrations of volatile fatty acids (VFA; P=0.003) and decreased the molar proportion of butyrate (P=0.034); all effects irrespective of environmental temperatures. A temperature-dependent monensin effect was detected on nitrogen retention (P=0.018) and N retained:N absorbed ratio (P=0.012). Animals fed monensin retained higher N amounts than those of the non-supplemented ones when the environmental temperature was 33.2 [degree sign]C. Environmental temperature and monensin supplementation showed an interaction effect on urine N concentration (P=0.003). Temperature did not affect N excretion in monensin-fed animals, but increased N excretion in the non-supplemented ones. Monensin increased the crude protein (CP) digestibility (P=0.094) for animals at both temperatures. In conclusion, monensin changes the metabolism of the heat-stressed animals by increasing rumen VFA concentration, digestibility and protein retention, thus improving food use and weight gain.
Keywords: Ammoniacal nitrogen; Digestibility; Feed efficiency; Nutrition; Volatile fatty acids; Weight gain

David K. Lambert, The expected utility of genetic information in beef cattle production, Agricultural Systems, Volume 99, Issue 1, December 2008, Pages 44-52, ISSN 0308-521X, DOI: 10.1016/j.agsy.2008.09.006.
(http://www.sciencedirect.com/science/article/B6T3W-4TWSWV8-1/2/0f34cea1bad9a99b3837aa67bc98ad9d)
Abstract:
Scientific inquiry is increasing our knowledge of plant and animal genomics. The ability to specify heterogeneous production processes, to sort agricultural inputs by genotype, or to guide breeding programs to satisfy specific markets based on genetic expression may increase producer and consumer benefits. This research develops a decision analysis framework to assess the expected value of genetic information under risk aversion. Expected utilities are evaluated both with and without genetic trait information. Potential gains in the value of information can be quantified as research unravels the linkages between genetics and crop and animal performance and quality. An application to cattle feeding indicates potential gains to developing markets for specific animal genetic characteristics based on the amino acid sequence of the leptin gene.

Keywords: Genotype; Value of information; Beef cattle; Expected utility

L.M. Brito, J. Coutinho, S.R. Smith, Methods to improve the composting process of the solid fraction of dairy cattle slurry, Bioresource Technology, Volume 99, Issue 18, December 2008, Pages 8955-8960, ISSN 0960-8524, DOI: 10.1016/j.biortech.2008.05.005. (http://www.sciencedirect.com/science/article/B6V24-4SS8CGV-1/2/b2b3fd40e14171b2563eaa9acf3fe97e)
Abstract:
Cattle slurry solid fraction (SF) with different dry matter (DM) contents was collected from two dairy farms and composted in static and turned piles, with different sizes and cover types, to investigate the effects of pile conditions on the physical and chemical changes in SF during composting and to identify approaches to improve final compost quality. Thermophilic temperatures were attained soon after separation of SF, but the temperature of piles covered with polyethylene did not increase above 60 [degree sign]C. The rate of organic matter (OM) mineralisation increased for turned piles in comparison to static piles, but the maximum amount of mineralisable OM (630-675 g kg-1) was similar for all pile treatments. The C/N ratio declined from over 36 to a value of 14 towards the end of composting, indicating an advanced degree of OM stabilisation. Mature compost was obtained from raw SF feedstock as indicated by the low compost temperature, low C/N ratio, and low content of combined with increased concentrations of . The efficiency of the composting process was improved and NH3-N losses were minimized by increasing DM content of the SF, reducing the frequency of pile turning and managing compost piles without an impermeable cover.
Keywords: Ammonium; Compost; Mineralisation; Nitrate; Organic matter

Yuri R. Montanholi, Nicholas E. Odongo, Kendall C. Swanson, Flavio S. Schenkel, Brian W. McBride, Stephen P. Miller, Application of infrared thermography as an indicator of heat and methane production and its use in the study of skin temperature in response to physiological events in dairy cattle (Bos taurus), Journal of Thermal Biology, Volume 33, Issue 8, December 2008, Pages 468-475, ISSN 0306-4565, DOI: 10.1016/j.jtherbio.2008.09.001. (http://www.sciencedirect.com/science/article/B6T94-4THC1HK-1/2/149a014d00bf5e24f48a4fe8230e5070)
Abstract:
There is a demand in the livestock industry for alternative assessments of feed efficiency. Infrared thermography was tested for predicting heat production, methane production and for the detection of physiological events (e.g. heat increment of feeding) in dairy cattle. Multiple body locations were infrared scanned concomitantly with the measurement of the animals' gaseous exchange. Infrared thermography can be successfully applied for assessing heat and methane production, through the analysis of feet temperature and temperature difference between left and right flanks, respectively. This technology is also useful for assessing physiological responses to milking and feeding.
Keywords: Calorimetry; Feed efficiency; Greenhouse gases; Heat increment of feeding; Holstein; Indirect heat production; Infrared imaging; Ruminant

Z.A. Kruk, C.D.K. Bottema, J.J. Davis, B.D. Siebert, G.S. Harper, J. Di, W.S. Pitchford, Effects of vitamin A on growth performance and carcass quality in steers, Livestock Science, Volume 119, Issues 1-3, December 2008, Pages 12-21, ISSN 1871-1413, DOI: 10.1016/j.livsci.2008.02.008. (http://www.sciencedirect.com/science/article/B7XNX-4S92XVW-1/2/b1f20e4a879daf88d61a1857fb4416c9)
Abstract:
Vitamin A plays a critical role in many essential life processes. In herbivores, it is either derived from plant [beta]-carotene or directly as a dietary supplement. In cattle, vitamin A has the potential

to influence various carcass traits that are sought by specific beef markets. A group of 20 Angus steers was removed from pasture and fed a low [beta]-carotene and vitamin A cereal-based ration on a feedlot for 308 days. Ten of the steers were supplemented with vitamin A (retinyl palmitate, 60 IU of vitamin A/100 kg body weight/day) and the other ten received no supplement. The results demonstrated that restriction of vitamin A intake changed intramuscular fat deposition without changing subcutaneous fat depots. Angus steers that had been depleted of vitamin A showed increased intramuscular fat in the longissimus thoracis et lumborum (LTL) by 35% ($P < 0.026$) and seam fat area at the quartering site by 33% ($P < 0.0273$), when compared with cattle supplemented with vitamin A. There were no changes in intramuscular fat in the semitendinosus. Visually assessed marbling scores were also higher (19%; $P < 0.094$) in the non-supplemented, depleted group. There was no effect of vitamin A depletion on cattle growth and other meat traits (eye muscle area, meat colour, pH, meat cut weight), meat eating attributes (tenderness, cooking loss) or muscle fibre diameter. The only difference ($P < 0.0177$) among the meat traits was fat colour where depleted animals had whiter fat than the controls. Moreover, the fat from the vitamin A depleted group was softer with a lower melting point. We conclude that the reduced vitamin A consumption, leading to vitamin A depletion, increases intramuscular fat. On the other hand, the vitamin A depletion did not increase subcutaneous fat depth or change other meat quality traits, suggesting that marbling and these other traits are not invariably related.
Keywords: Beef cattle; Marbling; Carcass quality; Vitamin A; Retinol

M. Dolejska, D. Senk, A. Cizek, J. Rybarikova, O. Sychra, I. Literak, Antimicrobial resistant Escherichia coli isolates in cattle and house sparrows on two Czech dairy farms, Research in Veterinary Science, Volume 85, Issue 3, December 2008, Pages 491-494, ISSN 0034-5288, DOI: 10.1016/j.rvsc.2008.03.007.
(http://www.sciencedirect.com/science/article/B6WWR-4SG01H8-1/2/6c3dbe3fafec09163e8709d068faee28)
Abstract:
Rectal smears of calves, cows and young bulls, as well as cloacal smears of house sparrows (Passer domesticus), from farms at the villages of Sumice and Troskotovice, Czech Republic, were examined for E. coli resistant to 12 antimicrobials. The resistant isolates were tested for antimicrobial-resistance genes and integrons. Totals of 40% (n = 183), 3% (n = 95), 0% (n = 33), and 9% (n = 54) of Escherichia coli isolates from calves, cows, young bulls and house sparrows, respectively, were antimicrobial resistant. The following genes were identified in cattle E. coli isolates: tetA, tetB (isolates resistant to tetracycline), blaTEM (beta-lactams), strA, aadA (streptomycin), sul1, sul2 (sulphonamides), and cat, floR (chloramphenicol). Seven of 16 antimicrobial-resistant calf isolates from the Sumice farm possessed class 1 integrons with the aadA1 gene cassette integrated, 1 kb in size. On the Troskotovice farm, eight of 57 antimicrobial-resistant calf isolates possessed class 1 integrons. Integrons of 1.5 kb with the dhfr1- aadA1 gene cassette were found in four isolates, followed by a 1 kb integron with the aadA1 gene found in three isolates, and a 1.7 kb integron with the dhfr17-aadA5 gene cassette and the phenotype ASSuTSxtNaCipCCfG. The prevalence of resistant E. coli in calves compared to adult cattle was much higher and probably was influenced by oral antimicrobial usage in calves, feeding with milk and colostrum from treated cows, as well as mechanisms unrelated to antimicrobial drug selection. Although house sparrows lived together with the cattle and came into contact with cattle waste on the farm, they were not infected by resistant E. coli isolates with the same characteristics as those found in cattle.
Keywords: Escherichia coli; Antimicrobial resistance; Dairy farm; Cattle; House sparrows; Passer domesticus; Genes; Integrons

Katrijn Cobbaut, Kurt Houf, Laid Douidah, Johan Van Hende, Lieven De Zutter, Alternative sampling to establish the Escherichia coli O157 status on beef cattle farms, Veterinary

Microbiology, Volume 132, Issues 1-2, 25 November 2008, Pages 205-210, ISSN 0378-1135, DOI: 10.1016/j.vetmic.2008.04.031.
(http://www.sciencedirect.com/science/article/B6TD6-4SD6SJT-3/2/cc4abda1b6c24915ce779a1c47781e7c)
Abstract:
Prevalence of Escherichia coli O157 in cattle at the farm level is mostly determined by taking individually rectal samples. From the animal welfare point of view the collection of such samples on the farm is not advisable. The present study evaluated alternative sample types to assess the E. coli O157 status of cattle farms. Twelve closed cattle farms were visited twice with a time interval of 6-8 months. Rectal and hide surface samples (the nose, the neck, the shoulder, the flank, and the round) were collected from beef cattle within the period of 5 months before slaughter and from their environment (overshoes from the pen bedding, swabs from the pen barrier, feed and water). Statistical analysis revealed that from all samples taken only the 'overshoe method' might be a good sampling technique to substitute the collection of individual fecal samples to establish the E. coli O157 status of a farm and even a pen. Characterization of the isolates, using pulsed field gel electrophoresis, revealed that on each positive farm only one genotype was presented, even after a period of more than 6 months.
Keywords: Beef cattle; E. coli O157; Farm; Alternative samples

Claudio Genchi, Michel Alvinerie, Andrew Forbes, Maurizio Bonfanti, Marco Genchi, Stefano Vandoni, Matteo Innocenti, Carlo A. Sgoifo Rossi, Comparative evaluation of two ivermectin injectable formulations against psoroptic mange in feedlot cattle, Veterinary Parasitology, Volume 158, Issues 1-2, 25 November 2008, Pages 110-116, ISSN 0304-4017, DOI: 10.1016/j.vetpar.2008.08.007.
(http://www.sciencedirect.com/science/article/B6TD7-4T8HHJ8-2/2/70a1aa7b659985b623ff361093ed32cf)
Abstract:
A study was carried out to compare the efficacy of two injectable formulations of ivermectin, Ivomec(R),1 Merial (IVM reference) and Ivogell(R),2 Intervet (IVM generic) in the treatment of psoroptic mange (Psoroptes ovis) in Charollais feedlot cattle. A total of 22 animals were ranked in order of the severity of mange and allocated to 11 replicates of 2 animals each. Within each replicate, one animal was randomly allocated to IVM reference product treatment (Group 1) and one to IVM generic (Group 2). Animals were treated on Day 0 and on Day 8 at the recommended dosage of 200 [mu]g ivermectin/kg bodyweight. The pharmacokinetics profiles (pK) of both IVM formulations were evaluated in plasma samples taken from 6 cattle randomly chosen per group on Day 0, before treatment, and then at 6, 12, 24 hours and daily from Day 2 to Day 7 after the treatment on Day 0. Additionally, the severity of mange lesions was assessed and mites were counted in skin scrapings on Days 0, 8, 15 and 25. Animals were weighed on Day 0 and 25 and body weight and average daily gains (ADG) were evaluated.
No statistical differences were found between the cattle of the two groups in any pK parameters, although the mean IVM plasma concentrations in cattle treated with the IVM reference product were consistently higher than those found in cattle treated with the generic compound. By Day 25, all animals in Group 1 had recovered clinically and parasitologically from psoroptic mange while cattle from Group 2 still had mange lesions and, in two animals, living mites were found in the skin scrapings; these differences were significant ($P < 0.001$). The mean body weight of the two groups was significantly different on Day 25 ($P < 0.01$) when animals in Group 1 weighed 20 kg more than those in Group 2. In conclusion, despite similarities in their pharmacokinetic profiles and formulations, the clinical efficacy of the two injectable formulations of IVM differed significantly in their therapeutic efficacy against psoroptic mange in feedlot cattle up to 25 days after treatment: this difference in response was reflected in an incomplete clinical and parasitological response in Group 2 and a slower growth rate.

Keywords: Psoroptic mange; Cattle; Ivermectin generic formulation; Efficacy; Pharmacokinetics

I.M.G.A. Berends, E.A.M. Graat, W.A.J.M. Swart, M.F. Weber, A.W. van de Giessen, T.J.G.M. Lam, A.E. Heuvelink, H.J. van Weering, Prevalence of VTEC O157 in dairy and veal herds and risk factors for veal herds, Preventive Veterinary Medicine, Volume 87, Issues 3-4, 17 November 2008, Pages 301-310, ISSN 0167-5877, DOI: 10.1016/j.prevetmed.2008.05.004.
(http://www.sciencedirect.com/science/article/B6TBK-4SY6Y93-1/2/b1831e9c379cbaccefdb78d995933480)
Abstract:
The aim of this study was to determine the herd prevalence of veal and dairy herds and to identify risk factors for VTEC O157 positive veal herds. The study was based on monitoring data from November 1996 through July 2005 of 1051 dairy herds and 930 veal herds. The herd level prevalence (95% CI) was 8.0% (6.4-9.6) for dairy herds and 12.6% (10.5-14.7) for veal herds. Within the population of veal herds, a prevalence of 39.8% (33.9-45.6) was found for pink veal herds (n = 269) and 1.5% (0.7-2.8) for white veal herds (n = 661).
Multivariable logistic regression showed that the type of veal (pink vs. white; OR = 21.6; 95% CI: 10.4-45.0), ventilation (mechanical vs. natural; OR = 0.4; 95% CI: 0.2-0.8), time between arrival in the herd and sampling (3-5 months vs. 0-2 months: OR = 2.33; 95% CI: 1.1-5.1, >=6 months vs. 0-2 months: OR = 4.11; CI: 1.9-8.9), other feed than the 7 most common (yes vs. no; OR = 2.1; 95% CI: 1.2-3.7) and at least one dog present in the stable (yes vs. no; OR = 2.6; 95% CI: 1.5-4.6) were significantly (P < 0.05) associated with the presence of VTEC O157. The large difference in the VTEC O157 prevalences for pink veal and white veal production might have been caused by a very different management of these type of herds. However, this could not be studied with the data collected.
Keywords: Escherichia coli; VTEC; Cattle; Risk factors; Monitoring

Noreen Machila, Eric M. Fevre, Ian Maudlin, Mark C. Eisler, Farmer estimation of live bodyweight of cattle: Implications for veterinary drug dosing in East Africa, Preventive Veterinary Medicine, Volume 87, Issues 3-4, 17 November 2008, Pages 394-403, ISSN 0167-5877, DOI: 10.1016/j.prevetmed.2008.06.001.
(http://www.sciencedirect.com/science/article/B6TBK-4SW8585-1/2/3c03a6894efd1b9e72d0b50068797310)
Abstract:
The ability of smallholder farmers and animal health workers to estimate live bodyweight can critically affect the likelihood of under- or over-dosing of veterinary compounds in decentralised systems where farmers administer a significant proportion of the veterinary treatments. A survey of 324 cattle owned by 170 farmers was conducted in Busia District, Kenya. Cattle were weighed on a standard calibrated scale and owners were asked to estimate the live weight of their animals. Weights were also estimated by a weigh-band and by local animal health workers.
Cattle owners consistently underestimated the weights of their cattle; 85.7% of the cattle had their bodyweights underestimated by an average of 46.9% of their true weight. Furthermore, very few cattle (19.0%) had their weights estimated accurately to within +/-20% of their true weight by these farmers, an accuracy range important for drug dosing. This finding raises concerns of widespread under-dosing of cattle with trypanocidal and other veterinary drugs. Animal health workers were better at estimating live bodyweight of cattle; 76.6% of cattle were estimated accurately to within +/-20% of their true weight.
It is possible to improve farmers' and animal health workers' ability to estimate accurately live bodyweight of cattle with appropriate training. Evidence of this was provided by animal health workers whose estimates improved over time as they received feedback of the true weights of different sizes of cattle from the standard scale.

Keywords: Live bodyweight estimate; True bodyweight; Trypanocidal drug dosage; Underdosage; Overdosage; East African zebu cattle

Ines Windschnurer, Claudia Schmied, Xavier Boivin, Susanne Waiblinger, Reliability and inter-test relationship of tests for on-farm assessment of dairy cows' relationship to humans, Applied Animal Behaviour Science, Volume 114, Issues 1-2, November 2008, Pages 37-53, ISSN 0168-1591, DOI: 10.1016/j.applanim.2008.01.017.
(http://www.sciencedirect.com/science/article/B6T48-4S26JPY-1/2/f8eee0cce5347e70a43b44268296049e)
Abstract:
Animals' relationship to humans, i.e., their perception of humans, is an important parameter to be included into on-farm welfare assessment schemes. The objectives of this study were to evaluate inter-observer reliability and between-experimenter repeatability of three previously used and two new tests feasible for on-farm assessment of animals' relationship to humans in loose-housed dairy cows. Additionally, inter-test relationships were analysed to obtain first information on the potential validity of the two new tests. Two experimenters performed five tests (avoidance distance test at the feeding place [AvoidF] and in the barn [AvoidB], approach test to a stationary human in the barn [Appr], passing and touching lying animals [LyingPT], walking through the herd and trying to touch animals [WalkT]) on 16 commercial dairy farms in a balanced order. The person actually not testing the cows observed and recorded the test results from a distance (observer). Inter-observer reliability was investigated by relating results of observer and experimenter. Between-experimenter repeatability, comprising inter-observer reliability as well as consistency of reactions of animals to humans, was evaluated by correlating the test results of both experimenters. Observer or experimenter biases were evaluated by testing for significant differences. High inter-observer reliability was found for all tests under consideration: correlation coefficients exceeded 0.9, percentage agreement for LyingPT was 100%, and negligible observer biases were found. Between-experimenter repeatability of the two avoidance distance tests (AvoidF and AvoidB) was high to very high (r = 0.7 to >0.9), both at an individual as well as at herd level. Evaluated at herd level, LyingPT was also highly repeatable (r = 0.7), whereas WalkT and Appr showed only moderate (0.4 to <0.7) between-experimenter repeatability. With regard to inter-test relationships (used for a preliminary investigation of convergent validity of the new tests), the avoidance distance test in the barn (AvoidB) highly correlated with AvoidF and WalkT (r = 0.7-0.9) and moderately (0.5) with LyingPT. The approach test (Appr) did not correlate significantly with any of the other tests (r = 0.0-0.4). Principal component analysis results showed that all but the measure of Appr loaded highly >=0.7 on one component. In sum, regarding reliability and convergent validity, both avoidance distance tests can be recommended as tests for assessing the cows' relationship to humans. In addition, the high interrelationship between WalkT and the avoidance distance test in the barn (AvoidB) makes WalkT a promising test for further development despite the absence of sufficient between-experimenter repeatability in the present study.
Keywords: Cattle; Human-animal relationship; Tests; Welfare

Henrik Bangso Nielsen, Irini Angelidaki, Strategies for optimizing recovery of the biogas process following ammonia inhibition, Bioresource Technology, Volume 99, Issue 17, November 2008, Pages 7995-8001, ISSN 0960-8524, DOI: 10.1016/j.biortech.2008.03.049.
(http://www.sciencedirect.com/science/article/B6V24-4SFHJ5B-2/2/9fc14e6115326541ad6d44309b59669d)
Abstract:
Strategies for recovery of ammonia-inhibited thermophilic biogas process, were evaluated in batch and lab-scale reactors. Active methane producing biomass (digested cattle manure) was inhibited with NH4Cl and subsequently, 3-5 days later, diluted with 50% of water, or with 50% digested manure, or with 50% fresh manure or kept undiluted. Dilution with fresh cattle manure resulted in

the highest methane production rate during the recovery period while dilution with digested cattle manure gave a more balanced recovery according to the fluctuations in volatile fatty acids. Furthermore, the process recovery of a 7600 m3 biogas plant suffering from ammonia inhibition was observed. The ammonia concentration was only gradually lowered via the daily feeding with cattle manure, as is the normal procedure at Danish full-scale biogas plants. Recovery took 31 days with a 40% methane loss and illustrates the need for development of efficient process recovery strategies.
Keywords: Biogas; Ammonia; Recovery strategies; Anaerobic digestion; Inhibition

Miaozong Wu, Aihua Wang, Gregory C. Bernard, John B. Hall, William E. Beal, R. Michael Akers, Yves R. Boisclair, Honglin Jiang, Increased degradation of insulin-like growth factor-I in serum from feed-deprived steers, Domestic Animal Endocrinology, Volume 35, Issue 4, November 2008, Pages 343-351, ISSN 0739-7240, DOI: 10.1016/j.domaniend.2008.07.003.
(http://www.sciencedirect.com/science/article/B6T62-4T890SK-1/2/b18f9baef1a90f4658317a6d9b83a10d)
Abstract:
Severe feed restriction decreases serum insulin-like growth factor I (IGF-I) concentration in animals, and this decrease is thought to be due to reduced IGF-I production in the liver. The objective of this study was to determine whether feed deprivation also increases degradation of serum IGF-I and serum levels of IGF binding protein 3 (IGFBP-3) and acid-labile subunit (ALS), which inhibit IGF-I degradation and increase IGF-I retention in the blood by forming a ternary complex with IGF-I, in cattle. Five steers had free access to pasture, and another five were deprived of feed for 60 h. Serum concentration of IGF-I and liver abundance of IGF-I mRNA at the end of the 60-h period were 50% and 80% lower, respectively, in feed-deprived steers than in fed steers. Less 125I-labeled IGF-I remained intact after a 45-h incubation in sera of feed-deprived steers than in sera of fed steers, suggesting that serum IGF-I is more quickly degraded in feed-deprived animals. Serum levels of IGFBP-3 and ALS were decreased by 40% and 30%, respectively, in feed-deprived steers compared with fed steers. These decreases were associated with more than 50% reductions in IGFBP-3 and ALS mRNA in the liver, the major source of serum IGFBP-3 and ALS. Taken together, these results suggest that feed deprivation reduces serum concentration of IGF-I in cattle not only by decreasing IGF-I gene expression in the liver, but also by increasing IGF-I degradation and reducing IGF-I retention in the blood through decreasing IGFBP-3 and ALS production in the liver.
Keywords: Fasting; Cattle; Growth hormone; IGF-I; IGFBP

A. Estrada-Angulo, A. Barreras-Serrano, G. Contreras, J.F. Obregon, J.C. Robles-Estrada, A. Plascencia, R.A. Zinn, Influence of level of zilpaterol chlorhydrate supplementation on growth performance and carcass characteristics of feedlot lambs, Small Ruminant Research, Volume 80, Issues 1-3, November 2008, Pages 107-110, ISSN 0921-4488, DOI: 10.1016/j.smallrumres.2008.09.006.
(http://www.sciencedirect.com/science/article/B6TC5-4TVG1BB-1/2/33e2c354ffba672c3ef6358c67da960e)
Abstract:
Forty-eight Pelibuey x Katahdin (38.8 +/- 0.67 kg) crossbred male lambs were used in a 32-day feeding trial (four pens per treatment in a randomized complete block design), to evaluate the influence of zilpaterol ([beta]2-agonist) supplementation level on growth performance and carcass characteristics. Lambs were fed a dry-rolled corn-based finishing diet (3.04 Mcal/kg of ME) supplemented with 0, 0.15, 0.20, or 0.25 mg/kg of live weight d-1 zilpaterol (as zilpaterol chlorhydrate, Zilmax(R), Intervet Mexico, Mexico City). DM intake averaged 1.099 +/- 0.042 kg/d and was not affected (P = 0.40) by treatments. Compared with control lambs, zilpaterol supplementation increased gain efficiency (15.8%, P < 0.03), apparent energy retention per unit

DMI (10.9%, P = 0.03), and tended to increased daily gain (16%, P < 0.07) and total gain (17.7%, P < 0.08). Zilpaterol supplementation did not affect (P = 0.20) carcass weight, longissimus muscle area (LM), or fat thickness, but increased (2.3%, P = 0.04) carcass dressing percentage and reduced (36%, P < 0.01) kidney-pelvic fat. Increasing level of zilpaterol supplementation increased total weight gain (linear component, P < 0.05), gain:feed (linear component, P < 0.01), and dressing percentage (linear component, P < 0.02), and decreased (linear component, P < 0.01) kidney-pelvic fat. We conclude that zilpaterol supplementation enhances growth performance and dressing percentage in lambs in a manner comparable to that of cattle (greater muscle accretion, reduced body fat). Responses to zilpaterol was optimal when supplemented at 0.20 mg of zilpaterol/kg of live weight d-1.
Keywords: [beta]-agonist; Carcass characteristics; Lambs; Performance; Zilpaterol

P.H. Robinson, K. Karges, M.L. Gibson, Nutritional evaluation of four co-product feedstuffs from the motor fuel ethanol distillation industry in the Midwestern USA, Animal Feed Science and Technology, Volume 146, Issues 3-4, 15 October 2008, Pages 345-352, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2008.01.004.
(http://www.sciencedirect.com/science/article/B6T42-4S02JX1-2/2/c5a5a9ef033d2cdb501accbaf5ace6b8)
Abstract:
The objective was to determine the nutrient profile, and variability, as well as estimate the net energy (NE) of four co-product feeds of the corn grain-based motor fuel ethanol distillation industry in the Midwestern USA. Ten samples each of conventional distillers dried grains with solubles (DDGS), raw-starch (i.e., uncooked) distillers dried grains with solubles (DDGS-BPX), high protein distillers dried grains (DDG-HP) and dehydrated dry milled corn germ (DCG) were collected over 3-week periods from production facilities in the Midwestern USA. Samples were analyzed for several organic and inorganic nutrients and were also incubated in vitro for 30 h with rumen fluid to determine the fermentability of neutral detergent fibre (aNDFom), which was used in addition to some of the organic components to estimate the NE value of the co-products. There was very little difference in the nutrient levels of the conventional DDGS versus the uncooked DDGS-BPX, with both having moderate levels of CP (~280 g/kg DM) with relatively low buffer solubility and acid detergent insolubility. The aNDFom of both was highly fermentable (~0.74) at 30 h of in vitro incubation and, combined with the high EE content (~110 g/kg DM), led to a high estimated NE. However, DDGS-BPX had somewhat more S, Na, Mn, Cu, Mo and Se, and less Zn, than the conventional DDGS. The high protein DDG-HP also had somewhat less aNDFom, although its fermentability was higher, and a much lower EE level than the DDGS and DDGS-BPX. In addition, its mineral profile differed substantially from both DDGS and DDGS-BPX. The DCG had a substantially different nutrient and mineral profile than all the DDG products, and differed to a small extent from conventionally produced corn germ (National Research Council, 2001. Nutrient Requirements of Dairy Cattle, seventh rev. ed. National Academy of Sciences, Washington, DC, USA). These `new generation' corn distillers co-products have a high nutritional value for ruminants and, in general, nutrient variability was low. Considered in the context of overall ration formulation criteria, these co-products should have a high nutritive value in cattle rations.
Keywords: Ethanol; Distillers dried grains; Corn germ

R. Meiswinkel, M. Goffredo, E.G.M. Dijkstra, I.J.K. van der Ven, T. Baldet, A. Elbers, Endophily in Culicoides associated with BTV-infected cattle in the province of Limburg, south-eastern Netherlands, 2006, Preventive Veterinary Medicine, Volume 87, Issues 1-2, Special Issue: The 2006 Bluetongue outbreak in North-West Europe: The outcome from the epidemiological investigation coordinated by the European food safety authority (EFSA), 15 October 2008, Pages 182-195, ISSN 0167-5877, DOI: 10.1016/j.prevetmed.2008.06.008.

(http://www.sciencedirect.com/science/article/B6TBK-4T3KT93-1/2/2c2b6584581a8c7980c5dd9a60561478)
Abstract:
Culicoides were captured at a BTV-infected dairy near Gulpen in the province of Limburg (south-east Netherlands) between 14 September and 4 October 2006. Onderstepoort-type blacklight traps were used to sample Culicoides both inside and outside a partially open shed housing 11 cattle. A total of 28 light trap collections were made at the shed and yielded:
- 9371 Culicoides representing 11 species; >90% comprised five potential vectors of BTV and in order of abundance were Culicoides obsoletus and Culicoides scoticus (of the Obsoletus Complex), Culicoides dewulfi, Culicoides pulicaris and Culicoides chiopterus; Culicoides imicola, the principal Mediterranean (and African) vector of BTV, was absent.
- 2339 Culicoides representing seven species were captured inside (endophily) the cattle shed; >95% comprised the Obsoletus Complex and C. dewulfi. Conversely, the Pulicaris Complex, represented by five species and including C. pulicaris, showed strong exophily with >97% captured outside the shed.
- 7032 Culicoides were captured outside the shed, approximately threefold more than inside. This trend was reversed on an overcast day, when eightfold more Culicoides were captured inside; this indicates that when the light intensity outdoors is low Culicoides will attack (i) earlier in the day while cattle are still at pasture, and (ii) might follow cattle into the sheds in the late afternoon leading to elevated numbers of biting midges being trapped inside the shed during the subsequent hours of darkness.
- Culicoides were captured inside the shed on all 14 sampling nights. On occasion up to 33% were freshly blood fed indicating they had avidly attacked the cattle inside (endophagy); because half the cattle had seroconverted to BTV, and because no cattle were left outdoors at night, the data indicate that (i) the housing of animals in partially open buildings does not interrupt the transmission of BTV, and/or (ii) BTV is being transmitted while cattle are grazing outdoors during the day.
- The capture of partially engorged midges inside the shed shows they are being disturbed while feeding; this may lead to cattle being attacked repeatedly, and if these attacks include older parous BTV-infected Culicoides, may enhance virus dissemination (particularly in sheds where cattle stand close together).
- Endo- and exophagy by potential vector Culicoides - coupled to increased adult longevity and multiple feeding events in single (potentially) infected midges - would ensure an R0 of >1, resulting in the continued maintenance and spread of BTV within local vertebrate populations.
- Four light trap collections made additionally in a mature deciduous forest 70 m from the shed yielded a high proportion (48%) of gravid females amongst which 10% had incompletely digested blackened blood meals in their abdomens; the absence of this age category in Culicoides captured at the sheds indicates that all Culicoides, after engorgement, exit the buildings to undergo oogenesis elsewhere.
In Europe, the blacklight trap is used widely for the nocturnal monitoring of Culicoides; a drawback to this approach is that this trap cannot be used to sample midges that are active during the day. Because diurnal biting in vector Culicoides may constitute a significant and underestimated component of BTV transmission a novel capture methodology will be required in future and is discussed briefly.
Keywords: Bluetongue; Netherlands; Culicoides; Vectors; Blood feeding; Endophily; Endophagy; Protective housing

K.A. Baum, J.M. Ham, N.A. Brunsell, P.I. Coyne, Surface boundary layer of cattle feedlots: Implications for air emissions measurement, Agricultural and Forest Meteorology, Volume 148, Issue 11, October 2008, Pages 1882-1893, ISSN 0168-1923, DOI: 10.1016/j.agrformet.2008.06.017.

(http://www.sciencedirect.com/science/article/B6V8W-4T7W3BS-1/2/f2ff75c7c2d2e1c5edb57a2347a95b3d)
Abstract:
Air quality issues at cattle feedlots are a growing concern, and micrometeorological techniques have potential for measuring air emissions from these operations. However, eddy covariance and related methods rely on assumptions about the boundary layer that might not hold above the complex, non-uniform, and fetch-limited surface of a feedlot. The objective of this study was to characterize the surface boundary layer of an open-air cattle feedlot to provide insight into how micrometeorological techniques might be applied to these non-ideal sites. An open-path eddy covariance system was used to collect high-frequency time-series data of wind speed, CO2, and H2O above a large commercial feedlot in central Kansas in 2006 and 2007. This site, like many High Plains locations, was characterized by windy conditions with daytime average wind speed of 5 m s-1, and near-neutral atmospheric stability was common, even at night. Using a modeled displacement height of 0.65 m, the roughness length ranged from 2 to 6 cm with a median of 3.6 cm. Ogives showed no signs of low-frequency transport (i.e. periods> 30 min). Eddy covariance measurements of CO2 fluxes averaged 0.4 kg m-2 d-1 while H2O fluxes averaged 2.3 kg m-2 d-1, both of which agreed with other studies measuring cattle respiration or water consumption. The tower was located along the north edge of a rectangular-shaped feedlot so the fetch was over 1600 m when winds were southerly. However, the length of fetch encompassed by feedlot pens decreased as winds became more southeasterly or southwesterly. Using the sharp contrast in CO2 fluxes from the pens versus the surrounding fields, the outer edge of the sampling footprint could be determined by observing abrupt changes in CO2 flux as wind directions shifted to the southeast or southwest. This provided a way to measure the footprint requirement using the respired CO2 from the cattle as a tracer. Under neutral atmospheric stability the required fetch was about 360 m when the sensor height was 6 m. The fetch requirements and the source area were predicted with a footprint model. Results showed that, on average, the three pens directly south of the tower contributed 61% of the measured flux. Roads, feeding bunks, and transfer alleys (i.e. surfaces within the footprint other than pens) accounted for 21% of the total area. Thus, accounting for the diluting effect of these spaces in the source area was important when attempting to compute a flux per unit animal or per unit pen area.
Keywords: Animal feeding operations; Eddy covariance; Cattle respiration; Fetch-limited; Footprint modeling; Spectral analysis; Emission factor; Roughness length

Leena Tuomisto, Leena Ahola, Paula Martiskainen, Risto Kauppinen, Arto Huuskonen, Comparison of time budgets of growing Hereford bulls in an uninsulated barn and in extensive forest paddocks, Livestock Science, Volume 118, Issues 1-2, October 2008, Pages 44-52, ISSN 1871-1413, DOI: 10.1016/j.livsci.2008.01.011.
(http://www.sciencedirect.com/science/article/B7XNX-4S0RC9D-1/2/b593e78712f18fc2de0e05c1bed9585d)
Abstract:
The housing of growing cattle in forest paddocks has recently become more common in Finland. Besides economic reasons, the practice could be justified by increased behavioural freedom of the animals. Since the behaviour of growing bulls in extensive housing has scarcely been studied, we conducted a study to investigate the behaviour of Hereford bulls in an uninsulated barn and in forest paddocks during summer. Bulls born in spring were housed from November onwards in either partly bedded pens in an uninsulated barn (two groups of five bulls, 6.4 m2/bull) or in forest paddocks (two groups of five bulls, 1000 m2/bull). All animals were fed a total mixed ration ad libitum. The following summer, the behaviour of the bulls (age 15-18 months) was observed for 24 h (00:00-00:00) in July and for 15 h (06:00-21:00) in August and September. Instantaneous sampling with a 5-min sampling interval was used. The paddock bulls performed more self-grooming and walking, and less drinking and other behaviours (e.g. idling in standing position)

than the pen bulls during all or most of the observations. There were no differences between the groups in time spent on eating at the feeding trough, object manipulating, ruminating, social licking, butting or resting during any or most of the observations. Furthermore, the paddock bulls spent also some time on grazing and browsing. Stereotyped tongue-rolling or bar-biting was not found in either housing environment. The results of the present study show that the bulls readily utilise the opportunities for more diverse behaviour (e.g. foraging, locomotion) in the paddocks. In the pens, drinking behaviour was disturbed, probably due to the lower space allowance and the rather slow refilling rate of the water bowl. Otherwise also the relatively spacious, partly bedded pens in the uninsulated barn seemed to be satisfactory in regard to the bulls' welfare, because clear behavioural signs of distress, such as stereotypies or severe aggression, were not observed in the pen bulls.
Keywords: Bulls; Forest paddock; Uninsulated barn; Behaviour; Time budget; Welfare

C.L. Zhang, H. Chen, Y.H. Wang, R.F. Zhang, X.Y. Lan, C.Z. Lei, L. Zhang, A.L. Zhang, S.R. Hu, Serotonin receptor 1B (HTR1B) genotype associated with milk production traits in cattle, Research in Veterinary Science, Volume 85, Issue 2, October 2008, Pages 265-268, ISSN 0034-5288, DOI: 10.1016/j.rvsc.2007.10.014.
(http://www.sciencedirect.com/science/article/B6WWR-4RWC89F-1/2/7b1bb3ea92f0df68e6da8e9ed225313d)
Abstract:
Serotonin receptor 1B (HTR1B) is one of the 14 different identified serotonin receptors which are involved in the regulation of behaviors such as sleep, fear, aggression, mood, and feeding. The aims of this study were to characterize polymorphisms in the 5' coding and the 3' flanking regions of the bovine HTR1B gene among Chinese Holsteins and to identify the association of HTR1B polymorphisms with milk production performance. SSCP was used to examine the polymorphisms at four loci and the fragments with different SSCP patterns were sequenced. A total of three single nucleotide polymorphisms (SNPs) were detected, among which the 205G > T mutation was found to cause a predicted amino acid change: from Ala to Ser at position 69. The polymorphism of G205T was identified to be associated with milk yield trait. Furthermore, the H1-C genotype was found to be associated with a significant increase in milk yield of 489 kg vs. the H1-A genotype ($P < 0.05$).
Keywords: HTR1B; SNPs; Milk yield; Bovine

G.A. Nader, P.H. Robinson, Effects of maceration of rice straw on voluntary intake and performance of growing beef cattle fed rice straw-based rations, Animal Feed Science and Technology, Volume 146, Issues 1-2, 15 September 2008, Pages 74-86, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2007.12.007.
(http://www.sciencedirect.com/science/article/B6T42-4RSHR4F-2/2/2c65e1c97525ca6603c91a1fff8c54ff)
Abstract:
Effects of field scale maceration on voluntary intake of rice straw, diet digestibility of neutral detergent fiber (aNDF) and performance of growing cattle were evaluated through chemical, in vitro and animal feeding experiments over a 3-year period. Due to the sequential nature of the study (i.e., a discrete experiment was completed in each year), the method of maceration differed among years. However, in each year, replicated rice fields of approximately 2.4 ha each, which had been managed similarly during growth, were harvested with or without maceration immediately after harvest. While no quantitative measure of maceration was applied in any experiment, the extent of maceration in year 1 was visually judged to be very light, characterized by only a few stem punctures and no longitudinal stem shredding. In year 2, the extent of stem puncture was increased, most internodes were crushed and a small amount of longitudinal shredding had occurred and, in year 3, the amount of internode crushing and longitudinal

shredding was extreme. In each feeding experiment, cattle were managed in groups of 8-10 and fed the experimental diets for a 14-day adaptation period prior to weighing on day 0 of the study. Diets consisted of alfalfa hay, concentrate ingredients and rice straw that were fed for ad libitum intake. In general, the chemical composition of the rice straw was typical of California rice straw and, in spite of some differences due to maceration within year, there was no consistent impact on any analyte among years. In each year, the macerated rice straw had a numerically higher calculated metabolizable energy value, but these differences failed to reach statistical significance. The 30 h in vitro digestibility of aNDF in the feces of cattle fed macerated straw was lower ($P<0.01$) in each study, although the absolute level of aNDF in feces did not differ. Whole tract digestion of dietary aNDF was not impacted by rice straw maceration in experiment 1, was weakly numerically increased in experiment 2 (i.e., $P=0.45$), and approached statistical significance in experiment 3 (i.e., $P=0.07$), as the degree of maceration increased. Voluntary dry matter (DM) intake was numerically lower in cattle fed macerated rice straw in each experiment, and both the numerical extent and statistical support for that decline increased from experiments 1 to 3 as the degree of maceration of the rice straw increased, such that the 0.47 kg/d decline in DM intake by feeding macerated straw in experiment 3 was different (i.e., $P<0.01$). However, body weight gain was not impacted in any experiment and a shift from less efficient to more efficient gain/feed ratio from experiments 1 to 3 failed to reach statistical significance in any year. Maceration, in spite of substantial changes to the physical nature of the rice straw, failed to substantively impact animal performance.
Keywords: Rice straw; Maceration; Digestibility; Intake; Weight gain

X.P.C. Verge, J.A. Dyer, R.L. Desjardins, D. Worth, Greenhouse gas emissions from the Canadian beef industry, Agricultural Systems, Volume 98, Issue 2, September 2008, Pages 126-134, ISSN 0308-521X, DOI: 10.1016/j.agsy.2008.05.003.
(http://www.sciencedirect.com/science/article/B6T3W-4T083DN-1/2/adbbf746016877fed15b871cc7b0b812)
Abstract:
Commodity-specific estimates of the greenhouse gas (GHG) emissions from Canadian agriculture are required in order to identify the most efficient GHG mitigation measures. In this paper, the methodology from the Intergovernmental Panel on Climate Change (IPCC) for estimating bovine GHG emissions, for census years from 1981 to 2001, was applied to the Canadian beef industry. This analysis, which is based on several adaptations of IPCC methodology already done for the Canadian dairy industry, includes the concept of a beef crop complex, the land base that feeds the beef population, and the use of recommendations for livestock feed rations and fertilizer application rates to down-scale the national area totals of each crop, regardless of the use of that crop, to the feed requirements of the Canada's beef population. It shows how high energy feeds are reducing enteric methane emissions by displacing high roughage diets. It also calculates an emissions intensity indicator based on the total weight of live beef cattle destined for market. While total GHG from Canadian beef production have increased from 25 to 32 Tg of $CO_2$ equiv. between 1981 and 2001, this increase was mainly driven by expansion of the Canadian cattle industry. The emission intensity indicator showed that between 1981 and 2001, the Canadian beef industry GHG emissions per kg of live animal weight produced for market decreased from 16.4 to 10.4 kg of $CO_2$ equiv.
Keywords: Greenhouse gases; Beef production; Canadian agriculture; Mitigation strategies; Intensity indicator

Audun Korsaeth, Relations between nitrogen leaching and food productivity in organic and conventional cropping systems in a long-term field study, Agriculture, Ecosystems & Environment, Volume 127, Issues 3-4, September 2008, Pages 177-188, ISSN 0167-8809, DOI: 10.1016/j.agee.2008.03.014.

(http://www.sciencedirect.com/science/article/B6T3Y-4SG017R-1/2/fadfbd846472b5edee233faeed3d56c8)
Abstract:
An ideal agricultural system should both maximize food production and minimize undesirable effects on the environment. The long-term Apelsvoll cropping system experiment, located in southeast Norway, was used in this study, to compare yields, major N flows (in particular measured leaching/runoff losses) and the N loss-to-food production ratios (LFP-ratios) in six different cropping systems over a 4-year period. The experiment included three systems with cash-cropping (CA1: conventional arable farming; CA2: arable farming practice with environmentally sound management; OA: organic arable farming with 25% of the area as green manure, and three systems with both arable and fodder crops, representing mixed dairy production (CM: conventional farming practice with 50% grass-clover ley; OM1: organic farming with 50% grass-clover ley; OM2: organic farming with 75% grass-clover ley). The forage production was assumed to be used for milk and meat production, in amounts calculated on the basis of available feed and estimated requirements for dairy cattle. All farm produce (cereals, potatoes, milk and meat) was converted into metabolizable energy for human consumption. Organic cropping gave significantly lower yields than conventional cropping, for both arable and mixed dairy systems, most likely due to sub-optimal plant nutrition and the lack of plant protection in the organic systems. The average net energy production in CA1 and CA2 was 2.4-5.3 times greater than that in the other systems, which illustrates the energy costs of taking 25% of the area out of food production to produce green manure (OA) and the energy cost of including an extra trophic level in the nutrient chain (CM, OM1 and OM2). Only CA2 and CM appeared to have a balanced N budget, whereas the other systems all had N deficits, in particular CA1 and OA. The total N losses to drainage were largest from CA1, but not significantly larger than those from OA, which had the largest N runoff of the systems, most likely due to the green manure in its rotation. The conventional system with environmentally sound management (CA2) had the lowest LFP-ratios overall. Among the arable cropping systems, the organic system with 25% green manure (OA) had the highest LFP-ratios. The mixed dairy systems had generally higher LFP-ratios than the arable systems. Including leaching/runoff N losses in the LFP-ratio, CA1, CA2, OA, CM, OM1 and OM2 appeared to lose 0.6, 0.4, 1.1, 0.9, 1.2 and 1.1 kg N, respectively, per GJ of produced metabolizable energy for human consumption.
Keywords: Arable cropping systems; Cereal yields; Human nutrition; Food production; Loss-to-production ratios; Mixed dairy systems; Net energy production; Nitrogen budgets; Yields

S. Froberg, E. Gratte, K. Svennersten-Sjaunja, I. Olsson, C. Berg, A. Orihuela, C.S. Galina, B. Garcia, L. Lidfors, Effect of suckling (`restricted suckling') on dairy cows' udder health and milk let-down and their calves' weight gain, feed intake and behaviour, Applied Animal Behaviour Science, Volume 113, Issues 1-3, September 2008, Pages 1-14, ISSN 0168-1591, DOI: 10.1016/j.applanim.2007.12.001.
(http://www.sciencedirect.com/science/article/B6T48-4RN4860-1/2/ce01ca6580727613bf26a65de8afc97a)
Abstract:
The aim of this study was to evaluate the effects of restricted suckling (RS) in Holstein cattle on the weight gain, health and behaviour of calves and on udder health and milk let-down in cows compared to artificial rearing (AR). The study was conducted in Mexico. The 27 cows with calves were assigned to one of the two treatments and studied until weaning 8 weeks postpartum. Cows were milked three times daily. RS calves were allowed to suckle for 30 min 2 h after morning and afternoon milking, whereas AR calves were fed milk from buckets through a floating nipple at the same time. During suckling/milk feeding, the AR calves performed more oral behaviours such as `cross-suck' and `lick object' than RS calves. The RS calves spent a longer time suckling on the front teats than the rear teats. During observations of general behaviour when calves were not milk

fed, AR calves displayed more often `cross-suck', `lick object', `eat concentrate', `eat hay' and `ruminate' than RS calves. Milk consumption (286 kg) over 8 weeks in both groups and live weight gain (LWG) were similar in RS (26.2 +/- 3.9 kg) and AR calves (26.1 +/- 1.4 kg), but the individual variation in LWG was higher in RS calves. The milk suckled by RS calves contained more fat and metabolisable energy (ME) per kg than the parlour milk fed to AR calves (6.1% vs. 4.2% and 3.5 MJ/kg vs. 2.9 MJ/kg) whereas AR calves ingested more than fourfold as much concentrate as RS calves (21.6 kg vs. 4.8 kg), which resulted in similar total ME intake in treatments. The California Mastitis Test scores revealed a tendency to improved udder health in RS cows compared to AR cows. The average time to milk let-down was similar in treatments. In conclusion, the RS system with the Holstein dairy cattle reduced `cross-sucking' and `licking objects' in the calves and tended to improve udder health in the cows, compared to the AR system.
Keywords: Artificial rearing; Behaviour; Dairy calves; Dairy cows; Restricted suckling; Udder health

Caroline Lee, Andrew D. Fisher, Matt T. Reed, John M. Henshall, The effect of low energy electric shock on cortisol, [beta]-endorphin, heart rate and behaviour of cattle, Applied Animal Behaviour Science, Volume 113, Issues 1-3, September 2008, Pages 32-42, ISSN 0168-1591, DOI: 10.1016/j.applanim.2007.10.002.
(http://www.sciencedirect.com/science/article/B6T48-4R3BW49-1/2/446d6e4aaab4cb14355162fbd871fb45)
Abstract:
Electrical stimuli are used increasingly to confine cattle, whether through conventional electric fencing or the development of `virtual' fencing systems. Two experiments were conducted to assess behavioural, heart rate and stress hormone responses of cattle to electrical stimuli typically used in such confinement applications. In the first experiment, 30 steers (18-months old; n = 10 per treatment) were held in a handling crush for 15 min after receiving one of the following treatments: nothing (control); delivery of three shocks at 2 s intervals (600 V, 250 mW); and restraint in a head bail for 3 min. Plasma cortisol and [beta]-endorphin concentrations were measured at 0, 5, 10, 15 min, 1, 2, 3, and 4 h. In a second experiment, heart rate and behaviour were measured in 17 heifers (18 months of age) subjected to one of the following treatments whilst held in a crush for 10 min: nothing (control; n = 5); delivery of three shocks at 2 s intervals (600 V, 250 mW; n = 6); and restraint in a head bail for 3 min (n = 6). Cortisol and [beta]-endorphin concentrations did not differ between treatments (P > 0.05). Whilst animals were receiving the treatments, heart rate was lower when head restrained compared with shock or control treatments (P = 0.009) and did not differ between control and electric shock treatments (P = 0.35). Upon release from the crush, heart rate was higher in shock and head restrained treatments than the control treatment (P = 0.005). Animals receiving the electric shock treatment tossed their heads more frequently whilst in the crush than control animals (P = 0.012) but did not differ from the other treatments in the number of vocalisations, tail swishes, steps back and forward, head tilts and head turns. There was a significant effect of treatment on flight time (P = 0.005); animals receiving the electric shocks were faster to leave the crush than control animals (P = 0.005) and there was no difference between head restraint and shock treatment (P = 0.86). In 10 min following release from the crush, there was no treatment difference in the time to start feeding. This study suggests that the stress response of cattle to low energy electric shocks is minimal and is similar to that induced by restraint in a crush.
Keywords: Electronic collars; Cortisol; Electric shock; Stress; Virtual fencing

Bryony A. Tolhurst, Alastair I. Ward, Richard J. Delahay, Ann-Marie MacMaster, Timothy J. Roper, The behavioural responses of badgers (Meles meles) to exclusion from farm buildings using an electric fence, Applied Animal Behaviour Science, Volume 113, Issues 1-3, September 2008, Pages 224-235, ISSN 0168-1591, DOI: 10.1016/j.applanim.2007.11.006.

(http://www.sciencedirect.com/science/article/B6T48-4RH8SB7-1/2/f92610cbb62a061ccb95ab3d743de62e)
Abstract:
Behavioural investigations into the transmission of bovine tuberculosis (Mycobacterium bovis) between badgers and cattle suggest that badger activity in farm buildings may incur a significant risk of cross-infection. However, measures to exclude badgers from buildings have not been systematically field-tested. In the present study, remote surveillance and radio-tracking were used to monitor the effect of electric fencing manipulations on the frequency of badger incursions into feed stores and cattle housing, and on badger ranging behaviour. Electric fencing was effective in preventing access to the farm buildings where it was installed and also significantly reduced incursions into unfenced buildings. Badger home range and core activity areas tended to increase in size when the fencing was installed, although they did not extend beyond the boundaries of the relevant social group territories. We discuss the logistical constraints of using electric fencing in this context and conclude that it is a potentially useful method of reducing contact between badgers and cattle, within farm buildings and yards.
Keywords: Badger; Avoidance behaviour; Farm buildings; Disease transmission; Electric fencing; Ranging behaviour

Young-Joo Kim, Woo-Jung Choi, Sang-Sun Lim, Jin-Hyeob Kwak, Scott X. Chang, Han-Yong Kim, Kwang-Sik Yoon, Hee-Myong Ro, Changes in nitrogen isotopic compositions during composting of cattle feedlot manure: Effects of bedding material type, Bioresource Technology, Volume 99, Issue 13, September 2008, Pages 5452-5458, ISSN 0960-8524, DOI: 10.1016/j.biortech.2007.11.012.
(http://www.sciencedirect.com/science/article/B6V24-4RWC86F-2/2/8071ae76a1cdd0514c3fa77b264c2e5f)
Abstract:
Temporal changes in [delta]15N of cattle feedlot manure during its composting with either rice hull (RHM) or sawdust (SDM) as bedding materials were investigated. Regardless of the bedding material used, the [delta]15N of total N in the manure increased sharply from +7.6[per mille sign] to +9.9[per mille sign] and from +11.4[per mille sign] to +14.3[per mille sign], respectively, in RHM or SDM, within 10 days from the commencement of composting. Such increases could be attributed primarily to N loss via NH3 volatilization and denitrification based on the very high [delta]15N values (greater than +20[per mille sign]) of and in the co-composted manure. The [delta]15N of total N in RHM was substantially lower (by more than 3[per mille sign]) than that in SDM, suggesting that the [delta]15N of the composted manure was affected not only by N loss but also by the type of bedding material used. Specifically, the higher N concentration in the rice hull than in the saw dust could lead to a greater 15N isotope dilution.
Keywords: Ammonia volatilization; Denitrification; Isotopic fractionation; Rice hull; Sawdust

M.J. Yokoo, L.G. Albuquerque, R.B. Lobo, L.A.F. Bezerra, F.R.C. Araujo, J.A.V. Silva, R.D. Sainz, Genetic and environmental factors affecting ultrasound measures of longissimus muscle area and backfat thickness in Nelore cattle, Livestock Science, Volume 117, Issues 2-3, September 2008, Pages 147-154, ISSN 1871-1413, DOI: 10.1016/j.livsci.2007.12.006.
(http://www.sciencedirect.com/science/article/B7XNX-4RXCD06-1/2/373d1805a57c0c0a7798611437f25944)
Abstract:
The aim of the present study was to evaluate the genetic and environmental factors affecting records of longissimus muscle area (LMA) and backfat thickness (BF) obtained between the 12th and 13th ribs, and rump fat thickness (RF) between the hook and pin bones, measured by real-time ultrasound in Nelore cattle. Also, weight records of 22,778 animals born from 1998 to 2003, in ten farms across six Brazilian states were used. Carcass traits as measured by ultrasound of the live animal were recorded from 2002 to 2004 in 2590 males and females with ages varying from

450 to 599 days. Fixed models including farm, year and season of birth, sex and type of feed effects, and the covariates age of dam (AOD) and age of animal at measurement were used to study the effect of environmental factors on these traits. The genetic parameters for LMA, BF and RF were estimated with two and three-trait animal models with 120-day weights using a restricted maximum likelihood method. All environmental effects significantly affected carcass traits, with the exception of year of birth for BF and RF and AOD for LMA. The heritability estimates for LMA, BF and RF were 0.35, 0.51 and 0.39, respectively. Standard errors obtained in one-trait analyses were from 0.07 to 0.09. Genetic correlation estimates between LMA and the two traits of subcutaneous fat were low (close to zero) and 0.74 between BF and RF, indicating that the selection for LMA should not cause antagonism in the genetic improvement of subcutaneous fat measured by real-time ultrasound.
Keywords: Age of dam; Carcass traits; Compensatory growth; Genetic Correlation; Heritability; Rump fat thickness

E. Solanas, C. Castrillo, M. Fondevila, Q.O. Ruiz Narvaez, J.A Guada, Effects of cereals and/or protein supplement extrusion on diet utilisation and performance of intensively reared cattle, Livestock Science, Volume 117, Issues 2-3, September 2008, Pages 203-214, ISSN 1871-1413, DOI: 10.1016/j.livsci.2007.12.014.
(http://www.sciencedirect.com/science/article/B7XNX-4RM89H7-2/2/f9f17e98b214b920aae45b747bbed169)
Abstract:
The effect of extruding the cereal and/or the protein supplement of a compound feed on its nutritive value and on the performance of intensively reared male calves was studied. The compound feed was formulated with 0.65 of a cereal blend (60:40 maize:barley), 0.25 of a protein blend (1/3:1/3:1/3 raw soybeans:peas:lupins), and 0.08 of urea to contain 0.17 of crude protein. It was tested without extruding (NE) and with the cereal blend (CE), the protein blend (PE) or both (CPE) extruded. Another non-extruded compound feed with mainly soybean meal as the protein supplement (NE-SBM) also was studied. The five experimental compound feeds together with barley straw were offered ad libitum to 50 male Friesian calves (112 kg initial live weight) for 13 weeks, recording individual feed intake and live weight gain. Crude protein (CP) solubility and in vitro and in situ CP degradation of experimental compounds, and in vitro gas production kinetics, in vivo digestibility and urinary allantoin excretion of diets were determined. Cereal extrusion promoted a greater gas production at all incubation times ($p < 0.001$), associated to the increase in starch gelatinisation. PE and NE-SBM compounds showed lower in vitro ($p < 0.01$) and in situ ($p < 0.001$) CP degradability than the other feeds. Ingredient extrusion did not affect apparent DM, OM and CP digestibilities, but diet CPE showed a lower NDF digestibility ($p < 0.05$) than the others (0.293 vs. 0.420, 0.387, 0.390 and 0.407 with CPE vs. NE, CE, PE and NE-SBM, respectively). The apparent EE digestibility increased ($p = 0.053$) with the inclusion of extruded ingredients, (0.799, 0.749 and 0.794 vs. 0.719 and 0.702 with CE, PE and CPE vs. NE and NE-SBM, respectively). Daily allantoin excretion was lower ($p < 0.01$) in calves receiving the CPE diet than in those receiving the NE, PE and NE-SBM diets. Treatments did not affect the average daily gains (1.61 +/- 0.022 kg d- 1), however calves on the CPE diet showed a lower ($p < 0.01$) concentrate and total conversion ratios than those fed NE, PE and NE-SBM (2.60 vs. 2.79, 2.85 and 2.98 kg concentrate DM kg- 1 daily gain and 2.93 vs. 3.09, 3.13 and 3.26 kg total DM kg- 1 daily gain, respectively). The CE diet resulted in numerically higher ($p > 0.05$) concentrate and total DM conversion ratios (2.72 and 3.02) than CPE and lower ($p < 0.05$) than NE-SBM. Improvement in feed conversion ratio after extrusion would be related to a better starch utilisation and not to changes in microbial or dietary protein flow to the duodenum, although a better utilisation of fat energy cannot be disregarded.
Keywords: Beef cattle; Extrusion; Digestibility; Growth

P.E. Strydom, Do indigenous Southern African cattle breeds have the right genetics for commercial production of quality meat?, Meat Science, Volume 80, Issue 1, 54th International Congress of Meat Science and Technology (54th ICoMST), 10-15August 2008, Cape Town, South Africa, September 2008, Pages 86-93, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.04.017. (http://www.sciencedirect.com/science/article/B6T9G-4SD29WR-1/2/c60e2d93d1e99692a75825fb2530eea3)
Abstract:
The establishment of cattle breeds which are now indigenous to Africa is believed by historians to be very closely associated with man, his development, migration and specific behaviour from 6000 years BC. Today these breeds compete with exotic breeds in a commercial system driven by global economical principles. Results from various trials are discussed to verify if these breeds can adhere to these principles and compete in the South African beef market to produce quality beef economically. Variation in frame size among indigenous breeds will determine their suitability as feedlot cattle depending on the price and feed margins driving profit in this industry sector. Meat quality analyses indicate small or no differences between indigenous and exotic European/British breeds but with potentially superior quality compared to Bos indicus breeds.
Keywords: Indigenous beef breeds; Tenderness; Yield; Growth performance; Pasture; Feedlot

Yolanda Saco, Marta Fina, Merce Gimenez, Raquel Pato, Jesus Piedrafita, Anna Bassols, Evaluation of serum cortisol, metabolic parameters, acute phase proteins and faecal corticosterone as indicators of stress in cows, The Veterinary Journal, Volume 177, Issue 3, September 2008, Pages 439-441, ISSN 1090-0233, DOI: 10.1016/j.tvjl.2007.05.019. (http://www.sciencedirect.com/science/article/B6WXN-4P6MC42-1/2/dad840e318d33d1d8636dc6cd4a704ba)
Abstract:
To assess the validity of laboratory parameters in blood and faeces as indicators of stress in cows, concentrations of cortisol, non-esterified fatty acids (NEFAs), 3-hydroxybutyrate, glucose, triglycerides, cholesterol, serum amyloid A (SAA) and haptoglobin in serum, as well as corticosterone in faeces, were determined in two breeds of cattle (Alberes and Bruna dels Pirineus) under different systems of housing and feeding. Serum cortisol concentrations were markedly elevated in the Alberes group, probably because they were less habituated to human handling. Corticosterone concentrations in faeces were significantly increased in the Bruna dels Pirineus cattle on Alberes pastures. Concentrations of NEFAs and cholesterol were significantly elevated in the Alberes cows, indicating an adrenergic stimulus of lipolysis or the existence of nutritional stress. SAA concentrations were significantly higher in groups living in hardy conditions, whereas there were no significant differences in haptoglobin between the three groups.
Keywords: Stress; Bovine; Cortisol; Corticosterone; Acute phase proteins

L.G. Dias, D.M. Correia, J. Sa-Morais, F. Sousa, J.M. Pires, A.M. Peres, Raw bovine meat fatty acids profile as an origin discriminator, Food Chemistry, Volume 109, Issue 4, 15 August 2008, Pages 840-847, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2008.01.008. (http://www.sciencedirect.com/science/article/B6T6R-4RMNYM1-1/2/973fe720865bea3ec28a55f47189539d)
Abstract:
Consumers are very concerned in 'Protected Designation of Origin' (PDO) products, namely meat, since they associate these products to quality and healthy foods. Thus, it is necessary to implement analytical methodologies that could assure consumers about the products they purchase. Since this kind of meat is usually sold with no information concerning cattle sex, age and slaughter season, these characteristics were intentionally not taken into account. In this study, two Portugueses PDO bovine breeds (Mirandesa and Barrosa) and two production sub-systems (traditional and organic farming) were studied during a two-year period. Statistical analysis showed

that production system and breed had a significant effect on the overall raw meat fatty acids (FA) content. Besides, the FA profiles could be used as an effective tool to differentiate the four groups studied allowing a 100% correct classification. The meat FA content was also correlated with the relative importance of the animal feeding stuff area.
Keywords: Bovine breed; Fatty acids; Linear discriminant analysis; Meat differentiation; Production systems

C.M. Guedes, D. Goncalves, M.A.M. Rodrigues, A. Dias-da-Silva, Effects of a Saccharomyces cerevisiae yeast on ruminal fermentation and fibre degradation of maize silages in cows, Animal Feed Science and Technology, Volume 145, Issues 1-4, Enzymes, Direct Fed Microbials and Plant Extracts in Ruminant Nutrition, 14 August 2008, Pages 27-40, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2007.06.037.
(http://www.sciencedirect.com/science/article/B6T42-4PGXF96-1/2/e70f0db6811e800b0f54dab64c6d5af8)
Abstract:
Effects of a Saccaromyces cerevisiae yeast (Levucell SC 10 ME; 1 x 1010 CFU/g (SC)) on ruminal fermentation and fibre degradation of maize silages was studied with 3 non-lactating fistulated cows fed maize silage, concentrate and meadow hay (48:42:10, DM basis) twice daily and supplemented with 0 (SC0), 0.3 (SC0.3) and 1 g (SC1.0) of SC/day. Maize silages, 40, were ruminally incubated in situ for 36 h to determine neutral detergent fibre degradation (NDFdeg). Silages were divided into two groups according to NDFdeg measured with the SC0 diet, being a low fibre degradation (LFD) group (NDFdeg: 0.20-0.30) and a high fibre degradation (HFD) group (NDFdeg: 0.35-0.45). Rumen fluid was collected on 2 non-consecutive days at 0, 2, 4 and 8 h post-feeding for determination of pH, ammonia N, volatile fatty acids (VFA) and lactate concentrations. The study was a 3 x 4 factorial design, with 3 replications, to examine effects on ruminal fermentation and in a 3 x 2 factorial design, with 3 replications, to examine effects on NDFdeg. Inclusion of SC increased ($P<0.01$) ruminal pH, decreased ($P<0.01$) lactate concentration and the acetate:propionate ($P<0.01$) ratio, but had no effect on ammonia N concentration. The SC addition at 1 g/day increased VFA concentration versus the control diet ($P<0.01$), further the reduced acetate:propionate ratio and increased fibrolytic activity of rumen bacteria as assessed by NDFdeg of silages. No effect on silage degradation occurred with the SC0.3 diet. Changes of rumen fermentation occurred from 0 to 8 h post-feeding, as expected, increasing ($P<0.05$) from 0 to 2 and/or 4 h after feeding followed by a decrease to 8 h. There was only an interaction (i.e., $P<0.05$) of diet x time post-feeding for ruminal pH and lactate concentration. Results show that this SC strain was effective in alleviating pH depression and lactate concentration after feeding of fistulated cows fed twice daily at close to the metabolizable energy maintenance requirements, irrespective of the level of YC inclusion. This suggests that this SC has the potential to reduce the risk of rumen acidosis in commercial cattle fed maize silage based diets and, if used at the highest level, could be of further benefit due to increased fibre degradation of low quality maize silages.
Keywords: Saccharomyces cerevisiae; Ruminal fermentation; In sacco fibre degradation; Cows

D.R. Miller, R. Elliott, B.W. Norton, Effects of an exogenous enzyme, Roxazyme(R) G2, on intake, digestion and utilisation of sorghum and barley grain-based diets by beef steers, Animal Feed Science and Technology, Volume 145, Issues 1-4, Enzymes, Direct Fed Microbials and Plant Extracts in Ruminant Nutrition, 14 August 2008, Pages 159-181, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2007.05.045.
(http://www.sciencedirect.com/science/article/B6T42-4PHSFD0-3/2/28be12a0ccf2305801f24b410845fa97)
Abstract:

A series of experiments were undertaken to determine effects of a mixed xylanase and endoglucanase exogenous enzyme (EE) product, Roxazyme(R) G2, on nutrient intake, digestion and feed conversion in beef steers fed sorghum or barley grain-based diets. Sixteen Bos indicus crossbred steers (314.2 +/- 26.07 kg) were allocated within stratified liveweight (LW) blocks to four treatments consisting of dry-rolled, sorghum or barley based (~0.60) diets treated with concentrate applied EE at 0 or 4.43 ml/kg diet dry matter (DM). The EE supplementation occurred for 7 weeks with digestibility measurements 2 and 6 weeks after commencement. The EE treatment resulted in increased daily voluntary DM intakes (P<0.05) for steers fed the sorghum diet, but not for steers fed the barley diet. Daily LW gain increased numerically on both diets (920 g/d versus 740 g/d, P=0.138) with no changes in feed efficiency. The EE treatment had no effect on total tract OM or fibre digestibility, but interacted with diet (P<0.05) whereby sorghum starch digestibility at 6 weeks was reduced by EE treatment (0.68 versus 0.81 control) without change in barley starch digestion (0.96). The EE supplements also increased (P<0.05) urinary N excretion. In a second 4 x 4 Latin Square experiment with 24 d periods, ruminally cannulated B. indicus crossbred steers (364.3 +/- 21.98 kg, n = 4) were fed sorghum grain diets, either as in the first experiment or at reduced grain levels (0.35 of diet DM), and untreated or treated with EE (4.18 ml/kg diet DM) as previously. Under these conditions, EE treatment had no effects on feed intake, total tract digestibility or ruminal fermentation measurements. A marker dilution technique indicated that EE treatment reduced (P<0.05) the fractional passage rate of a grain-associated marker when applied to the high grain diet, while increasing it on the low grain diet, but EE did not affect fluid or fibre marker flows from the rumen. Ruminal in sacco incubations of 3 mm ground pangola grass (Digitaria decumbens) or sorghum grain revealed a reduction (P<0.01) in the insoluble potentially degradable fraction of the grass with EE supplementation, likely due to reduced (P=0.058) anaerobic fungi colonisation, and a tendency (P=0.082) for increased extent of grain DM disappearance. A 70 d feedlot experiment used 96 Santa Gertrudis steers (351 +/- 25.3 kg) allocated in balanced groups to one of four replicates of four levels of EE supplementation (i.e., 0, 1.08, 2.16, 4.33 l/tonne DM total ration) applied to a high quality, dry-rolled sorghum (0.72 of DM) finishing ration. The EE had no effect on DM intake (120 g/kg LW0.75), LW gain (1.92 kg/d), feed efficiency (5.72 kg DM/kg LW gain) or carcase attributes. A mixed activity EE product fed to beef cattle had dietary dependant (both type and composition) effects on feed intake, starch and N digestion, microbial efficiency, grain marker flow rates and the extent of in sacco degradation of a grass forage. However, production performance and carcase measures were not effected by adding the EE to a high quality feedlot diet fed to growing steers.
Keywords: Enzymes; Grain; Digestion; Feed intake; Weight gain; Efficiency

L. Castillejos, S. Calsamiglia, J. Martin-Tereso, H. Ter Wijlen, In vitro evaluation of effects of ten essential oils at three doses on ruminal fermentation of high concentrate feedlot-type diets, Animal Feed Science and Technology, Volume 145, Issues 1-4, Enzymes, Direct Fed Microbials and Plant Extracts in Ruminant Nutrition, 14 August 2008, Pages 259-270, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2007.05.037.
(http://www.sciencedirect.com/science/article/B6T42-4PFFD14-1/2/c3fa5adbc9ad5798344b2e1722f00906)
Abstract:
Use of antibiotics as growth promoters in animal feeds has been banned in the European Union due to increasing concerns about the appearance of residues in meat and milk and antibiotic resistant strains of bacteria. Some essential oils (EO) modify rumen microbial activity and appear to be a `natural' alternative to modify rumen microbial fermentation. Effects of 10 EO (i.e., clove leave, hyssop, lavandin, lavender, thyme, oregano, rosemary, sage, savory, tea tree) were evaluated in in vitro 24 h batch culture of diluted rumen fluid [Tilley, J.M.A., Terry, R.A., 1963. A two stage technique for the in vitro digestion of forage crops. J. Brit. Grassland Soc. 18, 104-111] at pH 6.50. A 10:90 forage:concentrate diet (161 g/kg CP; 320 g/kg NDF; 380 g/kg starch on a dry

matter basis) typically fed to beef cattle in a barley grain based beef system was used as substrate. Treatments were: negative control (CTR), positive control (10 mg/l of monensin), and three doses of each EO (5, 50, 500 mg/l). After 24 h, pH was determined in the culture fluid and samples were analyzed for ammonia N and volatile fatty acid (VFA) concentrations. Monensin increased VFA concentration, and propionate and valerate proportions, and decreased acetate and butyrate proportions, the acetate to propionate ratio and ammonia N concentration. Lavender oil did not modify rumen microbial fermentation and lavandin and oregano (500 mg/l) inhibited rumen microbial fermentation thereby decreasing VFA concentration, which suggests that these EO may not be beneficial in beef cattle nutrition. However, the lower doses of oregano oil increased VFA concentration by 39-56%. Thyme and savory oils increased VFA concentration, and decreased ammonia N concentration and final pH. The 500 mg/l doses of rosemary, hyssop, sage, tea tree and clove leaf oils acted similar to monensin by increasing propionate and valerate proportion, and reducing acetate and butyrate proportions and the acetate to propionate ratio without reducing VFA concentration. Clove leaf oil at 500 mg/l increased total VFA and was the only EO that increased final pH. Most of these EO modified rumen microbial fermentation and may allow manipulation of rumen fermentation to improve animal performance.
Keywords: Essential oil; Rumen fermentation

Ellen M. Hoffmann, Natascha Selje-Assmann, Klaus Becker, Dose studies on anti-proteolytic effects of a methanol extract from Knautia arvensis on in vitro ruminal fermentation, Animal Feed Science and Technology, Volume 145, Issues 1-4, Enzymes, Direct Fed Microbials and Plant Extracts in Ruminant Nutrition, 14 August 2008, Pages 285-301, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2007.06.038.
(http://www.sciencedirect.com/science/article/B6T42-4PG2RXN-2/2/cb896111dcf5dbca3ef72956c30716e0)
Abstract:
A protein sparing effect in mixed cultures of rumen microbes, recently described for the field scabious Knautia arvensis [Selje-Assmann, N., Hoffmann, E.M., Muetzel, S., Ningrat, R., Wallace, R.J., Becker, K., 2007. Results of a screening programme to identify plants or plant extracts that inhibit ruminal protein degradation. Br. J. Nutr. 98, 45-53], and extractable with methanol, was similar to effects mediated by monensin. As a potential alternative to growth promoting feed antibiotics, we investigated this activity in a dose study. In vitro batch incubations were completed with rumen fluid from lactating Holstein cows on a substrate designed to resemble a concentrate-rich diet for dairy cattle, with a standardized protein supplement, to measure degradation of feed protein. Incubations with 3 [mu]M monensin were the external control. Five concentrations (i.e., 0.4-2 mg dry matter/ml) of methanol extract of K. arvensis were added, either substituting an equivalent amount of basal forage, or to a constant amount of substrate. Fermentation parameters, determined in regular intervals up to 12 h, were gas production, concentrations of short chain fatty acids (SCFA), ammonium and soluble true protein. When the extract was substituted, and total substrate was the reference, total SCFA yield was not affected, whereas release of branched SCFA and protein degradation rate were reduced in a dose-dependent manner by a maximum of ~60%. Propionate proportion increased with extract dose by up to ~15%, and effects could be modeled by linear regression with high correlation coefficients. Ammonium concentration decreased above the threshold concentration of 0.8 mg/ml by ~14%. However 3 [mu]M monensin, under the same conditions, decreased branched SCFA and protein degradation rate by ~36%, ammonium by 5% and increased propionate proportion by 28%. When the extract was added to a constant amount of substrate, rather than replacing forage, effects on protein degradation were more pronounced. In vitro results suggest that K. arvensis has the potential to increase rumen protein escape in ruminant diets, and thus improve N use efficiency in vivo. The methanol extractability of the active component provides perspective for development of

a standardized additive from this plant material that may be applicable in dairy cattle feeding systems, although its in vivo efficacy and persistency still need to be demonstrated.
Keywords: Plant extracts; Knautia arvensis; Fermentation; Rumen proteolysis; In vitro

M. Lourenco, G. Van Ranst, B. Vlaeminck, S. De Smet, V. Fievez, Influence of different dietary forages on the fatty acid composition of rumen digesta as well as ruminant meat and milk, Animal Feed Science and Technology, Volume 145, Issues 1-4, Enzymes, Direct Fed Microbials and Plant Extracts in Ruminant Nutrition, 14 August 2008, Pages 418-437, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2007.05.043.
(http://www.sciencedirect.com/science/article/B6T42-4PG2KV2-4/2/0ed016b0eb20fddb00bc1d7ba05878c2)
Abstract:
We review literature on effects of dietary forages on milk and tissue fatty acid composition of cattle and sheep, with particular emphasis on changes induced by leguminous and biodiverse forages versus intensive ryegrass. Differences are discussed in relation to changes in rumen or duodenal digesta to explain the origin of the differences as, in most cases, increased omega-3 PUFA (i.e., linolenic acid and/or long chain omega-3 PUFA) in milk and intramuscular fat due to feeding of red or white clover and botanically diverse forages could not be attributed to increased dietary supply of linolenic acid (C18:3 n-3). Hence, increased forestomach outflow of C18:3 n-3 has been suggested to originate from reduced rumen lipolysis, with literature providing some evidence for the role of polyphenoloxidase, which is particular active in red clover, to inhibit rumen lipolysis. Increased proportions of CLA c9t11 in milk and intramuscular fat of ruminants fed botanically diverse forages have been associated with increased forestomach outflow of vaccenic acid (C18:1 t11), which is the main precursor of endogenous CLA c9t11 production. Despite the lack of direct evidence, some plant secondary metabolites, present in herbs of botanically diverse forages, are suggested to be potential modifiers of rumen biohydrogenation based on their effects on rumen methanogenesis.
Keywords: Biohydrogenation; Botanically diverse forages; Fatty acids; Plant metabolites

Ben-hai XIONG, Qing-yao LUO, Jian-qiang LU, Liang YANG, Study of Digital Management System of Milking Process on Large-Sized Dairy Farm, Agricultural Sciences in China, Volume 7, Issue 8, August 2008, Pages 1022-1028, ISSN 1671-2927, DOI: 10.1016/S1671-2927(08)60142-X.
(http://www.sciencedirect.com/science/article/B82XG-4T9DCT2-H/2/6b94159becd1b588bdc804faaa8a67f8)
Abstract:
This study was to supply the systemic and full milking process data to support the implementation of both dairy herd improvement (DHI) and digital feeding of dairy cattle. This study designed the relational structured database and developed a set of digital management information system on milking process of intensive dairy farm using Visual Basic 6.0, Access databases, and Crystal report combining the milking characteristics of a grown cow, such as quality and sanitation testing indexes of raw milk. The system supplies a series of convenient, intelligent input interfaces of crude datum, and can count, analyze, and graphically show milking datum based on different types and different parities of cows or herds in a specific duration, and can dynamically produce some important derived data, such as days of grown cow, daily average of milk production of grown cow, days of cow milk production, and daily average of milking cow production; and can carry out all-pervasive data mining. With the help of system analysis and software design techniques, it is possible to realize precision farming for a dairy cattle herd based on whole digital management of milking process and realtime prediction on nutrient requirements and ration of dairy cattle, as well as dairy herd improvement.
Keywords: dairy farm; dairy herd improvement (DHI); grown cow; milking; digital management

Susan M. Cooper, Humberto L. Perotto-Baldivieso, M. Keith Owens, Michael G. Meek, Manuel Figueroa-Pagan, Distribution and interaction of white-tailed deer and cattle in a semi-arid grazing system, Agriculture, Ecosystems & Environment, Volume 127, Issues 1-2, August 2008, Pages 85-92, ISSN 0167-8809, DOI: 10.1016/j.agee.2008.03.004.
(http://www.sciencedirect.com/science/article/B6T3Y-4S9NG36-2/2/363b90b397092e3d427577a54a421528)
Abstract:
In order to optimize production, range managers need to understand and manage the spatial distribution of free-ranging herbivores, although this task becomes increasingly difficult as ranching operations diversify to include management of wildlife for recreational hunting. White-tailed deer are sympatric with cattle throughout much of their range and are a valuable commodity in southern rangelands. The spatial distribution of deer and cattle was monitored over 1 year during four trials each lasting 12 days. In each trial six white-tailed deer (three bucks, three does) and nine cows were fitted with Global Positioning System (GPS) collars. Collars were scheduled to take a position location every 5 min to determine animal location. These data were analyzed to study animal-to-animal interactions. To minimize problems of spatial autocorrelation, data were thinned to hourly locations for assessing animal home ranges and distributions. Although there was extensive overlap in spatial distributions of deer and cattle the species exhibited strong temporal separation. The mechanism was probably a combination of avoidance of cattle by deer and different habitat requirements. Close interactions were rare, however, individual deer did not show avoidance of cattle until they were within 50 m of each other. Species distributions overlapped mainly on the most productive ecological sites such as clay loam soils and riparian areas which were favored by both species. Cattle avoided rocky terrain, so deer had almost exclusive use of rocky areas including the productive deep soil drainage areas within them. Does particularly favored these areas and the riparian areas while bucks favored the more open clay loam sites. In this shrub-dominated system both deer and cattle were often located close to ranch roads, and cattle especially used roads as paths of least resistance. Cattle were closely associated with water sources, but deer did not stay long near water or at supplemental feeding sites. Concerns that cattle will displace deer into marginal habitats, or that deer will over utilize vegetation near water and feeders, were not supported.
Keywords: Animal interactions; Ecological sites; GPS; Rangeland; Spatial distribution; Texas

N.N. Jonsson, R.E. Bock, W.K. Jorgensen, Productivity and health effects of anaplasmosis and babesiosis on Bos indicus cattle and their crosses, and the effects of differing intensity of tick control in Australia, Veterinary Parasitology, Volume 155, Issues 1-2, 1 August 2008, Pages 1-9, ISSN 0304-4017, DOI: 10.1016/j.vetpar.2008.03.022.
(http://www.sciencedirect.com/science/article/B6TD7-4S7BDKP-4/2/8a96c52988437a458cddf0224ac9aee8)
Abstract:
Tick fever is an important disease of cattle where Rhipicephalus (Boophilus) microplus acts as a vector for the three causal organisms Babesia bovis, Babesia bigemina and Anaplasma marginale. Bos indicus cattle and their crosses are more resistant to the clinical effects of infection with B. bovis and B. bigemina than are Bos taurus cattle. Resistance is not complete, however, and herds of B. indicus-cross cattle are still at risk of babesiosis in environments where exposure to B. bovis is light in most years but occasionally high. The susceptibility of B. indicus cattle and their crosses to infection with A. marginale is similar to that of B. taurus cattle. In herds of B. indicus cattle and their crosses the infection rate of Babesia spp. and A. marginale is lowered because fewer ticks are likely to attach per day due to reduced numbers of ticks in the field (long-term effect on population, arising from high host resistance) and because a smaller proportion of ticks that do develop to feed on infected cattle will in turn be infected (due to lower parasitaemia). As a

consequence, herds of B. indicus cattle are less likely than herds of B. taurus cattle to have high levels of population immunity to babesiosis or anaplasmosis. The effects of acaricide application on the probability of clinical disease due to anaplasmosis and babesiosis are unpredictable and dependent on the prevalence of infection in ticks and in cattle at the time of application. Attempting to manipulate population immunity through the toleration of specific threshold numbers of ticks with the aim of controlling tick fever is not reliable and the justification for acaricide application should be for the control of ticks rather than for tick fever. Vaccination of B. indicus cattle and their crosses is advisable in all areas where ticks exist, although vaccination against B. bigemina is probably not essential in pure B. indicus animals.
Keywords: Bos indicus; Anaplasmosis; Babesiosis; Tick fever; Cattle; Tick control; Acaricides; Vaccination; Rhipicephalus microplus

Trevor W. Alexander, Shaun R. Cook, L. Jay Yanke, Calvin W. Booker, Paul S. Morley, Ron R. Read, Sheryl P. Gow, Tim A. McAllister, A multiplex polymerase chain reaction assay for the identification of Mannheimia haemolytica, Mannheimia glucosida and Mannheimia ruminalis, Veterinary Microbiology, Volume 130, Issues 1-2, 27 July 2008, Pages 165-175, ISSN 0378-1135, DOI: 10.1016/j.vetmic.2008.01.001.
(http://www.sciencedirect.com/science/article/B6TD6-4RMFNYM-1/2/1b3b6d5b600221a5927394888aa122bb)
Abstract:
The objective of this study was to design a multiplex PCR assay to identify Mannheimia haemolytica, Mannheimia glucosida and Mannheimia ruminalis. The multiplex PCR included primer sets HP, amplifying a DNA region from an unknown hypothetical protein, Lkt and Lkt2, amplifying different regions of the leukotoxinD gene, and 16S to amplify universal bacterial sequences of the 16S rRNA gene. Based on positive amplification, isolates were delineated as M. haemolytica (HP, Lkt, 16S), M. glucosida (HP, Lkt, Lkt2, 16S), or M. ruminalis (HP, 16S). The validity of the assay was examined against 22 reference strains within the family Pasteurellaceae and 17 field isolates (nasal) that had been collected previously from feedlot cattle and tentatively identified as M. haemolytica based on morphology and substrate utilization. Additionally, 200 feedlot cattle were screened for M. haemolytica using multiplex PCR. Forty-four isolates from 25 animals were identified as M. haemolytica. The PCR assay positively identified all M. haemolytica, as confirmed by phenotypic tests and clustering based upon cellular fatty acid methyl ester (FAME) profiles. Selected nasal isolates that exhibited evidence of haemolysis, but were M. haemolytica-negative based on PCR, were also confirmed negative by phenotypic and FAME analyses. The multiplex PCR assay required no additional phenotypic tests for confirmation of M. haemolytica, within the group of bacteria tested.
Keywords: Mannheimia haemolytica; Mannheimia glucosida; Mannheimia ruminalis; PCR; Identification; Leukotoxin; Bovine respiratory disease

K. Walsh, P. O'Kiely, A.P. Moloney, T.M. Boland, Intake, digestibility, rumen fermentation and performance of beef cattle fed diets based on whole-crop wheat or barley harvested at two cutting heights relative to maize silage or ad libitum concentrates, Animal Feed Science and Technology, Volume 144, Issues 3-4, 15 July 2008, Pages 257-278, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2007.10.018.
(http://www.sciencedirect.com/science/article/B6T42-4RB5BJ3-2/2/24988d07cdadf3dc38b701458707f2ff)
Abstract:
This experiment aimed to quantify the relative intake, digestibility, rumen fermentation, performance and carcass characteristics of beef cattle fed diets based on good quality whole-crop wheat and barley silages, each harvested at two cutting heights, and to rank these relative to good quality maize silage and an ad libitum concentrates-based diet. Ninety beef steers, initial live-

weight 438 +/- 31.0 kg, were allocated to one of the following dietary treatments in a randomised complete block design: maize silage (MS), whole-crop wheat harvested at a normal cutting height (WCW) (stubble height 0.12 m) or an elevated cutting height (HCW) (stubble height 0.29 m), whole-crop barley harvested at a normal cutting height (WCB) (stubble height 0.13 m) or an elevated cutting height (HCB) (stubble height 0.30 m), each being supplemented with 3 kg concentrates/head/day, and ad libitum concentrates (ALC) supplemented with 5 kg grass silage/head/day for the duration of the 160-day study. Mean dry matter (DM) of the maize silage, whole-crop wheat, head-cut wheat, whole-crop barley and head-cut barley was 301, 488, 520, 491 and 499 g/kg, respectively. There were no differences in total DM intake among treatments, or in rumen fermentation characteristics (except ammonia), or in DM digestibility among the forage-based treatments. Neutral detergent fibre digestibility was lower ($P<0.05$) for whole-crop wheat than head-cut barley, and starch digestibility was lower ($P<0.05$) for whole-crop barley and head-cut barley than maize silage. Steers fed ALC had a higher carcass gain ($P<0.001$) and carcass weight ($P<0.05$) than all other treatments, but there were no differences between any of the forage-based treatments. Steers fed MS had a better feed conversion efficiency (FCE) than those on WCW or WCB ($P<0.05$) but were similar to HCW and HCB. The FCE was better for ALC versus any of the other treatments, particularly compared to WCW or WCB ($P<0.001$). Subcutaneous fat from steers fed ALC was more yellow ($P<0.01$) than that from steers fed the other treatments. Neither intake nor performance were altered by raising the cutting height of cereals or by replacing whole-crop wheat by barley. However, head-cut cereals numerically favoured DM intake, carcass gain and feed conversion efficiency values nearer to that of maize than whole-crop cereal silages. Ad libitum concentrates supported superior levels of growth by steers compared to all other treatments.
Keywords: Maize; Whole-crop wheat; Whole-crop barley; Cutting height; Ad libitum concentrates

Claudio Zweifel, Kathrin Daniela Scheu, Michaela Keel, Franz Renggli, Roger Stephan, Occurrence and genotypes of Campylobacter in broiler flocks, other farm animals, and the environment during several rearing periods on selected poultry farms, International Journal of Food Microbiology, Volume 125, Issue 2, 15 July 2008, Pages 182-187, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2008.03.038.
(http://www.sciencedirect.com/science/article/B6T7K-4S6P1VJ-4/2/8d15ccd06c9171562b95e1eceb68d982)
Abstract:
On 15 Swiss poultry farms, broiler flocks, other farm animals, and the environment were examined during consecutive rearing periods to investigate the occurrence and genetic diversity of Campylobacter. Of the 5154 collected samples, 311 (6%) from 14 farms were Campylobacter positive by culture. Amongst the positive samples, 228 tested positive for Campylobacter jejuni and 92 for Campylobacter coli. Positive samples originated from broilers, the broiler houses, cattle, pigs, bantams, laying hens, a horse, and a mouse. Feed, litter, flies, and the supply air to the broiler house tested negative. By flagellin gene typing (fla-RFLP) and pulsed-field gel electrophoresis (PFGE), 917 Campylobacter isolates were genotyped. Additionally, amplified fragment length polymorphism (AFLP) analysis was performed on 15 assorted strains. On eight farms, matching genotypes were isolated from broiler flocks and other farm animals: Certain genotypes from cattle (farms H, K, L, and M), pigs (farms D and P), or laying hens (farm L) were subsequently found in the broiler flocks, whereas other genotypes initially present in the broiler flocks turned up in cattle (farms A, D, and O). These results emphasize the importance of other farm animals on poultry farms for broiler flock colonization. Indications of persistent contamination of the broiler house were evident on four farms (C, D, I, and L) where matching genotypes were detected in consecutive broiler flocks, but not concurrently in other samples. By fla-RFLP, PFGE, and confirmed by AFLP, some genotypes proofed to be identical across different farms.
Keywords: Campylobacter; Broiler flocks; Farm animals; Environment; Genotyping

Joe D. Luck, Stephen R. Workman, Mark S. Coyne, Stephen F. Higgins, Solid material retention and nutrient reduction properties of pervious concrete mixtures, Biosystems Engineering, Volume 100, Issue 3, July 2008, Pages 401-408, ISSN 1537-5110, DOI: 10.1016/j.biosystemseng.2008.03.011.
(http://www.sciencedirect.com/science/article/B6WXV-4SNHP1X-2/2/f3ad358d6aa6ae571db5b21e83e28779)
Abstract:
Runoff from agricultural activities can adversely affect the environment; however, little research has been conducted to determine the performance of pervious concrete for use in agriculture. Pervious concrete, with its unique infiltration properties, could be beneficial when used as a solid/liquid separation material for animal feeding pads, manure, or compost storage pads. Laboratory tests were conducted on replicated samples of pervious concrete made from two aggregate sources (river gravel and limestone) with two size fractions from each aggregate. Water was filtered through composted beef cattle manure and bedding (compost) that was placed on top of the pervious concrete specimens. T-tests indicated that the mass of compost retained on the surface of the pervious concrete specimens was significantly greater when smaller aggregate sizes (#8 river gravel) were used ($p=0.012$). Nutrient analyses were conducted on the effluent from the compost on pervious concrete and compared to values from an identical test performed by filtering water through compost on an 80 grade wire mesh screen. Filtering the compost effluent through pervious concrete resulted in significant reductions in total nitrogen, soluble phosphorus, and total phosphorus compared to the wire screen; however, no consistently significant differences were found with respect to the other analytes (e.g. dissolved organic carbon, ammonium, nitrate, and nitrite). The use of different aggregate types (river gravel or limestone) or different additives (fly ash or fibres) did not have any significant effect on analyte levels. This suggests that combinations of these materials in pervious concrete mixtures will not affect the performance of pervious concrete in this type of application.

Robert J. Collier, M.A. Miller, C.L. McLaughlin, H.D. Johnson, C.A. Baile, Effects of recombinant bovine somatotropin (rbST) and season on plasma and milk insulin-like growth factors I (IGF-I) and II (IGF-II) in lactating dairy cows, Domestic Animal Endocrinology, Volume 35, Issue 1, July 2008, Pages 16-23, ISSN 0739-7240, DOI: 10.1016/j.domaniend.2008.01.003.
(http://www.sciencedirect.com/science/article/B6T62-4RTTJGX-2/2/f81b8f2e5716432ccc507cf1cbbff86a)
Abstract:
During two studies, effects of recombinant bovine somatotropin (rbST) on plasma and milk IGF's in cows adapted to summer (S; 12 cows) or winter (W; 12 cows) conditions were evaluated. Each study consisted of on-farm periods (30 days) followed by climatology chamber periods (CC; 30 days). Cows were given daily injections of rbST, Sometribove, USAN (25 mg/day; 6 cows each study) or saline (control; 6 cows each study). During on-farm periods, blood and milk (am and pm) samples were collected once weekly. During CC periods, blood samples were collected every 2 days and milk samples (am and pm) were collected daily. Plasma IGF-I and IGF-II were increased in cows treated with rbST. A pronounced seasonal pattern in basal and rbST-stimulated plasma IGF-I but not IGF-II was detected. Higher basal and rbST-stimulated plasma IGF-I concentrations in S occurred despite large decreases in feed intake and energy balance. Milk IGF-I and IGF-II was not affected by rbST treatment or season. Although milk IGF-I and IGF-II concentrations were unaffected by rbST treatment, total IGF-output increased due to increased milk yield. The observed seasonal patterns in plasma IGF-I may be indicative of seasonal differences in the coupling of the somatotropin-IGF axis. In particular, we failed to detect an uncoupling of the somatotropin-IGF-I axis in S despite an induced negative energy balance during thermal stress.
Keywords: rbST; Season; IGF-I; IGF-II; Cattle

Alejandro E. Relling, Christopher K. Reynolds, Abomasal infusion of casein, starch and soybean oil differentially affect plasma concentrations of gut peptides and feed intake in lactating dairy cows, Domestic Animal Endocrinology, Volume 35, Issue 1, July 2008, Pages 35-45, ISSN 0739-7240, DOI: 10.1016/j.domaniend.2008.01.005.
(http://www.sciencedirect.com/science/article/B6T62-4RTTJGX-3/2/2b563db45ff0e4256670c9bf72e49bdb)
Abstract:
The effects of specific nutrients on secretion and plasma concentrations of gut peptides (glucagon-like peptide-1(7-36) amide (GLP-1), glucose-dependent insulinotropic polypeptide (GIP), and cholecystokinin-8 (CCK)) differ across species, but are not reported for cattle. Our objective was to determine acute (hours) and chronic (1 week) effects of increased abomasal supply of protein, carbohydrate, or fat to the small intestine on dry matter intake (DMI) and plasma concentrations of GLP-1, GIP, CCK, and insulin. Four mid-lactation Holstein cows were used in a 4 x 4 Latin square design experiment. Treatments were 7-day abomasal infusions of water, soybean oil (500 g/d), corn starch (1100 g/d), or casein (800 g/d). Jugular vein plasma was obtained over 7 h at the end of the first and last day of infusions. Oil infusion decreased DMI on day 7, but total metabolizable energy (ME) supply (diet plus infusate) did not differ from water infusion. Casein and starch infusion had no effect on feed DMI; thus, ME supply increased. Decreased DMI on day 7 of oil infusion was accompanied by increased plasma GLP-1 concentration, but decreased plasma CCK concentration. Increased plasma GIP concentration was associated with increased ME supply on day 7 of casein and starch infusion. Casein infusion tended to increase plasma CCK concentration on both days of sampling, and increased plasma GLP-1 and insulin concentration on day 1 of infusion. The present data indicate a sustained elevation of plasma concentration of GLP-1, but not CCK, may contribute to the reduced DMI observed in dairy cows provided supplemental fat.
Keywords: Glucagon-like peptide-1(7-36) amide; Glucose-dependent insulinotropic polypeptide; Cholecystokinin; Insulin; Intake

I. Aydin, F. Uzun, Potential decrease of grass tetany risk in rangelands combining N and K fertilization with MgO treatments, European Journal of Agronomy, Volume 29, Issue 1, July 2008, Pages 33-37, ISSN 1161-0301, DOI: 10.1016/j.eja.2008.02.003.
(http://www.sciencedirect.com/science/article/B6T67-4S862BW-1/2/9215dd7896308e444e1b9a3b92667d7b)
Abstract:
The most practical and effective method to increase dry matter production in rangelands is by adequate fertilization. N and K fertilizers have commonly been used worldwide to increase yield in rangelands. Fertilizers have a significant effect on mineral concentration in the forage. Risk of tetany, causing yield decrease and death in cattle, increases by feeding forage with a ratio of K/(Ca + Mg) >= 2.2. The fertilizers containing N and K are the most important factors increasing K/(Ca + Mg) ratio in forages. The present study has aimed to determine whether the tetany risks caused by K and N fertilization may be compensated by Mg fertilization. For this purpose, N (0 and 120 kg ha-1), K (0 and 100 kg ha-1) and Mg (0 and 30 kg ha-1) were applied as combinations of each other. Each plot was separated into three sub-plots sampled on 25 April, 15 May and 5 June to determine Ca, Mg, K concentrations and K/(Ca + Mg) ratio.
In this 2-year study, dry matter production in the control plot was 2064 kg ha-1 and nitrogen application increased the dry matter production of the plots by about 100%. Dry weight ratios of grasses increased while legume dry weight ratios decreased drastically in response to N fertilization. An increase was observed in K/(Ca + Mg) ratio with N fertilization due to the fact that legumes have higher concentrations of Ca and Mg than grasses. K fertilization resulted in an approximately 30% increase of K concentration in dry matter. K/(Ca + Mg) ratio in plots where N and K were applied separately was lower than 2.2. However, K/(Ca + Mg) ratio in plots to which N

and K were applied in combination was over 2.2, resulting in tetany risk. It is interesting to determine that Mg fertilization did not change Mg concentration in pasture. It was noted that tetany risk did not decrease with the advance of harvest dates. The results indicated that tetany risk caused by N and K fertilizations could not be compensated by Mg treatment. Therefore, it can be concluded that fertilization programmes avoiding legume decrease in rangelands may be useful to prevent the tetany risk.
Keywords: Forage quality; Botanical composition; Mineral concentration; Harvest date

P.S. Mir, K.S. Schwartzkopf-Genswein, T. Entz, K.K. Klein, E. Okine, M.V. Dodson, Effect of a short duration feed withdrawal followed by full feeding on marbling fat in beef carcasses, Livestock Science, Volume 116, Issues 1-3, July 2008, Pages 22-29, ISSN 1871-1413, DOI: 10.1016/j.livsci.2007.08.015.
(http://www.sciencedirect.com/science/article/B7XNX-4PP291X-4/2/5e8fddc82e136e659d81c10dffb7e95d)
Abstract:
The effect of feed withdrawal for 48 h, prior to initiation of the finishing (fattening) period (75 d) on carcass marbling fat was studied in 120 European x British cross-bred heifers with an average weight of 585 +/- 39 kg. Heifers were randomized in a 2 x 2 factorial design experiment with two dietary management treatments, where half the heifers were provided the feed components of steam rolled barley and barley silage either free choice or as a total mixed ration (TMR) containing 87% steam rolled barley and 13% barley silage with ad libitum vitamins and minerals via salt blocks for all animals. Within each dietary management treatment, 30 heifers were denied feed (water was available) for 48 h prior to the two week adaptation to the high grain diet preceding the 75 d finishing period. At the end of the 48 h feed denial blood samples were collected from the jugular vein prior to feeding for determination of glucose and insulin concentrations, which indicated that 48 h feed withdrawal consistently decreased (P = 0.0001) plasma concentrations of both glucose and insulin but the ratios of the concentrations of glucose to insulin were not affected. At slaughter samples of subcutaneous fat from the brisket (BF) and skirt muscle (pars costalis diaphragmatis; PCD) were procured for determination of chemical fat content, fat dissected from the muscle and for enumeration of adipocytes, less than 35 [mu]m in diameter and to determine the average cell size in the dissected fat and from the BF by flow-cytometry of adipocytes fixed in osmium tetroxide. The carcass characteristics were also obtained. Although no differences due feed withdrawal for 48 h were evident for carcass weight, percent lean (saleable) meat yield, rib eye area, average fat cover, fat content of PCD or BF, the US marbling score was increased (P = 0.048) and the amount of dissected fat from the muscle tended to be higher (P = 0.107), thus 81% of the carcasses graded 'US Choice' or 'Canada AAA,' or displayed at least a 'small' amount of intramuscular fat as compared (P = 0.0807) to 68% of the heifers not denied feed. Based on more than three years of weekly prices of carcasses that graded 'Canada AAA' and 'Canada AA,' these experimental results suggested that the expected price of a finished heifer could increase by $4.61 Canadian if a 48 h feed withdrawal was imposed prior to initiation of the finishing phase. Although significant differences in adipocyte numbers due to a single time 48 h feed withdrawal prior to initiation of the finishing phase were not detected, the carcass quality factors were affected leading to an odds ratio of 1.84 times in favour of cattle carcasses to grade 'Canada AAA' than if fed continuously.
Keywords: Feed withdrawal; Carcass characteristics; Marbling score; Dissected fat; Adipocyte enumeration

K. Walsh, P. O'Kiely, A.P. Moloney, T.M. Boland, Intake, performance and carcass characteristics of beef cattle offered diets based on whole-crop wheat or forage maize relative to grass silage or ad libitum concentrates, Livestock Science, Volume 116, Issues 1-3, July 2008, Pages 223-236, ISSN 1871-1413, DOI: 10.1016/j.livsci.2007.10.010.

(http://www.sciencedirect.com/science/article/B7XNX-4R718S5-1/2/0ce8af554bbcd5ce7bbfbab8251cc6bb)
Abstract:
Seventy beef steers, mean initial live-weight 424 (S.D. 33.0) kg, were blocked by live-weight and breed and allocated to one of 5 dietary treatments in a randomised complete block design. Treatments, including supplementation with 3 kg concentrates/head/day, were grass silage (GS), maize silage (MS), fermented whole-crop wheat (FWCW), urea-treated, processed whole-crop wheat (UPWCW), and ad libitum concentrates supplemented with 5 kg grass silage/head/day (ALC). The grain in urea-treated, processed whole-crop wheat (WCW) was cracked and the crop ensiled with a urea plus urease-based additive. The mean dry matter (DM) of the grass silage, maize silage, fermented WCW and urea-treated, processed WCW was 174, 315, 404 and 716 g/kg, respectively. Total DM intake and carcass growth were lowest for GS ($P < 0.001$). Relative to ALC, feed conversion efficiency (FCE) ($P < 0.05$), live-weight gain ($P < 0.05$), carcass-weight gain ($P < 0.01$) and kill-out rate ($P < 0.05$) were lower for GS, FWCW and UPWCW. The MS had a better FCE than the UPWCW ($P < 0.001$) or the FWCW ($P < 0.05$). Plasma urea concentration was lowest for MS and highest for UPWCW ($P < 0.001$). Animals offered the GS treatment had the most yellow fat (higher ($P < 0.05$) `b' value) and those offered UPWCW had the whitest fat (lower ($P < 0.01$) `b' value). It is concluded that MS, FWCW and UPWCW supported superior levels of growth by cattle compared to GS (in vitro DM digestibility 674 g/kg). There was no animal productivity advantage with UPWCW compared to FWCW.
Keywords: Maize; Whole-crop wheat; Ad libitum concentrates; Cattle; Feed intake; Growth rate

Alejandro Schor, Maria E. Cossu, Alejandra Picallo, Jorge Martinez Ferrer, Juan J. Grigera Naon, Dario Colombatto, Nutritional and eating quality of Argentinean beef: A review, Meat Science, Volume 79, Issue 3, Beef Up Your Tango - Meat Research in Argentina, July 2008, Pages 408-422, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.10.011.
(http://www.sciencedirect.com/science/article/B6T9G-4PYJSHG-2/2/f12f8312cf6045f1bc717b4320d9a46d)
Abstract:
This review deals with distinctive aspects of quality of Argentinean beef in terms of tenderness, flavour, colour, juiciness, taste, acceptability, lipid content and composition and its resultant nutraceutical characteristics. Differences are due to beef production systems based on temperate or tropical grasslands aimed at shortening the fattening phase as far as possible, with limited or null use of concentrates. However, the effect of limited supplemental feeding is also discussed as well as the responses arising from the use of beef cattle genotypes, including British, Continental, Dairy, Zebu breeds and their crosses, adapted to the various environments and systems found in the country.
Keywords: Beef; Argentina; CLA; Quality attributes; Review

A.M. Descalzo, A.M. Sancho, A review of natural antioxidants and their effects on oxidative status, odor and quality of fresh beef produced in Argentina, Meat Science, Volume 79, Issue 3, Beef Up Your Tango - Meat Research in Argentina, July 2008, Pages 423-436, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.12.006.
(http://www.sciencedirect.com/science/article/B6T9G-4RC2NV0-4/2/7dbd409531192c51e9bc4e476cfc18ca)
Abstract:
Meat derived from pasture feeding, is associated with a high level of antioxidants. Antioxidants are incorporated within cell membranes and protect tissues against oxidation from reactive oxygen species. This maintains the overall quality of meat and secondary products. This paper reviews the implications of incorporating natural antioxidants into fresh beef, focusing on the benefits of feeding cattle good quality pasture. Pasture samples typically have higher levels of [alpha]-

tocopherol, [beta]-carotene, ascorbic acid and glutathione than feedlot samples. These compounds retard lipid and protein oxidation in fresh and stored meat, and preserve the color and odor quality of beef. The significance of antioxidant enzymes is variable, because their behavior depends on individual redox status before slaughter. Understanding total antioxidant activity requires information on antioxidant and pro-oxidant status. With an abundance of pasture, Argentina has a natural advantage in producing meat with a high antioxidant value.
Keywords: [alpha]-Tocopherol; [beta]-Carotene; Glutathione; Ascorbic acid; Antioxidant activity; Antioxidant enzymes; Lipid and protein oxidation; Argentine beef

E.B.N. Graminha, A.Z.L. Goncalves, R.D.P.B. Pirota, M.A.A. Balsalobre, R. Da Silva, E. Gomes, Enzyme production by solid-state fermentation: Application to animal nutrition, Animal Feed Science and Technology, Volume 144, Issues 1-2, 23 June 2008, Pages 1-22, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2007.09.029.
(http://www.sciencedirect.com/science/article/B6T42-4R5G85C-2/2/1fd86a43b63f43a2b83db56412ba546e)
Abstract:
Many microorganisms that decompose lignocellulosic material are being studied as producers of enzymes to perform enzymatic hydrolysis of the lignocellulosic material present in residues from the agroindustries. Although the cellulose and hemicellulose present in these materials have their value for feeding cattle, their bioavailability requires breakdown of the bonds with indigestible lignin. Pre-digestion of such materials with ligninases, xylanases and pectinases (cellulase free) may transform the lignocellulosic substrate into a feed with greater digestibility and higher quality for ruminants. This review provides an overview of variables to be considered in the utilization of fungal plant-depolymerizing enzymes produced by solid-state fermentation from agricultural production residues in Brazil.
Keywords: Animal nutrition; By-products; Enzymes; Solid-state fermentation; Thermophilic fungi

H.O. Sanon, C. Kabore-Zoungrana, I. Ledin, Nutritive value and voluntary feed intake by goats of three browse fodder species in the Sahelian zone of West Africa, Animal Feed Science and Technology, Volume 144, Issues 1-2, 23 June 2008, Pages 97-110, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2007.10.004.
(http://www.sciencedirect.com/science/article/B6T42-4R5G38X-2/2/aadbcdacb9979d73a9fe228e78be0392)
Abstract:
Browsing ruminants have access to different biomass, depending on how high they can reach. Foliage consisting of leaves and green pods from Acacia senegal, Pterocarpus lucens and Guiera senegalensis, was collected according to height above ground accessible to either sheep (0.90 m), goats (1.65 m) or cattle (1.50 m). There was a significant variation in the chemical composition of the biomass between species. The crude protein (CP) content was 114, 157 and 217 g/kg dry matter (DM) and the neutral detergent fiber (aNDF) content 604, 534 and 412 g/kg DM for G. senegalensis, P. lucens and A. senegal, respectively. There was no significant variation in chemical composition according to the height accessible by cattle, sheep or goats. The voluntary intake was studied using eight goats per diet. The six diets consisted of the three browse leaves and two pods (A. senegal and P. lucens) and a control. The leaves were fed combined with hay of Schoenefeldia gracilis (maximum 30%) and the control was pure hay. Apparent digestibilities of the same diets, with the exception of G. senegalensis, were measured using five goats per diet. All browse fodders used in the feeding and digestibility trials were high in CP (105-170 g/kg DM) and lignin (164-234 g/kg DM except A. senegal leaves) and low in fiber (322-590 g/kg DM of NDF) compared to the hay (31 g/kg DM of CP and 755 g/kg DM of NDF). The highest intake was of the P. lucens diet (864 g) and the lowest of the G. senegalensis diet (397 g). The intake of pods from A. senegal was higher (1033 g) than from P. lucens pods (691 g). The apparent digestibility of OM

and CP in the browse leaves was 0.63 and 0.57 and 0.63 and 0.64 for A. senegal and P. lucens, respectively, higher than for the hay, which showed higher digestibility of NDF. A. senegal pods had higher digestibility for all nutrients than P. lucens pods. Based on the high CP content and the intake and digestibility characteristics, P. lucens leaves and A. senegal leaves and pods can be recommended as protein supplements to low quality diets.
Keywords: Acacia senegal; Pterocarpus lucens; Guiera senegalensis; Browse fodder; Chemical composition; Intake; Digestibility

F.C. Sacadura, P.H. Robinson, E. Evans, M. Lordelo, Effects of a ruminally protected B-vitamin supplement on milk yield and composition of lactating dairy cows, Animal Feed Science and Technology, Volume 144, Issues 1-2, 23 June 2008, Pages 111-124, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2007.10.005.
(http://www.sciencedirect.com/science/article/B6T42-4R70BPR-1/2/695d9c3d3cb750050542b5730633a961)
Abstract:
It is not clear if B vitamins supplied to the small intestine of dairy cows from dietary and rumen microbial sources are provided in sufficient quantity to maximize animal performance. Our objective was to determine effects of adding a ruminally protected B vitamin blend supplement, containing biotin, folic acid, pantothenic acid and pyridoxine, to the diet of high producing dairy cows on their productivity. Two dairy facilities located in California (USA) were used, one with mid lactation Holstein cows (Experiment 1) and the other with early lactation Holstein cows (Experiment 2). In each Experiment, cows were randomly assigned to treatment in a 2 x 2 crossover design with 28 d (Experiment 1) or 35 d (Experiment 2) experimental periods. In Experiment 1, milk and milk fat yield were unaffected by treatment, although milk fat proportion was lower (37.1 versus 36.3 g/kg; P<0.01), but milk protein yield was higher (1.21 versus 1.24 kg/d; P=0.02) in cows fed B vitamins. In Experiment 2, milk (39.60 versus 40.46 kg/d; P=0.02), milk fat (1.40 versus 1.47 kg/d; P<0.01) and milk protein yield (1.10 versus 1.16 kg/d; P<0.01), as well as milk energy output (113.2 versus 117.8 MJ/d; P<0.01) were all higher with B vitamin feeding. Body condition score (BCS) increased more with B vitamin feeding in Experiment 2, but was unaffected in Experiment 1. Body locomotion score (BLS) increased with B vitamin feeding in both experiments (P=0.01 and < 0.01, respectively), possibly an indication of reduced locomotory ability. Overall, productivity of high producing lactating dairy cows responded positively to feeding a mixture of ruminally protected B vitamins, although differences in the extent of the positive responses between experiments perhaps suggests that early lactation cows, with lower DM intake to milk yield ratios, may be more responsive to ruminally protected B vitamins than mid lactation cows, with higher DM intake to milk yield ratios.
Keywords: Biotin; Folic acid; Pantothenic acid; Pyridoxine; Dairy cattle; Milk protein

M. Herrero, P.K. Thornton, R. Kruska, R.S. Reid, Systems dynamics and the spatial distribution of methane emissions from African domestic ruminants to 2030, Agriculture, Ecosystems & Environment, Volume 126, Issues 1-2, International Agricultural Research and Climate Change: A Focus on Tropical Systems, June 2008, Pages 122-137, ISSN 0167-8809, DOI: 10.1016/j.agee.2008.01.017.
(http://www.sciencedirect.com/science/article/B6T3Y-4S1JJWD-1/2/9c97d78a57e5bc5b9e0062b4d055e687)
Abstract:
Livestock production systems in Africa are experiencing rapid changes in structure and function due to increased demands for livestock products from a more prosperous and ever-increasing human population. Some of these changes could lead to increased emissions of greenhouse gases. This paper explores the magnitudes of changes in production systems as a function of increased population densities and climate change. This paper also quantifies the methane

emissions from African cattle, goats and sheep from 2000 to 2030. The study integrates methodologies from different disciplines to derive spatially explicit distributions of methane emissions from domestic ruminants and their changes as livestock production systems evolve. A livestock systems classification framework was used to differentiate pastoral and crop-livestock systems using agro-ecological thresholds based on temperature and length of growing period (hyper-arid, arid, humid and temperate regions), the extent of irrigation and human population densities. Livestock numbers (tropical livestock units, TLU) were estimated from FAO data for each country and production system defined. Projections of livestock populations were derived from analysis of demand shifts in livestock products, and livestock systems changes estimated on the basis of potential climate change and population density change to 2030. For the estimation of diets for ruminants, Africa was split into regions (East, West, Southern, Central and North Africa, and The Horn of Africa) and diets for both the rainy and the dry seasons were estimated from literature reviews for each livestock species in each production system in each region. Feed intake, livestock production and the computation of methane emissions were obtained using a previously validated and widely used mechanistic model of digestion and metabolism in ruminants. Results suggest that (1) Africa produced around 7.8 million tonnes of methane/year in 2000. This figure is likely to increase to 11.1 million tonnes/year by 2030. (2) Methane emissions per tropical livestock unit (TLU, 250 kg bodyweight) can vary from 21 to 40 kg/(TLU year), depending on the production system and the region. (3) The highest emissions per animal come, and will continue to come, from ruminants in mixed crop-livestock systems. (4) The regions producing the highest concentrations of methane, now and in the future, are in general terms, The Horn of Africa, West and East Africa. (5) The average emission factors obtained in this study (31.1 kg/(methane (TLU year))) are in close agreement with the emission factors used by the International Panel on Climate Change (IPCC) for African ruminants (32 kg methane per animal per year). (6) The methodology employed in this study permits the disaggregation of methane emissions by country and production system, thus allows us to quantify changes in emissions as climate changes and production systems evolve. The results of the study are compared with those obtained in other studies around the world and its implications are discussed in relation to how systems are likely to evolve in Africa.
Keywords: Methane; Livestock systems; Livestock populations; Climate change; IPCC; Africa; Cattle; Sheep; Goats

Hendrika Anette van Dorland, Michael Kreuzer, Hans Leuenberger, Hans-Rudolf Wettstein, Eating behaviour of dairy cows offered fresh or ensiled white clover, red clover and ryegrass to choose from or in a mixture, Applied Animal Behaviour Science, Volume 111, Issues 3-4, June 2008, Pages 205-221, ISSN 0168-1591, DOI: 10.1016/j.applanim.2007.06.018.
(http://www.sciencedirect.com/science/article/B6T48-4PG8H1B-1/2/9752388fdae754e45aad558a5ee5f12b)
Abstract:
Two experiments with 24 lactating cows each were conducted in a group housing system to study the influence of feeding method (choice diets versus mixed diets) and forage species (white clover, red clover, ryegrass) both in fresh (experiment 1) and in ensiled form (experiment 2) in order to gain insight on how cows adjust their eating behaviour in order to optimize intake under the different feeding managements. Each experiment consisted of four dietary treatments, whereof two were mixed diets of clover (white or red clover) and ryegrass (0.4:0.6, on dry matter basis), and two were choice diets with cows having the choice among clover (white or red clover) and ryegrass. With the fresh forages, giving the choice compared to offering mixed diets resulted in a higher average daily number of meals (10.9 versus 8.8, $P < 0.01$) with red clover, and a longer overall eating duration (6.3 versus 5.1 h/day, $P < 0.01$) with white clover. With white clover in the diet, eating behaviour was especially different between choice and mixed diets throughout daytime and the dark phase. Cows ate fresh ryegrass at higher rates than the fresh clovers ($P < 0.05$)

during both the light and the dark phase. With the ensiled forages, feeding method did not affect number of meals per day (10.9 on average) and overall eating duration (4.3 h/day), and intake and eating rate remained unaffected throughout the day, independent of type of clover in the diet. Intake, eating duration, and eating rate were higher ($P < 0.05$) for white clover silage than for ryegrass silage, when both were simultaneously offered during the light phase. During the dark phase, the previously mentioned variables remained unaffected. The same was observed with the choice diet of red clover and ryegrass silage, although to a lesser extent. In both experiments and all treatments, a diurnal feeding pattern was observed and preference for clover observed in the morning declined during the course of the day, with a more pronounced decline in case of the ensiled forages than of the fresh forages. The results from this study show that optimization of intake between choice and mixed diets might be realized through adjustments in overall eating duration and/or eating rate, which partially depended on clover type included in the diet, and forage form and, to a lesser extent, on day time.
Keywords: Cattle; Legume; Feeding pattern; Choice diet

R.A. Eigenberg, T.M. Brown-Brandl, J.A. Nienaber, Sensors for dynamic physiological measurements, Computers and Electronics in Agriculture, Volume 62, Issue 1, Precision Livestock Farming (PLF), June 2008, Pages 41-47, ISSN 0168-1699, DOI: 10.1016/j.compag.2007.08.011.
(http://www.sciencedirect.com/science/article/B6T5M-4PYJDTJ-1/2/37484882d92e455dd9bb57eddce7fdae)
Abstract:
Stress research on agricultural production animals involves monitoring of bio-energetic responses to environmental challenges. Automated monitoring of physiological and behavioral responses of animals has the advantages of reducing labor, increasing the frequency of observation, and reducing bias and observer influence, but automation requires specialized instrumentation. Equipment has been developed or adapted to meet specific monitoring needs for a range of animals and facilities. This paper summarizes work related to cattle and swine stress research at the US Meat Animal Research Center, and specifically examines recording of body temperature, respiration rate, livestock safety monitoring and electronic identification. Much of this work has been reported previously and has been consolidated here to provide an overview of sensor development and application.
Keywords: Respiration rate; Body temperature; Electronic identification; Telemetry; Datalogger; Safety monitor; Feeding behavior

A. Kamkar, G. Karim, F. Shojaee Aliabadi, R. Khaksar, Fate of aflatoxin M1 in Iranian white cheese processing, Food and Chemical Toxicology, Volume 46, Issue 6, June 2008, Pages 2236-2238, ISSN 0278-6915, DOI: 10.1016/j.fct.2008.02.028.
(http://www.sciencedirect.com/science/article/B6T6P-4S2668F-1/2/cf744daae68ae695bbaa04f98eb6d289)
Abstract:
Aflatoxin M1 (AFM1) is an important mycotoxin frequently found in milk and dairy products. AFM1 is a major metabolic product of Aflatoxin B1 and is usually excreted in the milk and urine of dairy cattle that have consumed aflatoxin-contaminated feed.
The aim of this study was to determine the AFM1 concentration in curd and whey of Iranian white cheese. The cheese milk samples were artificially contaminated with AFM1 in six levels (0.25, 0.5, 0.75, 1, 1.25, and 1.75 [mu]g L-1). Cheese was produced according to Iranian traditional recipe. AFM1 distribution between curd, whey and cheese was determined by high performance liquid chromatography (HPLC) using immunoaffinity column clean up and florescence detection. AFM1 was recovered in whey, curd and cheese in the concentrations of 0.43, 1.47 and 1.57 [mu]g L-1,respectively. The level of Aflatoxin M1 in curd and cheese obtained 3.12- and 3.65-fold more than that in whey that shows the affinity of Aflatoxin M1 to the protein fraction of milk.

Keywords: Aflatoxin M1; Iranian white cheese; HPLC

Ulrich Meyer, Kristin Weigel, Friedrich Schone, Matthias Leiterer, Gerhard Flachowsky, Effect of dietary iodine on growth and iodine status of growing fattening bulls, Livestock Science, Volume 115, Issues 2-3, June 2008, Pages 219-225, ISSN 1871-1413, DOI: 10.1016/j.livsci.2007.07.013.
(http://www.sciencedirect.com/science/article/B7XNX-4PG2M36-3/2/3251f1c5baa107d58c50f4ecf7580998)
Abstract:
The aim of the present study was to assess the influence of different levels of iodine supplementation on animal growth and the iodine content of food from beef cattle. In a dose-response experiment with 34 growing fattening bulls of the 'German Holstein' breed, in the range from 223 to 550 kg body weight, three iodine dosages were tested. The animals were fed a corn silage/concentrate ration. Iodine concentration in the diet amounted to 0.79 (Group 1), 3.52 (Group 2) and 8.31(Group 3) mg I per kg dry matter (DM). After slaughtering, I was determined in blood, serum, plasma, thyroid, liver, kidneys and meat (M. longissimus dorsi, M. glutaeus medius) by ICP-MS. I-supplementation did not significantly influence DM intake, daily weight gain (1453 (1), 1419 (2) and 1343 (3) g; $p > 0.05$) or slaughtering performance, but the weight of the thyroid gland increased significantly with the highest I dosage (32 (1), 26 (2) and 42 (3) g animal- 1, $p < 0.05$). I-supplementation significantly increased I-concentration in muscle, liver, kidney and thyroid gland ($p < 0.05$). The contribution of beef food to I-intake of humans is relatively low, therefore there is no need to reduce the EU-upper limit (10 mg kg- 1 feed) for growing fattening cattle from the view of consumer safety. In view of animal health and performance more dose-response studies seem to be necessary.
Keywords: Growing fattening bulls; Dietary iodine; Growth performance; Iodine status

M. Blanco, G. Ripoll, P. Alberti, A. Sanz, R. Revilla, D. Villalba, I. Casasus, Effect of early weaning on performance, carcass and meat quality of spring-born bull calves raised in dry mountain areas, Livestock Science, Volume 115, Issues 2-3, June 2008, Pages 226-234, ISSN 1871-1413, DOI: 10.1016/j.livsci.2007.07.012.
(http://www.sciencedirect.com/science/article/B7XNX-4PG2M36-2/2/00e8276e19f0d3972ae7a7b031acfce4)
Abstract:
Sixteen bull calves were born in the Spanish Central Pyrenees in spring. They were either early (EW, 90 days of age) or normal weaned (NW, 180 days of age). At day 90, EW calves were placed on an intensive diet while NW calves were turned out with their dams to high mountain pastures. After summer, at day 180, NW calves were weaned and placed with EW calves on a common finishing diet until slaughter at the fixed age of 1 year. From birth to early weaning date, no performance differences appeared. However, EW calves gained faster (1.549 kg/day) than their unweaned counterparts (0.783 kg/day) from early to normal weaning date ($P < 0.001$). During the finishing period, NW calves showed compensatory growth, with a 44% higher ADG than EW calves ($P < 0.001$), with a similar feed intake and a better feed conversion ratio. Early weaned calves had a longer fattening phase than NW calves (264 vs. 158 days, respectively; $P < 0.001$) and thus total feed intake and feed costs were greater. When slaughtered at 1 year of age, EW and NW calves attained similar weight (489 vs. 510 kg, respectively; $P > 0.05$), but dressing percentage was higher for EW calves (56.9%) than for NW calves (55.2%) ($P < 0.01$), which led EW calves to have heavier carcasses, without differences in fat score or conformation. The different growth paths, the result of weaning management, did not affect meat tenderness, chemical composition and fatty acid profile, but affected meat lightness, with higher values for compensating calves (NW) than calves in continuous growth (EW). In conclusion, advancing weaning age modified calf performance without affecting substantially carcass characteristics, except for an improvement in dressing percentage, or meat quality.

Keywords: Beef cattle; Early weaning; Performance; Carcass quality; Meat quality

C. Kuhn, R. Lucius, H.F. Matthes, G. Meusel, B. Reich, B.H. Kalinna, Characterisation of recombinant immunoreactive antigens of the scab mite Sarcoptes scabiei, Veterinary Parasitology, Volume 153, Issues 3-4, 31 May 2008, Pages 329-337, ISSN 0304-4017, DOI: 10.1016/j.vetpar.2008.02.007.
(http://www.sciencedirect.com/science/article/B6TD7-4RVG3RX-3/2/e43bbfdd70ed008fd1cd5b242d115fe5)
Abstract:
Sarcoptic mange (or scabies) is an important skin disease which can affect a variety of species including humans, cattle, goats, sheep, horses, pigs, rabbits, and dogs. Approximately 300 million people are affected worldwide and in lifestock animals the infestation may lead to substantial economic losses caused by depression in growth and feed conversion rates. Diagnosis of Sarcoptes infestation is difficult and only a few serological tests have been developed using whole mite antigen for diagnosis of mange in animals. Here we describe the isolation and characterisation of cDNAs of several immunoreactive clones and their recombinant expression in Escherichia coli. Three of the proteins contain repetitive sequences which suggests that they might be involved in immune evasion. The application of these antigens in serodiagnosis and the suitability for diagnosis is discussed.
Keywords: Sarcoptes scabiei; Recombinant antigen; ELISA; Diagnosis

T. Geurden, R. Somers, N.T.G. Thanh, L.V. Vien, V.T. Nga, H.H. Giang, P. Dorny, H.K. Giao, J. Vercruysse, Parasitic infections in dairy cattle around Hanoi, northern Vietnam, Veterinary Parasitology, Volume 153, Issues 3-4, 31 May 2008, Pages 384-388, ISSN 0304-4017, DOI: 10.1016/j.vetpar.2008.01.031.
(http://www.sciencedirect.com/science/article/B6TD7-4RRNXSV-2/2/2e8383c4a4a931571599d7cf63cca4af)
Abstract:
In northern Vietnam, dairy cattle are mainly managed in small-scale farms, where animals are kept confined and feeding occurs by cut and carry methods. In the present study the occurrence of parasitic infections was examined in five provinces around Hanoi. A total of 201 farms were visited, and 334 stool and 239 blood samples were collected from calves younger than 3 months, animals between 3 and 24 months and adult cows. Furthermore, 254 milk samples were collected from lactating animals. Coproscopical examination indicated a high prevalence of nematode eggs (Cooperia spp., Haemonchus and Oesophagostomum spp.) in animals (n = 176) between 3 and 24 months (66%) and in adult cows (n = 90; 54%). In these age groups the prevalence of Fasciola was 28% and 39%, respectively, and for Paramphistomum the prevalence was 78% and 82%, respectively. Fifty percent of the calves younger than 3 months (n = 68) were positive for Giardia, and none for Cryptosporidium. Most Giardia isolates were identified as the non-zoonotic G. duodenalis assemblage E on the [beta]-giardin gene. The blood samples were examined with commercially available Svanovir(R)Elisa's for the presence of Anaplasma marginale and Babesia bigemina specific antibodies, and a prevalence of 28% and 54% was found, respectively. In the milk samples Neospora caninum specific antibodies (Svanovir(R)Elisa) were detected in 30% of the lactating animals. The present study demonstrates that parasitic infections occur frequently in dairy cattle around Hanoi although animals are mainly kept confined, and indicates that further research on the economic impact of these infections is needed.
Keywords: Prevalence; Parasite; Dairy; Hanoi; Vietnam

X. Markantonatos, M.H. Green, G.A. Varga, Use of compartmental analysis to study ruminal volatile fatty acid metabolism under steady state conditions in Holstein heifers, Animal Feed Science and Technology, Volume 143, Issues 1-4, Mathematical Models that Predict the Effects of

Feed Characteristics on Animal Performance, 22 May 2008, Pages 70-88, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2007.05.005.
(http://www.sciencedirect.com/science/article/B6T42-4NYBMD9-1/2/804ae0ae43843202372ab3349062b79a)
Abstract:
Four rumen-cannulated Holstein heifers were used to quantify volatile fatty acid (VFA) kinetics in the rumen using 13C stable isotopes. Heifers were fed either a low (L) or high (H) concentrate diet with level of concentrate of 250 or 700 g/kg dry matter, respectively. Isotopic tracers, Na-1-13C-acetate (Ac), -propionate (Pr), or -butyrate (Bu) were infused as a bolus into the rumen. Three days prior to sampling, cows were fed equal meals every 4 h for 2 days followed by 2 h feeding intervals 1 day prior to and on the day of sampling. The rumen was sampled 26 times (3 times prior to tracer infusion; background samples and 23 times during 8 h after tracer infusion). Isotopic enrichment was expressed as Tracer/(Tracee + Tracer) or F value. F values were corrected for skewness and graphed against time. A three-compartment model was adequate to describe VFA kinetics in the rumen. It was estimated that there was a flux of Ac to the Pr pool [0.05 g/min (L) versus 0.03 g/min (H)], resulting in an average conversion fraction of Ac to Pr of 0.051 in both groups. The model predicted that the fraction of Ac which contributed to the Pr pool was 0.198 (L) versus 0.145 (H). Although the fraction of the Ac conversion to Bu ranged from 0.367 (L) to 0.448 (H), only a small fraction [0.0137 (L) and 0.0160 (H)] of the Bu was converted to Ac. A major portion of the Bu was coming from Ac in both diet groups. The portion of Bu coming from Ac in the rumen varied between 0.95 and 0.65 in (L) and (H) diets, respectively. Turnover time of all VFA was calculated to be longer in H. Results indicate that Ac and Bu exchange, and that Ac contributes to the Pr pool. However, Pr does not contribute to the Ac or Bu pools. This study demonstrates the usefulness of 13C isotopes to study VFA kinetics and metabolism in cattle.
Keywords: VFA metabolism; VFA kinetics; Compartmental analysis

E. Detmann, S.C. Valadares Filho, D.S. Pina, L.T. Henriques, M.F. Paulino, K.A. Magalhaes, P.A. Silva, M.L. Chizzotti, Prediction of the energy value of cattle diets based on the chemical composition of the feeds under tropical conditions, Animal Feed Science and Technology, Volume 143, Issues 1-4, Mathematical Models that Predict the Effects of Feed Characteristics on Animal Performance, 22 May 2008, Pages 127-147, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2007.05.008.
(http://www.sciencedirect.com/science/article/B6T42-4NXGSC3-1/2/3f9c55d7a13a55e5d42bc450e92aa8aa)
Abstract:
Determination of the energetic contribution of different chemical components of cattle diets based on the content of total digestible nutrients (TDN) has been suggested by several authors and was adopted by the NRC [National Research Council (NRC), 2001. Nutrient Requirements of Dairy Cattle, seventh ed. Academic Press, Washington]. The main objective of that proposal is to overcome the high costs and the extended time of traditional in vivo digestion assays. Although theoretically based, the summative system adopted by the NRC [National Research Council (NRC), 2001. Nutrient Requirements of Dairy Cattle, seventh ed. Academic Press, Washington] has been shown to be inaccurate in predicting the TDN content of individual feeds or diets under tropical conditions. Therefore, a new model, that also uses a summative approach, was developed but it was based on data obtained in the tropics. The new model consists of equations that predict the digestible fractions of ether extract (n = 108), crude protein (n = 93), non-fibrous carbohydrates (n = 84), and neutral detergent fibre (n = 164). Non-fibrous components were evaluated by the Lucas [Lucas, H.L., 1960. Relations Between Apparent Digestibility and the Composition of Feed and Feces. 1: A Quantitative Theory. North Caroline State College, Raleigh] test to obtain true digestibility coefficients, and by the factorial system to distinguish between truly digested and metabolic fractions. Fibre components were evaluated using an adaptation of the surface law to

obtain the indigestible fraction and a meta-analysis approach to obtain digestibility coefficients of the potentially digestible fraction. The estimates obtained with the new model were validated and compared to those produced with the model adopted by the NRC [National Research Council (NRC), 2001. Nutrient Requirements of Dairy Cattle, seventh ed. Academic Press, Washington] for cattle managed under tropical conditions. Data from four trials, two with lactating cows (n = 63) and two with growing and finishing cattle (n = 44) were used. The estimates produced with the two models were compared based on the decomposition of the mean square prediction error. It can be concluded that the new model was more accurate in predicting TDN values than the NRC [National Research Council (NRC), 2001. Nutrient Requirements of Dairy Cattle, seventh ed. Academic Press, Washington] model under tropical conditions.
Keywords: Apparent digestibility; Lucas test; Surface law; Total digestible nutrients

T.P. Tylutki, D.G. Fox, V.M. Durbal, L.O. Tedeschi, J.B. Russell, M.E. Van Amburgh, T.R. Overton, L.E. Chase, A.N. Pell, Cornell Net Carbohydrate and Protein System: A model for precision feeding of dairy cattle, Animal Feed Science and Technology, Volume 143, Issues 1-4, Mathematical Models that Predict the Effects of Feed Characteristics on Animal Performance, 22 May 2008, Pages 174-202, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2007.05.010.
(http://www.sciencedirect.com/science/article/B6T42-4PCR1MS-1/2/7a79030323443900b8859b33d1288481)
Abstract:
The Cornell Net Carbohydrate and Protein System (CNCPS) predicts cattle requirements and nutrient supply for site-specific situations. This paper describes the CNCPS version 6 (CNCPSv6), which represents a re-engineering and updating of CNCPS version 5 with the following objectives: (1) improve the organization of the model and user interface to improve speed and accuracy in formulating diets for a herd of dairy cattle, (2) expand the carbohydrate pools to include sugars, soluble fibers, and organic and volatile fatty acids, (3) integrate a fat model to account for ruminal lypolization and biohydrogenation, and absorption of fatty acids in the small intestine, and (4) update the computational sub-models with new information. The CNCPSv6 model was re-designed using object-oriented programming in which physiological functions (e.g. growth, lactation, pregnancy) and anatomical compartments (e.g. rumen, intestines) were programmed as objects. The interface uses farm, location, and group flow, which decreases the number of inputs required per cattle group and allows for more rapid evaluation of diets, feed requirements, and nutrient excretion by location, group, and herd. The revised implementation of the body reserves sub-model allows accounting for fluxes in energy reserves when formulating diets. Updated equations and coefficients include the prediction of rumen ammonia balance and feed passage rates, indigestible DM, MP lactation efficiency, and DMI. The CNCPSv6 was evaluated with data from individually fed lactating dairy cows from three independent studies. As implemented, CNCPSv6 accounted for a similar proportion of the variation (86%) in first limiting (ME or MP) milk production as CNCPSv5 but with a lower bias (1% versus 4%, respectively). We concluded the re-designing and updating of the CNCPS improved its ability to formulate and evaluate a feeding program for a herd of dairy cattle with greater accuracy and efficiency.
Keywords: Modeling; Simulation; Cattle; Nutrient; Requirement; Supply; Rumen

J. Dijkstra, E. Kebreab, A. Bannink, L.A. Crompton, S. Lopez, P.A. Abrahamse, P. Chilibroste, J.A.N. Mills, J. France, Comparison of energy evaluation systems and a mechanistic model for milk production by dairy cattle offered fresh grass-based diets, Animal Feed Science and Technology, Volume 143, Issues 1-4, Mathematical Models that Predict the Effects of Feed Characteristics on Animal Performance, 22 May 2008, Pages 203-219, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2007.05.011.
(http://www.sciencedirect.com/science/article/B6T42-4NYBMD9-2/2/3bf83dc84cfe10f16d355e7f4b8a39f6)

Abstract:
Grass-based diets are of increasing social-economic importance in dairy cattle farming, but their low supply of glucogenic nutrients may limit the production of milk. Current evaluation systems that assess the energy supply and requirements are based on metabolisable energy (ME) or net energy (NE). These systems do not consider the characteristics of the energy delivering nutrients. In contrast, mechanistic models take into account the site of digestion, the type of nutrient absorbed and the type of nutrient required for production of milk constituents, and may therefore give a better prediction of supply and requirement of nutrients. The objective of the present study is to compare the ability of three energy evaluation systems, viz. the Dutch NE system, the agricultural and food research council (AFRC) ME system, and the feed into milk (FIM) ME system, and of a mechanistic model based on Dijkstra et al. [Simulation of digestion in cattle fed sugar cane: prediction of nutrient supply for milk production with locally available supplements. J. Agric. Sci., Cambridge 127, 247-60] and Mills et al. [A mechanistic model of whole-tract digestion and methanogenesis in the lactating dairy cow: model development, evaluation and application. J. Anim. Sci. 79, 1584-97] to predict the feed value of grass-based diets for milk production. The dataset for evaluation consists of 41 treatments of grass-based diets (at least 0.75 g ryegrass/g diet on DM basis). For each model, the predicted energy or nutrient supply, based on observed intake, was compared with predicted requirement based on observed performance. Assessment of the error of energy or nutrient supply relative to requirement is made by calculation of mean square prediction error (MSPE) and by concordance correlation coefficient (CCC). All energy evaluation systems predicted energy requirement to be lower (6-11%) than energy supply. The root MSPE (expressed as a proportion of the supply) was lowest for the mechanistic model (0.061), followed by the Dutch NE system (0.082), FIM ME system (0.097) and AFRC ME system (0.118). For the energy evaluation systems, the error due to overall bias of prediction dominated the MSPE, whereas for the mechanistic model, proportionally 0.76 of MSPE was due to random variation. CCC analysis confirmed the higher accuracy and precision of the mechanistic model compared with energy evaluation systems. The error of prediction was positively related to grass protein content for the Dutch NE system, and was also positively related to grass DMI level for all models. In conclusion, current energy evaluation systems overestimate energy supply relative to energy requirement on grass-based diets for dairy cattle. The mechanistic model predicted glucogenic nutrients to limit performance of dairy cattle on grass-based diets, and proved to be more accurate and precise than the energy systems. The mechanistic model could be improved by allowing glucose maintenance and utilization requirements parameters to be variable.
Keywords: Feed evaluation; Grass; Energy requirements; Modelling; Model evaluation

F. Garcia, R.D. Sainz, J. Agabriel, L.G. Barioni, J.W. Oltjen, Comparative analysis of two dynamic mechanistic models of beef cattle growth, Animal Feed Science and Technology, Volume 143, Issues 1-4, Mathematical Models that Predict the Effects of Feed Characteristics on Animal Performance, 22 May 2008, Pages 220-241, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2007.05.012.
(http://www.sciencedirect.com/science/article/B6T42-4P00S33-3/2/6b4ccc598d06a490f1e963a49bd17f09)
Abstract:
The INRA Growth Model (IGM) and the Davis Growth Model (DGM) are two dynamic mechanistic models developed to predict protein and fat deposition in growing cattle whatever the production system. Both models depend on animal genotype and age, metabolizable energy intake (MEI) and knowledge of previous growth. The aim of this paper was (i) to identify in which situations DGM and/or IGM provide reliable estimations of body protein and fat, (ii) to give insight on the improvements needed in each model and (iii) to discuss the usefulness of comparative analysis for improvement of mechanistic models. We performed a comparative analysis of DGM and IGM with three datasets from published experiments on Salers heifers, Angus-Hereford steers and

Charolais bulls. Each model was fitted independently to each dataset. Both models gave accurate and precise predictions of body protein. They also performed well for body fat in Charolais bulls growing continuously. However, DGM tended to underestimate body fat deposition during feeding restriction periods with Salers heifers. This suggests that DGM overestimated heat production during periods of low MEI. IGM was not sensitive enough to MEI as it overestimates body fat at low MEI and it underestimates body fat at high MEI in Angus-Hereford steers. Presently, IGM does not take into account metabolizable energy concentration (MEC) of the diet and thus does not simulate different growth trajectories for same MEI but different MEC. These results suggest that model's structure and equations for protein accretion in DGM and IGM are valid. Future improvements will focus on prediction of heat production during feed restriction periods for DGM and on mathematical formulation of feed energy utilisation for fat synthesis in IGM in order to improve model sensitivity to MEI. Comparative analysis provides meaningful information on the models behaviour for further improvement of processes simulations.
Keywords: Beef cattle growth; Comparative analysis; Body composition

S.A. Knott, L.J. Cummins, F.R. Dunshea, B.J. Leury, The use of different models for the estimation of residual feed intake (RFI) as a measure of feed efficiency in meat sheep, Animal Feed Science and Technology, Volume 143, Issues 1-4, Mathematical Models that Predict the Effects of Feed Characteristics on Animal Performance, 22 May 2008, Pages 242-255, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2007.05.013.
(http://www.sciencedirect.com/science/article/B6T42-4P47V2M-1/2/35534079eea342888e85e8831f37f9db)
Abstract:
The concept of residual feed intake (RFI), in determining differences among animals in converting feed into body tissue, was first raised in 1963. Feed efficiency is typically calculated as a function of liveweight gain (LWG) and feed intake (FI). Historically two versions of the same model were proposed, one where FI was adjusted for liveweight (LW) and LWG, and the other where LWG was adjusted for FI and LW. Variation in LWG or FI could then be partitioned into two parts; that which is expected and can be attributed to differences in FI or LWG; and that which is the residual portion, which is the deviation from the expected value based on regression, and therefore not accounted for by differences in FI or LWG. Based on this definition, it is the residual portion which is the measure of efficiency. Both within a livestock industry and between different livestock industries there is no set model for calculating RFI. This paper evaluated four models used to calculate RFI and one model used to calculate residual LWG (RLWG) at a standard level of nutrition. They were the main model currently in use in the Australian beef cattle industry (RFIB), the original models proposed in 1963 (RFI1963; RLWG1963); a French model which included ultrasound measures of muscle and fat depth (RFIF) and the use of the Australian feeding standards to calculate predicted intake and thus RFI (RFISCA). Using feed intake, liveweight and body composition data generated from the same group of sheep (n = 52) at two ages (6 mo, 13 mo), the relative merits of each model were evaluated and compared to the other models, to determine the most appropriate model to calculate RFI for sheep. For all the models except that used to calculate RLWG, over half of the variation in FI could be explained by the model. The amount of variation in FI accounted for depended on the parameters included and the dataset, with less variation in FI explained by the specific models in the older animals. The RFIF model, which included measures of body composition, accounted for the greatest proportion of the variation in FI and as such suggests that the inclusion of body composition parameters is likely to more accurately reflect true biological efficiency.
Keywords: Residual feed intake; Sheep; Model; Feed efficiency

M. Jouven, J. Agabriel, R. Baumont, A model predicting the seasonal dynamics of intake and production for suckler cows and their calves fed indoors or at pasture, Animal Feed Science and

Technology, Volume 143, Issues 1-4, Mathematical Models that Predict the Effects of Feed Characteristics on Animal Performance, 22 May 2008, Pages 256-279, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2007.05.014.
(http://www.sciencedirect.com/science/article/B6T42-4NX2VNK-1/2/d275def146251734c750135af7996290)
Abstract:
To investigate the dynamics of animal intake and production in grassland-based suckler systems, we constructed a model for suckling cows with their calves. The model calculates on a day-to-day basis the selective intake at pasture and the animal production (weight, condition, milk production) in response to energy intake. The model dynamically applies the feed evaluation systems developed by the INRA: the 'cattle fill unit' system to predict forage intake, and the 'feed unit' system to predict net energy requirements and supply. To predict intake at pasture, we adapted the cattle fill unit system by adding effects of herbage availability and sward structural composition on the amount and quality of intake.
At pasture, the grazeable herbage is divided into structural components characterized by their biomass and digestibility. The model predicts the composition of the diet, assuming that the most digestible and abundant components of herbage are preferred. The amount of herbage ingested depends on the animal profile, the digestibility of the diet and the amount of herbage available. Sward depletion by animal intake at pasture has feedback effects on herbage growth and quality, which can be calculated by a vegetation model. Animal production is calculated based on net energy balance, which is the difference between net energy intake and net energy requirements for maintenance (for cow and calf), gestation and lactation (for the cow). The net energy balance determines weight and condition gain or loss, and - after 3 months of lactation - influences milk production the following day. Changes in weight and condition have feedback effects on energy requirements and intake capacity.
Sensitivity analysis on the input values highlighted the importance of forage digestibility for the production of cows and calves. Calf growth was also driven over 3 months old by calf live weight, and under 3 months old by the milk production of the cow. The model's response to stocking rate during the grazing down of a paddock was consistent with current knowledge. The model was validated against experimental data for cows fed indoors or at pasture, at different feed allowances. Model predictions were precise for the digestibility of intake and for live weight (error represents 2-3% of the average observed value), satisfactory for dry matter intake, body condition score and milk production at the beginning of lactation (error represents 10% of the average observed value), and very imprecise for milk production after the third month of lactation (error represents 23% of the average observed value), but the latter had small consequences on calf live weight.
Keywords: Model; Suckler cow; Calf; Intake; Production; Sensitivity analysis; Validation

David Pacheco, Stochastic simulation of rumen degradable protein surplus in grazing dairy cows, Animal Feed Science and Technology, Volume 143, Issues 1-4, Mathematical Models that Predict the Effects of Feed Characteristics on Animal Performance, 22 May 2008, Pages 280-295, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2007.05.015.
(http://www.sciencedirect.com/science/article/B6T42-4NX8RD5-2/2/72a52aa31ec7778a920d8312e57043eb)
Abstract:
In grazing systems, the quality of the pasture is an ever-changing scenario: weather, forage variety, level of fertilisation and age of the plant are some of many factors influencing the quality of the cows' diet. Furthermore, accurate dry matter intake measurements are difficult to obtain under grazing conditions. As a result, the use of mathematical models to describe aspects of pasture digestion has been limited in practice. Stochastic modelling might overcome this limitation. In the current example, a static model of cow digestion (National Research Council (NRC), 2001.

Nutrient Requirements of Dairy Cattle. National Academy Press, Washington, DC, USA) was coded into a software package for probabilistic simulation (GoldSim v. 9.2) using stochastic variables for pasture chemical composition and dry matter intake. Partitioning of crude protein (nitrogen) in the rumen of cows was simulated over a period of 7 weeks in early spring to estimate the potential losses of nitrogen due to high ruminal degradability of protein when different levels and types of supplementary feeds were offered. More than 98% of the simulations resulted in estimated excess of rumen degradable protein of up to 561 g N/d. By comparison, the magnitude of deficit was small (up to -42 g N/d) in the simulations with negative values for rumen degradable protein balance. Pasture crude protein concentration was the stochastic variable with the biggest influence on the amount of rumen degradable protein. Higher levels of supplementation (60 g DM supplements per 100 g DMI) resulted in estimated excess rumen degradable protein that was 0.3 of that obtained from simulations with lower levels of supplementation (35 g DM supplements per 100 g DMI). Stochastic simulation may be useful to explore the likelihood of responses to management scenarios designed to increase the efficiency of dietary nitrogen utilisation in pastoral systems characterised by uncertainty and variability.
Keywords: Dairy cow; Forage protein degradation; Grazing; Nitrogen utilisation; Stochastic

J.S. Zhao, Z.M. Zhou, L.P. Ren, Y.Q. Xiong, J.P. Du, Q.X. Meng, Evaluation of dry matter intake and daily weight gain predictions of the Cornell Net Carbohydrate and Protein System with local breeds of beef cattle in China, Animal Feed Science and Technology, Volume 142, Issues 3-4, 1 May 2008, Pages 231-246, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2007.08.008.
(http://www.sciencedirect.com/science/article/B6T42-4R113MT-1/2/7e18bd4df9bdd82a7864c86c59978d73)
Abstract:
Three feeding trials with different dietary treatments were conducted to evaluate predictions of dry matter intake and average daily gain of Chinese local beef cattle by Cornell Net Carbohydrate and Protein System (CNCPS) version 5.0. In Trial 1, 60 growing Jin Nan yellow steers (local yellow cattle breed originated from Shanxi Province) were assigned to two treatments with five pens in each treatment and six animals in each pen. Trial 2 was conducted with 72 Lu Xi yellow growing steers (local yellow cattle breed originated from Shandong Province) in 12 conventional pens. These animals were assigned to four treatments with six animals in each pen. In Trial 3, 60 Lu Xi yellow steers were allocated to four treatments with five animals in each pen. Average daily dry matter intake (DMI) for each steer was measured as a mean of each pen. All the data about animals, environment, management and feeds required by the CNCPS model were collected, and model predictions were generated for animals of each pen. Model predictions were evaluated by mean bias, mean square prediction error (MSPE) and regression between the observed and predicted values. Animals in 9 of 10 treatments showed a very close model-predicted DMI values to the observed. In another treatment, animals had a mean bias of -0.72 kg DM/day (TRT 10 in Trial 3). With overall data included, the regression equation between observed and predicted DMI was: YOBS = 1.10XCNCPS - 0.78 (R2 = 0.82; P<0.0001), with an intercept not different (P=0.32) from zero, but a slope still different (P<0.0001) from 1. Although the model-predicted ADG values were very close to the observed values in all trials, most of the predicted values were always lower than the observed values with absolute mean bias less than 0.2. When all data were pooled, the regression equation between observed and predicted ADG was: YOBS = 1.07XCNCPS + 0.02 (R2 = 0.73; P<0.0001), with an intercept not different from zero (P=0.88), but a slope that differed from unity (P<0.0001). Results suggest that the CNCPS model is an acceptable model to predict dietary DM intake and average daily gain of Chinese local beef cattle breeds. Further studies are warranted to introduce model adjustment for Chinese conditions.
Keywords: CNCPS model; China local beef cattle breed; Dry matter intake; Average daily gain

Dorothee Putfarken, Jurgen Dengler, Stephan Lehmann, Werner Hardtle, Site use of grazing cattle and sheep in a large-scale pasture landscape: A GPS/GIS assessment, Applied Animal Behaviour Science, Volume 111, Issues 1-2, May 2008, Pages 54-67, ISSN 0168-1591, DOI: 10.1016/j.applanim.2007.05.012.
(http://www.sciencedirect.com/science/article/B6T48-4P2B3W9-2/2/f685dc1ccd6db8626b97097cf3211d5c)
Abstract:
Year-round mixed-species grazing at low densities in large-scale pasture systems has become a popular conservation concept as it is assumed to maintain the valuable biodiversity of semi-open cultural landscapes. This study aims to elucidate which vegetation types are preferentially grazed by cattle and sheep and whether the grazing animals change their preferences through the seasons so that year-round grazing leads to a utilization of all habitats. Additionally, we wanted to determine the main factors underlying the site use patterns of the animals.
The study was conducted on 180 ha of a nature reserve and former military training area in northern Germany from January to October. Within this area, the positions of one cattle herd and one sheep flock were simultaneously recorded every 5 min using the global positioning system (GPS). For this purpose, we fitted one GPS collar alternately to three different cows and another to three different sheep. If the position of a collared animal had changed more than 6 m but less than 100 m within 5 min grazing was assumed based on a validation of these thresholds by direct observation. Using a geographic information system, we analysed the location data with regard to vegetation characteristics, altitude, and distance from fences, water sources, and a sheep shed. For each month, we determined Ivlev's electivity index of both herbivore species in relation to eight broad vegetation types. We used multiple linear regression to create models that describe the grazing frequencies in the grid cells of the area depending on parameters of those grid cells and their spatial position.
Cattle preferred moist and productive habitats, whereas sheep preferred dry and nutrient-poor habitats. Only when feed was in extremely short supply, the animals switched to sites they had previously avoided. Differences in the spatial preferences of the two species were more marked than seasonal changes. Spatial demands of cattle and sheep were largely complementary. Grazing sites with better water availability (i.e. lower distance from the drinking trough and ponds) were significantly preferred by cattle. The sheep preferred grazing sites close to their shed.
Our results show that only a combination of different herbivores guarantees that all habitats of such a large low-intensity pasture are grazed and thus are kept in a management status favourable to conservation. However, the positioning of drinking troughs, fences, and sheds should be carefully considered as these facilities seriously influence the site use of the animals.
Keywords: Feeding electivity; Herbivore; Mixed-species grazing; Nature conservation; Spatial pattern

David Val-Laillet, Anne Marie de Passille, Jeffrey Rushen, Marina A.G. von Keyserlingk, The concept of social dominance and the social distribution of feeding-related displacements between cows, Applied Animal Behaviour Science, Volume 111, Issues 1-2, May 2008, Pages 158-172, ISSN 0168-1591, DOI: 10.1016/j.applanim.2007.06.001.
(http://www.sciencedirect.com/science/article/B6T48-4P77G07-1/2/f62881a76e8ecfcf102fd39d1c78b98d)
Abstract:
The aim of this study was to determine the extent to which the classical properties of social dominance describe the pattern of feeder-related displacements with groups of cattle. We also compared the advantages and disadvantages of three dominance indices for describing the competitive success at the feeder. We observed displacements at the feeder within six groups of 12 lactating dairy cows over 72 h per group. We demonstrated that the cattle in our experiment established a quasi-linear hierarchy at the feeder where many dominance relationships were bi-

directional (52.0 +/- 5.9%); namely, dominance relationships were significantly linear ($P < 0.05$ in five of the six groups) but contained many circular triads (45.0 +/- 5.6%). Dominance rank influenced the milk production ($r = 0.36$, $P = 0.002$) and the time budget of the animals: high-ranking cows were found spending more time at the feeder during the 120 min following provision of fresh food than low-ranking cows ($P = 0.022$), but dominance indices based on the occurrence of displacements at the feeder did not correlate with actual time spent at the feeder. The presence of numerous circular triads and bi-directional relationships suggests that the classical properties of social dominance do not correspond to the pattern of displacements that occur at feeders within small groups of cattle. Instead, the competitive success may also be affected by motivation or persistence by the animal to gain access to the food resource.
Keywords: Cattle; Social dominance; Competitive success; Hierarchy; Feeding competition

Anshu Singh, Jose R. Bicudo, Stephen R. Workman, Runoff and drainage water quality from geotextile and gravel pads used in livestock feeding and loafing areas, Bioresource Technology, Volume 99, Issue 8, May 2008, Pages 3224-3232, ISSN 0960-8524, DOI: 10.1016/j.biortech.2007.05.065.
(http://www.sciencedirect.com/science/article/B6V24-4PB1614-2/2/08f740f414f0bc07f7fe9ebe7d1c6ad5)
Abstract:
Geotextile and gravel pads offer a low-cost alternative to concrete for providing all-weather surfaces for cattle and vehicle traffic, and are used in many livestock facilities to minimize mud, runoff and erosion of heavy traffic areas. The objective of this study was to compare different combinations of geotextile and gravel used in heavy livestock traffic areas that minimize the potential for water pollution. Three different pad combinations were constructed in 2.4 x 6-m plots as follows: (i) woven geotextile + 100 mm of gravel + 50 mm Dense Grade Aggregate (DGA); (ii) woven geotextile + geoweb(R) + 100 mm DGA; and (iii) non-woven geotextile + 152 mm of gravel + 50 mm DGA; (iv) mud lots as control. The third combination was equivalent to one of the base treatments specified by the Kentucky Natural Resource and Conservation Service (NRCS). All treatment combinations were duplicated. Lysimeter pans were installed in four out of eight plots for the collection of leachate or drainage water. Runoff was collected at the lower end of the plots. About 14 kg of beef cattle manure were added evenly to the plots. Rainfall at 50 mm/h was applied using rainfall simulators. In the first five of ten experiments, manure was removed from the surface of the pads after each experiment. In the remaining five experiments manure accumulated on the surface of the pads. The effect of pad treatment was significant on the electrical conductivity (EC), total solids (TS), chemical oxygen demand (COD), nitrite ($NO_2$-N), total nitrogen (TN) and total phosphorus (TP) values in surface runoff at the 5% level. Manure removal did not have any significant effect on the nutrient content of runoff or leachate samples except for ammonia ($NH_4$-N) values. Although a mass balance indicated relatively small amounts of organic matter and nutrients were lost by runoff and leaching, the actual contamination level of both runoff and leachate samples were high; TP levels as high as 12 mg/l (5.4 mg/m2) in runoff and nitrate ($NO_3$-N) values as high as 10.8 mg/l (1.6 mg/m2) in leachate were observed.
Keywords: Cattle; Manure; Organic material; Nutrients; All-weather surfaces

R.S. Settivari, T.J. Evans, P.A. Eichen, G.E. Rottinghaus, D.E. Spiers, Short- and long-term responses to fescue toxicosis at different ambient temperatures, Journal of Thermal Biology, Volume 33, Issue 4, May 2008, Pages 213-222, ISSN 0306-4565, DOI: 10.1016/j.jtherbio.2007.12.001.
(http://www.sciencedirect.com/science/article/B6T94-4RVMXHW-1/2/1da022471f8bf292a98af6b9587e8d88)
Abstract:

Intake of endophyte-infected tall fescue by cattle results in fescue toxicosis, which is characterized by increased hyperthermia during heat stress and concomitant reductions in feed intake and growth. Rats were monitored at 21 or 31 [degree sign]C for short- or long-term periods to determine temporal changes associated with the intake of endophyte-infected (E+) or uninfected (E-) fescue seed diets. Core temperature only changed in rats fed E+ diet at 31 [degree sign]C. Intake of E+ diet reduced feed intake, daily gain, and serum prolactin. There were temporal and thermal differences in the response to endophytic toxins, with short-term changes diminishing over time at 21 [degree sign]C, but increasing for certain parameters at 31 [degree sign]C.
Keywords: Fescue toxicosis; Rat; Thermoregulation; Ergopeptide

A.P. Moloney, M.G. Keane, M.T. Mooney, K. Rezek, F.J.M. Smulders, D.J. Troy, Energy supply patterns for finishing steers: Feed conversion efficiency, components of bodyweight gain and meat quality, Meat Science, Volume 79, Issue 1, May 2008, Pages 86-97, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.08.004.
(http://www.sciencedirect.com/science/article/B6T9G-4PHSCBF-5/2/5447522196d2e93cfa87af35f10690b5)
Abstract:
The objective was to determine the effect of pre-slaughter growth rate on feed efficiency, components of body growth and on the tenderness of longissimus muscle from steers reared to a common age and carcass weight. Sixty Friesian steers were group-housed and offered grass silage ad libitum and 3.5 kg concentrates per animal daily for 5 months and then 5 kg concentrates and 1 kg grass hay for 1 month before the experiment began. The animals were then weighed and in a randomised block were assigned to one of 5 groups, for slaughter at the beginning of the experiment or to be offered concentrates and hay (900 and 100 g/kg total diet, respectively) to achieve target growths of: 0.72 kg/day continuously for 17 weeks, 0.36 kg/day for the first 8 weeks and 1.08 kg/day for the final 8 weeks (low-high), 1.08 kg/day for the first 8 weeks and 0.36 for the final 8 weeks (high-low) or 0.36 kg/day for the first 2 weeks, 0.72 kg/day during weeks 4 and 14 and 1.08 kg/day for the final 2 weeks (pulse). One week was allowed for transition to the different dietary allowances within each energy supply pattern. The mean age at the beginning and end of the study was 18 and 22.5 months, respectively. After slaughter, the weight of the carcass and kidney + channel fat depot were recorded, the pistola hind quarter was dissected into fat, lean and bone and the tenderness of the m. longissimus thoracis et lumborum (LTM) muscle was measured instrumentally and using a trained taste panel after 2, 7 or 14 days ageing. The pattern of energy supply did not affect carcass weight, fat score or kidney + channel fat weight. The pistola hind quarter from animals offered the low-high energy pattern had a similar composition to the continuously-fed animals but contained more muscle than that from animals offered high-low or pulse energy patterns. After 14 days ageing, LTM from the continuously-fed animals was more tender than that from animals offered the other energy supply patterns but shear force did not differ between supply patterns. The data do not support the hypothesis that pre-slaughter growth rate increases tenderness but suggest that energy supply pattern can influence body composition of finishing cattle.
Keywords: Beef; Energy; Muscle growth; Tenderness; Calpains; Sensory analysis

Bin Zhang, Qiang Lin, Junda Lin, Xialing Chu, Junyi Lu, Effects of broodstock density and diet on reproduction and juvenile culture of the Leech, Hirudinaria manillensis Lesson, 1842, Aquaculture, Volume 276, Issues 1-4, 30 April 2008, Pages 198-204, ISSN 0044-8486, DOI: 10.1016/j.aquaculture.2008.02.003.
(http://www.sciencedirect.com/science/article/B6T4D-4RTM2V0-1/2/abeb736e744e55a935a2b21417c5afe8)
Abstract:

The leech Hirudinaria manillensis, Lesson 1842 is of much interest for clinical and medicinal use. In this study, the effect of broodstock density (5, 10, 15, 20, 25, 30 and 50 ind tank- 1) on the reproductive efficiency of H. manillensis was examined. After 4 months of culture, the number of cocoons produced was significantly different among the different broodstock densities ($F_{6, 34} = 4.560$, $P < 0.05$), but fertilization ratio was not ($F_{6, 34} = 1.319$, $P = 0.285$). The average number of hatchlings per cocoon (5.72 +/- 0.13 ind) and hatching rate (96.82 +/- 1.31%) of the cocoons in the 5 ind tank- 1 treatment were significantly higher than those of the other treatments. The 50 ind tank- 1 treatment had the highest mortality of parent leeches (29.60 +/- 2.48%). The size and wet weight of the cocoons were significantly different among the treatments, with the 5 ind tank- 1 treatment having the largest cocoon size (standard length and diameter) and wet weight. The time of juvenile release from the cocoons did not differ significantly among the different broodstock densities ($P > 0.05$).
The effect of diet (FT1: live bullfrog, FT2: fresh cattle blood, and two blood plasma preparations FT3: NP-2002a and FT4: NP-2002b) on the feeding, growth and survivorship of the juvenile leeches was also studied. After 2 months of culture, juveniles in the FT2 (fresh cattle blood) treatment had the highest total food intake (13.11 +/- 0.07 g). Juveniles in the FT3 (NP-2002a) and FT1 (live bullfrog) treatments had a significantly high feeding ratio 95.00 +/- 1.16% and 91.33 +/- 1.20%, respectively. Percentage weight gain (WG) and specific growth rate (SGR) of the juveniles in the treatment FT4 (NP-2002b) were the lowest, at 168.52 +/- 15.82% and 1.64 +/- 0.10%, respectively. Juveniles in the FT3 (NP-2002a) and FT4 (NP-2002b) treatments had the highest survival rates, at 96.00 +/- 0.58% and 84.33 +/- 0.88%, respectively.
Keywords: Leech; Hirudinaria manillensis; Density; Growth; Survivorship; Reproduction

Katsuaki Sugiura, Noel Murray, Toshiyuki Tsutsui, Fumiko Kasuga, Simulating the BSE epidemic and multiplication factor in dairy herds in Japan, Preventive Veterinary Medicine, Volume 84, Issues 1-2, 17 April 2008, Pages 61-71, ISSN 0167-5877, DOI: 10.1016/j.prevetmed.2007.11.003. (http://www.sciencedirect.com/science/article/B6TBK-4RFD676-1/2/0502b23b379029f161d214a6c3c2fe8f)
Abstract:
With the objective of evaluating the effectiveness of an administrative guidance on the use of ruminant meat-and-bone meal in ruminant feed, effective from April 1996 to September 2001, we developed a model to simulate the evolution of the BSE epidemic and to estimate the BSE multiplication factor (K) in the Japanese dairy population. The output that provided the best fit to the number of BSE cases both observed and predicted to date suggest that the probability that bovine MBM was fed back to cattle was 14.2-75.2% and 0.129-0.570% during the periods from 1992 to April 1996 and from April 1996 to October 2001, respectively. Given these estimates, the value of K would have peaked in 1995 at 40-48 and then declined to 0.32-0.67 between 1997 and 2001. These results suggest that the administrative guidance was effective in reducing the amount of MBM fed to cattle by a factor of 104-141 and was perhaps enough to drive the epidemic towards extinction.
Keywords: Multiplication factor; Bovine spongiform encephalopathy; Japan; Simulation model; Feed ban

Takehisa Yamamoto, Toshiyuki Tsutsui, Akiko Nishiguchi, Sota Kobayashi, Simulation-based estimation of BSE infection in Japan, Preventive Veterinary Medicine, Volume 84, Issues 1-2, 17 April 2008, Pages 135-151, ISSN 0167-5877, DOI: 10.1016/j.prevetmed.2007.11.007. (http://www.sciencedirect.com/science/article/B6TBK-4RKDHJG-1/2/317f5408492bc4f5fa136d79c7daeeae)
Abstract:
The first case of bovine spongiform encephalopathy (BSE) in Japan was found in September 2001. As a result, national BSE surveillance systems in slaughterhouses and farms were

introduced between October 2001 and April 2004. All cattle, with the exception of those under 24 months of age that die at farms, now undergo compulsory testing when they die or are slaughtered. The removal of specified risk material (SRM) from all slaughtered cattle and a ban on the feeding of meat-and-bone meal to all farm animals were implemented in October 2001. However, infected cattle that died or were slaughtered before these measures were put into practice could have been a source of infection to other cattle through the rendering process. The slaughtered cattle could also have been a source of infection to humans via SRM that entered the food chain. The purpose of this study was to estimate the number of BSE-infected cattle that could have been a source of infection to cattle and humans before October 2001. Since all typical cases were dairy cattle, this study focused on the dairy cattle population. We developed a simulation model to obtain the year of death and the final disposition of infected cows born in each year from 1996 to 2001. In this model, the dairy cattle population was divided into birth cohorts, and parameters regarding its population dynamics were assumed to be constant. Using this model, the total number of infected cattle in each birth year was estimated by maximum likelihood estimation using data on the number of detected cases from 2002 to 2006. Finally, the number of infected cattle that died or were slaughtered each year was estimated by Monte-Carlo simulation using the same model with the total number of infected cattle estimated by maximum likelihood estimation. It was estimated that the majority of infected cattle that could have been sources of infection before 2001 were born in 1996. The total number born in 1996 was estimated to be 155 (95% confidence interval: 90-275). Of these 155 cattle, 56 died or were slaughtered before October 2001, after the accumulation of infectious agent in their bodies. Only 5 of these 56 cattle were estimated to have been slaughtered. Therefore, the number of infected cattle that could have served as a source of human infection would appear to have been a very limited subset of the BSE-infected cattle in Japan.
Keywords: Bovine spongiform encephalopathy; Variant Creutzfeldt-Jakob disease; Simulation model; Maximum likelihood estimation; Japan

S.J. Bach, Y. Wang, T.A. McAllister, Effect of feeding sun-dried seaweed (Ascophyllum nodosum) on fecal shedding of Escherichia coli O157:H7 by feedlot cattle and on growth performance of lambs, Animal Feed Science and Technology, Volume 142, Issues 1-2, 15 April 2008, Pages 17-32, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2007.05.033.
(http://www.sciencedirect.com/science/article/B6T42-4P77G77-1/2/7d58ddfd510feed71078098bd9bddd3a)
Abstract:
Thirty-two steers orally inoculated with a four-strain mixture (1010 CFU) of nalidixic acid-resistant Escherichia coli O157:H7 had sun-dried Ascophyllum nodosum seaweed (Tasco-14(TM)) added to their barley-based diet (860 g/kg barley grain and 90 g/kg whole crop barley silage, dry matter basis) to assess its effectiveness in reducing fecal shedding of the pathogen. Steers were housed in four groups of eight and received Tasco-14(TM) in the diet, in place of barley, at levels (as fed) of 10 g/kg for 14 days (T1-14), 20 g/kg for 7 days (T2-7), 20 g/kg for 14 days (T2-14), or not at all (i.e., control, CON). The dietary treatments commenced 7 days after E. coli O157:H7 inoculation and fecal shedding patterns were examined over 14 weeks. Water, water-trough interface, feed and fecal pat samples were also collected weekly and cultured for E. coli O157:H7. Detection of the pathogen in fecal samples was less frequent ($P<0.05$) in T1-14 (99/168) and T2-7 (84/168) versus CON (135/168) and T2-14 (115/168), and the concentrations of E. coli O157:H7 recovered in feces from T1-14 and T2-7 steers were lower ($P<0.005$) than from CON or T2-14 steers. Rates of decline in shedding of E. coli O157:H7 were similar among treatments, but final numbers of E. coli O157:H7 were lower ($P<0.05$) in T1-14 and T2-7 as compared to T2-14 and CON. Fecal volatile fatty acid concentrations and pH were similar among treatments, suggesting no fecal alterations that were antagonistic to survival. E. coli O157:H7 was present in 1 (from T2-7) of 56 cattle drinking water samples, 2 of 56 (T1-14, CON) feed samples and 32 of 56 fecal pats. A

second experiment investigated effects of the dietary treatment on growth performance of non-inoculated sheep. Tasco-14(TM) was administered to 40 individually fed Canadian Arcott lambs beginning at day 56 of a 105-day finishing period. The lambs received Tasco-14(TM) at 0 g/kg (control, CON), at 10 g/kg for 14 days (T1-14), 20 g/kg for 14 days (T2-14), 10 g/kg for 28 days (T1-28) or at 20 g/kg for 7 days (T2-7) as a top-dress on their pelleted, barley grain-based diet (n = 8). E. coli O157:H7 was not isolated from fecal samples collected at 4-week intervals, but generic E. coli populations were lower ($P<0.05$) in T1-28 lambs than in other treatments. Average daily gain, feed intake, feed efficiency and carcass traits did not differ among treatments. Our challenge study supports past studies showing that Tasco-14(TM) decreases shedding of E. coli O157:H7 by cattle. The lamb study shows that this additive did not directly affect feed intake or animal growth.
Keywords: Ascophyllum nodosum; Cattle; E. coli O157:H7; Seaweed; Sheep; Tasco-14(TM)

E. Froidmont, M. Bonnet, R. Oger, V. Decruyenaere, J.M. Romnee, Y. Beckers, N. Bartiaux-Thill, Influence of the grinding level and extrusion on the nutritional value of lupin seed (Lupinus albus) for cattle in the context of the Dutch protein evaluation system, Animal Feed Science and Technology, Volume 142, Issues 1-2, 15 April 2008, Pages 59-73, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2007.07.002.
(http://www.sciencedirect.com/science/article/B6T42-4PHSFD0-1/2/3e1477ffbbef7cf0b67fdfa3e33cd03a)
Abstract:
The experiment was conducted on double-muscled Belgian Blue bulls, fitted with rumen, duodenal and ileal cannulas, according to a 5 x 5 Latin square design with one missing animal. All diets contained 320 g/kg of lupin seed (Lupinus albus, var. Lublanc) on a dry matter (DM) basis. Four grinding treatments of raw lupins (RAW) were used to obtain median particle sizes of approximately 0.5, 2.0, 4.2 or 6.0 mm. One extrusion treatment (EXTR) was also used and consisted of heating to 180 [degree sign]C for 30 s. The pH and ammonia nitrogen (NH3-N) concentration kinetics in the rumen liquid differed between RAW and EXTR. The latter induced larger variation in these parameters after the meal. Quadratic effects of the grinding level on rumen fermentation parameters were observed at several sampling times for RAW. The grinding level had also quadratic effects on the intestinal digestibility of DM, organic matter (OM) and N, reaching a maximum with treatment 4.2 mm. The treatment 0.5 mm tended to reduce the microbial N flow at the duodenum whereas EXTR tended to increase the non NH3-N flow. The total digestible flow of N tended to increase with the intermediate grinding levels and EXTR. Lupin protein degradability was calculated at 0.78, 0.74, 0.65, 0.82 and 0.70 for the 0.5, 2.0, 4.2, 6.0 mm treatments and EXTR, respectively. Treatments 2.0 and 4.2 mm increased the digestible protein in the small intestine (DVE) content by more than 40% compared with treatment 0.5 mm. The balance between rumen fermentable N and energy (OEB) was reduced by 15% with the 4.2 mm and EXTR. Compared with treatment 4.2 mm, EXTR did not greatly improve the nutritional value of lupin seed. The results suggested that lupin seed should be coarsely ground or flattened to obtain a mean particle size between 2.0 and 4.2 mm for cattle feed, but that an insufficient grinding level (treatment 6.0 mm) induced a higher degradability of lupin protein, probably due to more intense rumination. Under our experimental conditions, the extrusion did not sufficiently improve the nutritional value of the seed to be economically viable. These results show that feeding standards should consider the influence of the grinding level of legume seeds in order to assess their nutritional value accurately.
Keywords: Lupin; Grinding; Standard feeding system; pulse; Nutritional value

C.R. Bailey, G.C. Duff, S.R.Sanders, J.L. Treichel, L.H. Baumgard, J.A. Marchello, D.W. Schafer, C.P. McMurphy, Effects of increasing crude protein concentrations on performance and carcass characteristics of growing and finishing steers and heifers, Animal Feed Science and Technology,

Volume 142, Issues 1-2, 15 April 2008, Pages 111-120, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2007.08.001.
(http://www.sciencedirect.com/science/article/B6T42-4PPNM8R-1/2/553eff87a5ce6e93f4df5e0c9b4d4612)
Abstract:
A 2 x 3 factorial design was utilized to ascertain the effects of three dietary crude protein (CP) concentrations on performance, carcass characteristics, and serum urea nitrogen (SUN) concentration in steers and heifers. Animals were blocked by gender (n = 9) and body weight (BW; n = 3/gender), randomly assigned to a diet containing 110, 125 or 140 g/kg dietary CP (n = 6), subjected to a growing period of 56, 84 or 112 d, depending on start BW, and a finishing period of 84 d. Animals were weighed and bled at 28 d intervals and daily dry matter intake (DMI), average daily gain (ADG), and gain to feed (G:F) were calculated and SUN was analyzed as a repeated measure throughout the study. Following slaughter, carcass data was collected for hot carcass weight (HCW), dressing percent (DP), kidney, pelvic and heart fat (KPH), 12th rib backfat (BF), loin muscle (LM) area, marbling score (MS), and yield grade (YG). Growing steers and heifers were programmed to gain 1.02 and 0.91 kg/d, respectively. Therefore, heifers consumed less than steers and steers gained more than heifers (P<0.01) with no differences in feed efficiency. Dietary CP treatment did not effect DMI, but did result in a quadratic (P=0.04) increase in ADG; thereby quadratically (P=0.06) and linearly (P=0.08) increasing final BW, and G:F, respectively. Finishing heifers consumed and gained less than steers (P<0.01), had lighter HCW (P<0.01) and greater DP (P=0.01) and LM area (P=0.01) than steers. DMI (P=0.02), ADG (P=0.05), HCW (P=0.08), and DP (P=0.06) reacted quadratically with increasing dietary CP. HCW (P=0.02) increased linearly with increasing dietary CP. G:F, KPH, BF, LM area, MS and YG was not affected by dietary CP concentration and G:F, KPH, BF, MS, and YG did not differ between genders. However, there was a gender x dietary CP interaction (P=0.01) for G:F. Steers were the most efficient at 125 g/kg dietary CP, while heifers were most efficient at 140 g/kg dietary CP. Gender had no effect on SUN concentrations, but SUN increased linearly (P<0.01) with increasing dietary CP concentrations. In conclusion, quadratic responses in DMI and ADG indicate that a 125 g/kg dietary CP concentration is optimal for either steers or heifers during the finishing period.
Keywords: Beef cattle; Dietary CP; Gender

Q. Liu, C. Wang, Y.X. Huang, K.H. Dong, W.Z. Yang, H. Wang, Effects of lanthanum on rumen fermentation, urinary excretion of purine derivatives and digestibility in steers, Animal Feed Science and Technology, Volume 142, Issues 1-2, 15 April 2008, Pages 121-132, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2007.08.002.
(http://www.sciencedirect.com/science/article/B6T42-4PMJ9W5-2/2/aa2d27e573ba64ea8b691e713ad4072e)
Abstract:
The objective of this study was to evaluate the effects of LaCl3 supplementation on rumen fermentation, urinary excretion of purine derivatives and feed digestibility in the total tract of steers. Eight ruminally cannulated Simmental steers (420 +/- 20 kg) were used in a replicated 4 x 4 Latin square experiment. The treatments were control (without LaCl3); La-low; La-medium and La-high with 450, 900 and 1800 mg LaCl3 per steer per day, respectively. Diet consisted of 600 g/kg corn stover and 400 g/kg concentrate (dry matter [DM] basis). Dry matter intake (averaged 9 kg/day) was restricted to a maximum of 90% of ad libitum intake. Ruminal pH (range of 6.59-6.42) was quadratically (P<0.04) changed, whereas total volatile fatty acids (VFA) concentration (range of 74.16-88.61 mM) was linearly (P<0.01) and quadratically (P<0.01) increased with increasing La supplementation. Ratio of acetate to propionate decreased linearly (P<0.01) from 3.28 to 1.79 as La supplementation increased due to the increased in propionate production. In situ ruminal neutral detergent fibre (aNDF) degradation of corn stover was improved but the crude protein (CP) degradability of soybean meal was decreased with increasing La supplementation. Urinary

excretion of purine derivatives was quadratically (P<0.01) changed with altering La supplementation (75.5, 81.0, 82.4 and 70.6 mmol/day for control, low-, medium- and high-LaCl3 supplementation, respectively). Similarly, digestibilities of organic matter, aNDF and CP in the total tract were also linearly and quadratically increased with increasing La supplementation. The present results indicate that supplementation of diet with LaCl3 improved rumen fermentation and feed digestion in beef cattle. It was suggested that the La stimulated the digestive microorganisms or enzymes in a dose-dependent manner. In the experimental conditions of this trial, the optimum La dose was about 900 mg LaCl3 per steer per day.
Keywords: Rare earth elements; Rumen fermentation; Digestibility; Urinary purine derivatives; Beef cattle

Jeremy Bryant, Nicolas Lopez-Villalobos, Colin Holmes, Jennie Pryce, Jose Rossi, Kevin Macdonald, Development and evaluation of a pastoral simulation model that predicts dairy cattle performance based on animal genotype and environmental sensitivity information, Agricultural Systems, Volume 97, Issues 1-2, April 2008, Pages 13-25, ISSN 0308-521X, DOI: 10.1016/j.agsy.2007.10.007.
(http://www.sciencedirect.com/science/article/B6T3W-4RWHXGS-1/2/8f505ba52f0b854cd1d7e53e8fca0802)
Abstract:
A dairy cattle simulation model for pastoral systems that considers how dairy cow genotypes respond to different environments is described. The dairy cow is represented by five modules for maintenance, pregnancy, growth, body energy reserves and lactation with the influence of environmental factors on processes included within each module. Feed intake is predicted based on the requirements for maintenance, growth and pregnancy, and the dairy cow's potential for yields of milk, fat and protein and body fat change in a given environment. The effects of various temporary environmental factors such as cow body condition score, climate, feed quality and the stage of pregnancy are all considered when predicting yields of milk, fat and protein, energy and dry matter intake. The model was evaluated using information from a prior experimental study with 1990s Holstein-Friesian dairy cattle of North American/European or New Zealand origin managed in a pasture-based system in early to peak lactation. The model was able to predict, to a high degree of accuracy, mean values for yields of milk, fat and protein, and concentrations of fat and protein. However for individual cows, feed intake and live weight change were less reliably predicted. The major source of error was a lack of simulated variation, rather than any systematic bias. The major advance of the model is its ability to predict performance from genetic and environmental sensitivity information for particular breeds, and its ability to predict feed intake and yields of milk, fat and protein concurrently.
Keywords: Genotype; Environment; Dairy cattle; Simulation; Evaluation

Marika Niemela, Arto Huuskonen, Sari Jaakola, Erkki Joki-Tokola, Marko Hyvarinen, Coastal meadows as pastures for beef cattle, Agriculture, Ecosystems & Environment, Volume 124, Issues 3-4, April 2008, Pages 179-186, ISSN 0167-8809, DOI: 10.1016/j.agee.2007.09.009.
(http://www.sciencedirect.com/science/article/B6T3Y-4R2GRSX-1/2/34b3418841089d28a49801f242dd5c41)
Abstract:
The forage yield and quality and the growth of beef calves were examined in a 3-year study on four farms on coastal meadows of the Bothnian Bay, Finland. The forage yield at the end of June (1704 kg dry matter ha-1 in average) was considerably lower than that of cultivated grasslands, whereas the nutritional quality of the forage was approximately at the same level. The daily gain of calves on coastal meadows was 1 kg day-1 on average. The calves raised on the coastal meadows had equal live weights as the beef calves of the same age in northern Finland in general. The interaction between breed and pasture type tended to be significant, indicating that

Simmental was capable of slightly better utilisation of coastal meadows than Limousin. Calculation of the nutrient budget showed that the amount of P entering the coastal meadows with creep feeding (0.046 kg ha-1 year-1) constituted a minor proportion of the total P load. Eutrophication of grazed semi-natural grasslands can be most effectively prevented with reasonable usage of additional minerals. The use of a suitable type of livestock and stocking rate and the timing of the grazing season were considered to be important aspects for adjusting the biodiversity management and livestock performance on coastal meadows.
Keywords: Beef cattle; Forage; Coastal meadow; Semi-natural grassland; Eutrophication; Biodiversity

G. Bretschneider, J.C. Elizalde, F.A. Perez, The effect of feeding antibiotic growth promoters on the performance of beef cattle consuming forage-based diets: A review, Livestock Science, Volume 114, Issues 2-3, April 2008, Pages 135-149, ISSN 1871-1413, DOI: 10.1016/j.livsci.2007.12.017.
(http://www.sciencedirect.com/science/article/B7XNX-4RNK46K-2/2/024aed5f2418f3c17c24a88eb3413a59)
Abstract:
Scientific literature on the use of antibiotic growth promoters (AGP) in beef cattle consuming forage-diets was reviewed. Database summarizes 136 comparisons between untreated and AGP-treated cattle from 48 bibliographic references. Performance data of cattle receiving AGP either alone or in combination with 17 [beta]-estradiol implants was statistically analyzed. Forage quality, in terms of average daily gain (ADG), differentially influenced (P = 0.1) the effect of AGP on beef cattle performance. As the quality of forage increased, the estimated net ADG response to monensin decreased and that to lasalocid increased. ADG increased quadratically (P < 0.01) with increasing doses of monensin (R2 = 0.71) or lasalocid (R2 = 0.63). Ionophore-dosage level quadratically improved (P = 0.01; R2 = 0.52) feed conversion (FCONV) of cattle without affecting their dry matter intake (DMI; P > 0.1). A linear relationship (P < 0.01) between ADG and dose of tetronasin (R2 = 0.64) or lysocellin (R2 = 0.52) was also observed. The combination of monensin and 17[beta]-estradiol implants resulted in an additive effect on ADG of grazing cattle. The experimental results reviewed show that, in beef cattle consuming forage-based diets, ionophores improve ADG and FCONV in a dose-dependent manner, with little or no effect on DMI. In addition, results suggest that forage quality influences the direction of the ADG response to AGP supplementation in cattle. Summarized data from beef cattle implanted with 17[beta]-estradiol and/or supplemented with monensin indicate that the combined response of these two compounds on cattle grazing high-quality pastures has no effect on ADG over that obtained by 17[beta]-estradiol alone.
Keywords: Growth promoter; Ionophore; Management; Beef cattle; Weight gain; Meta-analysis

J.D. Wood, M. Enser, A.V. Fisher, G.R. Nute, P.R. Sheard, R.I. Richardson, S.I. Hughes, F.M. Whittington, Fat deposition, fatty acid composition and meat quality: A review, Meat Science, Volume 78, Issue 4, April 2008, Pages 343-358, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.07.019.
(http://www.sciencedirect.com/science/article/B6T9G-4P7R8D5-5/2/9207a43d00ed100e5ee91ed47c0d0e3c)
Abstract:
This paper reviews the factors affecting the fatty acid composition of adipose tissue and muscle in pigs, sheep and cattle and shows that a major factor is the total amount of fat. The effects of fatty acid composition on meat quality are also reviewed. Pigs have high levels of polyunsaturated fatty acids (PUFA), including the long chain (C20-22) PUFA in adipose tissue and muscle. The full range of PUFA are also found in sheep adipose tissue and muscle whereas cattle `conserve' long chain PUFA in muscle phospholipid. Linoleic acid (18:2n - 6) is a major ingredient of feeds for all

species. Its incorporation into adipose tissue and muscle in relation to the amount in the diet is greater than for other fatty acids. It is deposited in muscle phospholipid at a high level where it and its long chain products eg aracidonic acid (20:4n - 6) compete well for insertion into phospholipid molecules. Its proportion in pig adipose tissue declines as fat deposition proceeds and is an index of fatness. The same inverse relationships are not seen in ruminant adipose tissue but in all species the proportion of 18:2n - 6 declines in muscle as fat deposition increases. The main reason is that phospholipid, where 18:2n - 6 is located, declines as a proportion of muscle lipid and the proportion of neutral lipid, with its higher content of saturated and monounsaturated fatty acids, increases. Oleic acid (18:1cis - 9), formed from stearic acid (18:0) by the enzyme stearoyl Co-A desaturase, is a major component of neutral lipid and in ruminants the same enzyme forms conjugated linoleic acid (CLA), an important nutrient in human nutrition. Like 18:2n - 6, [alpha]-linolenic acid (18:3n - 3) is an essential fatty acid and is important to ruminants since it is the major fatty acid in grass. However it does not compete well for insertion into phospholipid compared with 18:2n - 6 and its incorporation into adipose tissue and muscle is less efficient. Greater biohydrogenation of 18:3n - 3 and a long rumen transit time for forage diets also limits the amount available for tissue uptake compared with 18:2n - 6 from concentrate diets. A positive feature of grass feeding is that levels of the nutritionally important long chain n - 3 PUFA are increased ie EPA (20:5n - 3) and DHA (22:6n - 3). Future research should focus on increasing n - 3 PUFA proportions in lean carcasses and the use of biodiverse pastures and conservation processes which retain the benefits of fresh leafy grass offer opportunities to achieve this. The varying fatty acid compositions of adipose tissue and muscle have profound effects on meat quality. Fatty acid composition determines the firmness/oiliness of adipose tissue and the oxidative stability of muscle, which in turn affects flavour and muscle colour. Vitamin E is an essential nutrient, which stabilises PUFA and has a central role in meat quality, particularly in ruminants.
Keywords: Fatty acids; Meat quality; Pigs; Sheep; Cattle; Diets; Genetics; Lipid oxidation; Flavour

M. Jouven, R. Baumont, Simulating grassland utilization in beef suckler systems to investigate the trade-offs between production and floristic diversity, Agricultural Systems, Volume 96, Issues 1-3, March 2008, Pages 260-272, ISSN 0308-521X, DOI: 10.1016/j.agsy.2007.10.001.
(http://www.sciencedirect.com/science/article/B6T3W-4RB5GPY-1/2/091d81cdd5e8d30dc24d1e74adc5da4e)
Abstract:
In order to understand the farm-scale balance between the apparently conflicting objectives of system production and biodiversity conservation in grassland-based beef suckler systems, we constructed the whole-farm simulation model SEBIEN.
SEBIEN uses a bio-technical approach focussed on grassland utilization by the herd to predict the daily functioning of suckler systems based on permanent pasture. The farming system is divided into three main components which interact at multiple time scales: (i) management, divided into a strategic component (management plan) and a tactical component (management rules), (ii) herd, divided into a group of cows with calf and a group of heifers, and (iii) feed, comprising grasslands paddocks, conserved forage and purchased feed (hay and concentrate). Each component is the subject of a sub-model. The dynamic models predicting animal intake and performance and permanent pasture growth, structure and digestibility have been published previously. The management sub-model is described.
The inputs to SEBIEN include farm structure (= description of herd and grassland resources), management plan (= animal production objectives and grassland utilization), thresholds for management rules and weather data which introduces variability between seasons and years. The outputs of SEBIEN include the daily operation of the forage system, the dynamics of intake and performance for the average animals of the herd, and the dynamics of grassland production and utilization on each paddock. To characterize the production - biodiversity trade-offs at farm scale, we translated these outputs into an indicator of system production based on animal sales and

forage self-sufficiency, and into an indicator of floristic diversity based on soil fertility and grassland utilization rates on each paddock.
We simulated three case studies based on real farms with SEBIEN, compared their balance between production and floristic diversity and its response to biodiversity-friendly management rules such as late hay harvest and low grazing intensity. SEBIEN predicted that animal production was not systematically in conflict with floristic diversity at farm scale. The balance between grassland productivity and stocking rate was determinant for both floristic diversity and forage self-sufficiency. For all farms production remained unchanged when intermediate levels of biodiversity-friendly management rules were applied (40% of hay paddocks cut after flowering, or paddock change at grazing when sward height dropped under 8 cm). Though, the pattern and amplitude of the responses differed between farms. At farm scale, an increase in floristic diversity on a few paddocks sometimes led to a decrease on other paddocks, which confirms that farm-scale analysis are needed to evaluate the effects of field-scale environmental policies.
Keywords: Model; Forage system; Beef cattle; Grazing; Cutting; Production; Floristic diversity

V.G. Allen, C.P. Brown, E. Segarra, C.J. Green, T.A. Wheeler, V. Acosta-Martinez, T.M. Zobeck, In search of sustainable agricultural systems for the Llano Estacado of the U.S. Southern High Plains, Agriculture, Ecosystems & Environment, Volume 124, Issues 1-2, Special Section: Problems and Prospects of Grassland Agroecosystems in Western China, March 2008, Pages 3-12, ISSN 0167-8809, DOI: 10.1016/j.agee.2007.08.006.
(http://www.sciencedirect.com/science/article/B6T3Y-4R003D9-1/2/249d51d84a7c5f8c9ed4bcb7d07b2cc3)
Abstract:
Crop production on the Llano Estacado of the Texas High Plains has used precipitation and supplemental irrigation with water pumped from the Ogallala aquifer at rates that have far exceeded recharge for many years. Over 20% of the U.S. cotton (Gossypium hirsutum L.) crop is produced currently in this once vast grassland. Most of this cotton is produced in monoculture systems that are economically risky and contribute to wind-induced erosion and depletion of ground water resources. Although large numbers of cattle are found in this region, little integration of livestock and crop production exists. Integrated crop-livestock systems could improve nutrient cycling, reduce soil erosion, improve water management, interrupt pest cycles, and spread economic risk through diversification. Two whole-farm scale systems compared (1) a cotton monoculture typical of the region; and (2) an alternative integrated system that included cotton, forage, and Angus-cross stocker beef steers (initial body weight 249 kg). Steers grazed the perennial warm-season grass `WW-B. Dahl' old world bluestem [Bothriochloa bladhii (Retz) S.T. Blake] in sequence with rye (Secale cereale L.) and wheat (Triticum aestivum L.) from January to mid-July when they were sent to the feedyard for finishing. Grass seed were harvested from bluestem in October. Cotton in the alternative system was grown in a two-paddock rotation with the wheat and rye. Cotton was harvested from both systems in October. At the end of 5 years, the alternative system reduced needs for supplemental irrigation by 23% and for nitrogen fertilizer by 40% compared with the conventional cotton monoculture. Fewer chemical inputs including pesticides were required by the alternative system. Soil with perennial grass pasture was lower in predicted soil erosion and was higher in soil organic carbon, aggregate stability, and microbial biomass than soil where continuous cotton was grown. Profitability was greater for the alternative system until cotton lint yields reached about 1500 kg ha-1 for the continuous cotton system. Differences between the systems became larger as depth to ground water increased. Systems that are less dependent on supplemental irrigation and less consumptive of non-renewable resources and energy-dependent chemical inputs appear possible, but further improvements are required to ensure sustainability of agricultural systems for the future in the Texas High Plains.
Keywords: Water; Aquifers; Cropping and livestock systems; Grazing systems; Soil quality

Daniel M. Weary, Jennifer Jasper, Maria J. Hotzel, Understanding weaning distress, Applied Animal Behaviour Science, Volume 110, Issues 1-2, Early Weaning, March 2008, Pages 24-41, ISSN 0168-1591, DOI: 10.1016/j.applanim.2007.03.025.
(http://www.sciencedirect.com/science/article/B6T48-4NSV0TB-1/2/a7ae520c057c5ab469d0296571bfe090)
Abstract:
Farm animals often show a pronounced behavioural response to weaning. The aim of this review is to draw together theoretical and empirical literature that helps improve our understanding of this distress response and the ways in which it can be reduced. Key areas of relevant theory include the parent-offspring conflict and honest signalling literature from behavioural ecology. An understanding of the neurochemical mechanisms at play comes from the growing biopsychology literature on attachment and separation. Weaning for the young animal typically involves both separation from the dam and a change in diet from milk to solid food. However, in some cases these events are separated, allowing us to disentangle the effects and understand how they interact. In other situations, weaning can involve additional stressors such as a new physical environment and mixing with conspecifics. We review papers addressing these and other situations that allow us to understand the factors affecting weaning distress, focussing especially on pigs and cattle. We conclude that simultaneously imposing stressors at weaning can accentuate the distress response, and that under some situations disentangling these factors can much diminish the combined response. In particular, achieving high intakes before weaning, to the extent that the young is partially or fully established on solid feed, can reduce responses to separation from the dam when this occurs. The physical environment before and after weaning can affect the way animals interact with each other, and modifying the environment can be helpful in reducing aggressive interactions when animals are mixed at weaning.
Keywords: Maternal separation; Diet; Vocalizations; Pigs; Cattle

Karl Heaton, Simon D. Kelly, Jurian Hoogewerff, Mark Woolfe, Verifying the geographical origin of beef: The application of multi-element isotope and trace element analysis, Food Chemistry, Volume 107, Issue 1, 1 March 2008, Pages 506-515, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2007.08.010.
(http://www.sciencedirect.com/science/article/B6T6R-4PCXGMN-1/2/fde3150b26c0b103eca9d1342889f7a9)
Abstract:
Beef samples originating from the major cattle producing regions of the world (Europe, USA, South America, Australia and New Zealand) have been analysed using IRMS and ICP-MS. C and N isotope composition of the beef defatted dry mass and H and O isotope composition of the corresponding lipid fractions were determined. It was observed that intensive maize and/or C4 pasture feeding, during cattle production, gave rise to significant differences in the 13C content of beef produced in Brazil and the USA versus British beef fed predominantly on C3 pasture and fodder. The mean [delta]2H[per mille sign] and [delta]18O[per mille sign] values of beef lipid correlated well with the latitude of production regions and the relationship between the H and O isotopic contents were found to parallel the Meteoric Water Line. These findings support the hypothesis that the systematic global variations in the 2H and 18O content of precipitation are transferred through drinking water and feed into beef lipid. Multi-element concentrations determined in the beef were combined with the stable isotope data and submitted to multivariate analysis. Six key variables ([delta]13C[per mille sign] (defatted dry mass), Sr, Fe, [delta]2H[per mille sign] (lipid), Rb and Se) were identified by canonical discriminant analysis as providing the maximum discrimination between beef samples on the basis of the broad geographical areas (Europe, South America and Australasia). It was concluded that the methodology in its current state can be used to provide reliable origin information, but this is dependent upon the countries under investigation.

Keywords: Beef; Stable isotope; SIRA; Trace element; Geographic origin; Authenticity

Andrew J. Jay, Mary L. Parker, Richard Faulks, Fiona Husband, Peter Wilde, Andrew C. Smith, Craig B. Faulds, Keith W. Waldron, A systematic micro-dissection of brewers' spent grain, Journal of Cereal Science, Volume 47, Issue 2, March 2008, Pages 357-364, ISSN 0733-5210, DOI: 10.1016/j.jcs.2007.05.006.
(http://www.sciencedirect.com/science/article/B6WHK-4NX2NHF-2/2/5528d94a72e7669be54ccbc209f8eaf1)
Abstract:
Brewers' spent grain (BSG), one of the co-products of the brewing industry, has been mainly used as cattle feed. Spent grain was shown to contain a number of potentially high-value components such as feruloylated arabinoxylan and protein, as confirmed by microscopy and chemical analysis. A significant quantity of starch was also identified, a polysaccharide generally considered to be removed through the malting and mashing steps of brewing. As part of a study to increase the exploitation of spent grain, five separate fractions were prepared through combined milling and vibratory sieving and characterised in terms of chemical composition (polysaccharide composition and linkage; phenolic composition) and by fluorescence microscopy. Material retained on sieve mesh plates of 500, 250 and 150 [mu]m consisted mainly of arabinoxylan-rich palea and lemma, while material passing through 106 and 55 [mu]m sieves was fine, crumb-like material enriched in protein and starch. Lignin was present in all fractions, and originated from the fragmented palea and lemma. The results are discussed in relation to the potential for whole BSG exploitation.
Keywords: Arabinoxylan; Barley; Brewers' spent grain; Carbohydrate; Cereal processing co-products; Fractionation; Phenolic acids; Ferulic acid

H.E. Warren, N.D. Scollan, M. Enser, S.I. Hughes, R.I. Richardson, J.D. Wood, Effects of breed and a concentrate or grass silage diet on beef quality in cattle of 3 ages. I: Animal performance, carcass quality and muscle fatty acid composition, Meat Science, Volume 78, Issue 3, March 2008, Pages 256-269, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.06.008.
(http://www.sciencedirect.com/science/article/B6T9G-4P2YWX8-2/2/13ce7c9780649d32e65ec254e165cb9f)
Abstract:
An increase in the intake of the n-3 series polyunsaturated fatty acids (PUFA) is recommended by nutritionists for the human diet and beef is a significant source of these fatty acids. Enhancing the n-3 PUFA content of beef is important in view of the generally saturated nature of fatty acids in ruminant meats and the potentially negative effect this can have on human health. This study examined the effects of breed and diet on the fatty acid composition of beef M. longissimus. Ninety-six steers were used, 48 Aberdeen Angus cross (AA) and 48 Holstein-Friesian (HF). At 6 months of age, 3 groups were identified, to be slaughtered at 14, 19 and 24 months, respectively. Each group consisted of eight steers of each breed fed on a concentrate or a grass silage diet, rich in n-6 and n-3 PUFA, respectively. The intake of the concentrate diet was restricted so that steers of each breed grew at a similar rate on each diet. The early maturing AA produced heavier, fatter carcasses with better conformation. Animals fed grass silage had higher carcass fatness and conformation scores and higher levels of neutral lipid and total lipid in muscle than those fed concentrate. When all animals were pooled, a decline in PUFA% as total muscle lipid increased was evident. Feeding a grass silage diet rich in [alpha]-linolenic acid (18:3n-3) increased levels of this fatty acid in muscle neutral lipid by a factor of about 3.0 compared with the concentrate diet, as well as enhancing the synthesis of the n-3 series long-chain C20-22 PUFA in the phospholipid fraction, including docosahexaenoic acid (DHA, 22:6n-3). In contrast, both levels and proportions of linoleic acid (18:2n-6) and the n-6 series C20-22 PUFA were higher in animals fed the concentrate diet. The proportions of 18:1trans and conjugated linoleic acid (CLA) in muscle neutral lipid were higher in animals fed concentrate compared with silage in all 3 groups. This was partly

due to increased consumption of 18:2n-6. The ratio of PUFA to saturated fatty acids (P:S) in muscle was reduced by feeding grass silage, partly as the result of increased fat deposition. However, the increase in levels of n-3 series fatty acids with silage-feeding resulted in beneficially low n-6:n-3 ratios in muscle in all age groups (approximately 1.2 compared with 12.0 in the concentrate diet). Subtle breed differences in PUFA amounts and proportions were noted. Holstein-Friesians had higher proportions of PUFA and higher P:S ratios compared with AA, partly due to a higher proportion of phospholipid in total lipid. In phospholipid itself, HF in the 19 and 24 months groups had higher proportions of most n-3 PUFA. In all age groups the ratio of DHA to its precursor, 18:3n-3 was higher in HF.
Keywords: Beef; Fatty acids; Health; Forage; Grass; Age; Breed

Wilma J. Renken, Larry D. Howery, George B. Ruyle, R. Mark Enns, Cattle generalise visual cues from the pen to the field to select initial feeding patches, Applied Animal Behaviour Science, Volume 109, Issues 2-4, February 2008, Pages 128-140, ISSN 0168-1591, DOI: 10.1016/j.applanim.2007.03.014.
(http://www.sciencedirect.com/science/article/B6T48-4NP3NXC-2/2/49ac3e66c2f75f8761137a7411cd87ad)
Abstract:
Free-grazing ruminants forage in environments containing multiple levels of complexity; the forage selection process operates at the landscape scale, when selecting feeding sites, and at the plant part level when selecting actual bites. Pen trials have shown that livestock associate visual cues with feeding sites, however, no field study has shown that animals generalise from training with visual cues in pens in order to choose feeding sites in the field. Our study tested nine beef heifers' ability to generalise a learned visual cue association to select feeding sites in a rangeland setting offering a novel forage, Lehmann lovegrass (LL). Initially, animals were trained to associate high quality feed with a visual cue during pen trials. We then tested animal response to the cue before and after they gained 14-day grazing experience with LL. Two identical field experiments (i.e., novel, before animals had experienced foraging LL versus familiar, after the animals had 14-day grazing experience with LL) were conducted over 3-day periods. Each experiment consisted of 27, 10-min trials. Animals were tested in plots containing high quality (HQ) and low quality (LQ) LL patches. For each trial, one of three randomly selected scenarios was presented: (1) the visual cue was placed in the HQ patch, (2) the visual cue was placed in the LQ patch, or (3) no visual cue was placed in either patch. Dependent variables were first patch-type chosen, bite rate in each patch, and number of observations of grazing in each patch. Cue presence influenced initial patch choice, bite rate, and grazing tallies within patch type. Heifers took 212 more HQ bites than LQ bites when the cue was placed in the HQ patch ($P < 0.04$), but took only 45 more HQ bites than LQ bites when the cue was placed in the LQ patch ($P < 0.02$). Heifers took 135 more bites from the HQ patch than the LQ patch when no cue was present ($P < 0.02$). Heifers clearly preferred HQ patches over LQ patches regardless of cue presence or absence, but grazed more in HQ and LQ patches when the cue was placed in those patches. The number of grazing tallies was directly related to bite rate within a patch. Animals grazed more in HQ than LQ patches when no cue was present. Visual cue placement altered this pattern; animals increased grazing in cued patches regardless of quality. Grazing experience did not influence observed grazing behaviour or the influence of the visual cue.
Keywords: Cattle; Generalisation; Visual cues; Patch selection; Foraging behaviour; Rangelands

Reza Valizaheh, Douglas M. Veira, Marina A.G. von Keyserlingk, Behavioural responses by dairy cows provided two hays of contrasting quality at dry-off, Applied Animal Behaviour Science, Volume 109, Issues 2-4, February 2008, Pages 190-200, ISSN 0168-1591, DOI: 10.1016/j.applanim.2007.03.001.

(http://www.sciencedirect.com/science/article/B6T48-4NCK24D-2/2/7b0fef528d03f50ccca35756fec1acb7)
Abstract:
A typical dairy cow lactation cycle consists of 305 days of lactation followed by a 40-60 day period where she is not lactating (dry period). There is considerable variation in the procedures used to bring the lactation to an end (dry-off); however, commonly a combination of reduced milking frequency and low energy diets are used. The objective of this experiment was to investigate the effect of feeding two hay diets of contrasting digestibility on the decline in milk production and behavioural responses of cows to dry-off. Forty-two late lactation cows were divided into groups of three and randomly assigned to one of two dietary treatments and subjected to the same milking frequency schedule and observed for 12 days. Cows were initially fed a late lactation total mixed ration (TMR) for 6 days and then on day 0 switched to either ad libitum tall fescue grass hay (grass hay) or ad libitum oat hay as the sole feed for 6 days. At the same time a milking schedule, comparable to those used in many commercial dairies, was implemented. We monitored feeding and standing behaviour, as well as frequency of vocalization from all groups. Cows consumed on average 18.1 +/- 0.4 kg/day of TMR but after switching to hay, the dry matter intake in both treatments decreased to 7.0 +/- 0.1 kg/(cow day) for oat hay and 12.9 +/- 0.2 kg/(cow day) for grass hay. By day 12 milk production had declined from 16.4 +/- 6.1 kg/day to 4.7 +/- 0.37 kg on oat hay and 7.8 +/- 0.42 kg on grass hay. During the first 2 days of oat hay and grass hay feeding (days 0-1), the frequency of vocalizations increased for both treatment groups but was higher for the oat hay fed cows compared to the grass hay fed cows ($P < 0.02$). In summary, both hay diets were efficient in decreasing milk production, however compared to grass hay, cows on the oat hay diet had more pronounced decreases in dry matter intake and milk production and greater frequency of vocalization. Since increased frequency of vocalization in cattle has been associated with a distress response, these findings suggest the oat hay fed cows may be experiencing some distress during the dry-off procedure, perhaps due to hunger.
Keywords: Dairy cows; Dry-off; Diet quality; Hunger; Vocalization; Behaviour

Luis Sampedro, Jorge Dominguez, Stable isotope natural abundances ([delta]13C and [delta]15N) of the earthworm Eisenia fetida and other soil fauna living in two different vermicomposting environments, Applied Soil Ecology, Volume 38, Issue 2, February 2008, Pages 91-99, ISSN 0929-1393, DOI: 10.1016/j.apsoil.2007.10.008.
(http://www.sciencedirect.com/science/article/B6T4B-4R8M0C7-1/2/3a0a34a895689bd7740ec89afe748c76)
Abstract:
Manure heaps and vermicomposting systems are hotspots of heterotrophic activity supporting a high-detritivore biomass where epigeic earthworms interact intensively with bacteria, fungi and other soil fauna. We carried out a prospective study of the vermicomposting food webs using the natural abundance of stable C and N isotopes in 66 samples of soil fauna and the substrates in which the animals live in two systems: (i) a high-feeding-rate vermireactor, fed with pig slurry, and (ii) a farm manure vermicomposting heap fed with cattle manure. The aims of the study were specifically (i) to test the extent to which the isotopic signals in the earthworms resemble those of the substrates in which they live, (ii) to further our knowledge of the ontogenic changes in resource utilization of the earthworm Eisenia fetida, and (iii) to obtain information about the relative trophic position of the soil fauna in the food web of vermicomposting systems. Tissues of earthworms were significantly 15N-enriched (by 4-8[per mille sign]) relative to fresh and mature manures in both vermicomposting systems. The [delta]13C values of adult earthworms were not different from those of the fresh animal wastes in both vermicomposting systems, suggesting that adult worms preferred fresh manure than worked materials as carbon source. The little but significant enrichment in 15N observed in hatchlings living in the pig slurry vermicomposting bins relative to adult tissues likely reflect different feeding strategies, not observed in the cattle manure heap.

Besides, hatchlings in the cattle manure heap appeared markedly depleted in 13C (by ~5[per mille sign]) relative to the adult earthworms, suggesting the use of a different source of carbon in the early stage. Diptera larvae presented very low values of [delta]13C, likely suggesting a relevant role of methanotrophic bacteria in their diet. Based on the shifts in [delta]15N, a taxon in the pig slurry vermicomposting bins may be assigned at least to three relative trophic positions separated by a 15N shift of 2[per mille sign], with Enchytraeida clearly in the lower position, adults and hatchlings of E. fetida and nematodes in an intermediate level, and Collembola at the higher position showing an enrichment of 9[per mille sign] relative to the substrate. In the cattle manure heap three trophic levels may be also identified, with larvae of Diptera and Coleoptera as the less 15N-enriched level, a general detritivore group in intermediate position, and finally a predatory taxa with a +9[per mille sign] shift comprised by Staphylinidae.
Keywords: Epigeic earthworms; Soil food web; Trophic relationships; Isotopic ratios

Barry J. Bradford, Michael S. Allen, Negative energy balance increases periprandial ghrelin and growth hormone concentrations in lactating dairy cows, Domestic Animal Endocrinology, Volume 34, Issue 2, February 2008, Pages 196-203, ISSN 0739-7240, DOI: 10.1016/j.domaniend.2007.02.002.
(http://www.sciencedirect.com/science/article/B6T62-4N9N9MF-1/2/cd37c8efa7217f78d9c8a7696de1e582)
Abstract:
The reported effects of feeding on growth hormone (GH) secretion in ruminants have been inconsistent, and are likely influenced by energy status of animals. High-producing dairy cows in early lactation and late lactation were used to assess the effects of energy balance on temporal variation of plasma metabolites and hormones. Cows were fed a single diet once daily, and feed was withdrawn for 90 min prior to feeding. Beginning at the time of feed withdrawal, plasma samples were collected via jugular catheters hourly for 24 h. Concentrations of non-esterified fatty acids and GH were measured for all samples, while insulin, glucose, and acylated (active) ghrelin were quantified for four sample times around feeding. As expected, calculated energy balance was significantly lower in early lactation than late lactation cows (-43.5 MJ retained/day versus 7.2 MJ retained/day). Following the primary meal of the day, a GH surge was observed in early lactation but not in late lactation cows. This difference was not explained by temporal patterns in non-esterified fatty acid, insulin, or glucose concentrations. However, a preprandial ghrelin surge was observed in early lactation only, suggesting that ghrelin was responsible for the prandial GH surge in this group. Results of a stepwise regression statistical analysis showed that both preprandial ghrelin concentration and energy balance were significant predictors of prandial GH increase over baseline. Adaptations to negative energy balance in lactating dairy cattle likely include enhanced ghrelin secretion and greater GH response to ghrelin.
Keywords: Somatotropin; Growth hormone secretagogue; Homeorhesis; Dairy cow; Negative energy balance

J.B. Gaughan, T.L. Mader, S.M. Holt, Cooling and feeding strategies to reduce heat load of grain-fed beef cattle in intensive housing, Livestock Science, Volume 113, Issues 2-3, February 2008, Pages 226-233, ISSN 1871-1413, DOI: 10.1016/j.livsci.2007.03.014.
(http://www.sciencedirect.com/science/article/B7XNX-4NP3PCS-2/2/2d4199bd655a80ed563c7cbc56f6b76f)
Abstract:
Six Murray Grey x Hereford yearling steers were used to determine the effect of two cooling treatments (ENV) (day cooled (0600-1400) or night cooled (1400-2200), and two dietary treatments (DIET) - control (CON) no added fat or added fat (FAT) - on rectal temperature, respiration rate and dry matter intake (DMI). Cattle were exposed to 2 d of thermoneutral conditions followed by four hot days in a controlled climate facility. This was replicated 6 times.

Steers were given a 10 d rest in outside pens between each replication. Sprinklers (2.84 L min- 1; 5 min on, 20 min off) and fans (continuous; 2 m s- 1) were used when ambient temperature (TA) >= 28 [degree sign]C. Rectal temperature (5 min intervals) and respiration rate (hourly) were measured for 12 x 24 h periods on hot days (2 per replication). Individual DMI over two time periods (PER) (period 1; 0600-1500, and period 2; 1500-0600) and daily metabolisable energy (ME) intakes were also recorded. Steers fed FAT had greater ($P < 0.05$) DMI then the CON steers during day cooling. However, there were no DIET or PER differences for DMI during night cooling. DMI of FAT and CON fed steers during night cooling was similar to the DMI of the FAT fed steers during day cooling. Overall DMI was greater during night cooling (DMI from both diets pooled). There were PER differences for DMI, with more ($P < 0.05$) feed consumed during period 2 irrespective of ENV or DIET. ME intake was 22.9% greater ($P < 0.05$) for the FAT fed steers during day cooling then for the CON fed steers. There were no DIET effects on ME intake during night cooling. DIET had no effect ($P > 0.05$) on respiration rate however differences were seen for rectal temperature. Mean rectal temperature for the FAT steers was lower ($P < 0.05$) than the mean of the CON steers, however there were no within ENV differences. Day cooled cattle had a higher ($P < 0.05$) respiration rates (71.8 breaths/min; bpm) than the night cooled steers (65.3 bpm). There were no differences for rectal temperature. However, day cooled steers had lower ($P < 0.05$) rectal temperature and respiration rate than the night cooled steers during the day -- which corresponded with the day cooling period. Night cooling appears to be beneficial in lowering mean rectal temperature and respiration rate, and in maintaining DMI. There is no suggestion that feeding fat will replace the need for supplementary measures to alleviate heat exposure of confined cattle. However feeding fat may be worthwhile in maintenance DMI when combined with strategies involving day cooling.
Keywords: Cattle; Heat stress; Housing; Cooling; Diet

N. Fall, U. Emanuelson, K. Martinsson, S. Jonsson, Udder health at a Swedish research farm with both organic and conventional dairy cow management, Preventive Veterinary Medicine, Volume 83, Issue 2, 1 February 2008, Pages 186-195, ISSN 0167-5877, DOI: 10.1016/j.prevetmed.2007.07.003.
(http://www.sciencedirect.com/science/article/B6TBK-4PFFCXY-1/2/cb1288f9b22102fec3a25e4cb01e0cb1)
Abstract:
Our aim was to compare udder health in groups of organically and conventionally managed cows, using data from a longitudinal study in a Swedish dairy-research farm. Management of the groups was identical except for feed composition and the feeding regimen. Our dataset included all lactating cows calving from 1 September 1990 to 31 August 2001 (145 organically and 151 conventionally managed cows).
Udder health was assessed by the geometric average somatic-cell count (SCC) within 150 days after calving, by the number of monthly SCC tests >200,000 cells/ml within 150 days after calving and by presence of lactations with veterinary-treated cases of clinical mastitis. The effect of animal group was analysed by multivariable linear, Poisson and logistic-regression models, controlling for factors such as lactation number, breed, year, season and milk yield.
The groups did not differ in any measure of udder health. We had power to rule out differences of at least 33,000 cells/ml in the geometric average somatic-cell count, an incidence rate ratio of 0.65 in the incidence of high-SCC milk-testing occasions, and an odds ratio of 0.43 in veterinary treated cases of mastitis.
Keywords: Mastitis; Somatic-cell count; Cattle; Disease

A. Ovelhey, M. Beyerbach, J. Schael, T. Selhorst, M. Kramer, L. Kreienbrock, Risk factors for BSE-infections in Lower Saxony, Germany, Preventive Veterinary Medicine, Volume 83, Issue 2, 1 February 2008, Pages 196-209, ISSN 0167-5877, DOI: 10.1016/j.prevetmed.2007.07.005.

(http://www.sciencedirect.com/science/article/B6TBK-4PJ6BF7-1/2/cc6bc476eba0721d333367d691a2b930)
Abstract:
In order to generate data on the cattle population and farm management in the state of Lower Saxony, Germany, a basic demographic survey was conducted.
Afterwards these BSE-free farms as a reference population were compared with the population on BSE farms to identify risk factors for BSE infections. A variety of risk factors for BSE were reviewed, including the import of cattle from the United Kingdom, commercial foodstuff, dairy farming, herd size and cross-contamination with foodstuff for other farm animals.
For the basic demographic survey of the reference, a questionnaire was mailed to a representative sample of cattle farms in Lower Saxony where BSE cattle had not occurred before the sample was taken. Distribution of risk factors within this reference population (n = 731) and the BSE population (n = 49) were compared following the concept of indirect standardisation in stratified populations. The size of farms was used as the stratification variable, with three strata.
Under the same rate as in the reference population, the portion of Red Holstein cattle breed was four fold higher than in the BSE population (SER = 4.03; p = 0.0003). Milk replacer was fed 1.41 times more often on BSE farms (p = 0.0478). However, the use of concentrated foodstuff for pigs (SER = 0.21) was significantly less frequent in the BSE population than expected (p = 0.0001), whereas the husbandry of sheep, goats or game animals seemed to increase the risk of BSE 2.85 times (p = 0.0413). There were no significant differences between the two populations concerning the purchase of cattle (p = 0.1514) and the use of concentrated feed for calves during the 1990s (p = 0.6212).
This is an epidemiological indication of increased susceptibility of Red Holstein cattle to BSE. However, this study did not confirm the assumption that the use of commercial foodstuff other than milk replacer or the purchase of cattle increases the risk of BSE infection. It nevertheless remains likely that commercial foodstuffs such as concentrated feed for calves were risk factors in Germany as well.
Keywords: BSE; Basic demographic survey; Risk factors; Standardised exposure ratio; Farm and feeding management

Rosalind Ann Gilbert, Stuart Edward Denman, Jagadish Padmanabha, Narelle Fegan, Dawood Al Ajmi, Christopher S. McSweeney, Effect of diet on the concentration of complex Shiga toxin-producing Escherichia coli and EHEC virulence genes in bovine faeces, hide and carcass, International Journal of Food Microbiology, Volume 121, Issue 2, 31 January 2008, Pages 208-216, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2007.11.019.
(http://www.sciencedirect.com/science/article/B6T7K-4R53R73-7/2/206179fdfa4dbfa4b71e4f731fd2cf02)
Abstract:
An experiment was conducted to determine whether diets based on structural carbohydrate and/or simple sugars, as found in roughage and/or molasses-based diets, reduce the bovine faecal populations of Shiga toxin-producing Escherichia coli (STEC) isolates containing the eaeA and ehxA genes, referred to as complex STEC (cSTEC), compared with typical high starch, grain-based feedlot diets. In addition, whether commercial lairage management practices promote or diminish any diet-induced responses on the contamination of carcasses was also investigated.
After 13 days on the dietary treatments total faecal E. coli numbers were approximately one log lower in the roughage (R) and roughage + 50% molasses (RM) diets compared with grain (G) fed animals, this difference varying between 0.5 and 1 log at lairage. Fermentation patterns were similar in the R and RM diets whereas decreased pH and enhanced butyrate fermentation pathways were associated with the G diet.
A significant decrease in the faecal concentration of the eaeA gene occurred when animals were changed from high grain to R and RM diets for 6-13 days, compared with animals maintained on

the G diet. Significantly lower concentrations of the ehxA gene were also associated with the R diet. Concentrations of the stx2 gene however, were unaffected by diet.
cSTEC were infrequently isolated, with the faecal concentrations of these organisms being low (< 3 log10 MPN per g faeces). cSTEC were only isolated from animals fed G or RM diets, but were never isolated from cattle fed the roughage-based diet, with this diet-induced effect sustained following lairage. These organisms were not detected on the hide and carcass of animals found to shed cSTEC in their faeces and thus appeared uncontaminated with cSTEC.
Keywords: cSTEC; STEC; Bovine; Diet

H.G. Bateman II, M.D. Hanigan, R.A. Kohn, Sensitivity of two metabolic models of dairy cattle digestion and metabolism to changes in nutrient content of diets, Animal Feed Science and Technology, Volume 140, Issues 3-4, 15 January 2008, Pages 272-292, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2007.03.010.
(http://www.sciencedirect.com/science/article/B6T42-4NMKVFJ-1/2/29faab72edae992d8e25c5a05e01bda8)
Abstract:
To better understand how specific nutrients influence predicted outputs by two metabolic nutritional models (MOLLY and NRC) a sensitivity analysis was completed. This analysis examined the responses of the nutritional models when nutrient content of the diets was changed. Three diets were formulated and simulated in two nutritional models. These same diets were then simulated after 10 g/kg of diet DM then replacing it with the same mass of neutral detergent fibre, acid detergent fibre, starch, lignin, crude protein (CP), soluble CP, rumen undegradable protein, fat, or ash. Sensitivity estimates were calculated as the percent change in response variable from the diet with added nutrient compared to the original diet. Approximately 0.75 of the sensitivity estimates were less than 0.01 indicating that most changes to single nutrient concentrations did not have large impacts on simulated outputs. The incidence of large sensitivity estimates varied between models. Within the confines of this study, both models were more responsive to nutrient changes that altered protein content than to nutrient changes that altered energy content of the diet. Both models had nutrient inputs that had little or no impact on the outputs evaluated in this study. However, neither model was completely unresponsive to changes in any nutrient; suggesting that accurate description of nutrient supply inputs for these models is important and should be considered when evaluating predictions from the models. By coupling the knowledge of how specific nutrient inputs influence model predictions with desired animal outcomes, nutritionists that use these models can better allocate their feed and economic resources and time.
Keywords: Dairy cow; Nutrient model; Sensitivity; Prediction

M. Mellado, A. Olvera, Diets of prairie dogs (Cynomys mexicanus) co-existing with cattle or goats, Mammalian Biology - Zeitschrift fur Saugetierkunde, Volume 73, Issue 1, 15 January 2008, Pages 33-39, ISSN 1616-5047, DOI: 10.1016/j.mambio.2007.02.001.
(http://www.sciencedirect.com/science/article/B7GX2-4P0N25S-1/2/6ed9480410081c77146e4bbf14f8f970)
Abstract:
Diets of prairie dogs (Cynomys mexicanus) co-existing with goats or cattle were examined using microhistological fecal analysis in a 1-year study on a grassland of northern Mexico. Consumption of forbs was generally higher (33% versus 21% across all seasons; $P< 0.05$) in prairie dog diets co-existing with cattle compared to prairie dogs co-existing with goats. The diet of prairie dogs grazing with goats was based around grasses (79% of total forage ingested versus 68% for prairie dogs on the pasture grazed by cattle all seasons; $P<0.05$). In general, prairie dogs showed a higher preference for forbs in the pasture grazed by cattle than in the pasture grazed by goats. Data for dietary overlap (69% across all seasons) pointed to a moderate diet similarity between prairie dogs grazing with goats or cattle. Prairie dogs co-existing with goats had a higher ($P<0.05$)

fecal N concentration in the fall than prairie dog co-occurring with cattle (2.4+/-0.1 versus 2.1+/-0.1). In spring and summer, prairie dogs in the pasture shared with goats had higher (P<0.05) fecal P concentrations than prairie dog co-existing with cattle (3.0+/-0.4 versus 2.5+/-0.2 and 1.6+/-0.1 versus 1.0+/-0.1, respectively). The results of this study indicate distinct differences in diets of prairie dogs co-existing with goats or cattle, although these foraging differences did not affect negatively the diet quality of prairie dogs (based on fecal N and P data) grazing with goats, despite the highly degraded range in this site. Prairie dogs showed a high feeding adaptability, which allowed them to meet their nutritional needs in a highly degraded site around the goat's pens in a settlement with communal grazing land.
Keywords: Diet preference; Foraging; Microhystological analysis

Dalton H. Pereira, Odilon G. Pereira, Bruno C. Silva, Maria I. Leao, Sebastiao C. Valadares Filho, Rasmo Garcia, Nutrient intake and digestibility and ruminal parameters in beef cattle fed diets containing Brachiaria brizantha silage and concentrate at different ratios, Animal Feed Science and Technology, Volume 140, Issues 1-2, 1 January 2008, Pages 52-66, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2007.02.012.
(http://www.sciencedirect.com/science/article/B6T42-4N9MYPN-1/2/25eee47d76f101d88b5de949ac05b562)
Abstract:
Nutrient intake, total apparent and partial digestibility, ruminal pH and ammonia (NH3-N) concentrations were evaluated in beef cattle fed diets containing Brachiaria brizantha cv. Marandu silage and concentrate levels of 200, 350, 500 and 650 g/kg dry matter base. Four crossbred Holstein x Zebu rumen and abomasum fistulated steers, 224 +/- 23 kg-average initial live weight, were assigned to a 4 x 4 Latin square design. Chromic oxide was used as marker for estimates of faecal and abomasal dry matter flow. dry matter (DM), crude protein (CP), ether extract (EE), total carbohydrates (TCHO) and non-fibrous carbohydrates (NFC) (kg/d) intakes increased linearly (P<0.01) with concentrate increase in the diets but aNDF (neutral detergent fiber) intake (kg/d) decreased linearly (P<0.01). The DM and organic matter (OM) total apparent digestibilities were influenced (P<0.05) quadratically by the concentrate levels in the diets, estimating maximum values of concentrate levels of 504 and 507 g/kg DM, respectively. Total digestibilities of other nutrients were not influenced (P>0.05) by the diets. Concentrate level only affected apparent ruminal and intestinal digestibility for DM, CP and EE, using an adjusted quadratic equation (P<0.05) for DM and a linear equation for the others. Average pH values were normal in all the treatments for ruminal fermentation. The diets with concentrate levels of 200, 350, 500 and 650 g/kg DM presented a maximum NH3-N concentration of 25.4; 26.7; 20.8 and 29.0 mg NH3-N/dL, respectively, at 3.26; 2.64; 2.19 and 2.52 h. Diets containing concentrate levels of 200 and 350 g/kg DM, supplemented with B. brizantha silage, resulted in low nutrient intake, which can lower animal performance. However, the ruminal fermentation pattern was not influenced by the diets. Thus, the B. brizantha silage may be a good alternative as forage source in beef cattle diets. However, its use depends on good alimentary planning with an appropriate integration between pasture management and forage surplus conservation in the form of silage.
Keywords: Feedlot; Grass silage; Neutral detergent fiber; Roughage; Ruminal parameters

Domenico Frezza, Vincenzo Giambra, Fatima Chegdani, Cecilia Fontana, Giampietro Maccabiani, Nadia Losio, Elena Faggionato, Barbara Chiappini, Gabriele Vaccari, Christoph von Holst, Luigi Lanni, Stefano Saccares, Paolo Ajmone-Marsan, Standard and Light-Cycler PCR methods for animal DNA species detection in animal feedstuffs, Innovative Food Science & Emerging Technologies, Volume 9, Issue 1, January 2008, Pages 18-23, ISSN 1466-8564, DOI: 10.1016/j.ifset.2007.04.008.
(http://www.sciencedirect.com/science/article/B6W6D-4NN0WB6-1/2/16295ecb192f3ee58919b55e2c38e20e)

Abstract:
In this work four species-specific primers and probes were designed and evaluated for the detection and quantification of bovine, ovine, swine and chicken mitochondrial DNA in feeds. PCR primers were optimized using conventional and Real Time PCR, to detect short species-specific sequences amplifiable from heat treated material. Both methods confirmed the high specificity of the primers designed. Real time quantitative PCR assay allowed the detection of as few as 0.01 ng and 0.05 ng of ovine and bovine genomic DNA, respectively. The detection limit for swine and chicken genomic DNA was 0.5 ng. Sensitivity levels observed in DNA extracted from meat samples processed according to EU legislation were different compared to those in genomic DNAs previously described. They resulted in swine 5 fg of MBM DNA, in chicken 25 ng, in ovine and bovine 50 ng. We confirmed the efficiency and specificity of primers in RT-PCR to detect 0.5% of bovine, ovine, swine and chicken MBM in contaminated feedstuffs.Industrial relevance
The variant Creutzfeldt Jakob disease is a rare and fatal human neurodegenerative condition clearly linked with the bovine spongiform encephalopathies (BSE) of cattle. The ban of using animal derived protein in animal feeds has efficiently controlled the development of the BSE epidemic. The work presented by Frezza and collaborators is an application of the real time polymerase chain reaction (a standard procedure used in molecular biology also known as RT[hyphen (true graphic)]PCR) to identify specific DNA of four animal species (bovine, ovine, swine and chicken). This method is applied to the analysis of feeds to detect and eventually estimate the amount of animal derived proteins. The difficult aim to detect DNA derived from heat[hyphen (true graphic)]treated material was successfully reached using as target short mitochondrial DNA sequences. The method presented could have important application not only in the control of feed production but also in many fields of the food industry as quality and process control.
Keywords: BSE prophylaxis; Rendering material; Species-specific primers; Quantitative real time PCR

D.T. Beatty, A. Barnes, E. Taylor, S.K. Maloney, Do changes in feed intake or ambient temperature cause changes in cattle rumen temperature relative to core temperature?, Journal of Thermal Biology, Volume 33, Issue 1, January 2008, Pages 12-19, ISSN 0306-4565, DOI: 10.1016/j.jtherbio.2007.09.002.
(http://www.sciencedirect.com/science/article/B6T94-4PTMY0Y-1/2/e51fb79f01a4f4d12ef71feb43abb139)
Abstract:
A technique was developed to monitor and describe the relationship between core body temperature (Tc) and rumen temperature (Trum) in cattle. This relationship was assessed in cattle subjected to varying environmental temperatures and subsequent variations in dry matter and water intake. Increasing the environmental wet bulb temperature (WBT) from ambient conditions (approximately 15 [degree sign]C WBT) to mild heat stress conditions (25 [degree sign]C WBT) caused an increase in both Tc and Trum with significant decreases in feed intake and increases in water consumption. Despite increases in both Tc and Trum, reductions in dry matter intake, and an increase in water consumption, the relationship between Tc and Trum did not change.
Keywords: Temperature; Cattle; Rumen temperature; Core temperature; Heat production

Simone Rochfort, Anthony J Parker, Frank R. Dunshea, Plant bioactives for ruminant health and productivity, Phytochemistry, Volume 69, Issue 2, January 2008, Pages 299-322, ISSN 0031-9422, DOI: 10.1016/j.phytochem.2007.08.017.
(http://www.sciencedirect.com/science/article/B6TH7-4PTN8Y1-1/2/bbf264630554bd3a588f82b6256ee186)
Abstract:

Plants have been used throughout history for their medicinal properties. This use has often focused on human health but plants have also been, and still are, applied in ethnoveterinary practice and animal health management.
In recent times, the use of synthetic chemicals has become prevalent. Public awareness of the potential environmental and health risks associated with heavy chemical use has also increased. This has put pressure on regulatory bodies to reduce the use of chemicals in agriculture. The most striking example is the 2006 banning of antibiotics in animal feed by the European Union. Moves such as this have increased the drive to find alternatives to synthetic chemicals and research has again turned to the use of plant bioactives as a means of improving animal health.
Current scientific evidence suggests there is significant potential to use plants to enhance animal health in general and that of ruminants (cattle, deer, sheep, etc.) in particular. Active areas of research for plant bioactives (particularly saponin and tannin containing plants) include reproductive efficiency, milk and meat quality improvement, foam production/bloat control and methane production. Nematode control is also a significant area of research and the evidence suggests a much broader range of phytochemicals may be effective. This review presents a summary of the literature and examines international research efforts towards the development of plant bioactives for animal health.
Keywords: Ruminant; Anthelmintic; Methanogensis; Bloat control; Saponin; Tannin; Animal health

Caroline Lee, Kishore Prayaga, Matt Reed, John Henshall, Methods of training cattle to avoid a location using electrical cues, Applied Animal Behaviour Science, Volume 108, Issues 3-4, 25 December 2007, Pages 229-238, ISSN 0168-1591, DOI: 10.1016/j.applanim.2006.12.003.
(http://www.sciencedirect.com/science/article/B6T48-4MVDV9T-2/2/efad8fabe99a3eff17376c3bae9da1e6)
Abstract:
Electronic technologies offer new opportunities to control the spatial positioning and social groupings of cattle. This study examines the potential for cattle to be trained by associative learning so that they avoid a feed attractant when cued by electrical stimuli delivered by radio-controlled collars. In the first experiment, 12 heifers were fed hay from a trough for 14 days, and then trained using electrical stimuli on four occasions (days 15, 21, 28 and 239) to remain outside a 5 m exclusion zone (EZ) around the trough. When heifers reached the EZ boundary an electrical stimulus (600 V and 250 mW) was applied for a maximum of 5 s. When animals stopped, turned away or exited the EZ the stimulus was terminated. One heifer reached the trough on day 15 and two heifers reached the trough on day 21. None reached the trough on days 28 or 239. On average over the four tests, 43% of heifer responses to the electric shock were to turn away from the direction of movement, 26% to back-up, 18% to stop, 3% to continue forward at a walk and 10% to continue forward at a run. The duration of the stimulus required did not differ over the tests, however fewer stimuli were required on days 28 and 239 than on days 15 and 21 ($P < 0.01$), suggesting that heifers had learned to associate the aversive stimulus with the trough and to not enter the EZ. In the second experiment, 20 heifers were tested using two methods of training in a cross-over study, one method based on associative learning and the other, an uncoupled stimulus-response training method, in which the duration of electric stimulation was not coupled to the behavioural response of the animals. There was a significant carry-over effect, therefore treatment effects were examined only in the first period. A greater number of heifers reached the trough using the uncoupled stimulus-response training method (10 heifers) than the conditioning method (two heifers; $P < 0.001$). The alteration in the behavioural responses, as a result of the use of the uncoupled stimulus-response training method in period 1 on subsequent responses to the conditioning method in period 2, provided evidence that learning of appropriate responses can be disrupted if the method used is not consistent with associative learning principles.
Keywords: Cattle; Associative learning; Electronic collars; Electrical stimuli; Virtual fencing

A.B. Forbes, C.A. Huckle, M.J. Gibb, Evaluation of the effect of eprinomectin in young dairy heifers sub-clinically infected with gastrointestinal nematodes on grazing behaviour and diet selection, Veterinary Parasitology, Volume 150, Issue 4, 25 December 2007, Pages 321-332, ISSN 0304-4017, DOI: 10.1016/j.vetpar.2007.09.031.
(http://www.sciencedirect.com/science/article/B6TD7-4PV94F3-2/2/284046ec4542224e9a81a9e2854741db)
Abstract:
Inappetence is commonly associated with parasitism and has been observed in both housed and pastured ruminants. In seeking a functional explanation for these observations, it has been hypothesised that parasitized animals may feed more selectively in order to proportionally increase the protein content of their diet and thus partially compensate for their reduced feed intake. Support for this theory is found principally in studies in housed animals under carefully controlled experimental conditions. Grazing animals face a far more heterogeneous environment and a multiplicity of potentially confounding factors that could influence diet selection. Controlled grazing of adjacent monocultures of grass and clover can mitigate some of these variables and was used in the current study to examine the dietary preference of dairy heifers with sub-clinical parasitic gastroenteritis when compared to those receiving regular anthelmintic treatments. Grazing behaviour and herbage intake rates were determined through the use of jaw-movement recorders, direct observation and short-term liveweight change. Consistent with previous observations and despite evidence that nematode burdens were low in the untreated control heifers, a reduction in daily grazing time of 56 min (P = 0.054) was observed in the control animals. There was, however, no evidence that the control heifers showed greater preference for clover compared with ryegrass: partial preference for clover was 73.0% in the untreated controls and 75.5% in the treated heifers. Furthermore control heifers were observed grazing the clover swards significantly (P = 0.032) less frequently than the treated heifers. This study provides additional evidence in grazing cattle for parasite-induced inappetence, manifest as a reduction in grazing time and in subtle changes in ingestive behaviour. The observed partial preference for clover in both treated and control cattle was not significantly affected by the level of parasitism.
Keywords: Grazing behaviour; Eprinomectin; Clover; Parasitism

M.A. Ortiz-Rubio, E.R. Orskov, J. Milne, H.M.A. Galina, Effect of different sources of nitrogen on in situ degradability and feed intake of Zebu cattle fed sugarcane tops (Saccharum officinarum), Animal Feed Science and Technology, Volume 139, Issues 3-4, 15 December 2007, Pages 143-158, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2007.01.016.
(http://www.sciencedirect.com/science/article/B6T42-4N55TH0-1/2/276c670abd401158dbb6768c43369c28)
Abstract:
Research projects were conducted to determine the amount of nitrogen needed to maximize the dry matter intake (DMI) and degradability in steers consuming sugarcane tops (SCT). Four Zebu steers were allocated in four experiments under a 4x4 Latin square design and fed SCT as basal forage. The nitrogen sources were Taiwan grass (TG) at 0, 100, 200 and 300 g/kg; poultry manure (PM) 0, 100, 200 and 300 g/kg; urea at 0, 8, 16, and 24 g/kg of DM and high-nitrogen/energy supplement (HNES) 0, 500, 1000 and 1500 g fresh matter/(animal day). The addition of nitrogen increased the total DMI and SCT intake in all experiments, except in experiment 1, where, TG had a substitution effect on SCT intake. The intake of PM was 100 g/kg DM in all treatments in experiment 2, regardless the quantity of PM offered. Organic matter intake (g/kg W0.75) increased with supplementation in all experiments (P<0.05). The fractional degradation rate increased with nitrogen supplementation; however, there were no effect on the higher levels of supplementation in all experiments. The addition of a source of nitrogen increased the rumen ammonia concentration in all experiments. The fractional degradation rate of King grass as well as DMI of SCT were optimized when NH3 concentration was in the range of 90-110 mg/l in experiments with

PM, urea and HNES. These trials confirmed that SCT are a potential source of forage for cattle, but as sole food were deficient in nitrogen. However, it is possible to supply this nitrogen by 100 g PM/kg DM, 8 g urea/kg DM or 500 g of HNES to satisfy the needs of rumen microorganisms for fermentable nitrogen in SCT diets.
Keywords: Sugarcane tops; Degradability; Intake; Steers; Nitrogen supplementation

Katsuaki Sugiura, Noel Murray, Estimating the prevalence of BSE in dairy birth cohorts and predicting the incidence of BSE cases in Japan, Preventive Veterinary Medicine, Volume 82, Issues 3-4, 14 December 2007, Pages 213-235, ISSN 0167-5877, DOI: 10.1016/j.prevetmed.2007.05.021.
(http://www.sciencedirect.com/science/article/B6TBK-4P53RJ7-1/2/fa6d96e752b6c3ec1336272dba30c8e9)
Abstract:
Following the detection of the first case of BSE in Japan in September 2001, four million cattle were subjected to a rapid test for BSE up to the end of 2004. A further 10 cases were detected in the dairy cattle population and two cases in Holstein steers. We focused on the dairy population and estimated the prevalence of BSE infected animals within each birth cohort for the years 1992-2001 using Bayesian inference. From this we were able to predict historic and future trends in the number of infected animals culled from each cohort and whether or not they could be detected using a rapid test. Assuming that BSE infectivity entered Japan in 1995, 225 (95%CI: 111-418) infected animals were predicted to have been culled from 1995 to 2001, of which 116 (56-219) would have been slaughtered for human consumption, and 33 (12-65) cases would have been detected during this period if a BSE surveillance program as comprehensive as the one in place as of April 2004 was applied. Assuming that BSE infectivity entered Japan in 1992, 905 (366-4633) infected animals were predicted to have been culled from 1992 to 2001, of which 694 (190-2473) would have been slaughtered for human consumption, and 201 (53-693) cases would have been detected during this period. Assuming the April 2004 level of surveillance continues and that the feed ban introduced in 2001 is completely effective, 18 (3-111) BSE cases are likely to be detected in the future. The BSE epidemic in Japan most likely reached a peak between 1998 and 2001 and should be eradicated around 2012.
Keywords: Bovine spongiform encephalopathy; Bayesian inference; Prediction model; Japan

Karen Shelley Schwartzkopf-Genswein, Mary Elizabeth Booth-McLean, Mohammad Abid Shah, Toby Entz, Susan Joan Bach, Gerald John Mears, Allan Lee Schaefer, Nigel Cook, John Church, Tim Angus McAllister, Effects of pre-haul management and transport duration on beef calf performance and welfare, Applied Animal Behaviour Science, Volume 108, Issues 1-2, 10 December 2007, Pages 12-30, ISSN 0168-1591, DOI: 10.1016/j.applanim.2006.11.012.
(http://www.sciencedirect.com/science/article/B6T48-4MMP25X-1/2/89c6bde24c4484e021a601f0f77933dc)
Abstract:
Behavioural and physiological indicators of stress as well as growth performance, and morbidity rates were assessed in 174 steer calves (220 +/- 37 kg) for 30 days after transport from ranch-to-feedlot. The calves were conditioned (C) or not (NC), and subjected to short- (2.7 h, S) or long-hauling duration (15 h, L), yielding treatments CS, CL, NCS and NCL. Upon arrival at the feedlot, calves were randomly assigned to 16 pens (four pens per treatment, one of which was equipped with a radio frequency identification system for continual monitoring of individual bunk attendance (15 calves)). As part of the NC treatment calves were also exposed to a short (2 h) transport 24 h after their initial arrival to the feedlot. All calves were fed a barley silage/barley grain-based starter ration and weighed every 7 days. Cortisol concentrations were higher in NC compared to C calves regardless of transport distance ($P < 0.05$). NC calves also had higher pre- and off-loading cortisol concentrations than C calves. In transit, CS steers had the lowest heart rate (HR, 67.8 bpm +/-

0.61; P < 0.0001). HR was highest (P < 0.05) during the first 15 min of the journey for all calves and gradually declined until 121-161 min into the trip. NC calves spent more time at the feed bunk (222.9 min day-1 versus 128.6 min day-1) in the first 2 days in the feedlot. CL calves were observed more frequently at the water than NCL calves (P < 0.05). An interaction was observed for shrinkage (P < 0.001) and ADG (P < 0.01). Shrinkage was greater in CL than in NCL steers (23.6 kg versus 14.6 kg), and in NCL than in either CS (7.8 kg) or NCS (9.2 kg) steers. The lowest (P < 0.005) ADG was recorded for CL and NCS calves (0.8 and 0.9 kg, respectively), although their DM intake (6.0 and 6.8 kg day-1) was similar (P > 0.05) to calves in the other treatment groups. Morbidity rate was 5.17% with no treatment effect. Conditioning calves prior to transport allowed calves to better tolerate the stressors of transport and handling.
Keywords: Cattle; Conditioning; Transport distance; Health

Kelly J. Jewell, Peter Arcese, Sarah E. Gergel, Robust predictions of species distribution: Spatial habitat models for a brood parasite, Biological Conservation, Volume 140, Issues 3-4, December 2007, Pages 259-272, ISSN 0006-3207, DOI: 10.1016/j.biocon.2007.08.017.
(http://www.sciencedirect.com/science/article/B6V5X-4PX16X8-1/2/cbc3bddfc4d3c6bece1f9a99be6e7af4)
Abstract:
Empirical habitat selection models aid managers by predicting distribution patterns, but recent critiques urge a fuller application of available methods. We used a suite of habitat modelling techniques to identify factors influencing the distribution of brown-headed cowbirds (Molothrus ater), a brood parasite capable of causing population declines in some host species. We used data on cowbird occurrence in the Southern Gulf Islands, Canada, to estimate the influence of landscape features on cowbird distribution beginning with a set of a priori models based on literature. Best models were also constructed using stepwise logistic and autologistic regression, and using only widely available data, and these models and their predictive maps were then evaluated. Cowbirds were predicted by proximity to potential feeding areas and landscape context. The best logistic model included landcover, cattle, and distance to urban area and agriculture. Model performance was improved by autologistic regression, and models restricted to widely available data were only slightly poorer. All models were robust to internal validation using bootstrapping and when compared to an independent empirical dataset of parasitism rates of a host on 12 sites monitored for up to 8 years. Our predictive maps for cowbirds should help land managers make spatial predictions about cowbird impact on particular hosts, as well as evaluate land-use decisions that could influence cowbird abundance and host fitness. We evaluated several approaches to habitat modelling of interest to conservationists and make suggestions for future studies when spatial predictions are likely to affect decisions in conservation and land use planning.
Keywords: Autologistic regression; GIS; Model validation; Molothrus ater; Predictive mapping; Bird

Francis J. Larney, Xiying Hao, A review of composting as a management alternative for beef cattle feedlot manure in southern Alberta, Canada, Bioresource Technology, Volume 98, Issue 17, December 2007, Pages 3221-3227, ISSN 0960-8524, DOI: 10.1016/j.biortech.2006.07.005.
(http://www.sciencedirect.com/science/article/B6V24-4N08M6V-1/2/6d4011a9e3ded86d614f78f843813f58)
Abstract:
Composting is gaining increased acceptance as a management alternative for the large volumes of manure produced by southern Alberta's beef cattle feedlots. Research on windrow composting of feedlot manure was initiated at the Lethbridge Research Centre of Agriculture and Agri-Food Canada in 1996. Early studies looked at physical and chemical changes during composting. Studies have also been conducted on greenhouse gas emissions during composting and the effect of composting on reduction of pathogens, parasites and weed seed viability. The quality of

commercially-produced composts at southern Alberta feedlots has been examined as has the mineralization rates of soil-applied composts. This paper reviews results from our feedlot manure composting research program.
Keywords: Compost; Manure; Nutrients; Greenhouse gas emissions; Pathogens

C. Turcanu, B. Carle, F. Hardeman, G. Bombaerts, K. Van Aeken, Food safety and acceptance of management options after radiological contaminations of the food chain, Food Quality and Preference, Volume 18, Issue 8, December 2007, Pages 1085-1095, ISSN 0950-3293, DOI: 10.1016/j.foodqual.2007.05.005.
(http://www.sciencedirect.com/science/article/B6T6T-4NWCGT5-2/2/ed596ce60329577427489f15b6bb8ec8)
Abstract:
After an accidental radioactive release leading to contamination of the food chain, countermeasures may be used to reduce the radiological health risk to the population and to bring social reassurance. This paper analyses public acceptance and consumer's behaviour for various countermeasures for contaminated milk as revealed by a recent public survey in Belgium. The survey instrument used was Computer Assisted Personal Interviewing. A simulated news bulletin was included for a fast and realistic briefing on the situation investigated. The results show that clean feeding of dairy cattle and disposal of contaminated milk are the preferred options in case of contaminations above legal norms. For contaminations below legal norms, normal consumption of milk seems better accepted than disposal. Nonetheless, the expressed consumer's behaviour reveals a precautionary tendency: the presence of radioactivity at some step in the food chain could lead to avoiding purchasing products from affected areas. Finally, public trust building is revealed as a key element of a successful countermeasure strategy.
Keywords: Radioactive contamination; Food countermeasures; Public acceptance; Consumer's behaviour

M.C. Rufino, P. Tittonell, M.T. van Wijk, A. Castellanos-Navarrete, R.J. Delve, N. de Ridder, K.E. Giller, Manure as a key resource within smallholder farming systems: Analysing farm-scale nutrient cycling efficiencies with the NUANCES framework, Livestock Science, Volume 112, Issue 3, Recycling of Livestock Manure in a Whole-Farm Perspective, December 2007, Pages 273-287, ISSN 1871-1413, DOI: 10.1016/j.livsci.2007.09.011.
(http://www.sciencedirect.com/science/article/B7XNX-4PYY7M7-1/2/85eb1405757a2baf2ea15f36426ece69)
Abstract:
Smallholder farmers in Africa recognise the important role of manure in maintaining soil fertility. For smallholder farmers who use little fertiliser, efficient management of nutrients in manure is key for crop production. We describe a simple model to analyse the effect of manure management on the efficiency of mass and nutrient retention. We used on-farm data on manure excreted and manure management, experimental results, literature and fuzzy logic to model losses during manure storage. The model was used to analyse N cycling efficiency (NCE) within smallholder farms in western Kenya. Simulations showed that manure management during collection and storage had a large effect on the efficiency of C and nutrient retention. Differences in NCE between farmers of different wealth classes arose due to differences in resource endowment. For poorer farmers, large N losses occur at all stages of manure recycling. Urinary-N losses occurred on all farms but their impact on NCE for poor and medium-class farmers was larger due to the smaller amount of N recycled. With current management the poor farmer recovered < 1 kg N y- 1 in composted manure from 15 kg N y- 1 excreted. Improved manure storage had little effect on increasing overall NCE for the poor farmer due to large losses before storage. For the wealthier farmer improvement of manure storage increased NCE and allowed recycling of 30% of N excreted (ca. 30 kg N y- 1) with small investment in infrastructure. Covering manure heaps with a

polythene film reduced mass and N losses considerably. For the poor to increase overall NCE, investment in cattle housing and recycling of urinary-N is required. Increasing cattle numbers or improved feeding would have a larger effect on manure availability but this is constrained by feed scarcity and investment capacity. The absolute amounts of N recycled (1-6, 4-17 and 7-18 kg N y-1 for poor, medium and wealthier farmers) were small compared with maize N demand (> 50 kg N ha- 1), but significant given the small farm sizes (0.1-1.1 ha). Although absolute amounts of N recycled with improved manure management may have little immediate impact on crop productivity, manure is often the only input available. Manure provides other nutrients for crops and maintains soil organic matter -- both vital to guarantee efficient use of fertiliser N -- which justifies the search for interventions to assist farmers make better use of manure.
Keywords: Sub-Saharan Africa; NCE; Fuzzy logic modelling; FARMSIM; HEAPSIM

Younes Chorfi, Anne Lanevschi, Raynald Dupras, Vincent Girard, Armand Tremblay, Serum biochemical parameters and embryo production during superovulatory treatment in dairy cattle, Research in Veterinary Science, Volume 83, Issue 3, December 2007, Pages 318-321, ISSN 0034-5288, DOI: 10.1016/j.rvsc.2007.01.010.
(http://www.sciencedirect.com/science/article/B6WWR-4NC5T3J-2/2/9bd485437b15fe34e9f89645bc53f0b1)
Abstract:
The objective of this study was to determine the relationship between the number of transferable embryos (TE) and various blood chemistry parameters as a reflection of the metabolic state of cows after superovulatory treatment. Forty-nine Holstein cows were subjected to superovulatory treatment for commercial embryo production. At the time of embryo harvest, individual blood samples were taken from cows for biochemical analysis. All embryos including dead ones as well as non-fertilized oocytes were counted in uterine lavage. Feed samples collected daily for a period of two weeks before embryo harvest, were analyzed for mycotoxins: vomitoxin, zearalenone and T-2 toxin. On average, cows produced 9.45 +/- 5.60 embryos and oocytes of which 5.27 +/- 4.20 were TE, 0.37 +/- 0.80 were dead embryos and 3.82 +/- 3.78 were non-fertilized oocytes. Higher concentrations of Mg and K were associated with a higher production of TE ($p = 0.005$ and $p = 0.043$, respectively) and higher activity of creatinine kinase was associated with a lower production of TE ($p = 0.011$).
Keywords: Dairy cattle; Transferable embryos; Serum chemistry parameters; Mycotoxins

Johanne Ellis-Iversen, Richard P. Smith, Lucy C. Snow, Eamon Watson, Michael F. Millar, Geoff C. Pritchard, Anthony R. Sayers, Alasdair J.C. Cook, Sarah J. Evans, Giles A. Paiba, Identification of management risk factors for VTEC O157 in young-stock in England and Wales, Preventive Veterinary Medicine, Volume 82, Issues 1-2, 15 November 2007, Pages 29-41, ISSN 0167-5877, DOI: 10.1016/j.prevetmed.2007.05.004.
(http://www.sciencedirect.com/science/article/B6TBK-4P0VCWN-1/2/a056f3dc0ebaab09427c198d67768fc7)
Abstract:
We conducted a cross-sectional study on 255 cattle farms in England and Wales to identify risk factors for verocytotoxin-producing E. coli O157 (VTEC). Exposure variables were collected at the levels of the farm and of the group of young-stock within the farms. On each farm a group of young-stock (6-18 months of age) was sampled to establish VTEC status.
In our multiple logistic regression, farm VTEC status was associated with access to springs (OR: 0.31, CI95%: 0.12, 0.78) and assessing the wetness of the bedding material less frequently than daily (OR: 3.89 CI95%: 1.5, 10.2). At group-level we found no associated risk factors for animals housed outdoors in fields. Significant for groups housed in pens were wet bedding (wet OR: 3.43, CI95%: 1.3, 9.4; very wet OR: 4.24, CI95%: 1.2, 14.6), number of animals in the group (10-15 OR:

2.72, CI95%: 0.75, 9.9, 16-24, OR: 3.78, CI95%: 1.2, 12.3; >25 OR: 3.78, CI95%: 1.1, 12.7) and feeding straw (OR: 2.29, CI95%: 1.2, 5.5).
Keywords: VTEC; STEC; Zoonoses; Cattle; Risk factor

R. Renuka Devi, C. Arumughan, Phytochemical characterization of defatted rice bran and optimization of a process for their extraction and enrichment, Bioresource Technology, Volume 98, Issue 16, November 2007, Pages 3037-3043, ISSN 0960-8524, DOI: 10.1016/j.biortech.2006.10.009.
(http://www.sciencedirect.com/science/article/B6V24-4MFKD32-2/2/12d6f77313bafcece35523e060390e0b)
Abstract:
The aim of this study was to characterize the defatted rice bran (DRB) employing HPLC for identifying the major phytochemicals in DRB and to examine its commercial potential as a source of bioactive phytochemicals leading to value addition of DRB otherwise used as cattle feed. Various solvent extracts showed the presence of oryzanols, tocols, and ferulic acid. Methanol was the most effective extractant under the optimized conditions of a material-solvent ratio of 1:15 (wt./vol.) and a time of extraction of 10 h. The yields of total phenols, oryzanols and ferulic acid from DRB with methanol were 2204, 316, and 233 ppm, respectively. Enrichment of antioxidants in the crude methanolic extract (CME) was achieved by sequential extraction and fractionation, resulting in three enriched fractions, viz., acetone extract (AE), acetone extract-lipophilic fraction (AE-LP) and acetone extract-polar fraction (AE-PP). While AE-LP was enriched in oryzanols and tocols by about 65 times, AE-PP was enriched in ferulic acid by 70 times as compared to their contents in DRB.
Keywords: Defatted rice bran; Phytochemicals; HPLC; Oryzanols; Tocols; Ferulic acid; Extraction kinetics; Solvent fractionation

J. Carol Petherick, Spatial requirements of animals: Allometry and beyond, Journal of Veterinary Behavior: Clinical Applications and Research, Volume 2, Issue 6, November-December 2007, Pages 197-204, ISSN 1558-7878, DOI: 10.1016/j.jveb.2007.10.001.
(http://www.sciencedirect.com/science/article/B82Y3-4RB7BW5-6/2/1849733007008fc50145fbbd5a2312c1)
Abstract:
Space allowance is a major factor influencing animal welfare. For livestock, at least, it plays a critical role in profitability, yet there is little information on the amount of space that animals require. The amount of space an animal occupies as a consequence of its shape and size can be estimated using allometry; linear dimensions (L) can be expressed as L = kW1/3 and surface area (S) as S = kW2/3, where k = a constant and W = the weight of the animal. Such equations have been used to determine the amount of space needed by standing (area [m2] = 0.019W0.66) and lying (area [m2] = 0.027W0.67) animals. Limited studies on the lying down and standing up behaviors of pigs and cattle suggest that the amount of space required can be estimated by area (m2) = 0.047W0.66. Linear space required per animal for behaviors such as feeding or drinking from a trough can be estimated from 0.064W0.33, but in groups this requirement will be affected by social interactions among group members and the amount of competition for the resource. Determining the amount of space for groups of animals is complex, as the amount of useable space can vary with group size and by how group members share space in time. Some studies have been conducted on the way in which groups of domestic fowl use space, but overall, we know very little about the ways in which livestock time-share space, synchronicity in the performance of behaviors, and the effects of spatial restrictions on behavior and welfare.
Keywords: allometric equations; stocking density; space; social behavior

C.A. Morris, A review of genetic resistance to disease in Bos taurus cattle, The Veterinary Journal, Volume 174, Issue 3, November 2007, Pages 481-491, ISSN 1090-0233, DOI: 10.1016/j.tvjl.2006.09.006.
(http://www.sciencedirect.com/science/article/B6WXN-4MBC048-1/2/fbb33cb694f6d0764b5b34217de40d7f)
Abstract:
Cattle show considerable variability in their responses to a wide range of disease challenges, and much of the variability is genetic. This review highlights genetic variation in disease susceptibility in Bos taurus cattle, with variation found at the breed level and also within breeds. Disease challenges come from bacteria and viruses, parasites and feed-borne toxins. For an animal to survive, it needs its own mechanisms for resisting these challenges, or for being resilient to them, or it must be protected artificially from them. Disease challenges have been classified as `diseases from without', but there is also another class of genetic diseases resulting from inborn errors of metabolism, which might be called `diseases from within'.
Degrees of inheritance (heritabilities) are reviewed for a range of economically important traits including resistance to mastitis, ketosis, lameness, nematode parasites, external parasites, eye disease, respiratory disorders, tuberculosis, brucellosis, Johne's disease, foot-and-mouth disease, bovine spongiform encephalopathy, metabolic disorders caused by toxins found on the feed, and threshold levels of minerals and metabolites. Many, but not all, of the above require an immune response as part of the fight against an external challenge, and measurements have been made of general immune response as a way of describing or predicting how an animal will respond. There are now some examples of industry or breed societies applying selection for resistance to one or more diseases as part of a complete breeding objective in dairy cattle, beef cattle or dual purpose livestock. In most cases, industry and breed societies are in the early stages of applying effective selection pressure for resistance to specific cattle diseases, with the notable exceptions of Scandinavian cattle schemes, which lead the world in this respect.
Keywords: Cattle; Disease; Resistance; Genetics; Review

G.P. Mandal, R.S. Dass, D.P. Isore, A.K. Garg, G.C. Ram, Effect of zinc supplementation from two sources on growth, nutrient utilization and immune response in male crossbred cattle (Bos indicusxBos taurus) bulls, Animal Feed Science and Technology, Volume 138, Issue 1, 22 October 2007, Pages 1-12, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2006.09.014.
(http://www.sciencedirect.com/science/article/B6T42-4M4TNPD-1/2/11f3cbb5b1955892b6163be7fe2926f8)
Abstract:
To investigate effects of Zn supplementation on performance, mineral balance and immune response, 15 male crossbred cattle (Bos indicusxBos taurus) bulls of about 14 +/- 0.4 months of age and weighing 226.0 +/- 9.1 kg were divided in to three groups of five. Bulls in the control group were fed wheat straw and a concentrate mixture (basal diet with 32.5 mg Zn/kg dry matter (DM)), and in ZnSO4 and ZnProp groups 35 mg Zn/kg DM was added through Zn sulphate and Zn propionate, respectively. All bulls were fed their respective treatment diets for 180 days. Daily feed intake was recorded and bulls were weighed at every 15 days to determine change in body weight (BW). After 120 days of feeding, bulls were vaccinated with Brucella abortus strain 19, and cell mediated and humoral immune responses were assessed between 120 and 148 days of experimental feeding. After 150 days of feeding, a metabolism study of 6 days duration was completed to determine nutrient digestibility and mineral balances (i.e., Ca, P, Zn, Cu, Fe and Mn). Intake of total DM, digestibility of DM, crude protein, ether extract, neutral detergent fibre and acid detergent fibre, N balance, average daily gain, feed: gain did not differ between the groups. Intake, excretion and balance of Ca, P, Zn, Cu, Fe and Mn also did not differ between the groups. However, retention of Zn was higher ($P<0.001$) in the ZnProp group. Bulls supplemented with Zn propionate had higher cell mediated ($P<0.01$) and humoral ($P<0.05$) immune response, while there

was no alteration in immune response due to Zn sulphate supplementation. Results indicate that a diet containing about 32.5 mg Zn/kg DM was adequate to support normal growth and digestibility, but a better immune response occurred when Zn propionate was added to the diet at 35 mg/kg DM versus Zn sulphate.
Keywords: Zinc sulphate; Zinc propionate

L.M.M. Ferreira, U. Garcia, M.A.M. Rodrigues, R. Celaya, A. Dias-da-Silva, K. Osoro, The application of the n-alkane technique for estimating the composition of diets consumed by equines and cattle feeding on upland vegetation communities, Animal Feed Science and Technology, Volume 138, Issue 1, 22 October 2007, Pages 47-60, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2006.11.007.
(http://www.sciencedirect.com/science/article/B6T42-4MFJTBX-2/2/34d269b211baab43f735018854300b80)
Abstract:
The application of n-alkanes as faecal markers to estimate diet composition of equines and cattle was studied. Twelve mature crossbreed mares (385 +/- 47 kg live weight - LW) and six adult non-lactating cows (499 +/- 36 kg LW) of Asturiana de los Valles breed were divided in groups of three animals (H1, H2, H3 and H4 in equines and C1 and C2 in cattle) and housed in individual stalls. Animals received a daily total amount of 1.0 kg DM/100 kg LW of different experimental diets composed of herbaceous (Lolium perenne L.) and woody species (Ulex gallii Planchon and heather: Erica spp. and Calluna vulgaris L.). Diet composition varied among treatments: H1 and C1 - L. perenne as sole component; H2 and C2 - L. perenne (0.70) and heather (0.30); H3 - L. perenne (0.70) and U. gallii (0.30); H4 - L. perenne (0.40), heather (0.30) and U. gallii (0.30). Diet composition was estimated from the alkane concentrations (C27, C29, C31 and C33) in diet and faeces by least-squares procedures. Furthermore, the effect of using different sets of alkane faecal recovery, without no faecal recovery correction (R1), applying mean diet faecal recoveries (R2) or applying mean faecal recoveries across all diets (R3) was evaluated. The results showed that in equines the alkane faecal recovery was unrelated with carbon chain length. In contrast, in cattle, the alkane faecal recoveries increased with alkane chain length. The results obtained in equines suggested a negative association between diet digestibility (ranging from 0.39 to 0.58) and alkane faecal recoveries (ranging from 0.84 to 1.08) for the alkanes C27 ($r^2 = 0.701$, $P<0.001$), C29 ($r^2 = 0.580$, $P<0.01$), C31 ($r^2 = 0.604$, $P<0.01$) and C33 ($r^2 = 0.742$, $P<0.001$). Accurate diet composition estimates were obtained in equines using alkane faecal concentrations corrected or not for their incomplete faecal recovery.
The results obtained in this study confirmed the usefulness of the n-alkane markers to estimate diet composition of equines and cattle grazing these type vegetation communities with very different components. However, in cattle these diet composition markers needed proper adjustment of their faecal concentrations prior to their application.
Keywords: Herbivores; n-Alkane markers; Heathland

Shinichi Hatama, Tomoyuki Shibahara, Masatsugu Suzuki, Koichi Kadota, Ikuo Uchida, Toru Kanno, Isolation of a Megatrypanum trypanosome from sika deer (Cervus nippon yesoensis) in Japan, Veterinary Parasitology, Volume 149, Issues 1-2, Special section: Food-borne Parasitic Zoonosis - Papers presented at the Fourth Annual Meeting of the European Veterinary Parasitology College (EVPC), 21 October 2007, Pages 56-64, ISSN 0304-4017, DOI: 10.1016/j.vetpar.2007.07.019.
(http://www.sciencedirect.com/science/article/B6TD7-4PG8HJC-1/2/8dd76c984b38c02d239441d4bcb39613)
Abstract:
A trypanosome was isolated from a sika deer (Cervus nippon yesoensis) in Hokkaido, Japan, during the primary culture of sika deer renal cells. This is the first report of isolation of a

Megatrypanum trypanosome from Japanese Cervidae. The trypanosome, designated TSD1, was propagated and maintained in Eagle's modified essential medium containing 20% fetal bovine serum with sika deer renal cells as feeder. The TSD1 trypanosome was morphometrically similar to Trypanosoma cervi, which is commonly isolated from American and European deer. PCR analysis with primers for 18S ribosomal DNA and nucleotide sequencing showed that TSD1 is a member of genus Trypanosoma, subgenus Megatrypanum. Phylogenetically TSD1 is closely related to T. theileri, a common trypanosome of cattle, but is distinguishable from T. theileri by some morphometrical and biological features.
Keywords: Cervus nippon yesoensis; Megatrypanum; Renal cell culture; Sika deer; Trypanosome

S.S. Nielsen, N. Toft, Assessment of management-related risk factors for paratuberculosis in Danish dairy herds using Bayesian mixture models, Preventive Veterinary Medicine, Volume 81, Issue 4, 16 October 2007, Pages 306-317, ISSN 0167-5877, DOI: 10.1016/j.prevetmed.2007.05.001.
(http://www.sciencedirect.com/science/article/B6TBK-4NY4WGC-1/2/5c46cde512c6727941e28b579a2314f5)
Abstract:
Transmission of Mycobacterium avium subsp. paratuberculosis (Map) to susceptible animals is primarily considered to occur via faeces and milk originating from infectious cows. However, studies of factors resulting in increased transmission of Map are difficult to perform due to a long and unpredictable incubation period and inaccurate diagnostic tests. A multi-level Bayesian mixture model has been shown to predict the infection status of an individual cow more precisely than traditional cut-off based methods used for interpretation of diagnostic test-information, thereby increasing the precision of the diagnostic information.
The objective of our study was to assess management-related risk factors for within-herd transmission of Map. Management-related risk factors were recorded in 97 Danish dairy herds. Twenty-six months following that recording, the antibody status of all lactating cows (n = 7410) in the same herds was measured by the use of an ELISA. A multi-level Bayesian mixture model was used to assess the association between the probability of infection of individual cows and 41 herd-level management-related risk factors using univariable analyses. In this model, the continuous OD value was used to estimate the probability of infection, corrected for known animal covariates and laboratory factors. The statistical significance of the potential risk factors was assessed by calculating odds ratios and their 95% credibility posterior intervals.
Four significant risk factors were identified: housing of cows in bed stalls compared to housing in tie stalls; low level of hygiene in the feeding area of calving areas; low amounts of straw in the bedding of the calving area; high animal density among young stock >12 months of age. Surprisingly, the hygiene level in the calving area was not found to affect the odds of infection.
Keywords: Cattle; Multi-level Bayesian mixture model; Paratuberculosis; Herd-level management-related risk factors

D.P. Morgavi, R.T. Riley, An historical overview of field disease outbreaks known or suspected to be caused by consumption of feeds contaminated with Fusarium toxins, Animal Feed Science and Technology, Volume 137, Issues 3-4, Fusarium and their toxins: Mycology, occurrence, toxicity, control and economic impact, 1 October 2007, Pages 201-212, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2007.06.002.
(http://www.sciencedirect.com/science/article/B6T42-4P5YK4D-2/2/2c81134474794ece6dd4d507b44d1634)
Abstract:
The interest in mycotoxins began when aflatoxins were found to be carcinogens and to be widespread in foodstuffs and feedstuffs. Today, mycotoxins and mouldy feedstuffs are known causes of animal disease. Symptoms are often subtle and there can be many equally non-

definitive contributing factors; for example, environmental stress, exposure to multiple mycotoxins and infectious agents, and nutrient/vitamin deficiencies. Thus, it is often difficult to establish cause-effect relationships with contaminated feedstuffs. The Fusarium toxins of greatest concern are deoxynivalenol (DON), fumonisins, and zearalenone. For each, mould-contaminated feed was implicated as the cause of animal disease long before the toxins were identified. In the field, changes in performance or behaviour and increased susceptibility to infectious disease are possible subtle signs of exposure to mycotoxins in feed. Because most cases of toxicity present non-specific clinical signs, cases of suspected mycotoxicosis often remain unreported. Nonetheless, for DON, fumonisin and zearalenone there are signs that are highly suggestive of exposure. For DON a commonly observed effect is feed refusal which has been reported in cattle, pigs and chickens; however, pigs appear to be the most sensitive. Although DON is not considered to be acutely toxic to farm animals, it is considered to be a major cause of economic loss due to reduced performance. In pigs, the reduction in feed intake occurs relatively soon after consuming feeds containing greater than 1 mg deoxynivalenol/kg and emesis at >10 mg/kg. Field outbreaks of mouldy maize-induced equine leukoencephalomalacia (ELEM) have been reported since 1891 and in 1988 pure fumonisin was shown to produce ELEM in a horse. ELEM syndrome is a fatal disease that apparently occurs only in equids. The length of exposure, level of contamination, individual animal differences, previous exposure, or pre-existing liver impairment may all contribute to the appearance of the clinical disease. Analysis of feeds from confirmed cases of ELEM indicates fumonisin B1 concentration greater than 10 mg/kg in the diet is associated with increased risk of ELEM. Another disease caused by fumonisin is porcine pulmonary edema syndrome. Zearalenone has been implicated in field outbreaks of reproductive problems, vulvovaginitis and anestrus in pigs. The primary effect of zearalenone is estrogenic and prepubertal female pigs are the most affected animal. The history of discovery of mycotoxin involvement in animal diseases serves as a warning that yet to be discovered mycotoxins could also be involved in current or future inexplicable animal production problems.
Keywords: Mycotoxins; Fusarium toxins; Deoxynivalenol; Fumonisin; Zearalenone

Lucia Decastelli, Jeanne Lai, Monica Gramaglia, Antonietta Monaco, Carlo Nachtmann, Franca Oldano, Mauro Ruffier, Alessandro Sezian, Carlo Bandirola, Aflatoxins occurrence in milk and feed in Northern Italy during 2004-2005, Food Control, Volume 18, Issue 10, October 2007, Pages 1263-1266, ISSN 0956-7135, DOI: 10.1016/j.foodcont.2006.08.006.
(http://www.sciencedirect.com/science/article/B6T6S-4M6RYVP-2/2/842fa34b336cabd608a5ee407dede269)
Abstract:
Aflatoxin B1, a common occurring type of aflatoxin in feed, is a potent cancer-causing agent. Lactating cows fed with aflatoxin-contaminated feed trasmit the toxin, as the metabolic form aflatoxin M1, into the milk with high risk for consumers. The aim of this study is to determine the contamination degree of raw milk and feed in Valle d'Aosta region.
From the beginning of 2004 to the end of 2005 samples of raw cow's milk and cattle feed has been analysed: in 2004, the presence of aflatoxin M1 in milk and B1 in feed was higher than the maximum allowable in 1.7% of raw milk samples and in 8.1% of feed samples. In 2005 the presence of these aflatoxins are below the limits of EU regulations.
The samples were analysed with an ELISA immunoassay, used as screening test, and the positive samples were confirmed by the HPLC analysis.
Keywords: Mycotoxin; Aflatoxin; Milk; Feed

William R. Perry, Thomas Marsh, Rodney Jones, M.W. Sanderson, J.M. Sargeant, D.D. Griffin, R.A. Smith, Joint product management strategies for E. coli O157 and feedlot profits, Food Policy, Volume 32, Issues 5-6, October-December 2007, Pages 544-565, ISSN 0306-9192, DOI: 10.1016/j.foodpol.2006.11.003.

(http://www.sciencedirect.com/science/article/B6VCB-4MSHTJY-1/2/9102126e799081f9a74857f5a71a6888)
Abstract:
The objective of this study was to investigate the associations of management strategies on Escherichia coli O157 and feedlot profits. Management practices that affect cattle performance were identified using ordinary least squares regressions, while a negative binomial regression was used to identify management practices that were associated with E. coli O157 prevalence. Findings support the hypothesis that E. coli O157 occurrences in the feedlot were not directly associated with cattle performance in the feedlot, which suggests potential for a downstream production externality problem. General categories of management strategies were associated with cattle performance and E. coli O157 occurrences and were consistent with past research. As implementation of enhanced food safety regulations potentially shift responsibility of ensuring safety of the food supply from a government based agency onto private firms, a portion of the costs of E. coli O157 outbreaks is likely to shift to feedlots in the future.
Keywords: Feedlot profits; E. coli O157; Management strategies; Economic externalities

N. Pareek, J. Voigt, O. Bellmann, F. Schneider, H.M. Hammon, Energy and nitrogen metabolism and insulin response to glucose challenge in lactating German Holstein and Charolais heifers, Livestock Science, Volume 112, Issues 1-2, Special section: Non-Ruminant Nutrition Symposium, October 2007, Pages 115-122, ISSN 1871-1413, DOI: 10.1016/j.livsci.2007.02.001.
(http://www.sciencedirect.com/science/article/B7XNX-4N7RDM0-3/2/af20ed6ecc6c1e541ffa6a1b5e5182eb)
Abstract:
Energy and protein metabolism were investigated in lactating Holstein (n = 6) and Charolais (n = 8) heifers, thus in cattle with different potential for milk production and nutrient accretion, but comparable body size. Insulin responses to glucose challenge during lactation were also investigated. Feed intake, milk production and nutrient loss through faeces and urine were measured for 5 days to calculate energy and nitrogen balance. 15N-glycine was infused to measure 15N turnover and to calculate protein synthesis and degradation. Blood samples were taken 3 h after feed intake on day 12 to measure postprandial glucose and insulin concentrations. On day 16, heifers received intravenous glucose infusions (1 g/kg BW0.75) and blood samples were taken before and 7, 14, 21 and 28 min after glucose challenge. Blood glucose and insulin concentrations were measured, and areas under the curve were calculated. Dry matter intake was higher ($P < 0.01$) in Holstein than in Charolais heifers. Milk yield was higher ($P < 0.01$) and protein content in milk was lower ($P < 0.01$) in Holstein than in Charolais heifers. Charolais heifers showed a higher energy and nitrogen balance ($P < 0.01$) than Holstein heifers, whereas net protein synthesis and efficiency of protein synthesis were greater in Holstein than in Charolais heifers. Plasma insulin concentrations after feed intake and before glucose challenge, as well as glucose increase after glucose challenge were higher ($P < 0.05$) in Charolais heifers when compared to Holstein heifers. In conclusion, lower energy and nitrogen balances in Holstein than in Charolais heifers were particularly caused by differences in their potential for milk production and were accompanied by lower plasma insulin levels in Holstein heifers. Charolais heifers showed a greater potential for energy and protein accretion combined with higher insulin levels and lower glucose half-life. As Charolais and Holstein represent important bovine breeds for nutrient accretion and secretion type, respectively, females of these two breeds are appropriate to investigate the genetic and physiological background for differences in regulation of nutrient partitioning in cattle.
Keywords: Dairy and beef heifers; Lactation; Energy and nitrogen balance; Protein turnover; Glucose; Insulin

T.J. Wistuba, E.B. Kegley, J.K. Apple, D.C. Rule, Feeding feedlot steers fish oil alters the fatty acid composition of adipose and muscle tissue, Meat Science, Volume 77, Issue 2, October 2007, Pages 196-203, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.03.002.
(http://www.sciencedirect.com/science/article/B6T9G-4N7RY78-1/2/95d1efa17311e84274089eb40e35d0b3)
Abstract:
Sixteen steers (441 +/- 31.7 kg initial body weight) consumed two high concentrate diets with either 0 or 3% fish oil to determine the impact of fish oil, an omega-3 fatty acid source, on the fatty acid composition of beef carcasses. Collected tissue samples included the Longissimus thoracis from the 6th to 7th rib section, ground 10th to 12th rib, liver, subcutaneous adipose tissue adjacent to the 12th rib, intramuscular adipose tissue in the 6th to 7th rib sections, perirenal adipose tissue, and brisket adipose tissue. Including fish oil in the diet increased most of the saturated fatty acids ($P < 0.01$) and proportions of polyunsaturated fatty acids ($P < 0.06$), and decreased ($P < 0.01$) proportions of monounsaturated fatty acids. Dietary fish oil increased ($P < 0.01$) levels of omega-3 fatty acids in sampled tissues, resulting in lower ($P < 0.01$) omega-6:omega-3 ratios. The weight percentages of C20:5 and C22:6 in tissue may provide the recommended daily allowance for humans. Fish oil may have a role in beef niche marketing if there are no deleterious effects on consumer satisfaction.
Keywords: Beef cattle; Fatty acid; Fish oil; Longissimus thoracis

M. Dehghan-banadaky, R. Corbett, M. Oba, Effects of barley grain processing on productivity of cattle, Animal Feed Science and Technology, Volume 137, Issues 1-2, 1 September 2007, Pages 1-24, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2006.11.021.
(http://www.sciencedirect.com/science/article/B6T42-4MJS039-1/2/f422703751dfc2ecce4f7f086b1fdfee)
Abstract:
Barley grain is one of the most common feed grains used in diets for dairy and beef cattle. Because the endosperm of the barley kernel is surrounded by the pericarp, which is extremely resistant to microbial degradation in the rumen, dry barley grain needs to be processed to improve its utilization by beef and dairy cattle. Dry rolling is a common processing method, and increases ruminal digestibility of grain and productivity of animals, but the grain kernels often shatter during processing, producing many fine particles, which has been associated with inconsistent animal performance. Steam rolling and temper rolling can reduce production of fine particles during rolling, allowing more uniform particle size distribution. Steam flaking uses moisture, heat and pressure to gelatinize starch granules, but positive effects of starch gelatinization on animal performance may be less for barley grain versus corn or sorghum because barley starch, once exposed to microbial organisms in the rumen, is readily degradable even without being gelatinized. Treatment of grains with NaOH may increase its ruminal starch digestibility without increasing ruminal rate of starch release. Roasting and aldehyde treatment decrease the rate of crude protein degradation and optimize organic matter degradation in the rumen, while application of ammonia or fibrolytic enzymes can increase degradation of the hull. Consistency in processed grain quality (e.g., particle size) and predictability in animal performance should be considered as an important quality parameter of processing. In addition, initial grain quality, extent of processing, processing method, and their interactions, determine the feeding value of barley grain and affect the productivity of cattle. Further research is warranted to develop a common quality parameter accounting for variations in physical, chemical and biochemical properties for processed barley grain.
Keywords: Barley grain; Processing; Dairy cows; Beef cattle; Productivity

Eva Schlecht, Hartmut Richter, Salvador Fernandez-Rivera, Klaus Becker, Gastrointestinal passage of Sahelian roughages in cattle, sheep and goats, and implications for livestock-mediated

nutrient transfers, Animal Feed Science and Technology, Volume 137, Issues 1-2, 1 September 2007, Pages 93-114, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2006.11.001. (http://www.sciencedirect.com/science/article/B6T42-4MFTVMC-1/2/5af72c67cc13fc994a1bc3374b2974f3)
Abstract:
Green and dry pasture vegetation and millet crop residues are the main feed for domesticated ruminants across the West African Sahelian zone. Studying their gastrointestinal passage is important for modelling livestock-mediated nutrient flows in these agro-pastoral systems. Intake, passage, digestion and excretion were studied in 16 cattle, 16 sheep and 16 goats offered these feeds at levels corresponding to 0.8 and 1.3 times voluntary feed intake. Parameters of particle passage were derived from faecal excretion of a pulse-dose of short (1-2 mm) and long (>2 mm) particles labelled with Ytterbium, using age-dependent Gamma-2 single-compartment models. Across the three species, mean retention time of particles in the mixing compartment (CMRT) varied between 39-50 and 54-66 h in green and dry pasture vegetation and between 66 and 88 h in millet leaves, and was always longer in cattle than in small ruminants ($P<0.05$). Particle passage through the mixing compartment ([lambda]), particle half life (T50) and total tract mean retention time (TMRT) were correlated to the dry matter digestibility and to the contents of nitrogen and neutral detergent fibre of the ingested diet, while particle size had no and feed intake only a weak influence on these parameters.
The results suggest that seasonal and species-specific differences in gastrointestinal passage of feed particles should be taken into account when addressing the temporal aspects of livestock-mediated matter and nutrient flows across the agro-pastoral landscapes of the Sahel.
Keywords: Particle passage; Roughages; Cattle; Sheep; Goats; Nutrient transfer; Sahel

M.E. Dikeman, Effects of metabolic modifiers on carcass traits and meat quality, Meat Science, Volume 77, Issue 1, 53rd International Congress of Meat Science and Technology (53rd ICoMST), September 2007, Pages 121-135, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.04.011. (http://www.sciencedirect.com/science/article/B6T9G-4NKJ0MR-1/2/f36452e9eb002ae7987f9fddccd37add)
Abstract:
Much research has been conducted and published about metabolic modifiers that increase growth rate, improve feed efficiency, increase carcass leanness, and decrease carcass fatness. Most of these metabolic modifiers have been developed to improve efficiency and profitability of livestock production and to improve carcass composition, with fewer of them developed and researched specifically to improve meat quality. Some of the metabolic modifiers can have negative effects on visual and sensory meat quality, especially when not used as recommended. This review evaluates the various kinds of metabolic modifiers that have been researched for their effects on production efficiency, carcass composition, and meat quality. Nutritional composition of meat generally is improved from use of most of the metabolic modifiers, visual quality is improved by others, but some can have a negative effect on marbling and tenderness. Anabolic steroid implants are very cost effective and practical for beef cattle production but aggressive implants used within 70 days of slaughter or too frequent use of them will reduce tenderness and marbling. Somatatropin and approved [beta]-agonists are very effective in improving growth performance and carcass leanness in pigs, and [beta]-agonists are effective in cattle, but improper use of them can have negative effects on marbling and tenderness. Feeding supplemental levels of vitamin E is quite beneficial for improving meat color and shelf-life of beef, lamb, and pork, whereas not supplementing diets with vitamin A has potential for improving marbling in cattle. Immunocastration shows promise for capitalizing on the efficiency of muscle growth of young boars up to a few weeks before slaughter, at which time boar taint is prevented and marbling is improved by immunocastration. Potential exists for improving the fatty acid profile of lipids and increasing conjugated linoleic acid content in beef through dietary manipulation. Supplementing

swine diets with conjugated linoleic acid can improve carcass composition of swine, but is not yet cost effective to use. Dietary inclusion of magnesium, manganese, or chromium in diets of pigs and sheep has potential to improve meat color and water-holding capacity. Although, not all of these metabolic modifiers are approved in all countries, proper use of the ones that are approved offers opportunities for economically improving production efficiency and carcass leanness while maintaining acceptable marbling and tenderness, while some provide opportunities to enhance meat color and quality.
Keywords: Metabolic modifiers; Growth performance; Meat quality; Dietary manipulation; Carcass traits

R.R. Grummer, Strategies to improve fertility of high yielding dairy farms: Management of the dry period, Theriogenology, Volume 68, Supplement 1, Proceedings of the International Conference on Farm Animal Reproduction - "From Egg to Embryo", International Conference on Farm Animal Reproduction, 1 September 2007, Pages S281-S288, ISSN 0093-691X, DOI: 10.1016/j.theriogenology.2007.04.031.
(http://www.sciencedirect.com/science/article/B6TCM-4NT24PN-4/2/4cbf254188a0250633adb519ae1801ee)
Abstract:
Reproductive performance of dairy cattle has been related to a wide variety of indicators of energy status, e.g., extent of negative energy balance, time of energy balance nadir, body weight loss, body condition score, and body condition score loss. Energy balance begins to decrease during the last few weeks prior to calving primarily due to a 30-35% reduction in feed intake. Cows typically remain in negative energy balance for five to seven weeks postpartum. Nutritional strategies to improve energy balance during the transition period include fat supplementation and feeding additional nonfiber carbohydrate. Unfortunately, neither approach is likely to markedly enhance energy status, although fat supplementation may increase reproductive efficiency independent of any effect on energy balance. Alternative management strategies may be required to improve fertility of dairy cows. Shortening or eliminating the dry period may improve energy status of dairy cows and increase reproductive efficiency. Shortening or eliminating the dry period may enhance dry matter intake during the transition period, decrease milk energy output, or both. A preliminary study using small animal numbers indicated that reducing dry period length to 28 or 0 days may decreases days to first ovulation, increase first service conception rate, and decrease days open. A follow-up study employing large animal numbers confirmed that reducing dry period length from 55 to 34 days can decrease days to first ovulation and decrease the percentage of anovular cows. The reduction in days open was greater for older cows than second parity cows. The reduction in days open was not related to effects of treatment on milk yield. Shortening or eliminating the dry period may be a more successful approach to improving reproductive efficiency than diet manipulation.
Keywords: Fertility; Dry period; Management; Energy balance; Dairy cattle

Anne Buschmann, Franz J. Conraths, Thomas Selhorst, Julia Schultz, Matthias Kramer, Martin H. Groschup, Imported and indigenous BSE cases in Germany, Veterinary Microbiology, Volume 123, Issue 4, Recent Progress in Prion Research - Scientific Advances Reported at the Concluding Meeting of the German TSE Research Platform, German TSE Research Platform, 31 August 2007, Pages 287-293, ISSN 0378-1135, DOI: 10.1016/j.vetmic.2007.04.011.
(http://www.sciencedirect.com/science/article/B6TD6-4NFH0BB-8/2/8c3d0faa1efdfe440444dd0f528b6c22)
Abstract:
Bovine spongiform encephalopathy (BSE) is a transmissible fatal neurodegenerative disease in cattle with an average incubation time of five years. The first BSE case in an indigenous cow was detected in Germany in November 2000. This was almost eight years after the huge BSE epidemic

in the United Kingdom had peaked, and several years after many EU member states had seen their first BSE case. In the 1990s, BSE had been diagnosed in six imported animals in Germany. However, after the implementation of an active surveillance programme using BSE rapid testing systems, 399 indigenous German BSE cases have been found up to the end of July 2006. The birth cohorts of 1995-1997 contribute to the vast majority of the first 250 German cases that were diagnosed between 2000 and 2003. However, the most recent German BSE cases belong primarily to the birth cohorts 1998-2000 which is indicative of a recycling of BSE infectivity at that time. Moreover, there were two BSE cases in cattle born in spring 2001, i.e. after the meat and bone meal feed ban had come into effect on 2nd December 2000. In this article, we describe the dynamics of the German BSE epidemic and compare these data with those of other countries that observed larger numbers of cases.
Keywords: BSE epidemic; Bovine spongiform encephalopathy; Surveillance

M. Tichit, L. Doyen, J.Y. Lemel, O. Renault, D. Durant, A co-viability model of grazing and bird community management in farmland, Ecological Modelling, Volume 206, Issues 3-4, 24 August 2007, Pages 277-293, ISSN 0304-3800, DOI: 10.1016/j.ecolmodel.2007.03.043.
(http://www.sciencedirect.com/science/article/B6VBS-4NSV17S-1/2/26939c0c8283a23755c6691a9c576577)
Abstract:
In European grasslands, livestock grazing is a key driver of habitat quality. However, the specific grazing regimes that favour habitat quality and ensure biodiversity conservation remain largely unknown. This paper develops a dynamic model to predict how livestock grazing may be used to sustain a bird community without penalizing cattle feeding. The model focuses on a grassland grazed by cattle which is also the breeding habitat of three wader species. It integrates the dynamics of a sward, controlled through grazing, and that of three bird populations. Viability theory and dynamic programming are used to reveal viable grazing strategies that ensure the creation of two levels of habitat quality (homogeneous and heterogeneous) whilst ensuring cattle feeding. Viable grazing strategies are ranked through an economic criterion and referred as ecologic or economic grazing. Then using viability population analysis, we assess the extinction risk of the wader community in both levels of habitat quality. Globally, grazing had a more positive effect on the wader community than did the no-grazing scenario. Both levels of habitat quality could be generated through both grazing strategies corresponding to contrasting temporal distributions of livestock densities. Grazing strategies resulted in differential community viability. Ecologic grazing always ensured wader community maintenance, whatever the level of habitat quality targeted. This was not the case for economic grazing which reduced the wader community to two species. Species response showed two contrasting patterns, with a more dramatic decline for lapwings than redshanks in both the no-grazing and heterogeneous habitat quality scenarios. This may lead to conservation problems because of the relationship between population size and probability of extinction observed for lapwings.
Keywords: Grazing; Biodiversity; Habitat quality; Dynamics; Viable control

A.E. Mather, G.T. Innocent, S.A. McEwen, W.J. Reilly, D.J. Taylor, W.B Steele, G.J. Gunn, H.E. Ternent, S.W. J. Reid, D.J. Mellor, Risk factors for hide contamination of Scottish cattle at slaughter with Escherichia coli O157, Preventive Veterinary Medicine, Volume 80, Issue 4, 16 August 2007, Pages 257-270, ISSN 0167-5877, DOI: 10.1016/j.prevetmed.2007.02.011.
(http://www.sciencedirect.com/science/article/B6TBK-4NNPH39-1/2/8fb8e2a5167d0fdb74b52d604f06f7c3)
Abstract:
In the slaughter processing of cattle, contaminated hides have been identified as one of the major sources of Escherichia coli O157 carcase contamination. Logistic regression analysis was applied to data collected in a large scale study in Scotland involving 222 cattle forming 34 groups sent for

slaughter from 30 farms to 10 slaughterhouses. Aspects of individual animal characteristics, farm management practices and slaughterhouse features were examined to identify potential risk factors for hide contamination at harvest. Two models were developed, the first in which slaughterhouse was modelled as a fixed effect, and a second model where slaughterhouse and farm groups were modelled as random effects. In the first model, there was a significantly increased risk of a carcase testing positive for E. coli O157 on the hide if either the hide of the carcase immediately before or after it on the line was contaminated (OR 3.6; 95% CI: 1.4-9.9). If both adjacent carcases had contaminated hides, the odds ratio for the study carcase having a contaminated hide rose to 11.5 (95% CI: 4.4-32.5). If animals were held in lairage, receiving hay as feed appeared to have a protective effect on hide contamination. Transportation to the slaughterhouse by haulier, as opposed to transport by the farmer, was associated with a 5.4 increase in the odds of E. coli O157 contamination. The use of a crush in the lairage, often employed when reading ear tags, was also found to significantly increase the odds of hide contamination with E. coli O157. In the second model, the inclusion of slaughterhouse and farm group as random effects resulted in two of the previously identified factors being associated with hide contamination. If at least one of the adjacent carcases on the line had a contaminated hide, the associated odds ratio was 6.6 (95% CI: 2.8-15.9), which rose to 22.7 (95% CI: 9.3-55.5) if both adjacent hides were contaminated. Receiving hay in lairage was found to be important to the model, although not significant in itself (OR 0.005; 95% CI: 1.2e-6-20.7). These results suggest that modifiable risk factors for hide contamination exist. However, in order best to reduce the prevalence of hide contamination at slaughter, individual slaughterhouse risk assessment and intervention strategies are appropriate.
Keywords: E. coli O157; Hide contamination; Slaughterhouse; Logistic regression

A.J. Ho, R. Ivanek, Y.T. Grohn, K.K. Nightingale, M. Wiedmann, Listeria monocytogenes fecal shedding in dairy cattle shows high levels of day-to-day variation and includes outbreaks and sporadic cases of shedding of specific L. monocytogenes subtypes, Preventive Veterinary Medicine, Volume 80, Issue 4, 16 August 2007, Pages 287-305, ISSN 0167-5877, DOI: 10.1016/j.prevetmed.2007.03.005.
(http://www.sciencedirect.com/science/article/B6TBK-4NMTYVB-3/2/7ad5c8d9c8b4ca3e77a7ef52a1306ed1)
Abstract:
Fecal shedding of Listeria monocytogenes poses a risk for contamination of animal feed and agricultural environments and raw food at the pre-harvest stages of food production. To be able to reduce these risks it is critical to improve understanding of the epidemiology of L. monocytogenes shedding in feces. The objective of this study was to assess the daily variability of fecal shedding and its association with individual animal (lactation number and the day of current lactation) and environmental (feed) risk factors. That was achieved by application of longitudinal daily sample collection in a herd of dairy cattle and molecular characterization of isolated L. monocytogenes. Fecal samples (25) and silage samples (2) were collected daily during two 2-week periods and one 5-day period. L. monocytogenes was isolated from 255 out of 825 (31%) fecal samples on 24 out of 33 (73%) days, and from 25 out of 66 (38%) silage samples on 16 out of 33 (48%) days. Ninety-four percent of cows excreted L. monocytogenes in feces at least once during the study period. Our data analyses indicated that (i) the prevalence and incidence risk of L. monocytogenes fecal shedding in cattle vary considerably over time, from 0 to 100%, and both are associated with contamination of silage, (ii) L. monocytogenes fecal shedding in cattle could occur as part of an outbreak or as an isolated sporadic case, (iii) L. monocytogenes subtypes associated with human infections are commonly isolated from cattle feces and silage, and (iv) a single cow can harbor more than one L. monocytogenes subtype on any given day. Although limited to a single dairy cattle herd, these findings provide a significant advancement in the understanding of the epidemiology of L. monocytogenes fecal shedding in dairy cattle.

Keywords: L. monocytogenes; Shedding; Silage; Outbreak; Sporadic case

Shi-jun LIU, Jia-qi WANG, Deng-pan BU, Hong-yang WEI, Ling-yun ZHOU, Qiu-jiang LUO, The Effect of Dietary Vegetable Oilseeds Supplement on Fatty Acid Profiles in Milk Fat from Lactating Dairy Cows, Agricultural Sciences in China, Volume 6, Issue 8, August 2007, Pages 1002-1008, ISSN 1671-2927, DOI: 10.1016/S1671-2927(07)60140-0.
(http://www.sciencedirect.com/science/article/B82XG-4PM8WN0-F/2/1544e9cdb23e2bc2741d43d1cbdbe712)
Abstract: Abstract
To determine the effect of dietary supplementation with vegetable oilseeds on the composition of bovine milk fatty acids (FAs), 40 Holstein dairy cows were used with a complete randomized design. At the beginning of the experiment, the cows were 150+/-25 day in milk (DIM). Total duration of the experiment was six weeks. Measurements were made during the last three weeks. Cows in four treatments were fed with a basal diet (CT) or basal diet supplemented with either whole full fat soybean (WFS), full fat expanded soybean (FPS) or whole full fat soybean with whole cottonseed and full fat expanded soybean (MIX). The composition of the milk fat was analyzed by gas chromatography. Relative to control, the conjugated linoleic acid (CLA) concentration in milk fat from cows on FPS was significantly increased by 83.88% ($P < 0.05$). The proportions of C12:0 were decreased by 35.7, 35.51, and 38.65% in milk fat from cows on WFS, MIX, and FPS compared with cows on CT. Similar decreases in C14:0 were 23.83, 24.85, and 31.48% in WFS, MIX, and FPS treatments, respectively. Feeding vegetable oilseeds increased the proportion of healthy FAs (mainly CLA), whereas decreased the concentration of C12:0 and C14:0. Therefore, milk and dairy products would have higher nutritive and therapeutic value.
Keywords: dairy cattle; vegetable oilseed; conjugated linoleic acid; milk fat

Kenneth A. Byrne, Ger Kiely, Paul Leahy, Carbon sequestration determined using farm scale carbon balance and eddy covariance, Agriculture, Ecosystems & Environment, Volume 121, Issue 4, August 2007, Pages 357-364, ISSN 0167-8809, DOI: 10.1016/j.agee.2006.11.015.
(http://www.sciencedirect.com/science/article/B6T3Y-4MR1JW0-1/2/f981b565437ea7d066fb3cc45ed8ac28)
Abstract:
Studies using eddy covariance have shown grasslands to be both sinks and sources of carbon dioxide ($CO_2$). However, such studies do not take into account the exports of carbon (C), such as in meat and milk and imports of C, such as off-farm derived C in cattle feed supplement. By coupling eddy covariance results with farm management data we quantified the farm scale C balance during 2004 for two dairy farms in South West Ireland. The system boundary for inputs and outputs of C is the farm perimeter. Carbon sequestration is determined as the difference between all C inputs and C outputs. Carbon inputs are similar in both farms with net ecosystem exchange (NEE) (2.9 +/- 0.5 t C ha-1 year-1) accounting for 88 and 81% of C inputs in Farms A and B, respectively. Carbon in concentrate feed accounts for 12 and 19% of C inputs in Farms A and B, respectively. Respiration by cattle during the winter housing period, and respiration by cows during milking throughout the grazing season, are the largest C outputs and account for approximately half of C outputs on both farms. The other major sources of C output are milk, $CH_4$ produced by enteric fermentation and emitted during slurry spreading and dissolved organic carbon (DOC) in streamflow. Carbon in meat and $CH_4$ emissions from dung (both in the farmyard and fields) and animal slurry in farmyard storage are minor sources of C output. The annual total C inputs are 3.30 and 3.58 t C ha-1 and the total C outputs are 1.25 and 1.43 t C ha-1 in Farms A and B, respectively. The net difference is 2.05 and 2.15 t C ha-1 in Farms A and B, respectively. This suggests that both farms were net C sinks for 2004. Further work on below ground process and soil C turnover is required to determine if this C sink estimate is reflected in changes in soil C

stocks. Furthermore, we estimate the global warming potential (GWP) of this grassland to be a sink for ~1 t CO2 equiv. ha-1 year-1.
Keywords: Greenhouse gases; Grassland; Carbon cycling; Radiative forcing

J.H. Kim, C.W. Kim, G.C. Ahn, E.K. Park, C.M. Kim, K.K. Park, Ergovaline levels in tall fescue and its effect on performance of lactating cows, Animal Feed Science and Technology, Volume 136, Issues 3-4, 1 August 2007, Pages 330-337, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2007.01.002.
(http://www.sciencedirect.com/science/article/B6T42-4N14D5T-1/2/d782423c29f49b70ebbd78b4e5ff7101)
Abstract:
To investigate the effects of ergovaline on milk production of lactating dairy cows, a survey and feeding trial were conducted. In the survey, 25 samples of imported tall fescue (Festuca arundinacea) hay were collected and analyzed for ergovaline. Ergovaline was detected in all 25 samples, ranging from 21 to 782 [mu]g/kg, and averaging 125 [mu]g/kg (dry matter (DM) basis). Based on a toxic threshold ergovaline level of 50 [mu]g/kg DM, more than one-half of the samples could be potentially toxic to cattle. In the feeding trial, 12 Holstein dairy cows were fed one of two diets for 28 days. A total mixed ration (TMR; concentrate:roughage ratio of 0.54:0.46, DM basis) with tall fescue hay (450 g/kg of dietary DM) contained either a low (45 [mu]g/kg DM; LE) or high level of ergovaline (782 [mu]g/kg DM; HE). Temperature ranged from -0.1 to 13.1 [degree sign]C. Intake of TMR and tall fescue, and milk yield were not different between treatments. Milk fat content ($P<0.001$) and milk fat yield ($P<0.05$) for HE were lower than for LE. Milk protein concentration was lower ($P<0.05$) for HE than for LE, but lactose concentration was not different. Solids-not-fat concentration for HE was lower ($P<0.001$) than for LE due to decreased milk fat and protein concentrations. These results indicate that feeding HE tall fescue can reduce performance of lactating dairy cows even with relatively cool temperatures and a relatively high dietary ratio of concentrate to roughage.
Keywords: Tall fescue; Endophyte; Ergovaline; Dairy cows

Wen-Ju Zhang, Zi-Rong Xu, Xiao-Liang Pan, Xiang-Hua Yan, Yan-bo Wang, Advances in gossypol toxicity and processing effects of whole cottonseed in dairy cows feeding, Livestock Science, Volume 111, Issues 1-2, August 2007, Pages 1-9, ISSN 1871-1413, DOI: 10.1016/j.livsci.2007.03.006.
(http://www.sciencedirect.com/science/article/B7XNX-4NHM764-2/2/75134088884a82399852bcfa604285bc)
Abstract:
Whole cottonseed (WCS) is a byproduct of the cotton-fiber industry. There are Upland and Pima two main varieties of cottonseed (CS), and Pima CS is considered nutritionally superior to Upland CS because of its higher fat and protein content. Pima CS contains more gossypol and a higher proportion of the (-) isomer than Upland CS. Monogastric animals are particularly sensitive to the toxic effects of gossypol, whereas ruminants are somewhat more resistant, especially for female. Concentrations of plasma gossypol (PG) and its negative isomer were directly proportional to free gossypol (FG) intake in dairy cows. The sign of gossypol toxicity observed was an increase in erythrocyte fragility (EF) for cows receiving high dietary FG. Pre- and postpartum consumption of FG might impair some aspects of calf skeletal development and vitamin metabolism, but long-term performance of cows and calves was not affected. The possible effect of WCS fat on reducing microbial activity and potential gossypol toxicity may limit the amount of WCS that can be supplemented to high-yielding dairy cows. The current recommendation is to include WCS at up to 150 g/kg of the diet. WCS processing, especially heat treatment, may aid in providing more unchanged WCS fat and CP to the small intestine, and decreasing ruminal CP degradability and increasing post ruminal digestibility. Heat treatment may also be a useful tool in reducing FG in

WCS. Thus, heat treatment may enable an increase in the supplementation rate of WCS for dairy cattle rations. DM intake of dairy cattle is not altered when WCS is included at up to 25% of the diet. The DM intake response to the inclusion of WCS in the diet is a function of both climatic and dietary factors. However, DM intake decreased linearly with increasing levels of iron sulfate in the diet, and substitution of cracked Pima CS for Upland CS increased DM intake.
Keywords: Dairy cows; Whole cottonseed; Gossypol toxicity; WCS processing

Elisabet Nadeau, Jan-Eric Englund, Anders H. Gustafsson, Nitrogen efficiency of dairy cows as affected by diet and milk yield, Livestock Science, Volume 111, Issues 1-2, August 2007, Pages 45-56, ISSN 1871-1413, DOI: 10.1016/j.livsci.2006.11.016.
(http://www.sciencedirect.com/science/article/B7XNX-4MV1P6X-1/2/31f2f18bbedf17810c5180788c847403)
Abstract:
The aim of this study, which was part of the EU-financed project Life Ammonia, was to evaluate the effects of dietary components and milk production on nitrogen efficiency of dairy cows. The study included examining the effects of decreased crude protein (CP) concentration in a grass-clover silage based diet and results of mixing whole-crop barley silage (WCBS) with grass-clover silage in the diet, on feed intake, milk production and nitrogen efficiency. Rations were formulated and milk production data were registered individually each month for 42 cows of the Swedish Red Cattle breed during four indoor periods from 1999 to 2003. The range in nitrogen efficiency by the cows, 11 to 398 days in milk, was 18 to 40%, when fed a diet containing 135 to 184 g CP/kg DM, 44 to 56% of NDF as rumen degradable fibre (RDF) and milking 13 to 57 kg of ECM daily. The average CP concentration of the diet, containing mainly grass-clover silage and concentrate, was decreased from 168 g/kg DM (170 g in early lactation) in the control treatment period to 160 g/kg DM (163 g in early lactation) during the following treatment period. The CP concentration was 170 g/kg DM (171 g in early lactation) during the third treatment period, when the grass-clover silage was fed in a mixture with WCBS. Using the whole data set (n = 284 for primiparous, n = 440 for multiparous cows based on measurements each month) resulted in models, in which total DM intake, ECM yield, dietary CP concentration and RDF were the most important factors affecting nitrogen utilisation of primiparous and multiparous cows. Increases in both average DM intake and milk yield by multiparous cows and no changes in average intake and milk yield by primiparous cows fed the low CP diet or the normal CP diet containing WCBS, compared to cows fed the normal CP diet, resulted in similar nitrogen efficiencies among the treatments. Hence, dietary CP concentrations of 160 to 170 g/kg DM can be used for cows in early lactation in commercial herds to improve nitrogen utilisation without causing a simultaneous decrease in milk yield.
Keywords: Crude protein; Feed intake; Milk yield; Nitrogen efficiency

A. Hessle, E. Nadeau, S. Johnsson, Beef heifer production as affected by indoor feed intensity and slaughter age when grazing semi-natural grasslands in summer, Livestock Science, Volume 111, Issues 1-2, August 2007, Pages 124-135, ISSN 1871-1413, DOI: 10.1016/j.livsci.2006.12.014.
(http://www.sciencedirect.com/science/article/B7XNX-4N2M6S6-1/2/53c11234f00b66eb96457ab04efb4ecf)
Abstract:
Only limited knowledge exists on how to produce high-quality beef carcasses when the cattle also are grazing semi-natural grasslands for nature conservation purposes. The objectives of the two factorially-designed trials were to determine the effects of indoor feed intensity (low vs. high) and slaughter age (18 vs. 22 months) on performance and carcass quality of beef heifers, raised from weaning until slaughter and grazing semi-natural grasslands during growing seasons. In the first trial, 56 Charolais heifers were used of which 28 were fed only grass-clover silage ad libitum (low; CL), and another 28 heifers were fed 2.0 kg of grain daily in addition to the silage (high; CH). In the second trial, 28 Angus heifers were fed grass-clover silage at 80% ad libitum (low; AL), whereas

another 28 heifers were fed silage ad libitum (high; AH). According to a national nature conservation score, the grazing pressure on the semi-natural grassland was classified as having been satisfactory to maintain the floristic diversity as no litter had been accumulated onto the sward. From weaning until slaughter, no difference in average daily gains (ADG) was found between the CH and the CL, whereas the AH had higher ADG than the AL (693 vs. 573 g, $P < 0.001$). Heifers in both trials had higher carcass weights and more fat, Charolais heifers also had better conformation and Angus heifers had higher dressing percentage at 22 months than at 18 months of slaughter age ($P < 0.05$). In conclusion, carcass traits in both trials were more affected by slaughter age than by feed intensity and desirable grazing effects were achieved on the pasture.
Keywords: Beef heifers; Feed intensity; Slaughter age; Semi-natural grasslands

Sofia Fredriksson Eriksson, Jana Pickova, Fatty acids and tocopherol levels in M. Longissimus dorsi of beef cattle in Sweden - A comparison between seasonal diets, Meat Science, Volume 76, Issue 4, August 2007, Pages 746-754, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.02.021. (http://www.sciencedirect.com/science/article/B6T9G-4N5CXN7-1/2/dbced334dee1947f99c7bdacad3c50c8)
Abstract:
This study investigated the influence of Swedish outdoor feeding systems on the fatty acid composition and tocopherol content of M. Longissimus dorsi from beef. Dietary effects of pasture (PA), silage, and silage supplemented with grain (SIG) were compared. Each dietary group consisted of six animals. Higher levels ($P < 0.05$) of polyunsaturated fatty acids (PUFA) were found in the PA treatment. The n - 6/n - 3 fatty acid ratio of total lipids in the muscle tissue was in the range 1.2-1.5. The SIG treatment increased the n - 6/n - 3 ratio and decreased the total PUFA content of muscle tissue. The lipid class composition and the content of [alpha]-tocopherol in the meat showed no differences among treatments.
Keywords: Beef meat; Pasture; Phospholipids; Tocopherol

D. Liamadis, Ch. Milis, Significance of quality of truly digestible protein on performance of ewes at late pregnancy and early lactation, Small Ruminant Research, Volume 71, Issues 1-3, August 2007, Pages 67-74, ISSN 0921-4488, DOI: 10.1016/j.smallrumres.2006.04.012. (http://www.sciencedirect.com/science/article/B6TC5-4K7FJGV-1/2/c4f74047be7a00f27ddc512a281ff6d5)
Abstract:
Two trials were conducted in ewes at late pregnancy and early lactation in order to evaluate the effects of substituting the moderate degradable protein of soy bean (SBM), with a low degradable protein of corn gluten meal (CGM), accordingly that both diets were calculated to provide equal truly digestible protein (PDI). At the first trial thirty multiparous ewes were examined in an 8-week study that started at parturition. Animals were fed in groups (15 ewes), with two isocaloric-isonitrogenous-isofibrous rations. Treatments were: (A) SBM, (B) CGM. Diets were different at PDIA/PDI ratio (0.52 versus 0.63). The second trial lasted 7 weeks, 5 weeks pre partum till 2 weeks post partum. Three rations were tested by the use of 48 pregnant ewes. Ewes were allotted to three equivalent groups: (A) SBM and wheat bran, (B) CGM and corn gluten feed, (C) CGM and corn gluten feed plus additional lysine (CGML). Data from both trials were analyzed as repeated measures. CGM compared to SBM decreased milk yield and fat corrected milk (FCM) yield (2.25 and 1.98 kg of milk; 2.47 and 2.17 kg of FCM), while tended to decrease milk's protein content (5.45 and 5.36%, for the SBM and CGM group). The daily production of fat, protein and lactose were higher in SBM than in CGM. CGM ration decreased body weight (BW) gain of ewes during late pregnancy and mean birth BW of litter, and also caused a 30% increase of abortions-dead births. CGM cannot totally replace SBM, in ewes' diets at early lactation, because of the decrease in milk yield as well as the milk's protein content, even when equal PDI is provided, due to low

lysine content. This trial has extended the knowledge from cattle, that supplementation of lysine, usually the first limiting amino acid, is also crucial in ewes during pregnancy and lactation.
Keywords: Ewe's milk; Protein source; Lysine; Pregnancy

M.A. Galina, F. Osnaya, H.M. Cuchillo, G.F.W. Haenlein, Cheese quality from milk of grazing or indoor fed Zebu cows and Alpine crossbred goats, Small Ruminant Research, Volume 71, Issues 1-3, August 2007, Pages 264-272, ISSN 0921-4488, DOI: 10.1016/j.smallrumres.2006.07.011.
(http://www.sciencedirect.com/science/article/B6TC5-4KV3XX8-1/2/e0f1900c1bd58b18daba4d7cf5645638)
Abstract:
Sixty Alpine crossbred goats were pastured on 14 ha of shrub land and 14 Zebu cattle on 16 ha of a tropical Legume forest with grasses, both groups supplemented with a slow-intake urea mixture (SIUS). Milk production was sustained by the SIUS supplement, when forage growth was reduced, thus avoiding over-grazing of the rangeland, and production of cheese by the farmer was assured. Artisan cheese was made from the non-pasteurized raw milk. During the spring and summer of 2004, cheese quality parameters of fatty acid contents and nutroceutical components in cheese made from the milk of grazing Zebu cattle or Alpine crossbred goats was studied, and compared with cheeses manufactured of milk from indoor fed animals. Monoterpene and sesquiterpene contents in spring in grazed Zebu cheese were 460 and 520 ng/kg cheese, respectively, while indoor fed Zebu cattle had 126 and 210 ng/kg. Goat cheese monoterpenes were 480 ng/kg in the spring and 440 ng/kg in the summer on grazed animals. Sesquiterpenes content in goat cheese were 1200 ng/kg in the summer and 500 ng/kg in the spring on pasture goats. Fat content was lower in grazed Zebu cattle cheese at 13.6 g/100 g cheese and cholesterol was 70.5 mg/100 g cheese, compared to 17.5 g fat/100 g cheese and 79.1 mg/100 g cheese for indoor fed Zebu cattle. Grazing caused higher tocopherol contents in cheese from grazing Zebu at 127 mg/100 g DM, compared to 77 mg/100 g DM in cheese from indoor fed cattle. Grazing also increased the linoleic acid content in Zebu cattle cheese (173 mg/kg versus 140 mg/kg/cheese) but especially in goat grazing up to 183 mg/100 g cheese. Differences between spring and summer were similar. Cheese fat and cholesterol contents were lower for grazing goats at 12.3 g/100 g cheese and 63.2 mg/100 g cheese, compared to 16.9 g/100 g cheese and 80.4 mg/100 g cheese for indoor fed goats, respectively. Grazing caused higher tocopherol contents in cheese from goats at 211 mg/100 g cheese, compared to 87 mg/100 g cheese, respectively, in indoor fed goat cheese. The presence of omega 3 and 6 distribution, were mostly better in GG and GC. Values of the series omega 3 fatty acids were higher in GG. Alfa linolenic-ALA and oleic acids had the highest concentration in GG cheese. The omega 6 fatty acids (total linolenic, eicosatrienoic and archiodenic) were higher in GG as compared to the other cheeses. Finally for cis-4,7,10,13,16,19-docosahexaenoico acid (DHA) in both indoor made cheeses presented higher concentrations compared with grazed made cheeses. FAME total concentration subdivided in saturated and monounsaturated, were significantly higher for IG and IC from GG and GC ($P < 0.05$). For polyunsaturated FAME results were similar to all groups. For the total concentration of the [omega]-3 series, the highest values (0.06 g/100 g fresh cheese) corresponded to GG and GC. Finally, the relationship between [omega]-3:[omega]-6 averaged 3.48 in all groups. It is concluded that cheese from grazing animals was better in quality parameters for human nutrition than that produced from milk of indoor fed animals due to the botanical differences in the two feeding systems regardless of the species of animals.
Keywords: Goat; Zebu cattle; Cheese; Grazing; Cholesterol; Tocopherol; Terpenes; Indoor feeding

A. Bach, C. Iglesias, M. Devant, Daily rumen pH pattern of loose-housed dairy cattle as affected by feeding pattern and live yeast supplementation, Animal Feed Science and Technology, Volume 136, Issues 1-2, 15 July 2007, Pages 146-153, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2006.09.011.

(http://www.sciencedirect.com/science/article/B6T42-4M3BC75-1/2/a0deb1e83a40013571491b625d92f265)
Abstract:
The aim of this study was to continuously monitor rumen pH of loose-housed dairy cattle as affected by feeding pattern and live yeast supplementation. Three multiparous lactating rumen-cannulated cows receiving the same basal ration once daily were supplemented with 5 g/d (equivalent to 1010 CFU/d) of Saccharomyces cerevisiae strain CNCM I-1077 (Levucell SC2, Lallemand, Toulouse, France) alternately for periods of 2 weeks following a cross-over design. The three cows were maintained in loose-house conditions and milked with a robotic milking system. Cows consumed a fraction of their ration in the feed bunk as a mixed ration and about 3 kg/d of concentrate during milking at the robotic milking unit. During the last 8 d of each period, rumen pH was monitored every 15 min. However, the rumen was accessed only once every 3 days. These pH measurements were recorded with a pH meter capable of storing pH values automatically that was placed inside a custom-made polyvinyl cylinder with about 300 g of lead to ensure that the device remained in the ventral part of the rumen throughout all readings. Individual feed intake and feeding patterns were also recorded. The data were analyzed using a mixed-effects model with repeated measures. Average rumen pH was greater ($P<0.01$) when yeast was supplemented than when no yeast was provided. Ruminal pH decreased ($P<0.001$) as time since last basal ration bout increased, and this decrease was more ($P<0.05$) pronounced when no yeast was supplemented. Yeast-supplemented cows had a greater ($P<0.05$) meal frequency than the unsupplemented cows. The results indicate that live yeasts have a beneficial effect on ruminal pH of cows kept in loose-house conditions. Furthermore, yeast effects on rumen pH may be evident starting 1 week after supplementation.
Keywords: Rumen; pH; Yeast; Intake; Dairy cattle

R.A. Champion, L.R. Matthews, An operant-conditioning technique for the automatic measurement of feeding motivation in cows, Computers and Electronics in Agriculture, Volume 57, Issue 2, July 2007, Pages 115-122, ISSN 0168-1699, DOI: 10.1016/j.compag.2007.02.008.
(http://www.sciencedirect.com/science/article/B6T5M-4NCKJ2H-1/2/049564e50d09b9c61e2851b1d68c3730)
Abstract:
There are few methods for measuring the motivation that livestock have to obtain resources. The objective of this work was to develop and test a prototype automatic system to measure feeding motivation in cattle. The system described arranges for individual cows to make a behavioural response of a round trip of 40 m in order to obtain silage feed reward. A microcontrolled moving electric fence signals the end of a reward period and guides the animal 20 m down a visually isolated race to the `home end'. Once the fence has travelled 20 m, it stops and returns to a position that allows access to the feeder. The feeding interval and subsequent fence movement are initiated by a successful electronic identification of the animal's presence at the reward feed bin. The size of the reward can be controlled by the feeding interval at the reward feed bin. The cows were given an allowance of silage feed at the home end of the race and they could consume this without doing any work. In tests lasting approximately 23 h, four cows made an average of 40 trips per cow, per test. The measurement system was used in four 23 h training sessions and 19 tests of similar duration. During these 23 periods the system failed twice and was broken by the cow once. This work demonstrates the potential of the system to measure the motivation that cows have to obtain resources. There is ongoing work at AgResearch Ruakura to further develop the system to facilitate its more widespread use.
Keywords: Motivation; Operant; Cattle; Feeding; Welfare; Behaviour

C. Castillo, J.L. Benedito, V. Pereira, P. Vazquez, M. Lopez Alonso, J. Mendez, J. Hernandez, Malic acid supplementation in growing/finishing feedlot bull calves: Influence of chemical form on

blood acid-base balance and productive performance, Animal Feed Science and Technology, Volume 135, Issues 3-4, 15 June 2007, Pages 222-235, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2006.07.010.
(http://www.sciencedirect.com/science/article/B6T42-4KST3JJ-2/2/3f7b6b5bdb4d9641ad2ddd2236105cfb)
Abstract:
The aim of the present study was to evaluate the effects of two chemical forms of malate (malic acid and a commercial malate salt) on acid-base balance and productive performance in cattle maintained in a commercial feedlot system, taking into account the entire productive cycle (i.e., the growing and finishing periods). Thirty-eight Belgian Blue bull calves were utilized for a 148-day feedlot study. Animals were allotted randomly to one of three experimental groups: (1) control group (C, no supplementation, n = 10), (2) dl-malic acid supplementation (MA, n = 14; 4 g/kg DM basis) and (3), supplementation with a commercial salt of dl-malic acid (MS, n = 14; 4 g/kg DM basis). Blood pH, pCO2, HCO3-, base excess (BE) and serum l-lactate were determined. Productive data were also evaluated as complementary information for understanding internal changes associated with supplementation. Although no differences ($P>0.1$) were found in performance parameters, results were numerically better for supplemented animals than for controls. The efficiency of the organic acid supplementation varies depending on its chemical form and on productive stage: while similar results were observed using the salt form or the free acid in the growing period, better results were obtained with the acid form in the finishing period. Looking at blood parameters, the malate salt seems to be more effective than the acid form due to the fact that the latter tended to decrease blood bases (although the possibility that the malate salt may cause blood alkalinization due to decreased pCO2 needs to be further explored). Finally, the effect of supplementation on blood l-lactate was shown ($P<0.05$) from the first week of the study: controls showed higher values than supplemented animals. In the growing period, differences were observed between C and MA steers, and between C and MS in the finishing period. In our opinion, there is a clear need for research evaluating the effects of organic acids on ruminant health in vivo.
Keywords: Malate salt; Malic acid; Beef cattle; Acid-base balance

H. Suyama, S.E. Benes, P.H. Robinson, G. Getachew, S.R. Grattan, C.M. Grieve, Biomass yield and nutritional quality of forage species under long-term irrigation with saline-sodic drainage water: Field evaluation, Animal Feed Science and Technology, Volume 135, Issues 3-4, 15 June 2007, Pages 329-345, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2006.08.010.
(http://www.sciencedirect.com/science/article/B6T42-4KY88KS-1/2/96b3ee367c62bba94ba4ebcde406808e)
Abstract:
On the Westside of California's San Joaquin Valley, the discharge of subsurface agricultural drainage water (DW) is subject to strict environmental regulations due to its high selenium (Se) content and potential risks to wildlife. Re-use of saline-sodic DW to irrigate salt-tolerant forage crops is attractive because it reduces the volume of DW requiring disposal and the land area affected by salinity, while producing forages to satisfy the large demand for animal feed resulting from rapid expansions in dairy and beef cattle operations in this area. The biomass production and nutritional quality of six forages (`Jose' tall wheatgrass, creeping wildrye, alkali sacaton, `Alta' tall fescue, puccinellia and `Salado/801S' alfalfa) were evaluated under DW irrigation on a commercial farm near Five Points in Fresno County, California. The forage fields were in their second to fifth year of DW application and most had soil salinities higher than 12 dS/m ECe (electrical conductivity of the saturated soil paste extract). In addition to being very saline, the fields had high levels of boron (B), Se and sodicity [high sodium (Na) relative to calcium (Ca) and magnesium (Mg)]. `Jose' tall wheatgrass and creeping wildrye had acceptable dry matter (DM) production (7.0 and 11.5 t/ha year) under highly saline conditions of 19 and 13 dS/m ECe, respectively. Alfalfa

produced 16-20 t/ha year of DM under low salinity conditions of <7.0 dS/m ECe. The forages had estimated metabolizable energy (ME) contents of 7.9-9.9 MJ/kg DM - with the exception of alkali sacaton (6.7 MJ/kg DM) - which would make them acceptable as feeds for beef cattle, sheep and some classes of dairy cattle. Selenium levels varied from 4.4 to 10.7 mg/kg DM in forages that had received 4-5 years of DW application. Forages at the high end of this range could cause Se toxicity in ruminants when used as a sole source of forage, but they could also be used as a Se supplement if fed at a rate of 20-40 g/kg in the Se-deficient areas found along the eastern SJV. Saline-sodic DW can be used as a water resource to produce forage suitable for many classes of ruminants, although drainage waters with high levels of Se may present both problems and opportunities.
Keywords: Salt-tolerant forages; Drainage water re-use; Salinity; Selenium; Tall wheatgrass

X.P.C. Verge, J.A. Dyer, R.L. Desjardins, D. Worth, Greenhouse gas emissions from the Canadian dairy industry in 2001, Agricultural Systems, Volume 94, Issue 3, Special Section: sustainable resource management and policy options for rice ecosystems, International symposium on sustainable resource management and policy options for rice ecosystems, June 2007, Pages 683-693, ISSN 0308-521X, DOI: 10.1016/j.agsy.2007.02.008.
(http://www.sciencedirect.com/science/article/B6T3W-4NJP3YG-1/2/932878e7fd65ea7eaa8e2608dbcc1cec)
Abstract:
In order to demonstrate the impact of an increase in production efficiency on greenhouse gas (GHG) emissions, it is important to estimate the combined methane (CH4), nitrous oxide (N2O) and carbon dioxide (CO2) emissions per unit of production. In this study, we calculated the GHG emissions from the Canadian dairy industry in 2001 as a fraction of the milk production and per dairy animal. Five regions were defined according to the importance of the dairy industry. N2O and CO2 emissions are directly linked with areas allocated to the dairy crop complex which includes only the crop areas used to feed dairy cattle. The dairy crop complex was scaled down from sector-wide crop areas using the ratios of dairy diet to national crop production of each crop type. Both fertilizer application and on-farm energy consumption were similarly scaled down from sector-wide estimates to the dairy crop complex in each region. The Intergovernmental Panel on Climate Change (IPCC) methodology, adapted for Canadian conditions, was used to calculate CH4 and N2O emissions. Most of the CO2 emission estimates were derived from a Fossil Fuel for Farm Fieldwork Energy and Emissions model except for the energy used to manufacture fertilizers. Methane was estimated to be the main source of GHG, totalling 5.75 Tg CO2 eq with around 80% coming from enteric fermentation and 20% coming from manure management. Nitrous oxide emissions were equal to 3.17 Tg CO2 eq and carbon dioxide emissions were equal to 1.45 Tg. The GHG emissions per animal were 4.55 Mg CO2 eq. On an intensity basis, average GHG emissions were 1.0 kg CO2 eq/kg milk. Methane emissions per kg of milk were estimated at 19.3 l CH4/kg milk which is in agreement with Canadian field measurements.
Keywords: Greenhouse gases; Intensity indicator; Milk production; Canadian dairy sector

H. Pathak, R. Wassmann, Introducing greenhouse gas mitigation as a development objective in rice-based agriculture: I. Generation of technical coefficients, Agricultural Systems, Volume 94, Issue 3, Special Section: sustainable resource management and policy options for rice ecosystems, International symposium on sustainable resource management and policy options for rice ecosystems, June 2007, Pages 807-825, ISSN 0308-521X, DOI: 10.1016/j.agsy.2006.11.015.
(http://www.sciencedirect.com/science/article/B6T3W-4MV1H7G-2/2/77852c467101b5796fa5c6969507fc9a)
Abstract:
This study presents a modeling tool to assess emission of greenhouse gases (GHG) from the agricultural sector as affected by land-use and residue utilization options. The overall purpose of

this tool is twofold: (i) a spreadsheet model for comprehensive compilation of the direct and indirect emissions from land management, residue-burning and fossil fuel consumption through on-farm and off-farm operations and (ii) a decision support tool to explore economically viable mitigation options through detailed cost-benefit analysis of different technological options. We developed TechnoGAS (technical coefficient generator for mitigation technologies of greenhouse gas emissions from agricultural sectors), which integrates analytical and expert knowledge with regional databases on bio-physical, agronomic and socio-economic features to establish input-output relationships (`Technical Coefficients') related to GHG emissions in agriculture. The approach includes emissions of methane (CH4) from rice fields, rice straw burning and cattle; carbon dioxide (CO2) from fossil fuel and soil organic carbon decline as well as nitrous oxide (N2O) from soil, rice straw burning and fertilizer use. To illustrate the approach of the spreadsheet model for comprehensive compilation of emissions, we applied TechnoGAS for an entire rice-wheat cropping cycle in the state of Haryana in northern India as a case study. Twenty technologies of rice production, which can be adopted by farmers, are analysed for their operation-specific emissions including their global warming potential (GWP). The technologies differ in terms of water regime, residue management/utilization, soil management and additives, which represent different mitigation options for GHG emissions. With the current farmers' practice in various districts in Haryana, soil-borne emissions are the major source of GHG contributing 53% of the average GWP (3288 kg CO2 equivalent ha-1) in rice followed by burning of rice straw (13% of the GWP). Cattle, farm operations, off-farm and inorganic fertilizer contributes 12%, 10%, 10% and 2% of the GWP, respectively. Emissions from wheat are relatively low (1204 kg CO2 equivalent ha-1) as there is no CH4 emission and wheat straw is not burnt. Different mitigation technologies show pronounced effects on the GWP of the rice crop and varied between 1715 kg CO2 equivalent ha-1 with continuous flooding, urea and rice straw used for building materials and 10,020 kg CO2 equivalent ha-1 with continuous flooding, and application of nutrients through organic manure. Compared to current farmers' practice, 13 technologies are found to have the potential to reduce the GWP by 8-51%, but they also reduce the net income of farmers. Upscaling of the estimates to the entire state of Haryana shows that the GWP with the current farmers' practice in rice is 2617 Gg CO2 equivalent. Modification of water management from continuous flooding to alternate flooding or application of urea alone instead of urea plus FYM will reduce the GWP by 15% and 29%, respectively, while feeding of rice straw to cattle and supplying N through urea will reduce it by 41% compared to the current practice of burning rice straw and use of FYM. The study shows that the TechnoGAS tool can be used for estimating GHG emission from various land-use types and for identifying promising mitigation options. A detailed cost/benefit analysis is supplied by Wassmann and Pathak [Wassmann, R., Pathak, H., this volume. Introducing greenhouse gas mitigation as a development objective in rice-based agriculture: II. Cost-benefit assessment for different technologies, regions and scales.].
Keywords: Carbon dioxide; Land-use planning; Methane; Nitrous oxide; Rice-wheat systems; Systems analysis

C.S. Pinares-Patino, P. D'Hour, J.-P. Jouany, C. Martin, Effects of stocking rate on methane and carbon dioxide emissions from grazing cattle, Agriculture, Ecosystems & Environment, Volume 121, Issues 1-2, The Greenhouse Gas Balance of Grasslands in Europe, June 2007, Pages 30-46, ISSN 0167-8809, DOI: 10.1016/j.agee.2006.03.024.
(http://www.sciencedirect.com/science/article/B6T3Y-4JVTBHS-4/2/543dcb548bea70beb2ade36182fbc638)
Abstract:
Pastoral farming contributes significantly to total agricultural emissions of greenhouse gases, and stocking rate is the simplest grassland management decision. A study was conducted during the 2002 and 2003 grazing seasons on a semi-natural grassland in the French Massif Central in order to measure enteric methane (CH4) and total carbon dioxide (CO2) emissions from Holstein-

Friesian heifers (initial liveweight (LW) 455 +/- 29 and 451 +/- 28 kg in 2002 and 2003, respectively) managed at low (LSR) and high (HSR) stocking rates (1.1 LU ha-1 versus 2.2 LU ha-1, respectively) under a continuous grazing system. Measurements took place in late spring, mid summer, late summer and early autumn. Daily CH4 and CO2 emissions by individual heifers were measured during 7 consecutive days in each period using the sulphur hexafluoride (SF6) tracer technique. In both grazing seasons, the herbage in the LSR system had higher mass (HM) than in the HSR system, especially in mid and late summer. In both grazing seasons, herbages offered in the LSR system were of lower quality than those in the HSR system, and consequently feed organic matter (OM) digestibilities (OMD) and intakes (OMI) in the LSR system were lower ($P < 0.01$) than in the HSR system. In both grazing seasons, heifer LW increased as the seasons progressed ($P < 0.001$), and heifers in the HSR system tended to be heavier than those in the LSR system. Systems did not differ ($P > 0.05$) in mean absolute CH4 emission (223 g d-1 versus 242 g d-1 and 203 g d-1 versus 200 g d-1 for LSR and HSR in the 2002 and 2003 seasons, respectively), but as the seasons progressed, CH4 emission per unit of digestible feed intake was higher ($P < 0.05$) in the LSR than in the HSR treatment. Both absolute CH4 emission (g d-1) and CH4 yield (CH4 energy loss as a percentage of gross energy intake, % of GEI) were consistently related ($P < 0.05$) to OM intake (both gross and digestible). The SF6 tracer technique appeared to overestimate total CO2 emission from heifers. Nevertheless, significant ($P < 0.01$) coefficients of correlation were found between measured CO2 emissions and LW ($r = 0.68$ and 0.41 in season 2002 and 2003, respectively), and these correlations were stronger for HSR-managed heifers than LSR-managed heifers. This study found no effect of SR system on enteric CH4 emissions from heifers. The study also found that the SF6 tracer technique seemed to overestimate CO2 emission.

Keywords: Methane; Carbon dioxide; Greenhouse gases; Cattle; Grassland; Stocking rate; SF6

L.M.M. Ferreira, U. Garcia, M.A.M. Rodrigues, R. Celaya, A. Dias-da-Silva, K. Osoro, Estimation of feed intake and apparent digestibility of equines and cattle grazing on heathland vegetation communities using the n-alkane markers, Livestock Science, Volume 110, Issues 1-2, June 2007, Pages 46-56, ISSN 1871-1413, DOI: 10.1016/j.livsci.2006.09.026.
(http://www.sciencedirect.com/science/article/B7XNX-4M6SGG3-3/2/a15f0856af3f118cdb7963c7ffe20116)

Abstract:
The application of n-alkanes as faecal markers to estimate feed intake and apparent digestibility (DMDap) of equines and cattle was studied. Additionally, the effect of using different data on diet composition, known proportions of the diet components (DC1) and those estimated using the alkane markers (DC2), on the accuracy of intake and DMDap estimates was evaluated. Six mature horses, divided in two groups of three animals (H1 and H2), and three adult non-lactating cows of Asturiana de los Valles breed (C) were housed in individual stalls. H1 and C groups were fed on a diet composed of Lolium perenne L. (70%) and heather (30%) and H2 received L. perenne (40%), heather (30%) and Ulex gallii Planchon (30%). The dietary component heather represented the field proportions of different plant species of heathland, namely Erica umbellata L., Erica cinerea L. and Calluna vulgaris L., at this experimental period. All animals received a daily dose of paper pellets containing C24, C32 and C36 n-alkanes as external markers with the purpose of using different n-alkane pairs of adjacent chain length for feed intake estimations. The results indicated that a period of 3 and 5 days was sufficient for these external markers to reach a steady concentration in faeces of cattle and equines, respectively. In contrast to the results obtained in cattle, the alkane faecal recovery in equines was unrelated to the carbon chain length. Diet composition only affected the faecal recovery of the alkanes C24 ($P < 0.05$), C31 ($P < 0.05$), C32 ($P < 0.05$) and C36 ($P < 0.01$) in the faeces of the equines, suggesting a different dispersion of the synthetic n-alkanes in the digesta. In equines, DMDap estimates were not affected by the n-alkane (C27, C29, C31 and C33) used in the calculations, contrasting with the significant ($P < 0.001$)

effect observed in cattle. In both animal species, the data on diet composition (DC1 or DC2) used in the calculations did not affect DMDap estimates. Feed intake estimates were affected by the alkane pair used in the calculations in H1 ($P < 0.05$), H2 ($P < 0.001$) and C ($P < 0.001$). The data on diet composition used in the intake calculations affected the resultant estimates in H1 ($P < 0.05$) but not in H2 and C. The differences from the known intake values were lower when using C31:C32 alkane pair, overestimating intake in only an average of 4.5, 13.0 and 1.3% in H1, H2 and C, respectively, using DC1 or DC2. The results obtained in this study confirm the accuracy of the n-alkane markers to estimate simultaneously feed intake, apparent digestibility and diet composition of equines and cattle grazing these type vegetation communities.
Keywords: Equines; Cattle; n-alkanes; Feed intake; Apparent digestibility; Diet composition

P. Mantysaari, H. Khalili, J. Sariola, A. Rantanen, Use of barley fibre and wet distillers' solubles as feedstuffs for Ayrshire dairy cows, Animal Feed Science and Technology, Volume 135, Issues 1-2, 15 May 2007, Pages 52-65, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2006.05.020.
(http://www.sciencedirect.com/science/article/B6T42-4KF6BP3-1/2/9a2a638481ed42f012ce6d62100290be)
Abstract:
The experiment was conducted to study use of barley fibre and wet distillers' solubles (WDS), by-products from integrated starch-ethanol production, as feed in dairy cows' diet. Barley fibre is a fibrous by-product with high content of neutral detergent fibre and low content of starch. Wet distillers' solubles is the non-fermentable residue after distillation of ethanol. It has a high crude protein content with a high rumen degradability. Ayrshire cows, 12 multiparous and 12 primiparous, were divided into 6 blocks of 4 cows according to parity and calving date. Cows in each block were fed four different total mixed rations (TMR) according to a balanced 4 x 4 Latin Square design within a 2 x 2 factorial arrangement of the treatments. Treatments were two different energy sources (barley (B) or barley + barley fibre (BF, 1:1)) with two protein sources (rapeseed meal (RSM) or RSM + WDS). Thus, the treatments were B, B + WDS, BF and BF + WDS. Grass silage was the forage (400 g/kg diet dry matter). On the B + WDS and BF + WDS diets, the amount of WDS in TMR was 120 g/kg dry matter (DM). The crude protein content of the diets was 180 g/kg DM. Replacing half of the barley grain with barley fibre increased ($P<0.01$) milk yield (32.2 kg/day versus 33.0 kg/day) but had no effect on DM intake (DMI) (21.5 kg/day versus 21.7 kg/day). Replacement caused a small, but significant ($P<0.001$) decrease in milk protein content (35.3 g/kg versus 34.2 g/kg) with no change in protein yield. Inclusion of barley fibre in the diet had no effect on milk fat content but changed ($P<0.001$) its fatty acid profile by increasing the proportion of unsaturated fatty acids and conjugated linoleic acid. Replacing part of the RSM with WDS decreased performance of cows by reducing ($P<0.001$) DMI (21.0 kg/day versus 22.1 kg/day), milk yield (31.7 kg/day versus 33.6 kg/day) and yields of milk components. Inclusion of WDS in the diet decreased efficiency of N utilization. Barley fibre was a good fibrous component in concentrates for dairy cows' TMR, but WDS was an inferior protein feed to RSM as a feed for lactating Ayrshire dairy cows.
Keywords: Dairy cattle; Barley fibre; Wet distillers' solubles; Total mixed ration; Milk yield; Ayrshire

T.K. Flesch, J.D. Wilson, L.A. Harper, R.W. Todd, N.A. Cole, Determining ammonia emissions from a cattle feedlot with an inverse dispersion technique, Agricultural and Forest Meteorology, Volume 144, Issues 1-2, 14 May 2007, Pages 139-155, ISSN 0168-1923, DOI: 10.1016/j.agrformet.2007.02.006.
(http://www.sciencedirect.com/science/article/B6V8W-4NC50BS-1/2/171ed053b231faa911bc8c31aedb0314)
Abstract:
An inverse-dispersion technique is used to calculate ammonia (NH3) gas emissions from a cattle feedlot. The technique relies on a simple backward Lagrangian stochastic (bLS) dispersion model

to relate atmospheric NH3 concentration to the emission rate QbLS. Because the wind and the source configuration are complicated, the optimal implementation of the technique is unclear. Two categorically different measurement locations (for concentration and winds) are considered: within the feedlot and downwind. The in-feedlot location proved superior, giving a nearly continuous QbLS timeseries. We found average emissions of 0.15 kg NH3 animal-1 day-1 in both 2004 and 2005, representing a loss of 63% (2004) or 65% (2005) of the dietary nitrogen in the animal feed. Downwind measurement locations were less useful for several reasons: a narrow range of useable wind directions; ambiguity in the choice of wind statistics to use in the calculations; low NH3 concentrations; and downwind deposition of NH3. When addressing a large source (like a feedlot) that modifies the ambient wind flow, we recommend in-source measurements for use in inverse-dispersion applications.
Keywords: Trace gas fluxes; Atmospheric dispersion; Atmospheric deposition; Ammonia fluxes; Lagrangian stochastic models; Inverse dispersion

Wataru Yamamoto, Ioan Ap Dewi, Muhammad Ibrahim, Effects of silvopastoral areas on milk production at dual-purpose cattle farms at the semi-humid old agricultural frontier in central Nicaragua, Agricultural Systems, Volume 94, Issue 2, May 2007, Pages 368-375, ISSN 0308-521X, DOI: 10.1016/j.agsy.2006.10.011.
(http://www.sciencedirect.com/science/article/B6T3W-4MK0J1H-1/2/5c1e68788ef0586839afc99daa2b65ee)
Abstract:
In extensive cattle production systems, the composition of grazing areas may significantly influence productivity. In dual-purpose cattle production systems in the lowland tropics, pasture lands with trees, so-called silvopastoral areas, are considered as being important, particularly to facilitate the management of crossbred European native cattle. The aim of the study was to quantify the effects of silvopastoral areas on production at dual-purpose cattle farms in the semi-humid lowlands of central Nicaragua. The relationships between seasonal milk production and herd data, and the proportions of land use types were examined for 74 farms by stepwise regression analysis.
The results showed significant positive effects on saleable milk production of areas of degraded pasture (DGPS) ($P < 0.001$), natural and cultivated pastures with moderate tree density (MTCP and MTNP) ($P < 0.05$), and cultivated pasture with low tree density (LTCP). However, negative effects of land use types under natural pasture with low tree density (LTNP) ($P < 0.01$) was also observed, suggesting that on smaller farms, high stocking rates resulted in overgrazing. Analysis by season confirmed the positive effects of DGPS on saleable milk production at the end of the dry season ($P < 0.01$), and of MTNP at the beginning of the wet season ($P < 0.05$). This suggests that degraded pasture may be important as a source of cattle feed at the end of the dry season whilst MTNP are particularly important at the beginning of the wet season. The area of Brachiaria brizantha had positive effects on saleable milk production at the end of the dry season ($P < 0.01$), suggesting that the use of this species is an important option for farmers.
The study concluded that silvopastoral systems for dual-purpose cattle production developed in the study area by maintaining useful naturally regenerated trees in grazing areas with relatively low stocking rates and limited amounts of supplemental fodder. Increases in the meat:milk price ratio is likely to reduce tree cover. Further studies are recommended on broadleaf plants in the grazing areas and their nutritional values in the dry season, the feasibility of increasing the availability of supplemental fodder for milk production in the dry season, and the impact of land use types on seasonal grazing decisions.
Keywords: Dual-purpose cattle production; Silvopastoral system; Stepwise regression; Degraded pasture; Milk production

Matthew R. Redding, Alan Skerman, John Ritchie, Kenneth D. Casey, How effective are broad-scale nutrient mass balances for determining the sustainability of lot-feed manure application?, Agriculture, Ecosystems & Environment, Volume 120, Issues 2-4, May 2007, Pages 166-178, ISSN 0167-8809, DOI: 10.1016/j.agee.2006.08.015.
(http://www.sciencedirect.com/science/article/B6T3Y-4M33VRK-2/2/7e486ce7d1bebb7e76817fe49b853751)
Abstract:
Nutrient mass balances have been used to assess a variety of land resource scenarios, at various scales. They are widely used as a simple basis for policy, planning, and regulatory decisions but it is not clear how accurately they reflect reality. This study provides a critique of broad-scale nutrient mass balances, with particular application to the fertiliser use of beef lot-feeding manure in Queensland.
Mass balances completed at the district and farm scale were found to misrepresent actual manure management behaviour and potentially the risk of nutrient contamination of water resources. The difficulties of handling stockpile manure and concerns about soil compaction mean that manure is spread thickly over a few paddocks at a time and not evenly across a whole farm. Consequently, higher nutrient loads were applied to a single paddock less frequently than annually. This resulted in years with excess nitrogen, phosphorus, and potassium remaining in the soil profile. This conclusion was supported by evidence of significant nutrient movement in several of the soil profiles studied.
Spreading manure is profitable, but maximum returns can be associated with increased risk of nutrient leaching relative to conventional inorganic fertiliser practices. Bio-economic simulations found this increased risk where manure was applied to supply crop nitrogen requirements (the practice of the case study farms, 200-5000 head lot-feeders).
Thus, the use of broad-scale mass balances can be misleading because paddock management is spatially heterogeneous and this leads to increased local potential for nutrient loss. In response to the effect of spatial heterogeneity policy makers who intend to use mass balance techniques to estimate potential for nutrient contamination should apply these techniques conservatively.
Keywords: Nutrient mass balance; Manure; Cattle; Waste re-use

Mark R. Wilkins, Wilbur W. Widmer, Karel Grohmann, Randall G. Cameron, Hydrolysis of grapefruit peel waste with cellulase and pectinase enzymes, Bioresource Technology, Volume 98, Issue 8, May 2007, Pages 1596-1601, ISSN 0960-8524, DOI: 10.1016/j.biortech.2006.06.022.
(http://www.sciencedirect.com/science/article/B6V24-4KR3J77-1/2/ef358cc3c2f67ffd4c6ffd7addbb0536)
Abstract:
Approximately 1 million metric tons of grapefruit were processed in the 2003/04 season resulting in 500,000 metric tons of peel waste. Grapefruit peel waste is usually dried, pelletized, and sold as a low-value cattle feed. This study tested different loadings of commercial cellulase and pectinase enzymes and pH levels to hydrolyze grapefruit peel waste to produce sugars. Pectinase and cellulase loadings of 0, 1, 2, 5, and 10 mg protein/g peel dry matter were tested at 45 [degree sign]C. Hydrolyses were supplemented with 2.1 mg beta-glucosidase protein/g peel dry matter. Five mg pectinase/g peel dry matter and 2 mg cellulase/g peel dry matter were the lowest loadings to yield the most glucose. Optimum pH was 4.8. Cellulose, pectin, and hemicellulose in grapefruit peel waste can be hydrolyzed by pectinase and cellulase enzymes to monomer sugars, which can then be used by microorganisms to produce ethanol and other fermentation products.
Keywords: Citrus; Grapefruit; Peel; Enzymes; Ethanol; Renewable fuels

Monica M.S. Simas, Mariana B. Botura, Benedito Correa, Myrna Sabino, Carlos A. Mallmann, Thereza C.B.S.C. Bitencourt, Maria J.M. Batatinha, Determination of fungal microbiota and mycotoxins in brewers grain used in dairy cattle feeding in the State of Bahia, Brazil, Food Control,

Volume 18, Issue 5, May 2007, Pages 404-408, ISSN 0956-7135, DOI: 10.1016/j.foodcont.2005.11.007.
(http://www.sciencedirect.com/science/article/B6T6S-4JCBKM4-2/2/13dd22366306a365c3a1e2bbbb51140f)
Abstract:
The aim of this study was to determine the mycoflora and evaluate the presence of aflatoxins and ochratoxins in brewers grain used to feed dairy cattle in the State of Bahia. Twenty samples of brewers grain were collected each trimester, during a whole year, in five properties located in cities of the 'reconcavo baiano' (Bahia, Brazil) for a total of 80 samples. Samples were analyzed for aflatoxins and ochratoxins by fluorimetry with immunoaffinity columns. Aspergillus was the most frequently isolated genus (42.5%), followed by Penicillium, Mucor, Rhizopus and Fusarium. Mycotoxicological analyses did not show the presence of ochratoxins, but the presence of aflatoxins was observed in 33.75% (27/80) of the samples, with contamination levels between 1 and 3 [mu]g/kg.
Keywords: Fungi; Barley; Mycotoxins

M.J.M. Batatinha, M.M.S. Simas, M.B. Botura, T.C. Bitencourt, T.A. Reis, B. Correa, Fumonisins in brewers grain (barley) used as dairy cattle feed in the State of Bahia, Brazil, Food Control, Volume 18, Issue 5, May 2007, Pages 608-612, ISSN 0956-7135, DOI: 10.1016/j.foodcont.2006.02.008.
(http://www.sciencedirect.com/science/article/B6T6S-4KYXHR4-1/2/7331c832ca94147ebbd0ce8945beb90c)
Abstract:
Fumonisins are mycotoxins produced by the genus Fusarium that may induce toxic effects in several animal species and may be found in several kinds of foods and feed. In the State of Bahia, Brazil, brewers grain, which are a brewery by-product, have been largely used in the feeding of animals, specially dairy cattle, due to their nutritional value and low cost of transportation. The aim of this study was to establish the presence of fumonisins in brewers grain used as dairy cattle feed in the State of Bahia. Twenty samples of brewers grain were collected every three months during a whole year, for a total of 80 samples, in five properties located in the 'reconcavo baiano'. These samples were analyzed for the presence of fumonisins using high efficiency liquid chromatography (HPLC). Results showed contamination of 58 (72.5%) samples, with contamination mean level equal to 226.5 [mu]g/kg, with 50.30 and 908.47 [mu]g/kg as the minimum and maximum levels, respectively. This is the first report of the occurrence of this mycotoxin in the State of Bahia.
Keywords: Fumonisins; Cattle; Barley

M. Al-Haddawi, G.B. Mitchell, M.E. Clark, R.D. Wood, J.L. Caswell, Impairment of innate immune responses of airway epithelium by infection with bovine viral diarrhea virus, Veterinary Immunology and Immunopathology, Volume 116, Issues 3-4, 15 April 2007, Pages 153-162, ISSN 0165-2427, DOI: 10.1016/j.vetimm.2007.01.007.
(http://www.sciencedirect.com/science/article/B6TD5-4MX56C6-3/2/662a3afa79528d1cbcc547885f2efef6)
Abstract:
Bovine viral diarrhea virus (BVDV) infection is an important risk factor for development of shipping fever pneumonia in feedlot cattle, and infects but does not cause morphologic evidence of damage to airway epithelial cells. We hypothesized that BVDV predisposes to bacterial pneumonia by impairing innate immune responses in airway epithelial cells. Primary cultures of bovine tracheal epithelial cells were infected with BVDV for 48 h, then stimulated with LPS for 16 h. Expression of tracheal antimicrobial peptide (TAP) and lingual antimicrobial peptide (LAP) mRNA was measured by quantitative RT-PCR, and lactoferrin concentrations were measured in culture supernatant by ELISA. BVDV infection had no detectable effect on the constitutive expression of TAP and LAP mRNA or lactoferrin concentration in culture supernatant. LPS treatment provoked a significant

increase in TAP mRNA expression and lactoferrin concentration in the culture supernatant ($p < 0.01$), and these effects were significantly ($p < 0.02$, $p < 0.01$) abrogated by prior infection of the tracheal epithelial cells with the type 2 ncp-BVDV isolate. In contrast, infection with the type 1 ncp-BVDV isolate had no effect on TAP mRNA expression or lactoferrin secretion. LPS treatment induced a significant ($p < 0.001$) upregulation of LAP mRNA expression, which was not significantly affected by prior infection with BVDV. These data indicate that infection with a type 2 BVDV isolate inhibits the LPS-induced upregulation of TAP mRNA expression and lactoferrin secretion by tracheal epithelial cells, suggesting a novel mechanism by which this virus abrogates respiratory innate immune responses and predisposes to bacterial pneumonia in cattle.
Keywords: Innate immunity; Defensins; Lactoferrin; Bovine viral diarrhea virus; Cattle; Respiratory system

A. Larsson, S.-O. Dimander, A. Rydzik, A.Uggla, P.J. Waller, J. Hoglund, A 3-year field evaluation of pasture rotation and supplementary feeding to control parasite infection in first-season grazing cattle--Dynamics of pasture infectivity, Veterinary Parasitology, Volume 145, Issues 1-2, 10 April 2007, Pages 129-137, ISSN 0304-4017, DOI: 10.1016/j.vetpar.2006.12.005.
(http://www.sciencedirect.com/science/article/B6TD7-4MWPVDF-1/2/4ba94839ec9db2b5781f70b7f485caf8)
Abstract:
A 3-year grazing trial (2002-2004) was conducted on a commercial beef cattle farm in south-central Sweden to assess different methods of parasite control. This paper focuses on the dynamics of the free-living larval stages, whereas data on performance and within-host parasitological variables are presented in a complementary paper. Each year in May, 4 groups of 10 first-season grazing (FSG) steers were turned out on to separate 2 ha paddocks and subjected to the following strategies: (1) spring turn-out on to pasture which had been grazed the previous year by second-season grazing (SSG) steers (paddock RT), followed by a move to aftermath (paddock AM) after 10 weeks (mid-July), (2) supplementary feeding with concentrate and hay for 4 weeks following turn-out (paddock FD), set stocked, (3) untreated control (paddock UT), set stocked and (4) anthelmintic treated control (paddock DO), set stocked. All paddocks were assigned a new set of FSG cattle each year whereas the treatments remained the same. Pasture infectivity were monitored partly by two tracer calves that grazed each paddock along with the FSG calves for 3 weeks after turn-out and prior to housing, partly by analysis of herbage samples for infective larvae (L3) that were collected from each paddock at monthly intervals between April and October. The predominant genera found were Cooperia and Ostertagia. Tracers grazing paddock RT overall harboured less worms, and in particular less Ostertagia spp., and tracers grazing paddock AM in mid-July harboured insignificant numbers of nematodes compared to tracers on the FD and UT paddocks. Although total worm counts varied between groups, smaller numbers were generally observed early in the grazing-season (May), compared to close to housing (September) when inhibited early L4 larvae were almost exclusively found. Results observed from herbage samples showed high numbers of L3 in spring before the time of turn-out, compared to around housing. In conclusion, the rotation control strategy showed promising results and provided a turn-out pasture that was `nematode safe' to FSG cattle the following spring, whereas the feeding strategy failed as applied in this experiment.
Keywords: Ostertagia; Cooperia; Trichostrongylid larvae; Epidemiology; Pasture infectivity; Grazing management; Parasite control

Andrea C. Mayer, Christine Huovinen, Silvopastoralism in the Alps: Native plant species selection under different grazing pressure, Ecological Engineering, Volume 29, Issue 4, Carbon sequestration and landscape ecology in Western Europe, 1 April 2007, Pages 372-381, ISSN 0925-8574, DOI: 10.1016/j.ecoleng.2006.09.015.

(http://www.sciencedirect.com/science/article/B6VFB-4MX4VSH-1/2/6227288d8cc14362057c866ba11870a4)
Abstract:
To evaluate the suitability of wood pastures as a managing tool in subalpine regions it is essential to know more about the influence of grazing on the ground vegetation. This study assessed native plant species selection by cattle at different stocking rates, feeding habits and site preferences of cattle. Based on the results, conclusions concerning the value of silvopastoral systems in the Alps were drawn. A field study on six different wood pasture areas, grazed by cattle at different stocking rates, was accompanied by an experiment on three adjoining areas of 0.51 ha each, stocked with either three, six, or nine heifers. Plant species were recorded in plots of 20 cm x 20 cm before and after grazing, and the intensity of grazing on each species was assessed. At low stocking rates, grasses and tall species were most intensely grazed, while at higher stocking rates the intake of forbs and small species increased. Since no relationship was found between nutritional value and species preference, other factors such as accessibility of a plant seem to be important for the feeding preferences of cattle. The preference for grasses at low and medium stocking rates suggests that an increased growth of forbs might lead to an increase in plant species diversity.
Keywords: Agroforestry; Biodiversity; Cattle stocking rate; Forest grazing; Mountain forest; Treeline ecotone

H. Hirooka, J.B. Liang, F. Terada, Development and evaluation of a model for prediction of fecal and urinary nitrogen excretions in cattle, Livestock Science, Volume 107, Issues 2-3, April 2007, Pages 282-288, ISSN 1871-1413, DOI: 10.1016/j.livsci.2006.12.002.
(http://www.sciencedirect.com/science/article/B7XNX-4N08V7N-1/2/01e12447e3f8c2518fbcaf53b2d67f37)
Abstract:
The reduction of nitrogen (N) excretion in animal production is crucial in intensive farming systems particularly in the developed countries. In this study, a model to predict N excretion in cattle was developed based on existing feeding standards and evaluated using independent N balance experiments for Holstein steers and lactating cows and Japanese Black (JB) steers. Although model predictions for fecal and urinary N excretions appeared to be close to observed values in plot figures, statistical analysis showed that the model tended to over-predict both fecal and urinary N excretions, especially in Holstein lactating cows. This was because body weight changes of cows during lactation period were not considered in the model due to the lack of information (i.e., body weight gain or loss) available in the experimental data for evaluation. There were large mean bias and small line bias for urinary N prediction, but reverse results were obtained for fecal N prediction. The largest mean square prediction errors for both N excretions were due to random variation in all cases. When all data were pooled (combined), the accuracy for predictions for fecal N excretion was considerably high ($r2 = 0.94$), indicating that the model may predict fecal N excretion beyond breeds, sexes and physiological states (growing and lactating). More information and accumulated data will be required to predict urinary N excretion under a wide range of genotype and environmental situation.
Keywords: Nitrogen; Excretion; Cattle; Model; Prediction

H. Suyama, S.E. Benes, P.H. Robinson, S.R. Grattan, C.M. Grieve, G. Getachew, Forage yield and quality under irrigation with saline-sodic drainage water: Greenhouse evaluation, Agricultural Water Management, Volume 88, Issues 1-3, 16 March 2007, Pages 159-172, ISSN 0378-3774, DOI: 10.1016/j.agwat.2006.10.011.
(http://www.sciencedirect.com/science/article/B6T3X-4MJBTMB-1/2/d373ad8beb0aa5ca0a7dc49def217ca6)
Abstract:

Reuse of saline-sodic drainage water (DW) to irrigate salt-tolerant forages is an attractive option for growers in California's drainage-impaired, San Joaquin Valley since it will reduce the volume of drainage water requiring disposal and supply feed to expanding dairy and beef cattle industries. Five forages (tall wheatgrass, paspalum, creeping wildrye, bermudagrass and alfalfa) were evaluated in a greenhouse study to compare forage species for biomass yield, mineral composition, and quality as ruminant feeds when irrigated with freshwater (ECw = 0.85 dS/m) and saline DW (ECw = 11 and 18 dS/m) and grown in a field soil mix characteristic of the drainage-impaired areas. Tall wheatgrass was highly salt-tolerant with a relative yield of 85% under high salinity, whereas the relative yield of alfalfa was 43%. Metabolizable energy (ME in MJ/kg DM), the potential energy that the ruminant can obtain from consuming the forage, was higher in this greenhouse study as compared to our prior field study (Suyama et al., 2006). ME differed among the forage species and was ranked as: tall wheatgrass and alfalfa > paspalum > bermudagrass and creeping wildrye. All forages were deemed suitable as feeds for beef cattle and goats fed at maintenance energy levels. However, with long term consumption, the high selenium and sulfur content of these forages could potentially affect animal physiology, unless they were fed in a mixed ration.
Keywords: Salt tolerance; Drainage water reuse; Salinity; Selenium; Boron; Tall wheatgrass; Forage quality; Forage yield

Renata Ivanek, Yrjo T. Grohn, Alphina Jui-Jung Ho, Martin Wiedmann, Markov chain approach to analyze the dynamics of pathogen fecal shedding--Example of Listeria monocytogenes shedding in a herd of dairy cattle, Journal of Theoretical Biology, Volume 245, Issue 1, 7 March 2007, Pages 44-58, ISSN 0022-5193, DOI: 10.1016/j.jtbi.2006.09.031.
(http://www.sciencedirect.com/science/article/B6WMD-4M2GGXT-1/2/d1ff35a8e9319e8ac995247b3cb33b50)
Abstract:
Fecal shedding is an important mechanism of spreading of a number of human and animal pathogens. Understanding of the dynamics of pathogen fecal shedding is critical to be able to control or prevent the spread of diseases caused by these pathogens. The objective of this study was to develop a model for analysis of the dynamics of pathogen fecal shedding. Fecal shedding of Listeria monocytogenes in dairy cattle was used as a model system. A Markov chain model (MCM) with two states, shedding and non-shedding, has been developed for overall L. monocytogenes fecal shedding (all L. monocytogenes subtypes) and fecal shedding of three L. monocytogenes subtypes (ribotypes 1058A, 1039E and 1042B) using data from one study farm. The matrices of conditional probabilities of transition between shedding and non-shedding states for different sets of covariates have been estimated by application of logistic regression. The covariate-specific matrices of conditional probabilities, describing the presence of different risk factors, were used to estimate (i) the stationary prevalence of dairy cows that shed any L. monocytogenes subtype or ribotypes 1058A, 1039E, and 1042B, (ii) the duration of overall and subtype specific fecal shedding, and (iii) the duration of periods without shedding. A non-homogeneous MCM was constructed to study how the prevalence of fecal shedders changes over time. The model was validated with data from the study farm and published literature. The results of our modeling work indicated that (i) the prevalence of L. monocytogenes fecal shedders varies over time and can be higher than 90%, (ii) L. monocytogenes subtypes exhibit different dynamics of fecal shedding, (iii) the dynamics of L. monocytogenes fecal shedding are highly associated with contamination of silage (fermented feed) and cows' exposure to stress, and (iv) the developed approach can be readily used to study the dynamics of fecal shedding in other pathogen-host-environment systems.
Keywords: Markov chain model; Logistic regression; Duration of fecal shedding; Silage; Stress

David G. Masters, Sharon E. Benes, Hayley C. Norman, Biosaline agriculture for forage and livestock production, Agriculture, Ecosystems & Environment, Volume 119, Issues 3-4, March 2007, Pages 234-248, ISSN 0167-8809, DOI: 10.1016/j.agee.2006.08.003.
(http://www.sciencedirect.com/science/article/B6T3Y-4KY88C0-2/2/8458cebfa1fa64dccd6a4ead4e1b1850)
Abstract:
There are a range of plants that are capable of growing under conditions of saline soil and water. Many of these plants represent a feed resource for livestock. At the lower levels of salinity (<15 dS m-1) both legumes and grasses with moderate salt tolerance are capable of providing 5-10 t of edible dry matter (DM) year-1, particularly when the availability of water is high. At high salt concentrations (>25 dS m-1), production levels drop and the plant options decrease significantly. However, even at these high salinities there are a range of halophytic grasses and shrubs that will produce between 0.5 and 5 t of edible DM year-1. The crude protein and digestible fibre content of these plants is variable but is probably not directly influenced by the salinity level. Importantly though, the mineral composition of the plants may be significantly altered by the concentration and type of salts in the soil and water. For plants with moderate salt tolerance, accumulation of sulfur and selenium has been reported. For the halophytic plants, particularly the chenopod shrubs, sodium, potassium, chloride, calcium and magnesium may all accumulate to be above the maximum tolerable levels for livestock. The high concentrations of sodium chloride in particular will cause depressed feed intake and under some conditions will compromise animal health. It is also not unusual to find that plants growing in saline environments accumulate a range of secondary compounds. These may have beneficial effects on grazing livestock (e.g., vitamin E and betaine) or be may be toxic (e.g., oxalate, coumarin and nitrate). Importantly, these plants can be managed so as to provide a significant contribution to a feeding system for ruminants. Prospects for the future are good, as to date, there has been little effort to improve the feeding value of salt tolerant plants through breeding or selection, or to select livestock that are more capable of tolerating high salt intakes.
Keywords: Ruminants; Sheep; Cattle; Nutritive value; Salt; Salinity; Salt tolerance

D. Kiran, U. Krishnamoorthy, Rumen fermentation and microbial biomass synthesis indices of tropical feedstuffs determined by the in vitro gas production technique, Animal Feed Science and Technology, Volume 134, Issues 1-2, 1 March 2007, Pages 170-179, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2006.05.017.
(http://www.sciencedirect.com/science/article/B6T42-4KFMM9V-2/2/ec1103b64532b5994a06d109f63fc3ec)
Abstract:
This study was conducted to establish rumen fermentation characteristics and microbial biomass synthesis indices for the feed ingredients commonly used in the manufacturing of compounded cattle feeds and/or in feeding large ruminants in Bangalore and surrounding districts of Karnataka state, India. The feed samples selected for the study included 8 protein sources, 9 energy sources, 8 varieties of finger millet straw (FMS) and 12 varieties of rice straw (RS). The fermentation characteristics were studied by measuring the gas production in vitro and by fitting cumulative gas production against time of incubation in the exponential model, Y = D [1 - e-k*t], where Y is gas volume at time t, D is potential gas production (ml/g DM) and k (h-1) is rate at which gas is produced. The D and k for protein sources, energy sources, FMS and RS were 234.7 +/- 53.1 and 0.123 +/- 0.032, 402.8 +/- 51.8 and 0.076 +/- 0.021, 261.6 +/- 16.4 and 0.064 +/- 0.011, 254.8 +/- 16.8 and 0.033 +/- 0.005, respectively. The feed samples were incubated again to determine the cumulative gas production and true digested organic matter (TDOM) at time of half asymptotic gas production (t1/2). The TDOM was calculated as the difference between OM incubated and the OM residue at t1/2 after refluxing with neutral detergent solution. The ratio of milligram TDOM to milliliter gas produced at t1/2 (partitioning factor (PF)) was regarded as an index of efficiency of

microbial biomass synthesis (EMBS) on the assumption: (i) carbon of TDOM is quantitatively distributed between microbial biomass and the sum of fermentative gas and short chain fatty acids (SCFAs); and (ii) gas production is stoichiometrically related to SCFAs. The PF, for the respective group of feedstuffs varied from 3.86 to 6.48, 3.28 to 4.53, 2.73 to 3.72 and 2.55 to 3.23. Using ingredients for which the PF was determined, six mixed diets were formulated to differ in PF with finger millet straw as roughage component (700 g/kg as is) across all the diets. Evaluation of these diets for gas production and PF revealed significant associative effects up to 12 h after incubations. Therefore, it is concluded that the range in the PF of the tested feed ingredients is wide enough to facilitate ingredient selection for higher PF or in other words higher EMBS. However, since the associative effect of ingredients influence gas production and PF of mixed diets, the limitations in using gas production kinetics and PF of the ingredients to achieve a desirable fermentation characteristics of mixed diets should be realized.
Keywords: Gas production; True digestibility; Partitioning factor; Microbial biomass

G.J. Bishop-Hurley, D.L. Swain, D.M. Anderson, P. Sikka, C. Crossman, P. Corke, Virtual fencing applications: Implementing and testing an automated cattle control system, Computers and Electronics in Agriculture, Volume 56, Issue 1, March 2007, Pages 14-22, ISSN 0168-1699, DOI: 10.1016/j.compag.2006.12.003.
(http://www.sciencedirect.com/science/article/B6T5M-4MW95B0-1/2/2b2454fa8635bae2a0dd29c0b71beab4)
Abstract:
Managing livestock movement in extensive systems has environmental and production benefits. Currently permanent wire fencing is used to control cattle; this is both expensive and inflexible. Cattle are known to respond to auditory and visual cues and we investigated whether these can be used to manipulate their behaviour. Twenty-five Belmont Red steers with a mean live weight of 270 kg were each randomly assigned to one of five treatments. Treatments consisted of a combination of cues (audio, tactile and visual stimuli) and consequence (electrical stimulation). The treatments were electrical stimulation alone, audio plus electrical stimulation, vibration plus electrical stimulation, light plus electrical stimulation and electrified electric fence (6 kV) plus electrical stimulation. Cue stimuli were administered for 3 s followed immediately by electrical stimulation (consequence) of 1 kV for 1 s. The experiment tested the operational efficacy of an on-animal control or virtual fencing system. A collar-halter device was designed to carry the electronics, batteries and equipment providing the stimuli, including audio, vibration, light and electrical of a prototype virtual fencing device. Cattle were allowed to travel along a 40 m alley to a group of peers and feed while their rate of travel and response to the stimuli were recorded. The prototype virtual fencing system was successful in modifying the behaviour of the cattle. The rate of travel of cattle along the alley demonstrated the large variability in behavioural response associated with tactile, visual and audible cues. The experiment demonstrated virtual fencing has potential for controlling cattle in extensive grazing systems. However, larger numbers of cattle need to be tested to derive a better understanding of the behavioural variance. Further controlled experimental work is also necessary to quantify the interaction between cues, consequences and cattle learning.
Keywords: Animal behaviour; Free-ranging cattle; Sensory stimuli; Fencing; Prototype virtual fencing device; Wireless sensor network

RM. Kathiresan, Integration of elements of a farming system for sustainable weed and pest management in the tropics, Crop Protection, Volume 26, Issue 3, Weed Science in Time of Transition, March 2007, Pages 424-429, ISSN 0261-2194, DOI: 10.1016/j.cropro.2005.11.015.
(http://www.sciencedirect.com/science/article/B6T5T-4M93NY3-1/2/3d82812598544c7d2de489f65d95af5f)
Abstract:

Diversification of agricultural activities that links farm-based enterprises with cultivation of field crops helps the resource-poor farmers in tropics to generate additional income, gainful employment and improve their dietary standards. A farming system approach has been found to be a resource management strategy for achieving economic and sustainable agricultural production, catering to the diverse needs of tropical farm household while preserving the resource base and ensuring high environmental quality. A judicious combination of any one or more of the farming enterprises like poultry rearing, duckery, fish culture, cattle rearing, green manuring and culture of bio-fertilizers contribute significantly for weed and pest management in field crops. Cropping system strategies like rotation of crops in sequence, intercropping and mulching do influence the weed-pest complex of crops. All these elements alter the weed flora in cropped fields through their feeding habits, allelopathic or allelomediatory principles in their excreta, suppression through physical interference like shading and altered ecology. Some of these elements also supplement pest management directly by virtue of their predatory behaviour or indirectly through suppression of weeds that serve as alternate hosts and by inducing fast and robust crop growth. Field experiments in Faculty of Agriculture, Annamalai University, India have revealed such beneficial interactions among component elements of different farming systems, viz., rice+fish+poultry, rice+azolla+fish, greenmanure-rice, rice-pulse, goat rearing+sorghum and cotton intercropped with pulse. All these approaches along with similar strategies involving other farming elements are discussed here.
Keywords: Farm components; Animal; Agro-forestry; Integrated weed and pest management

Dalton Henrique Pereira, Odilon Gomes Pereira, Bruno Ceolin da Silva, Maria Ignez Leao, Sebastiao de Campos Valadares Filho, Fernanda Helena Martins Chizzotti, Rasmo Garcia, Intake and total and partial digestibility of nutrients, ruminal pH and ammonia concentration and microbial efficiency in beef cattle fed with diets containing sorghum (Sorghum bicolor (L.) Moench) silage and concentrate in different ratios, Livestock Science, Volume 107, Issue 1, March 2007, Pages 53-61, ISSN 1871-1413, DOI: 10.1016/j.livsci.2006.09.002.
(http://www.sciencedirect.com/science/article/B7XNX-4M3BGYV-2/2/ad86332da72f6d6fe9ec0fc96b4ba6b3)
Abstract:
The intake and total apparent and partial digestibility of nutrients, ruminal pH and ammonia concentrations and efficiency of microbial synthesis were evaluated in beef cattle fed diets containing sorghum silage and concentrate in the following ratios: 800:200, 650:350, 500:500 and 350:650 g/kg, in a total dry matter basis. Four crossbred Holstein x Zebu rumen and abomasum fistulated steers, 224 +/- 23 kg-average initial live weight, were assigned to a 4 x 4 Latin square design. Chromic oxide was used as marker to estimate fecal and abomasal dry matter flows, and microbial efficiency was determined from purine basis. The intakes and total apparent digestibilities of DM, OM, CP and NFC and TDN intakes increased linearly ($P < 0.01$) with the increase of concentrate in the diet. NDF intake and total apparent digestibility decreased linearly ($P < 0.05$). The apparent ruminal and intestinal digestibilities of DM, OM, CP, NDF and NFC were not influenced ($P > 0.05$) by increasing the concentrate in the diet, and the mean values were 619 and 381 (g/kg); 656 and 349; 391 and 498; 902 and 79 and 600 and 399 (g/kg DM), respectively. There was a quadratic effect of collection time ($P < 0.01$) on the concentration of ruminal NH3-N and pH, considering maximum and minimum values of 14.89 mg/dL and 6.16 at 2.39 and 4.28 h after feeding, respectively. The efficiency of microbial synthesis, expressed in different ways was not influenced ($P > 0.05$) by treatments, with 11.39 g CPmic/100 gTDN on average. Although increasing concentrate levels in the diets resulted in higher intakes of almost all nutrients, this did not result in alterations in the ruminal variables evaluated.
Keywords: Chromic oxide; Crude protein; Ruminal parameters; Roughage

Pekka Huhtanen, Ulla Asikainen, Marjatta Arkkila, Seija Jaakkola, Cell wall digestion and passage kinetics estimated by marker and in situ methods or by rumen evacuations in cattle fed hay 2 or 18 times daily, Animal Feed Science and Technology, Volume 133, Issues 3-4, 15 February 2007, Pages 206-227, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2006.05.004.
(http://www.sciencedirect.com/science/article/B6T42-4K42DMC-2/2/c951253deb7078b5739297fb43f7c4b3)
Abstract:
This study was conducted to determine the effects of timing rumen evacuations on kinetic parameter estimates of wall digestion and passage. Another objective was to estimate the rate constants of rumen neutral detergent fibre (NDF) kinetics in cattle fed grass hay using rumen evacuations, and to compare the results to those obtained by conventional methods (in situ incubation, marker kinetics). Four young cattle were used in a switch-back design and fed a grass hay diet either twice daily at 7.00 and 19.00 h or 18 times per day starting at 7.00 h. Rumen evacuations were made just before morning feeding (7.00 h) and 11.00 and 15.00 h. The ingested feed, rumen and duodenal digesta and faeces were divided into five particle size fractions by wet sieving. Particulate matter retained on the sieves were analysed for NDF which was further subdivided into digestible (DNDF) and indigestible NDF (INDF) by 12-day in situ incubation. The rate constants were derived from average rumen pool sizes by pooling the particle fractions into large, medium and small particles (three-pool) or into large and small particles (two-pool). Feeding frequency had no effect on ruminal or total digestibility, average rumen pool size or kinetic parameters. The results showed that kinetic parameters, estimated from a single evacuation, can be severely biased due to under- or overestimation of rumen pool size. The rate of particle breakdown based on rumen INDF kinetics was slower than the passage rate of small particles (0.033 h-1 versus 0.047 h-1). Digestion rate of medium particles was faster than that of large or small particles. The passage rate of both DNDF and INDF increased with decreasing particle size and it was slower for DNDF than for INDF irrespective of particle size indicating selective retention. Digestion rate of DNDF estimated by the in situ incubation was lower than that derived from rumen evacuation. Model calculations suggested that the values based on the in situ incubations were underestimated. Ytterbium labelled hay underestimated the residence time in ruminal compartments compared with INDF estimated by rumen evacuation technique (42.5 h versus 49.8 h). However, the passage rates of small particles estimated from the marker kinetics were similar to those derived from rumen evacuation.
Keywords: Digesta kinetics; Rumen evacuation; Rumen model; Steady state

L.W.D. van Raamsdonk, C. von Holst, V. Baeten, G. Berben, A. Boix, J. de Jong, New developments in the detection and identification of processed animal proteins in feeds, Animal Feed Science and Technology, Volume 133, Issues 1-2, Feed Safety, 1 February 2007, Pages 63-83, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2006.08.004.
(http://www.sciencedirect.com/science/article/B6T42-4KXDR65-1/2/a2724a277b3de23516cb3caca96c995f)
Abstract:
It is generally accepted that the most likely route of infection of cattle with bovine spongiform encephalopathy (BSE) is by consumption of feeds containing low levels of processed animal proteins (PAPs). This likely route of infection resulted in feed bans, which were primarily aimed at ruminant feeds, and were later extended to all feeds for farmed animals. The feed bans were expected to develop into a future enforcement of the 'species-to-species' ban, which prohibits only the feeding of animal-specific proteins to the same species. The species-to-species ban requires support of species-specific identification methods.
In the European Union, microscopic evaluation is currently the only accepted method for the detection and characterization of PAPs in feeds, since it is possible to detect contaminations at the requested level of 1 g/kg with hardly any false negative nor positive results. This method is

predominantly focused on the presence and characteristics of bone fragments, although other structures, e.g. muscle fibres, may provide circumstantial evidence of the respective animal types. Recent developments are the identification of bone fragments at the level of classes (mammal versus bird versus fish), supported by image analysis of bone characteristics.
Detection of DNA and specific proteins are additional methods that can be applied for the identification of PAPs in feeds. DNA is known to be very specific for animal species and breeds, whereas proteins can also indicate the type of tissue. The latter aspect is important to differentiate between proteins that are authorised in animal nutrition from banned proteins. Improvements can be noted in recent years for both methods. For a proper application of polymerase chain reaction (PCR) to detect specific sequences of DNA, primer sets have been developed which amplify a DNA sequence shorter than approximately 100 nucleotides. Specific antibodies have been developed for protein detection of ruminant or bovine material. Recent results of various studies indicate that specific DNA and protein detection methods can detect PAPs at a contamination level of 1 g/kg. However, full validation of these methods still needs to be carried out.
Other methods such as near-infrared spectroscopy (NIRS), near-infrared microscopy (NIRM), near-infrared imaging, liquid chromatography (LC) and olfactometry techniques can and will be applied for the detection of PAPs. NIRS is a non-destructive method that can be applied on-line in feed production plants. Generally, the detection limit is still too high to be applied in official control laboratories. Nevertheless, industrial application is feasible. NIRM and near-infrared imaging are techniques that allow collection of near-infrared spectra from individual particles. The level of detection is lower than 1 g/kg since it is based on the microscopic technique, in combination with the option of identification of the individual particles. LC is based on the detection and, if present, the ratio of different polypeptides. For example, carnosine is mainly present in mammals and anserine mainly found in birds. Olfactometry is based on detection of volatile non-specific agents. It is a non-destructive and fast technique. For both LC and olfactometry it appears that the presence of fish material masks the detection of proteins of land animals, even at a contamination level of 5 g/kg.
Since 2003 five different proficiency studies and ring trials have been organized. The first proficiency study, allowing the participants to apply their own protocol, revealed that correct microscopic detection of 1 g/kg of mammalian PAP in the presence of 50 g fish meal/kg was realised in 0.44 of the cases. However, a bench mark study organized in the same year showed that a microscopic detection of 0.98 can be reached provided the application of an optimal protocol and a sufficient level of expertise. More recent studies showed that training, the application of a decision support system and use of an improved microscopy protocol resulted in a higher sensitivity.
An attractive approach is the combination of the very low detection level of microscopy with identification by other methods. Several strategies for a combination of screening and confirmation methods are discussed in the present paper. The new developments in methodology will support current or new legislation (e.g. species-to-species ban, general application of fish meal).
Keywords: BSE; Feed ban; Animal proteins; Microscopy; PCR; Immunoassay; NIR; HPLC; Protein analysis

Emad Ghafoori, Peter C. Flynn, John J. Feddes, Pipeline vs. truck transport of beef cattle manure, Biomass and Bioenergy, Volume 31, Issues 2-3, February-March 2007, Pages 168-175, ISSN 0961-9534, DOI: 10.1016/j.biombioe.2006.07.007.
(http://www.sciencedirect.com/science/article/B6V22-4M936FT-1/2/3c5ce1d963aaecca85cf62176d7a7c87)
Abstract:
Anaerobic digestion (AD) of manure can be conducted at a wide range of capacities. As capacity increases, economies of scale in capital equipment are realized but transportation costs increase as manure must be carried longer distances to the plant site. In this study, we evaluate the cost of

pipelining manure from beef cattle feedlots and digestate from an AD plant as an alternative to truck transport. Pipeline transportation cost for manure is minimized at a slurry concentration of about 12%; low concentrations require a larger pipeline, and high concentrations require higher pumping costs. Pipelining costs are highly scale dependent, while trucking costs are virtually independent of scale for a given carrier size. A stand-alone manure pipeline competes with trucking at 90,000 head of beef cattle. Digestate volume is about 2.4 times the volume of manure and a stand-alone digestate pipeline is more economic than trucking at 21,000 head, and a two-way pipeline at 29,000 head. Incremental net fixed costs for trans-shipment from truck to pipeline are low for manure and zero for digestate because equipment installed at the pipeline inlet eliminates the need for identical equipment within the digester plant. A manure pipeline must run for a minimum distance to recover the incremental fixed cost of trans-shipment; at 300,000 animals, the minimum economic pipeline distance is 9 km. Pipeline transport of beef cattle manure has the potential to reduce overall transportation cost to a large centralized digester in areas such as Dodge City, Kansas or Lethbridge, Alberta where very large numbers of beef cattle are in feedlots. A 50 km pipeline carrying manure from 300,000 beef cattle has an overall transport cost of 40% of ongoing truck transport.
Keywords: Manure management; Manure transport; Digestate transport; Pipeline; Truck; Transportation costs

Dawn J. Bush, Matthew H. Poore, Glenn M. Rogers, Craig Altier, Effect of stacking method on Salmonella elimination from recycled poultry bedding, Bioresource Technology, Volume 98, Issue 3, February 2007, Pages 571-578, ISSN 0960-8524, DOI: 10.1016/j.biortech.2006.02.017. (http://www.sciencedirect.com/science/article/B6V24-4JWFGTR-1/2/5d9476d3d8ae31558397e4f101a1659e)
Abstract:
Recycled poultry bedding (RPB) is a protein and mineral supplement for cattle. Concerns regarding this product have arisen because of the perceived risk of transmitting potentially pathogenic organisms to cattle. This study's primary objective was to assess survival of Salmonella in RPB stacked to a recommended height (2.13 m--DS-RPB), or a height of 0.76 m (SS-RPB). Dialysis bags containing RPB and Salmonella typhimurium were placed throughout stacks. Temperature was monitored daily using thermocouples attached to sample bags. After 21 days, sample bags were recovered. Ammonia analysis was performed from multiple sites in the stacks. Bag contents were cultured to determine viability of the salmonella inoculates. This trial demonstrated a wide variation of temperature within the stacks. Temperature near the edge of stacks changed with ambient temperature. Ammonia concentration in the RPB was highest at the top of the DS-RPB. Salmonella was eliminated in 98.7% of sites, with at least a 5-log reduction in the Salmonella organisms in sites where it was still viable.
Keywords: Byproduct feeds; Poultry litter; Preharvest food safety; Recycled poultry bedding; Salmonella

P. Stacey, P. O'Kiely, A.P. Moloney, F.P. O'Mara, Feeding value for finishing beef steers of wheat grain conserved by different techniques, Livestock Science, Volume 106, Issues 2-3, February 2007, Pages 154-168, ISSN 1871-1413, DOI: 10.1016/j.livsci.2006.07.016. (http://www.sciencedirect.com/science/article/B7XNX-4KV3Y8Y-1/2/eebed0038fb5785a3dbb45f559ece89a)
Abstract:
The objective was to determine the feeding value of high moisture grain as an alternative to dry grain for finishing beef cattle. Winter wheat grain was harvested sequentially for rolling, acid treatment and ensilage (ER; 705 g dry matter (DM)/kg), urea whole grain treatment and anaerobic storage (UN; 746 g DM/kg) and whole grain propionic acid treatment and aerobic storage (rolled before feeding; PR; 849 g DM/kg). Friesian steers (n = 120; mean starting live-weight 518 kg)

were allocated on a live-weight basis to 12 replicate blocks and then randomly assigned from within blocks to ten treatments. Treatments were grass silage offered ad libitum together with (i) no wheat, (ii-iv) PR at 3 or 6 kg/head daily, or ad libitum, (v-vii) UN at equivalent DM allowances to (ii) and (iii) above, or ad libitum, (viii-x) ER at equivalent DM allowances to (ii) and (iii) above, or ad libitum. Mean daily live-weight gains were 852 (ER), 726 (UN) and 855 g (PR) (s.e. = 65.5; $P < 0.05$) with corresponding values for carcass gain of 522, 425 and 528 g (s.e. = 35.6; $P < 0.001$) and daily silage DM intakes of 3.5, 4.0 and 3.6 kg (s.e. = 0.15; $P < 0.001$). Wheat DM intake when offered ad libitum was 7.8, 8.3 and 8.2 kg (s.e. = 0.10; $P < 0.05$) for ER, UN and PR, respectively. The content of apparently undigested whole grains and starch in faeces was higher ($P < 0.001$) for UN than for ER and PR, particularly at higher rates of wheat ingestion. It is concluded that ER treatment of wheat grain can be an acceptable alternative to the more traditional PR and superior to the UN treatment in the diets of finishing beef cattle.
Keywords: Wheat; Moist grain; Conservation; Storage; Feeding value; Cattle

K.H. Walker, L.R. Fell, L.A. Reddacliff, R.J. Kilgour, J.R. House, S.C. Wilson, P.J. Nicholls, Effects of yard weaning and training on the behavioural adaptation of cattle to a feedlot, Livestock Science, Volume 106, Issues 2-3, February 2007, Pages 210-217, ISSN 1871-1413, DOI: 10.1016/j.livsci.2006.08.004.
(http://www.sciencedirect.com/science/article/B7XNX-4KXDRK1-1/2/ba35dd9f805cf5be3cd34f2d30a81d72)
Abstract:
Two experiments were conducted to determine the effect of weaning in small yards, with or without a feed bunk training procedure, on the subsequent behaviour and performance of Bos taurus steers in a feedlot. A reduction in the incidence of bovine respiratory disease (BRD) was the primary objective. In each experiment, about 200 male beef calves (Angus x Hereford and Hereford) were separated from their mothers at 7-9 months of age and allocated to one of three matched weaning treatment groups. The treatments were (1) yard weaning with hay or silage, (2) yard weaning with hay or silage plus a novel handling procedure to train the animals to be able to find a grain ration in a trough, and (3) paddock weaning without supplement or handling according to common industry practice in southeastern Australia. Paddock weaning is the practice of abrupt separation of cows and calves followed by return to separate pasture paddocks, whereas yard weaning involves abrupt separation but the calves remain in the yards for several days. Experimental vaccines against the major BRD pathogens were given to half of each group 1-2 months prior to entry into a commercial feedlot. The yard weaned and yard trained cattle had a significantly greater weight gain in the first month and over the 90-day feeding period than the paddock weaned control groups. There was no difference between the groups in pre-feedlot weight gain. The yard trained groups showed greater feeding activity during the first few days in the feedlot, but were not significantly different in weight gain from yard weaned. The vaccination treatment also significantly improved the weight gain in the first month and over 80 days. The combination of yard weaning and vaccination produced the highest weight gains overall. There was consistently less morbidity in the yard weaned groups compared to paddock weaned controls. The morbidity in yard trained groups was intermediate between these two. Weaning in small yards and the appropriate use of effective BRD vaccines 1-2 months before feedlot entry are recommended for B. taurus feeder steers in southeastern Australia to minimise sickness and improve productivity in the feedlot. Associated benefits are reduced risks of antibiotic residues and of animal welfare problems.
Keywords: Beef cattle; Feedlots; Stress; Adaptation; Weaning; Feeding behaviour; Performance

Joan W. Reijs, Marthijn P.W. Sonneveld, Peter Sorensen, Rene L.M. Schils, Jeroen C.J. Groot, Egbert A. Lantinga, Effects of different diets on utilization of nitrogen from cattle slurry applied to

grassland on a sandy soil in The Netherlands, Agriculture, Ecosystems & Environment, Volume 118, Issues 1-4, January 2007, Pages 65-79, ISSN 0167-8809, DOI: 10.1016/j.agee.2006.04.013. (http://www.sciencedirect.com/science/article/B6T3Y-4K5SSVG-1/2/35b306fcf3c0ed851dc57b0b9eb56eeb)
Abstract:
Dietary adjustments have been suggested as a means to reduce N losses from dairy systems. Differences in fertilizing value of dairy slurry as a result of dietary adjustments were evaluated in a 1-year grassland experiment and by long-term modelling. Slurry composition of non-lactating dairy cows was manipulated by feeding diets with extreme high and low levels of dietary protein and energy. C:Ntotal ratio of the produced slurries ranged from 5.1 to 11.4. To evaluate their short-term fertilizer N value, the experimental slurries (n = 8) and slurries from commercial farms with variable composition (n = 4), were slit-injected in two grassland fields on the same sandy soil series in the north of The Netherlands (53[degree sign]10'N, 6[degree sign]04'E), with differences in sward age and ground water level. The recently established grassland field (NEW) was characterized by lower soil OM, N and moisture contents, less herbs and more modern grass varieties compared to the older grassland field (OLD). Slurry was applied in spring (100 kg N ha-1) and after the first cut (80 kg N ha-1) while in total four cuts were harvested. Artificial fertilizer N treatments were included in the experiment to calculate the mineral fertilizer equivalent (MFE) of slurry N. The OLD field showed a higher total N uptake whereas DM yields were similar for the two fields. Average MFE of the slurries on the OLD field (47%) was lower than on the NEW field (56%), probably as a result of denitrification of slurry N during wet conditions in spring. Slurries from high crude protein diets showed a significantly higher MFE ($P < 0.05$) compared to low crude protein diets. No significant differences in MFE were observed between slurries from high and low energy diets. On both fields, MFE appeared to be positively related to the ammonium content ($P < 0.001$) and negatively to the C:Ntotal ratio of the slurry DM ($P = 0.001$). Simulation of the effect of long-term annual application of 180 kg N ha-1 with highest and lowest C:Ntotal ratio suggested that both slurries would lead to an increase in annual soil N mineralization. Both soil N mineralization and SOC appeared to be substantially higher in equilibrium state for the slurry with the highest C:Ntotal ratio. It is concluded that in a situation with slit-injection, the reduced first-year N availability of slurry with a high C:Ntotal ratio as observed in the grassland experiment will only be compensated for by soil N mineralization on the very long term.
Keywords: Cattle slurry; C:N ratio; Nitrogen utilization; Fertilizing value; Grassland; Diet composition

Abdellah Zinedine, Jose Miguel Soriano, Juan Carlos Molto, Jordi Manes, Review on the toxicity, occurrence, metabolism, detoxification, regulations and intake of zearalenone: An oestrogenic mycotoxin, Food and Chemical Toxicology, Volume 45, Issue 1, January 2007, Pages 1-18, ISSN 0278-6915, DOI: 10.1016/j.fct.2006.07.030. (http://www.sciencedirect.com/science/article/B6T6P-4PNJ1NF-2/2/7e0ab7eabaef67e35ef29c5eea6454f0)
Abstract:
Zearalenone (ZEA) is a mycotoxin produced mainly by fungi belonging to the genus Fusarium in foods and feeds. It is frequently implicated in reproductive disorders of farm animals and occasionally in hyperoestrogenic syndromes in humans. There is evidence that ZEA and its metabolites possess oestrogenic activity in pigs, cattle and sheep. However, ZEA is of a relatively low acute toxicity after oral or interperitoneal administration in mice, rat and pig. The biotransformation for ZEA in animals involves the formation of two metabolites [alpha]-zearalenol ([alpha]-ZEA) and [beta]-zearalenol ([beta]-ZEA) which are subsequently conjugated with glucuronic acid. Moreover, ZEA has also been shown to be hepatotoxic, haematotoxic, immunotoxic and genotoxic. The exact mechanism of ZEA toxicity is not completely established. This paper gives an overview about the acute, subacute and chronic toxicity, reproductive and

developmental toxicity, carcinogenicity, genotoxicity and immunotoxicity of ZEA and its metabolites. ZEA is commonly found on several foods and feeds in the temperate regions of Europe, Africa, Asia, America and Oceania. Recent data about the worldwide contamination of foods and feeds by ZEA are considered in this review. Due to economic losses engendered by ZEA and its impact on human and animal health, several strategies for detoxifying contaminated foods and feeds have been described in the literature including physical, chemical and biological process. Dietary intakes of ZEA were reported from few countries from the world. The mean dietary intakes for ZEA have been estimated at 20 ng/kg b.w./day for Canada, Denmark and Norway and at 30 ng/kg b.w./day for the USA. The Joint FAO/WHO Expert Committee on Food Additives (JECFA) established a provisional maximum tolerable daily intake (PMTDI) for ZEA of 0.5 [mu]g/kg of body weight.
Keywords: Zearalenone; Toxicity; Occurrence; Food; Metabolism; Detoxification

C. Devendra, Perspectives on animal production systems in Asia, Livestock Science, Volume 106, Issue 1, January 2007, Pages 1-18, ISSN 1871-1413, DOI: 10.1016/j.livsci.2006.05.005. (http://www.sciencedirect.com/science/article/B7XNX-4KPFM00-1/2/793fbce61f13c403dcad309b93a9eb39)
Abstract:
Asian animal production systems are discussed in the context of their relevance, types, trends, opportunities for productivity enhancement, and the implications for natural resource management (NRM). These include a variety of systems in agro-ecological zones which can be grouped broadly into one of three categories: landless, crop-based and, and rangeland-based. The landless production systems are of two types: (i) highly industrialised pig and poultry production, and (ii) extensive systems involving small ruminants, cattle and camels and resource-poor nomads, transhumants or agricultural laborers and seasonal migrations. Within crop-based systems, animals are found in both irrigated and rainfed areas. The genesis of these systems is illustrated, and includes two broad categories: systems combining animals with annual or perennial cropping. The significance of crop-animal interactions and economic benefits from 31 case studies in 11 countries highlight the importance of animals in crop-based systems. Animal production trends are influenced by strong demand-led factors such as population growth, urbanisation, income growth and changing consumer preferences These are of two categories: (i) modern, demand-driven and capital intensive non-ruminant (pig and poultry) sector which is dominant, growing, and supplies the major share of animal proteins,which however is unable to meet current and projected human requirements, and (ii) traditional resource-driven and labour intensive ruminant (buffaloes, cattle, goats and sheep) sector which mainly involve small farms and small farmers and are lagging. The disparity questions efficiencies of prevailing animal production systems and NRM. Integrated animals-tree crop production systems are underestimated and are potentially very important. Two possible scenarios for the future of crop-animal systems are increased size and specialisation, and the other disintegration due to population pressure. It is suggested that crop-animal systems and small farms will continue to be predominant in Asia, in which intensification, growth and increased contribution are likely in the future. Major issues to be addressed across systems include inter alia nutrient flows, waste disposal, overgrazing, all year round feeding systems, zoonosis, and policy issues. The less-favored and more constrained rainfed areas can be made more productive through increased public and private sector investments, interdisciplinary research and development, and improved technology application. The challenges and benefits for the future include improved efficiency of NRM, agricultural growth, reduced poverty, improved livelihoods of the poor and environmental sustainability.
Keywords: Animal production systems; Crop-animal systems; Types; Trends; Economic benefits; Productivity enhancement; Interdisciplinary research; Asia

M. Olivan, L.M.M. Ferreira, R. Celaya, K. Osoro, Accuracy of the n-alkane technique for intake estimates in beef cattle using different sampling procedures and feeding levels, Livestock Science, Volume 106, Issue 1, January 2007, Pages 28-40, ISSN 1871-1413, DOI: 10.1016/j.livsci.2006.06.015.
(http://www.sciencedirect.com/science/article/B7XNX-4KR3JSH-1/2/ebc85376d06ff1ad6e256048104cb022)
Abstract:
The present study aimed to evaluate the reliability of the n-alkane technique for estimating herbage intake in beef cattle receiving two different feeding levels (low and high) and to test the effect of different faeces sampling procedures (total faeces samples or rectal grab samples at 8 h intervals) on the n-alkane faecal recoveries and hence on intake estimates. Two consecutive experiments were performed with 11 non-lactating beef cows of 'Asturiana de los Valles' breed, fed with lucerne hay at two feeding levels: 1.0 or 1.7 kg DM/100 kg body weight (BW). Animals received a daily dose of paper pellets containing C24, C32 and C36 n-alkanes as external markers with the purpose of using different n-alkane pairs of adjacent chain length (C23/C24, C25/C24, C31/C32, C33/C32, C35/C36) for intake calculations. A 5-day equilibrium period was sufficient for external marker concentrations and n-alkane pair ratios to reach steady state in faeces. There was no effect of different sampling times (every 8 h) on the faecal excretion of n-alkane pairs C31/C32 and C33/C32. Grab samples obtained at the time of dosing (0830 h) gave the best estimate of n-alkane pair ratios in total faeces collection. There was a general trend of increasing n-alkane faecal recoveries with increased chain length, although n-alkanes C30, C31 and C33 showed lower faecal recoveries than expected. n-Alkane recoveries were in general lower at the low feeding level, where an increase in individual variability of natural n-alkane recoveries was observed. At both feeding levels, the n-alkane pairs C23/C24 and C35/C36 gave accurate estimates of the treatment average intake, although the natural n-alkane (C23 or C35) faecal recoveries showed high individual variability, which could be in part due to analytical bias caused by their extremely low concentration in the diet and faeces. However, the n-alkane pairs C31/C32 and C33/C32 gave the greatest deviations of intake estimates, due to the high discrepancy between the faecal recoveries of natural and dosed n-alkanes. These results demonstrate that in beef cattle, feeding level may have some influence on the relative faecal recoveries of the n-alkane pair used for intake calculations. This effect, together with the high individual variability of n-alkane recoveries, especially under low feeding level, may produce significant deviations of the individual intake estimates.
Keywords: Feeding level; Beef cattle; n-Alkanes; Intake

G. Chladek, D. Zapletal, A free-choice intake of mineral blocks in beef cows during the grazing season and in winter, Livestock Science, Volume 106, Issue 1, January 2007, Pages 41-46, ISSN 1871-1413, DOI: 10.1016/j.livsci.2006.06.014.
(http://www.sciencedirect.com/science/article/B7XNX-4KJTNW6-3/2/baab0abee603ec9f26f93c3404d90aee)
Abstract:
A herd of 25 beef cows were offered four types of mineral blocks (A, B, C, D) with a different Ca to P ratio (A 0.6:1, B 0.8:1, C 2:1 and D 3.6:1). The Mg content was identical in all blocks whereas the Na content was equal in B, C and D, while the Na content in A block was double. The mineral block intake was monitored for 1 year, which was broken down to the grazing period (Pa) and the winter period (Wi). The intake of pasture grass and winter forage was assessed and the feed chemical composition was analysed; based on the obtained values, a macroelement balance (for Ca, P, Mg, Na and K) was calculated.
The results showed the forage diet met requirements for all the observed macroelements (except in Na). The macroelement intake from forage was considerably higher than from mineral blocks. There were significant seasonal (Pa versus Wi) differences in B and C blocks intake. The

consumption of D block was relatively invariable all year round; block A was refused in both seasons though it contained the highest amount of highly deficient Na.
It can be concluded that mineral content in forage meets beef cattle requirements for Ca, Mg and K, P content is just satisfactory, and Na content is insufficient. It appears that cows control, to some extent, the Ca to P ratio in their diet by choosing the appropriate type of mineral block. However, the preference or refusal of some types of mineral blocks regardless of the season suggests the influence of other factors affecting mineral block intake which were not the subject of our observation.
Keywords: Mineral blocks; Free-choice intake; Beef cows; Ca; P; Mg; Na; K

Nicola Bourne, D. Claire Wathes, Michael McGowan, Richard Laven, A comparison of the effects of parenteral and oral administration of supplementary vitamin E on plasma vitamin E concentrations in dairy cows at different stages of lactation, Livestock Science, Volume 106, Issue 1, January 2007, Pages 57-64, ISSN 1871-1413, DOI: 10.1016/j.livsci.2006.07.001.
(http://www.sciencedirect.com/science/article/B7XNX-4KNKH5B-3/2/1b1d24384c08d4a08485f5ceb2c40302)
Abstract:
As a result of research conducted in the US, recommendations for dry cow vitamin E intakes have increased seven fold there, however there has been no change to recommendations in the UK. As part of a larger study comparing the impact of existing UK and new US recommended vitamin E intakes on the health and fertility of commercial dairy cows in the UK, a study was set up to investigate the effect of route of supplementation and stage of lactation, over a 21 day period, on the response to mega-supplementation of cattle receiving supposedly adequate vitamin E. The study assessed the response of dry, peak lactation and mid lactation cows to in-feed or parenteral vitamin E supplementation (7 animals per treatment/lactation stage group) by measuring plasma and milk vitamin E concentrations, blood glutathione peroxidase (GSH-Px) activity and milk yields over a 21 day period. Plasma vitamin E concentrations were significantly influenced by a time, stage and treatment interaction ($P = 0.046$). Both dry and lactating animals had significantly higher plasma vitamin E concentrations at some time points in the parenteral supplemented cows compared to the in-feed supplementated animals ($P <= 0.011$ and $P < 0.01$, respectively). Milk vitamin E concentrations did not significantly differ between lactation stages but treatment had a significant effect on concentrations ($P < 0.008$) when lactation stage was removed from the model. There was no significant difference in milk yield between treatment groups. A significant relationship between plasma and milk vitamin E concentrations was only found in the parenterally supplemented cows ($r = 0.435$, $P < 0.001$). In cattle with intakes greater than the ARC recommendations, measurement of plasma vitamin E concentration may be of limited value in determining whether there has been a response to supplementation. The relationship between plasma and milk vitamin E concentrations is too poor for milk vitamin E concentrations to be used as a proxy for plasma vitamin E.
Keywords: Dairy cattle; Route comparison; Vitamin E; Plasma status

C.L. Lorenzen, J.W. Golden, F.A. Martz, I.U. Grun, M.R. Ellersieck, J.R. Gerrish, K.C. Moore, Conjugated linoleic acid content of beef differs by feeding regime and muscle, Meat Science, Volume 75, Issue 1, January 2007, Pages 159-167, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.06.025.
(http://www.sciencedirect.com/science/article/B6T9G-4KPPCKB-2/2/692f64dad48a2642e50049c8e7e5df6d)
Abstract:
The project objective was to determine the CLA content of three muscles (Longissimus lumborum, LD; Semimembranosus, SM; Triceps brachii, TB), in both raw and cooked states, in cattle finished on pasture or with grain supplements. Cattle were randomly assigned to one of four finishing

regimens; pasture (n = 11), pasture with grain supplement (n = 11), pasture with grain supplement containing soyoil (n = 12), and feedlot (n = 12). In the raw state, TB had higher ($P < 0.05$) CLA than LD or SM on a mg/g sample basis. Total CLA was higher ($P < 0.05$) in the soyoil diet when compared to the other three feeding regimes on a mg/g sample basis and when expressed as mg/g fat in both raw and cooked analyses. Pasture inclusion produced higher levels ($P < 0.05$) of total CLA than the feedlot diet on a mg/g fat basis for cooked samples while maintaining acceptable eating quality.
Keywords: Beef; Conjugated linoleic acid; Muscle

H.O. Sanon, C. Kabore-Zoungrana, I. Ledin, Behaviour of goats, sheep and cattle and their selection of browse species on natural pasture in a Sahelian area, Small Ruminant Research, Volume 67, Issue 1, January 2007, Pages 64-74, ISSN 0921-4488, DOI: 10.1016/j.smallrumres.2005.09.025.
(http://www.sciencedirect.com/science/article/B6TC5-4HK5SSK-1/2/96859816e9f1ba58425865569cdaa07c)
Abstract:
A study was conducted in the Sahelian zone of Burkina Faso of the behaviour of cattle, sheep and goats on natural pasture and their preference for browse species. Concurrently, a survey was undertaken on a sample of farmers (herders, women and livestock owners) in the study area to estimate the indigenous knowledge of browse species and their utilisation by ruminants. A herd of cattle and flocks of sheep and goats belonging to farmers were followed on pasture, each species during three consecutive days each month, from May 2003 to April 2004, and their activities were recorded regularly every 15 min, as well as the browse species selected and the height reached while browsing. The farmers had good knowledge of the browse species present in the area and their preferential classification depended on the availability of the species, their nutritive value and also other ways of utilising the species concerned. However, some divergence existed in the knowledge of farmers compared to the result from the behaviour study, e.g. some species were mentioned by farmers but not found in the inventory. There was a decline in the feeding activities of all animal species from rainy to dry season, while resting and ruminating activities were increasing at the same time. This decline in time spent feeding was more important for cattle (from 72 to 39% of total time) as they relied on the herbaceous biomass for feeding, while sheep and goats made a shift in the feeding activities from grazing to browsing when the herbaceous biomass decreased. Cattle browsed (leaves and litter) during all the study period for around 4.5% of the time spent on pasture. Sheep and goats showed a peak in browsing activity in the dry season, 28 and 52% of the time, respectively. During the whole observation period, cattle browsed 10 species, with Guiera senegalensis most often selected, with 59, 54 and 84% of browsing time, respectively, in the rainy, post rainy and dry season. G. senegalensis, Combretum micranthum and Balanites aegyptiaca were the most important species browsed by sheep among the 20 browse species selected. Goats browsed more than 20 species daily but the most preferred species were Acacia senegal, B. aegyptiaca and Pterocarpus lucens. The mean height reached by goats when browsing was higher (1.65 m) than that of cattle (1.47 m) and sheep (0.87 m). The result from this study can be used to select species for regeneration and to advice farmers on the importance of herd composition.
Keywords: Feeding behaviour; Browse preference; Cattle; Sheep; Goats; Indigenous farmer knowledge

D.K. Lee, J.J. Doolittle, V.N. Owens, Soil carbon dioxide fluxes in established switchgrass land managed for biomass production, Soil Biology and Biochemistry, Volume 39, Issue 1, January 2007, Pages 178-186, ISSN 0038-0717, DOI: 10.1016/j.soilbio.2006.07.004.
(http://www.sciencedirect.com/science/article/B6TC7-4KMYRS6-5/2/624ad3795be020e2ec04357b47c587ce)

Abstract:
Switchgrass (Panicum virgatum L.) grown for biomass feedstock production has the potential to increase soil C sequestration, and soil CO2 flux in grassland is an important component in the global C budget. The objectives of this study were to: (1) determine the effects of N fertilization and harvest frequency on soil CO2 flux, soil microbial biomass carbon (SMBC), and potentially mineralizable carbon (PMC); and (2) evaluate the relationship of soil CO2 flux with soil temperature, soil moisture, SMBC, and PMC. Two N rates (0 and 224 kg ha-1) were applied as NH4NO3 and cattle (Bos Taurus L.) manure. Switchgrass was harvested every year at anthesis or alternate years at anthesis. The data were collected during growing season (May-October) 2001-2004 on switchgrass-dominated Conservation Reserve Program (CRP) land in east-central South Dakota, USA. Manure application increased soil CO2 flux, SMBC, and PMC during the early portion of the growing season compared with the control, but NH4NO3 application did not affect soil CO2 flux, SMBC, and PMC. However, seasonal variability of soil CO2 flux was not related to SMBC and PMC. Estimated average soil CO2 fluxes during the growing periods were 472, 488, and 706 g CO2-C m-2 for control, NH4NO3-N, and manure-N plots, respectively. Switchgrass land with manure application emitted more CO2, and approximately 45% of the C added with manure was respired to the atmosphere. Switchgrass harvested at anthesis decreased soil CO2 flux during the latter part of the growing season, and flux was lower under every year harvest treatment than under alternate years harvest. Soil temperature was the most significant single variable to explain the variability in soil CO2 flux. Soil water content was not a limiting factor in controlling seasonal CO2 flux.
Keywords: Soil CO2 flux; Switchgrass; Soil temperature; Soil carbon; Microbial biomass; N fertilization

Makiko Yamaguchi, Yoshihiko Ito, Seiya Takahashi, Fourteen-week feeding test of meat and milk derived from cloned cattle in the rat, Theriogenology, Volume 67, Issue 1, IETS 2007 Pre-Conference Symposia, IETS 2007, 1 January 2007, Pages 152-165, ISSN 0093-691X, DOI: 10.1016/j.theriogenology.2006.09.010.
(http://www.sciencedirect.com/science/article/B6TCM-4M3BC28-2/2/203a441cd2640a6b4038322da65dd5e7)
Abstract:
Agricultural application of cloned livestock produced by nuclear transfer requires public and governmental understanding of food-safety issues. To determine whether physiological effects occurred in animals fed products derived from cloned cattle, we conducted long-term (14 week) trials feeding Crj:CD(SD)IGS rats meat and milk from cloned cattle. Diets containing meat and milk were equal in nutritional value to the basal diet (AIN93G). Urinalysis was performed at Weeks 4, 8 and 12; at the end of the feeding period, blood sampling and autopsies were conducted. During the feeding periods, there were no significant differences in general condition, death loss, growth, battery of functional observational tests and estrous cycles among groups given diets containing meat and milk powder from non-clone, embryonic clone and somatic clone cattle. Furthermore, no significant changes attributed to consumption of clone meat or milk were detected in urinalysis, hematological and blood chemical, gross pathological or histological examinations. Therefore, we concluded that the physiologic conditions of the rats were not affected by consumption of meat and milk from bovine clones.
Keywords: Food safety; Toxicology; Pathology; Animal cloning; Risk assessment

A. Larsson, S.-O. Dimander, A. Rydzik, A. Uggla, P.J. Waller, J. Hoglund, A 3-year field evaluation of pasture rotation and supplementary feeding to control parasite infection in first-season grazing cattle--Effects on animal performance, Veterinary Parasitology, Volume 142, Issues 3-4, 20 December 2006, Pages 197-206, ISSN 0304-4017, DOI: 10.1016/j.vetpar.2006.07.017.

(http://www.sciencedirect.com/science/article/B6TD7-4KW5WNM-1/2/dc1de579b20293e806e77c873b38360a)
Abstract:
To evaluate non-chemical strategies to control pasture-borne parasites in first-season grazing (FSG) cattle, a 3-year grazing trial was conducted during 2002-2004 on naturally infected pastures on a commercial beef cattle farm in Sweden. A uniform pasture was divided in 4 equal 2 ha paddocks onto each of which 10, 5-9 months old dairy breed steer calves were allocated at turn-out in May each year. Two strategies were evaluated: (1) turn-out onto pasture which had been grazed the previous year by second-season grazing (SSG) steers, followed by a move to aftermath in mid-July (RT) and (2) supplementation with concentrate and roughage for 4 weeks from turn-out (FD). Comparisons were made with an untreated (UT), and an anthelmintic treated control group (DO). Animal parasitology and performance were monitored monthly throughout the 20 weeks grazing period. Additional sampling occasions were performed on day 9 (for coccidia) and 10 weeks after turn-out (mid-July). Due to clinical parasitic gastro-enteritis (PGE), salvage treatments were performed on all animals in group FD approximately 7 weeks after turn-out in 2003 and of three animals in group UT 5 weeks after turn-out in 2004. In 2003, the geometric mean oocyst excretion 9 days after turn-out was approximately 150,000 opg of mainly Eimeria alabamensis in group FD, and in 2004 approximately 180,000 opg in group UT. Apart from the DO group, geometric mean faecal egg counts (FEC) were between 80 and 400 epg 4 weeks after turn-out. Mean serum pepsinogen concentrations (SPC) of approximately 3.6 U tyrosine were recorded in the FD and UT groups from late August 2002. In 2003 and 2004, mean concentrations in these groups were between 4.1 and 7.2 U tyrosine 8 weeks after turn-out. By the end of the three grazing seasons the average weight gain difference compared to the DO group was for FD -29, -38 and -5 kg and for RT -4, -21 and +14 kg, and compared to the UT group -18, +2 and +22 for FD and +7, +19 and +41 kg for group RT. In conclusion, the rotation control strategy showed promising results, whereas the strategic feeding was poor from a parasite control standpoint.
Keywords: Nematoda; Coccidia; Ostertagia; Eimeria; Grazing management; Production loss; Organic production

Karin Schutz, Deborah Davison, Lindsay Matthews, Do different levels of moderate feed deprivation in dairy cows affect feeding motivation?, Applied Animal Behaviour Science, Volume 101, Issues 3-4, 15 December 2006, Pages 253-263, ISSN 0168-1591, DOI: 10.1016/j.applanim.2006.02.008.
(http://www.sciencedirect.com/science/article/B6T48-4JKYTC6-1/2/cef15b502120f303415592ac2987447e)
Abstract:
Dairy cows grazed on pasture are likely to experience seasonal fluctuations in both the quantity and quality of forage available. In order to better understand how the variation in feed supply influences animal welfare, we need to understand the degree of hunger experienced during various levels of feed restriction. The aim of this study was to study feeding motivation in dairy cows by measuring cows' motivation to walk for food at different levels of feed deprivation. In the first study 18 lactating dairy cows were divided into three groups of six, with one group being tested each day, and each group tested four times, once every 3 days. Each cow was randomly allocated to one of four different levels of feed deprivation (0, 3, 6 or 9 h) and then given the opportunity to walk a number of consecutively increasing distances along a race in a U-turn to obtain a specified amount of food (increasing distance by 20 m starting at 20 m). All cows were randomly exposed to all feed deprivation levels over the 12 days in a crossover design. Maximal distance walked, milk production, body weight and body condition score (BCS) were monitored during the test period. The experiment was repeated with 12 non-lactating cows (divided into three groups of four) following the same protocol as in the first study. In the lactating cows, there was a significant effect of treatment on maximal distance walked with maximal distance increasing

approximately linearly with increasing feeding deprivation levels. In both lactating and non-lactating cows, there was a significant effect of body weight on maximal distance walked with lighter cows walking greater distances. There was no significant relationship between BCS or daily milk production and maximal distance walked. The results show that feeding motivation in lactating dairy cows increases within a few hours of feed deprivation and that lighter cows may be more motivated to spend energy to obtain a limited amount of food compared to heavier cows. We conclude that this method is suitable for studying feeding motivation, at least in lactating dairy cattle. However, more research is needed to provide information about the levels of hunger at which an animal starts to suffer.
Keywords: Dairy cattle; Feed deprivation; Feed motivation; Walking distance; Welfare

Anne Marie B. de Passille, Jeffrey Rushen, Calves' behaviour during nursing is affected by feeding motivation and milk availability, Applied Animal Behaviour Science, Volume 101, Issues 3-4, 15 December 2006, Pages 264-275, ISSN 0168-1591, DOI: 10.1016/j.applanim.2006.02.007.
(http://www.sciencedirect.com/science/article/B6T48-4K128SY-1/2/ed064fd07679923e0737e54502842f77)
Abstract:
We examined the relationship between calves' suckling behaviour at nursing, calves' feeding motivation and milk availability. Dairy calves (six female and four male) suckled from their dams twice a day after milking from birth until 9 weeks old. By removing different amounts of milk from the udder during the milking prior to the nursing, we were able to control how much milk was available to the calf during nursing. Reducing milk availability led to lower milk ingestion but a longer duration of sucking in more frequent but shorter bouts and more butting and switching between teats. Increasing milk availability had the opposite effects although no extra milk was drunk compared to the control condition. By use of tube feeding or reducing the amount drunk during a previous meal, we were able to control the level of the calves' feeding motivation at the nursing. Increasing the calves' feeding motivation increased the duration of sucking and increased the amount of milk consumed by the calf. Reducing the calves' hunger had the opposite effects. Calves' suckling behaviour did not change between the ages of 2 and 9 weeks. The rate of sucking was not affected by either milk availability of feeding motivation. The results show that calves' behaviour during nursing is a poor indicator of milk transfer but that calves are able to regulate milk intake during nursing. Butting and teat switching are likely signs of low milk flow rates. Allowing calves to nurse milked cows occasionally is a useful model to examine the effect of feeding motivation and milk availability on suckling behaviour.
Keywords: Dairy cattle; Calves; Nursing; Suckling behaviour; Milk intake

Karl A. Dawson, Nutrigenomics: Feeding the genes for improved fertility, Animal Reproduction Science, Volume 96, Issues 3-4, Nutrition and Fertility in Dairy Cattle, December 2006, Pages 312-322, ISSN 0378-4320, DOI: 10.1016/j.anireprosci.2006.08.009.
(http://www.sciencedirect.com/science/article/B6T43-4KJM010-B/2/316d1d3532953d9095c916d3fbfa1e3b)
Abstract:
The post genomic era will result in many new molecular tools for evaluating the factors influencing fertility and reproductive performance in domestic livestock and poultry. There is currently considerable interest and practical merit in examining the regulatory steps involved in the process of gene transcription. Currently, oligo-based and cDNA microarray techniques make it possible to understand many of the factors controlling the regulation of gene transcription and globally evaluate gene expression profiles by looking at the relative abundance of gene-specific mRNA in tissues. These techniques provide an unprecedented amount of information and are only now being used to examine key reproductive, developmental, and performance characteristics in cattle. They also promise to provide a tremendous amount of new information that can be used to

understand and diagnose key issues that limit reproductive performance. The science of nutrigenomics has begun to use information obtained from basic studies of the genome to evaluate the effects of diet and nutrient management schemes on gene expression. Preliminary studies have shown the value of such techniques and suggest that it will be possible to use specific gene expression patterns to evaluate the effects of nutrition on key metabolic processes relating to reproductive performance. While the effects of nutrition on fertility are only partially understood, modern nutrigenomics will undoubtedly play a key role in developing strategies for addressing some of the limitations in reproductive performance.
Keywords: Fertility; Microarray; Nutrigenomics; Transcription; Oxidative stress

T.M. Brown-Brandl, J.A. Nienaber, R.A. Eigenberg, T.L. Mader, J.L. Morrow, J.W. Dailey, Comparison of heat tolerance of feedlot heifers of different breeds, Livestock Science, Volume 105, Issues 1-3, December 2006, Pages 19-26, ISSN 1871-1413, DOI: 10.1016/j.livsci.2006.04.012.
(http://www.sciencedirect.com/science/article/B7XNX-4K7WV17-1/2/4d1b47e2d24d792f0ec59886e2527193)
Abstract:
Heat stress in cattle causes decreases in feed intake and feed efficiency; in extreme cases, it can cause death. These losses amount to millions of dollars each year. A study was designed to determine severity of heat stress among four breeds of cattle. Throughout two summers, 256 feedlot heifers of four different breeds were observed. Respiration rates, panting scores, and surface temperatures were taken twice each day on 10 animals/breed for several weeks during the summers of 2002 and 2003. Twenty-four-hour behavior measurements were recorded for four heat-stress and four thermoneutral days. Results showed during the afternoon, Angus cattle (black) had the highest respiration rates, panting scores, and surface temperatures, followed by the MARC III (dark red), Gelbvieh (tan), and Charolais (white). Behavior data showed that heat stress increased drinking and standing behavior, and decreased eating, lying, and agonistic behaviors, and that dark-hided cattle adjusted their behavior more than light-hided cattle. Overall, it was found that breed of cattle with dark-hides were more affected by temperature changes and at peak temperatures than breeds of cattle with light-hides.
Keywords: Feedlot cattle; Heat stress; Respiration rate; Panting score; Color

T.M. Brown-Brandl, R.A. Eigenberg, J.A. Nienaber, Heat stress risk factors of feedlot heifers, Livestock Science, Volume 105, Issues 1-3, December 2006, Pages 57-68, ISSN 1871-1413, DOI: 10.1016/j.livsci.2006.04.025.
(http://www.sciencedirect.com/science/article/B7XNX-4K7WV17-3/2/993107b2b9e78b7517b114adeb39c9a8)
Abstract:
Heat stress in cattle results in millions of dollars in lost revenue each year due to production losses, and in extreme cases, death. Death losses are more likely to result from animals vulnerable to heat stress. A study was conducted to determine risk factors for heat stress in feedlot heifers. Over two consecutive summers, a total of 256 feedlot heifers (32/ breed/ year) of four breeds were observed. As a measure of stress, respiration rates and panting scores were taken twice daily (morning and afternoon) on a random sample of 10 heifers/ breed. Weights, condition scores, and temperament scores were taken on 28-day intervals during the experiment. Health history from birth to slaughter was available for every animal used in this study. It was found that at temperatures above 25 [degree sign]C, dark-hided animals were 25% more stressed than light-colored; a history of respiratory pneumonia increased stress level by 10.5%; each level of fatness increased stress level by approximately 10%; and excitable animals had a 3.2% higher stress level than calm animals. Not only did the stress level increase with these risk factors, but average daily gain was reduced. The Charolais cattle gained significantly more than all other breeds of cattle

tested. Calm cattle gained 5% more than excitable cattle. Finally, cattle treated for pneumonia gained approximately 8% slower than non-treated cattle. The results of this study have not only revealed heat stress risk factors of breed (color), condition score (fatness), temperament, and health history (treated or not treated for pneumonia), but have also shown the effectiveness of using respiration rate as an indicator of heat stress.
Keywords: Feedlot cattle; Heat stress; Respiration rate; Pneumonia; Color

M. Sarwar, M. Nisa, Z. Hassan, M.A. Shahzad, Influence of urea molasses treated wheat straw fermented with cattle manure on chemical composition and feeding value for growing buffalo calves, Livestock Science, Volume 105, Issues 1-3, December 2006, Pages 151-161, ISSN 1871-1413, DOI: 10.1016/j.livsci.2006.05.021.
(http://www.sciencedirect.com/science/article/B7XNX-4KJ7582-1/2/fcd10e57472a82d1e7f9793cc36bf436)
Abstract:
The study was conducted to examine the chemical composition of urea-molasses treated wheat straw (WS) fermented with cattle manure (CM) and its feeding value for growing buffalo male calves. Wheat straw treated with varying levels of urea (0%, 2% and 4%) and molasses (2% and 4%) was ensiled with 30% cattle manure (on dry matter basis) for different fermentation periods (20, 30 and 40 days). Fermented wheat straw (FWS) after each fermentation period was analyzed for pH, dry matter (DM), crude protein (CP), true protein (TP), ammonia nitrogen (NH3-N), acid detergent fiber (ADF) and neutral detergent fiber (NDF). Maximum pH, DM, CP, TP and NH3-N and minimum NDF contents were observed with 4% urea. The 4% molasses level increased the CP, TP and NH3-N contents of FWS, but pH, DM and NDF remained unchanged after 40 days of fermentation. The 4% urea x 4% molasses interaction resulted in maximum DM, CP, TP, NH3-N after 40 days of fermentation period and this combination was used for large scale production of FWS to evaluate its feeding value for calves. Four isonitrogen and isocaloric diets were formulated. The control FWS 0 diet contained no FWS while in FWS 15, FWS 25 and FWS 35 diets concentrate was replaced with 15%, 25% and 35% FWS, respectively. The diets were randomly allotted to four groups of 28 calves 9-12 months of age, seven in each group, in a randomized complete block design to examine the nutrient intake, digestibility, nitrogen balance and weight gain. An increased DM, organic matter (OM), CP and NDF intakes were observed in calves fed FWS diets compared to those fed FWS 0 diet. Nitrogen retention increased significantly with increasing the level of FWS. The DM, OM, CP and NDF apparent digestibilities were non-significant in calves fed different levels of FWS. A linear increase in weight gain was noticed in calves fed diets containing increasing level of FWS.
Keywords: Urea-molasses fermented wheat straw; Chemical composition; Cattle manure; Buffalo calves; Growth performance

Havard Steinshamn, Mats Hoglind, Torstein H. Garmo, Erling Thuen, Ulrik Tutein Brenoe, Feed nitrogen conversion in lactating dairy cows on pasture as affected by concentrate supplementation, Animal Feed Science and Technology, Volume 131, Issues 1-2, 15 November 2006, Pages 25-41, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2006.02.004.
(http://www.sciencedirect.com/science/article/B6T42-4JFHF3G-1/2/3f1852a69f14f94c13ad0e90ec3a98f2)
Abstract:
The effect of concentrate supplementation on nitrogen (N) intake and excretion in grazing lactating dairy cows was determined in three herds in Norway. Grazing trials were conducted with each herd in June and August for two consecutive years. The average supplementation was 1.8 (S.D. 2.1) kg DM/day, and the concentrate was based on grain with a N content ranging from 18.7 to 24 g/kg DM. Herbage DM and N intake were reduced with increasing supplementation, but total DM and N intake increased. Milk yield and protein content increased by 1.1 kg milk and 0.28 g protein

per kg milk for each kg extra concentrate. Milk N excretion increased with increasing supplementation (6.5 g N/kg DM), and N utilisation improved by 11.7 g N per kg N intake per kg extra concentrate. Excretion of urine N and its share of total excreta N decreased by 4.0 and 9.2 g/kg concentrate, respectively. The reducing effect on urine N excretion of supplementation was, however, numerically low compared with other studies, most likely due to a high crude protein content of the concentrate used.
Keywords: Dairy cattle; Concentrate; Nitrogen excretion; Nitrogen efficiency; Grazing; Milk production

A.J. Duncan, Abdur Rahman, D.W. Miller, P. Frutos, I.J. Gordon, Atiq-ur Rehman, Ataullah Baig, Farman Ali, I.A. Wright, Transhumance livestock production in the Northern Areas of Pakistan: Nutritional inputs and productive outputs, Agriculture, Ecosystems & Environment, Volume 117, Issues 2-3, November 2006, Pages 195-204, ISSN 0167-8809, DOI: 10.1016/j.agee.2006.04.003.
(http://www.sciencedirect.com/science/article/B6T3Y-4JW7WKD-1/2/3f3f1993e1ca9b5b0c50b4d955d52d79)
Abstract:
The Northern Areas of Pakistan form a mountainous, semi-arid region in which subsistence mixed farming is the predominant economic activity for the majority of the population, which numbers around 1 million. Following a period of relative isolation, construction of the Karakoram Highway and the ensuing development activity have been catalysts for rapid infrastructural and social change over the last two decades. In the study reported here, feed resources for the livestock enterprise, which is largely made up of cattle, goats and sheep, were studied in detail over the course of a single winter feeding season. Productive outputs including liveweight change, milk production and reproductive performance were also quantified over a full year. The aim of the study was to provide a quantitative description of the system and to assess the extent to which proximity to a major highway influenced livestock husbandary. Six villages across the region were selected for study as part of a 2 x 3 factorial design with one village per cell of the study design. Factors consisted of two geographical transects and three agro-ecological zones. Transects were the Karakoram Highway (KKH) transect which enjoyed relatively good transport infrastructure and the Gilgit Ghizer Region (GGR) transect where infrastructure was more limited. Agro-ecological zones were the single, transitional and double cropping zones. One village per transect from each of the three main agro-ecological zones was chosen for study with 6-7 households within each village studied. Results showed that feed resources per household did not vary significantly according to transect or zone but cattle numbers per household were higher in the GGR transect than in the KKH transect indicating a heavier reliance on subsistence livestock production in this transect. Live weight and body condition of livestock in the Northern Areas changed markedly over the annual cycle. Losses of live weight were in the order of 10% over winter while summer gains during the summer season averaged 35% of initial live weight. There were differences between transects, with animals in the KKH gaining less weight in summer but showing higher milk yield (in cattle) and better reproductive performance. The results indicate a typical system of smallholder livestock production with heavy reliance on cereal by-products, a mix of livestock species and a relative scarcity of stored feed resources relative to overall livestock holdings. This study also suggests that proximity to the main highway running through the Northern Areas is associated with a reduced but more feed-efficient livestock production system.
Keywords: Livestock system; Pakistan; Productivity; Smallholder; Nutrient supply

Auvo Sairanen, Hannele Khalili, Perttu Virkajarvi, Concentrate supplementation responses of the pasture-fed dairy cow, Livestock Science, Volume 104, Issue 3, November 2006, Pages 292-302, ISSN 1871-1413, DOI: 10.1016/j.livsci.2006.04.009.
(http://www.sciencedirect.com/science/article/B7XNX-4K7FB4Y-1/2/f6e4ea1c0b8b290a7f1e72675c99a0db)

Abstract:
The aim of this study was to investigate the effects of increasing amounts of cereal-based concentrate on milk production. The study consisted of a series of three separate experiments in which cows were grazed in intensive rotation on timothy-meadow fescue pasture. In Experiment 1, 28 multiparous Holstein-Friesian cows received 0, 3, 6 and 9 kg concentrate in a cross-over designed trial with a fixed daily herbage allowance of 21 kg DM/cow. The energy-corrected milk yield increased linearly 0.84 kg/kg DM ($P < 0.001$), up to the 9 kg concentrate level. The milk fat ($P < 0.001$) and urea ($P < 0.001$) content decreased linearly (0.41 g/kg DM and 0.15 mmol/kg DM, respectively). The milk protein content tended ($P = 0.08$) to increase 0.10 g/kg DM with increasing supplementation.
In Experiment 2, 17 primiparous cows and 28 multiparous cows were used in a randomized-block designed trial with 3, 6 and 9 kg concentrate supplementation and a fixed 25 kg DM herbage allowance. The energy corrected milk yield increased linearly ($P < 0.01$) 0.67 kg/kg DM, whereas the milk urea content decreased linearly ($P < 0.001$) 0.27 mmol/kg DM. The milk protein content increased and the fat content decreased, but these differences were not significant.
In Experiment 3, a cross-over design was used to assess the response to concentrate supplementation of 24 multiparous cows (treatments: 6, 9 and 12 kg; fixed herbage allowance 25 kg DM) and 12 primiparous cows (treatments: 4, 7 and 10 kg; herbage allowance > 25 kg DM). The energy-corrected milk yield of the multiparous cows varied quadratically ($Pquad < 0.001$; 30.0, 32.5 and 32.2 kg for 6, 9 and 12 kg supplementation, respectively). Supplementation linearly decreased the urea ($P < 0.001$) 0.13 mmol/kg DM and fat ($P < 0.001$) 0.46 g/kg DM contents. The milk fat content also varied quadratically, showing the lowest content with the 12 kg level ($Pquad < 0.05$; 37.3, 37.3 and 34.9 g/kg for 6, 9 and 12 kg supplementation, respectively). The energy-corrected milk yield of the primiparous cows increased linearly ($P < 0.001$) 0.54 kg/kg DM up to 10 kg supplementation, whereas the milk urea ($P < 0.001$) and fat contents decreased linearly ($P < 0.01$) by 0.19 mmol/kg DM and 0.61 g/kg DM, respectively.
The results showed that the milk response remained linear up to the 9 kg supplementation level, but the highest level of supplementation resulted in only a marginal increase in milk yield. There was no interaction between season and milk or milk protein yield, which indicates that it is possible to maintain stable grazing conditions during the main grazing season in Nordic latitudes. The results support to some extent the hypothesis that the marginal milk response to supplementation increases with increasing milk production.
Keywords: Dairy cattle; Grazing; Concentrate feeding

R.W. Purchas, J.R. Busboom, B.H.P. Wilkinson, Changes in the forms of iron and in concentrations of taurine, carnosine, coenzyme Q10, and creatine in beef longissimus muscle with cooking and simulated stomach and duodenal digestion, Meat Science, Volume 74, Issue 3, November 2006, Pages 443-449, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.03.015.
(http://www.sciencedirect.com/science/article/B6T9G-4JKRH61-1/2/b1c8b1ec42b3ebea004a37da96fde16b)
Abstract:
Longissimus muscle samples from 31 Angus-cross heifers finished on either a high-concentrate feedlot diet or pasture were used to evaluate the effects of cooking (71 [degree sign]C) on the concentration and forms of iron in the meat, and also on concentrations of the bioactive compounds taurine, carnosine, coenzyme Q10, creatine and creatinine. For a sub-sample of 15 the effects of pepsin and pancreatin digestion were assessed. For iron, cooking resulted in some overall loss together with a major change from soluble haem and non-haem iron to the insoluble forms, but solubility was regained to a significant extent following digestion. Total haem iron percentage, however, decreased at each step from an initial 88% to a final 61% of total iron. For the bioactive compounds, cooking led to a reduction in taurine, carnosine, coenzyme Q10, and creatine. The effects of digestion on the bioactive compounds varied. No clear differences were

shown in the way in which beef from pasture-finished and feedlot-finished cattle responded to cooking and digestion.
Keywords: Pepsin digestion; Pancreatin; Bile extract; Haem iron; Beef; Cooking

D.A. King, C.E. Schuehle Pfeiffer, R.D. Randel, T.H. Welsh Jr., R.A. Oliphint, B.E. Baird, K.O. Curley Jr., R.C. Vann, D.S. Hale, J.W. Savell, Influence of animal temperament and stress responsiveness on the carcass quality and beef tenderness of feedlot cattle, Meat Science, Volume 74, Issue 3, November 2006, Pages 546-556, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.05.004.
(http://www.sciencedirect.com/science/article/B6T9G-4K0C9K9-5/2/6ecc30baf45a5725388e0243f842c2f3)
Abstract:
Three groups of steers (A, B, C) were used to study the effect of temperament (Calm, Intermediate, and Excitable) on meat quality. Temperament was based on exit velocity, pen scores, and chute scores. Temperament traits were consistent across evaluations, and values decreased ($P < 0.05$) in magnitude over time. Increasing excitability was associated with higher ($P < 0.05$) serum cortisol concentrations. Carcasses from cattle with calm temperaments had higher ($P < 0.05$) 0.5 h postmortem pH values than those from Intermediate and Excitable cattle (0.1 and 0.2 units, respectively). Group C Excitable steers had higher ($P < 0.05$) WBS values than the calmer Group C steers. This trend was observed in Group A steers, although the values were not statistically different. Correlations were highest between temperament values and tenderness after 21 d. Temperament influences tenderness, although the mechanism is not clear.
Keywords: Beef; Carcass quality; Stress; Temperament; Tenderness

P.K. Ghosh, Devi Dayal, K.K. Bandyopadhyay, M. Mohanty, Evaluation of straw and polythene mulch for enhancing productivity of irrigated summer groundnut, Field Crops Research, Volume 99, Issues 2-3, 30 October 2006, Pages 76-86, ISSN 0378-4290, DOI: 10.1016/j.fcr.2006.03.004.
(http://www.sciencedirect.com/science/article/B6T6M-4JYKKSN-1/2/24aeb46934d49788f188d00254006d0e)
Abstract:
In Vertisols of the semi-arid tropics lack of optimum soil water and low soil temperature (<18 [degree sign]C) during germination, and high soil temperature (>37 [degree sign]C) during pod development stage has been a major barrier to realizing yield potential of summer groundnut. Seven field experiments (comparing straw with polythene, 50 [mu]m gauge mulch, duration of retention of polythene mulch, testing the combined effect of straw and polythene mulch, N management in straw mulch and field demonstration) were carried out from 1992 to 1999 in a sequence to identify a suitable mulch material, which was socially and economically acceptable and could overcome soil water and soil temperature related problems for summer groundnut. In general, straw mulch (wheat or paddy) produced more pod (17-24%) and haulm yields (16%) of groundnut than polythene mulch (black or transparent) and no mulch because of favourable soil water and soil temperature, earlier seedling emergences, more flower and mature pods numbers, lower bulk density and less weeds. We observed that groundnut plants showed N deficiency under wheat straw mulch at the early stage (up to 60 days after sowing). However, towards maturity N deficiency occurred at the early stage had no significant negative impact on pod yield of groundnut because the plants recovered N deficiency and had greater chlorophyll content and pod yield. This is presumed to be associated with bio-availability of macro and micronutrient during decomposition of organic mulch. The pod yield of groundnut under black polythene was higher than under transparent polythene. The polythene mulch increased soil temperature by 4-5 [degree sign]C through out the crop growth (germination to maturity), which increased seeding emergence but was detrimental to pod setting and pod development (soil temperature exceeded 40 [degree sign]C). Thus, the benefit of polythene was only observed when it was retained up to podding

stage, but not up to harvest. The combined application of wheat straw and black polythene out-yielded sole application of wheat straw mulch but the former was 45% less profitable than the later one because of the cost of polythene. Wheat straw mulch was finally demonstrated to the farmer's field. It was found that sacrificing 5 t wheat straw as cattle feed, farmers on return get additional 0.47 t ha-1 legume fodder due to mulching which is nutritionally superior quality fodder in terms of crude protein, phosphorus content, crude fiber, ash and silica content compared to wheat straw as cattle feed. Thus, 16% additional production of highly nutritive groundnut haulm due to mulching has a significant implication on (i) nutritional fodder security, especially during the dry season when green fodder is costly and its availability is limited, and (ii) additional income of Rs. 3935 ha-1 from mulch. These two considerations, apart from solving temperature related problems convinced 32 farmers of Vadhvi and Zanjarda village of Junagadh district, Gujarat for adoption of wheat straw technology for summer groundnut in about 50 ha areas.
Keywords: Black polyethylene; Mulch; Paddy straw; Polyethylene mulch; Soil temperature; Summer groundnut; Transparent polyethylene; Wheat straw

Steven H. Hendrick, Todd F. Duffield, Ken E. Leslie, Kerry D. Lissemore, Marie Archambault, Randy Bagg, Paul Dick, David F. Kelton, Monensin might protect Ontario, Canada dairy cows from paratuberculosis milk-ELISA positivity, Preventive Veterinary Medicine, Volume 76, Issues 3-4, 17 October 2006, Pages 237-248, ISSN 0167-5877, DOI: 10.1016/j.prevetmed.2006.05.007.
(http://www.sciencedirect.com/science/article/B6TBK-4K719PW-2/2/1a61e711cfdab60732cc44e3771cb87a)
Abstract:
Our objective was to define the role of monensin sodium in protecting cows from being milk-ELISA positive for paratuberculosis in Ontario, Canada dairy herds. In total, 4933 dairy cows from 94 herds were enrolled in this cross-sectional study. Forty-four of the enrolled herds were selected purposively by their herd veterinarian and another 50 herds were randomly selected from a local milk production-recording agency. A herd-management survey was completed on each farm during the months of May through August 2003. During this same time-period, composite milk samples were collected from all lactating cows and tested with a milk-ELISA for antibodies to Mycobacterium avium subspecies paratuberculosis. Analyses were stratified according to the paratuberculosis history of the herds. In the 48 herds in which paratuberculosis had not been diagnosed before, the use of calf hutches and monensin in milking cows were both associated with reduced odds of a cow testing positive (OR = 0.19 and 0.21, respectively). In the 46 herds with a prior history of paratuberculosis, feeding monensin to the breeding-age heifers was associated with decreased odds of a cow testing positive (OR = 0.54). Monensin use might be associated with milk-ELISA positivity, but its impact on the transmission of paratuberculosis remains unknown.
Keywords: Paratuberculosis; Johne's disease; Management practices; Cattle-microbiological diseases

A. Rouilly, J. Jorda, L. Rigal, Thermo-mechanical processing of sugar beet pulp. I. Twin-screw extrusion process, Carbohydrate Polymers, Volume 66, Issue 1, 5 October 2006, Pages 81-87, ISSN 0144-8617, DOI: 10.1016/j.carbpol.2006.02.025.
(http://www.sciencedirect.com/science/article/B6TFD-4JMVHSD-5/2/391ca3a374fce7f4431158fda6827a00)
Abstract:
Sugar beet pulp (SBP) is the raffinate of sugar extraction. Composed of empty vegetal cells, three quarters of it consist of polysaccharides. As it is cheap and produced in great quantities SBP is a potential raw material for industrial applications other than cattle feeding. Twin-screw extrusion modified its structure and destructuring level depended on the specific mechanical energy provided (SME). By gradually increasing this energy, the rate of soluble matter increased, cell structure was progressively destroyed and SBP rheological behaviour was modified. For an SME

of 745 W h kg-1, SBP examined through a scanning electron microscope showed a structure similar to that of a composite formed by a continued matrix consisting mainly of pectin and hemicelluloses filled with cellulose microfibres. Plasticized SBP was then formed by injection-molding. Thus treated, SBP becomes a cheap alternative to the use of thermoplastic starch for the production of biodegradable materials.
Keywords: Twin-screw extrusion; Rheology; Thermoplastic; Injection-molding

Hamed M. El-Mashad, Wilko K.P. van Loon, Grietje Zeeman, Gerard P.A. Bot, Gatze Lettinga, Effect of Inoculum Addition Modes and Leachate Recirculation on Anaerobic Digestion of Solid Cattle Manure in an Accumulation System, Biosystems Engineering, Volume 95, Issue 2, October 2006, Pages 245-254, ISSN 1537-5110, DOI: 10.1016/j.biosystemseng.2006.06.006.
(http://www.sciencedirect.com/science/article/B6WXV-4KSD5FM-1/2/9ba49ce68fc8f24128e7e3a78825b5bf)
Abstract:
The effect of both leachate recirculation (at 40 and 50 [degree sign]C) and the mode of inoculum addition (at 50 [degree sign]C) on the performance of a non-mixed accumulation (i.e. fed batch) system treating solid cattle wastes was investigated, using laboratory scale reactors at a filling time of 60 days. A relatively high methane production rate (MPR) and low stratification of intermediates occur with leachate recirculation. The leachate recirculation volume flow and methane production rate are smaller at 40 [degree sign]C than at 50 [degree sign]C: 0[middle dot]31 and 0[middle dot]7 l [CH4] l-1 [reactor] day-1, respectively. The increased MPR at higher temperature is at one hand caused by the increase of microbial activity, at the other hand by the lower viscosity causing the increased leachate recirculation volume. Dividing the inoculum in equal doses and distributing them with the feed positively affects the system behaviour as compared to adding the same inoculum amount at the reactor bottom at the start only. Without addition of inoculum a very poor system performance was observed. The average MPR was 0[middle dot]2, 0[middle dot]4 and 0[middle dot]5 l [CH4] l-1 [reactor] day-1 for the reactor without inoculum, inoculum addition at the reactor bottom and inoculum addition in different equal doses, respectively.

C.K. Reynolds, Production and metabolic effects of site of starch digestion in dairy cattle, Animal Feed Science and Technology, Volume 130, Issues 1-2, Starch structure and digestibility: Basic aspects and new research, 30 September 2006, Pages 78-94, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2006.01.019.
(http://www.sciencedirect.com/science/article/B6T42-4JD1153-1/2/da55a24ac7d3a72eda029bfe900733e7)
Abstract:
Milk solids yield in modern dairy cows has increased linearly over the last 50 years, stressing the need for maximal dietary energy intake to allow genetic potential for milk energy yield to be realized with minimal negative effects on health and reproduction. Feeding supplemental starch is a common approach for increasing the energy density of the ration and supplying carbon for meeting the substantial glucose requirement of the higher yielding cow. In this regard, it is a long held belief that feeding starch in forms that increase digestion in the small intestine and glucose absorption will benefit the cow in terms of energetic efficiency and production response, but data supporting this dogma are equivocal. This review will consider the impact of supplemental starch and site of starch digestion on metabolic and production responses of lactating dairy cows, including effects on feed intake, milk yield and composition, nutrient partitioning, the capacity of the small intestine for starch digestion, and nutrient absorption and metabolism by the splanchnic tissues (the portal-drained viscera and liver). Whilst there appears to be considerable capacity for starch digestion and glucose absorption in the lactating dairy cow, numerous strategic studies implementing postruminal starch or glucose infusions have observed increases in milk yield, but

decreased milk fat concentration such that there is little effect on milk energy yield, even in early lactation. Measurements of energy balance confirm that the majority of the supplemental energy arising from postruminal starch digestion is used with high efficiency to support body adipose and protein retention, even in early lactation. These responses may be mediated by changes in insulin status, and be beneficial to the cow in terms of reproductive success and well-being. However, shifting starch digestion from the rumen impacts the nitrogen economy of the cow as well by shifting the microbial protein gained from starch digestion from potentially absorbable protein to endogenous faecal loss.
Keywords: Starch; Dairy cattle; Site of digestion

D.D. Tarkalson, J.O. Payero, S.M. Ensley, C.A. Shapiro, Nitrate accumulation and movement under deficit irrigation in soil receiving cattle manure and commercial fertilizer, Agricultural Water Management, Volume 85, Issues 1-2, 16 September 2006, Pages 201-210, ISSN 0378-3774, DOI: 10.1016/j.agwat.2006.04.005.
(http://www.sciencedirect.com/science/article/B6T3X-4K5HWGB-2/2/31a056971750ad119cc51351845653de)
Abstract:
Nitrate leaching from agricultural soils can increase groundwater nitrate concentrations. The objectives of the study were to assess the accumulation and movement of nitrate in the soil profile over a 2-year period under deficit irrigation conditions following a one time application of N in cattle feedlot manure and commercial fertilizer to corn at rates to achieve yield goals expected under conditions of full irrigation. Cattle manure and ammonium nitrate were applied in 2002 at the University of Nebraska recommended rate (1M and 1F, respectively) and cattle manure was applied at twice the recommended rate (2M) for N for the 2002 corn (Zea mays L.) crop. The recommended rate was based on expected yields under full irrigation. The manure N treatments were applied to percolation lysimeters and adjacent plots on a Cozad silt loam soil. Ammonium nitrate was applied only to the percolation lysimeters. Leachate from the lysimeters was extracted from a depth of 2.1 m and soil samples were collected from field plots in 0.3 m depth increments to 2.1 m on a periodic basis. Water available to the crop was sufficient to meet 89 and 79% of the potential crop ET in 2002 and 2003, respectively. When averaged over the manure N treatments, reduced ET resulted in grain yields that were approximately 2.1 and 2.7 Mg ha-1 less than expected in 2002 and 2003. Under deficit water inputs there was leachate movement below the root zone. Leachate depths averaged over N treatments were, however, reduced by 15% (33 mm) in 2002 and 47% (102 mm) in 2003 compared with those reported under full irrigation. The average nitrate-N (NO3--N) concentrations in leachate were higher under the 2M treatment (41 mg L-1) compared to the 1M treatment (17 mg L-1). The average NO3--N concentrations in leachate from the 1F treatment (28 mg L-1) was not different than the 1 or 2M treatments. There were trends for greater NO3--N mass losses in leachate averaged over all treatments in 2003 compared to 2002, indicating that NO3--N derived from the 2002 application leached to at least 2.4 m below the soil surface. There were no mass loss differences in leachate due to the 2001 crop in 2002. In 2003, mass of NO3--N in lysimeters cropped to soybean in 2001 were significantly higher (144 kg NO3--N ha-1) than the mass in lysimeters cropped to corn in 2001 (51 kg NO3--N ha-1). Nitrate-N mass increased in the 0.9-2.1 m soil depth 12-13 months after manure N treatment applications. The 2M treatment had greater soil NO3--N mass than the 1M treatment for most sampling dates in the surface 0.9 m. This research shows that there can be significant nitrate losses under deficit irrigation when manure N is over applied. These losses are likely related to water initially stored below the root zone and preferential flow of water from irrigation and precipitation. Determining accurate yield expectations under deficit irrigation conditions, correct scheduling of irrigation, and the use current best management practices for N management can help minimize nitrate losses in leachate.

Keywords: Plant available nitrogen; Evapotranspiration; Deficit irrigation; Corn; Maize; Nitrogen; Leaching; Percolation lysimeter

H.V. Petit, H. Twagiramungu, Conception rate and reproductive function of dairy cows fed different fat sources, Theriogenology, Volume 66, Issue 5, 15 September 2006, Pages 1316-1324, ISSN 0093-691X, DOI: 10.1016/j.theriogenology.2006.04.029.
(http://www.sciencedirect.com/science/article/B6TCM-4K3D30D-1/2/aabae72ad79ce6fd0f05336045e933d7)
Abstract:
The objective of the experiment was to determine the effects of fat supplementation on cyclicity, progesterone concentration, follicular development, conception rate, embryo mortality, and plasma concentrations of prostalglandin F metabolite (PGFM) in cattle. The hypothesis of this experiment was that feeding flaxseed, which is a source rich in C18:3, would increase conception rate of dairy cows due to decreased plasma PGFM concentrations. A total of 138 lactating Holstein cows were allotted at calving to three groups of 46 cows, blocked for similar calving dates. Cows within each block were assigned to one of three isonitrogenous, isoenergetic, and isolipidic supplements based on either whole flaxseed (FLA), Megalac(R) (MEG) or micronized soybeans (SOY). The diets were fed from calving to Day 50 of pregnancy for pregnant cows, or 120 day postpartum for those not diagnosed pregnant after AI. Detailed measurements of PGFM and follicle dynamics were only made on four cows for FLA and five cows for both MEG and SOY. The response in PGFM concentration following the oxytocin challenge administered around Week 11 of lactation was similar over time among treatments. Plasma progesterone concentrations from Days 17 to 21 of the estrous cycle starting around Week 9 of lactation and determined on a subsample of cows (n = for FLA and n = 5 for both MEG and SOY) were higher for cows fed FLA than for those fed SOY (P = 0.04) or MEG (P = 0.06). Conception rates were similar among treatments. Total embryo mortality was lower (P = 0.07) for cows fed FLA (0%) compared to those fed either MEG (15.4%) or SOY (8.0%). The mean size of the CL measured during a complete estrous cycle from Week 9 of lactation was smaller for cows fed SOY (16.3 mm) compared to those fed either FLA (19.1 mm) or MEG (18.3 mm). We inferred that pregnancy losses could be reduced by feeding whole flaxseed as a result of its effects on different factors such as modulation in concentration of progesterone and size of the CL.
Keywords: Flaxseed; Fatty acid; Ovarian function; Prostaglandins; Embryonic loss

Inger Sofie Hamnes, Bjorn Gjerde, Lucy Robertson, Prevalence of Giardia and Cryptosporidium in dairy calves in three areas of Norway, Veterinary Parasitology, Volume 140, Issues 3-4, 10 September 2006, Pages 204-216, ISSN 0304-4017, DOI: 10.1016/j.vetpar.2006.03.024.
(http://www.sciencedirect.com/science/article/B6TD7-4JVSVNT-1/2/69e096dcad47654aa2114b524fd838ac)
Abstract:
A study was undertaken to determine the prevalences of Cryptosporidium and Giardia in dairy calves less than 6 months of age in Norway. Faecal samples were collected from a total of 1386 calves, between 3 and 183 days of age, in 136 dairy farms from three different areas of Norway. Faecal samples were examined for Cryptosporidium oocysts and Giardia cysts after concentration and immunofluorescent staining.
Giardia was found in 93% (127 out of 136) of the farms and in 49% (679 out of 1386) of the calves. Cryptosporidium was found in 53% (72 out of 136) of the farms and in 12% (167 out of 1386) of the calves. The level of Giardia and/or Cryptosporidium was low in the majority of the infected calves.
Infection peaked in the age group 2-3 months for both Cryptosporidium and Giardia. The prevalences of both parasites were higher in samples taken during winter than in samples taken during summer, and statistically significant differences were found when prevalences in different

age groups of calves were compared between the three areas. A significantly lower prevalence of Cryptosporidium was found in calves housed in shared pens that were thoroughly washed more than three times a year than in calves from pens washed less often. For Giardia there was a trend for decreasing intensity of infection with increasing age in the sampled calves. For Cryptosporidium there was a trend for increasing herd prevalence with increasing number of calves in the herd, but this trend was not statistically significant. Other parameters which were investigated such as housing, feeding or management routines were not associated with prevalence or intensity of infection with either parasite.
Keywords: Cryptosporidium; Giardia; Cattle; Prevalence; Calves; Norway

D. Villalba, I. Casasus, A. Sanz, A. Bernues, J. Estany, R. Revilla, Stochastic simulation of mountain beef cattle systems, Agricultural Systems, Volume 89, Issues 2-3, September 2006, Pages 414-434, ISSN 0308-521X, DOI: 10.1016/j.agsy.2005.10.005.
(http://www.sciencedirect.com/science/article/B6T3W-4HR76RM-4/2/966f7fa99a02dd4e5f6643b9e65f8549)
Abstract:
A stochastic model for simulating mountain beef cattle systems was described and validated using real data. The model was able to properly simulate complex batches of animals with different initial characteristics and so obtain results about the mean and variance of animal productive and reproductive outputs. Model was used to simulate four feeding strategies during winter period in the conditions of autumn calving in the Spanish Pyrenees. The simulated strategies were CONTROL: 100% of recommendations for the mean animal; LOW1: as 24% restriction from the amount of energy provided to CONTROL, applied only during lactation; LOW2: the same of LOW1, but was applied only the last two thirds of lactation; LOW3: 16% restriction from CONTROL applied at late gestation and first third of lactation. Simulated results showed that restrictions around 25% of the total winter energy requirements of beef cows in housing conditions are possible and sustainable. The best option taking into account reproductive performance and outputs variability seems to be a continuous restriction during all lactation (strategy LOW1). On the other hand, an extensification policy implying extended grazing till mid or late December with housing afterwards (strategy LOW3), is also possible and will have no negative consequences on calf growth (only viability of young calves being outdoors in autumn should be evaluated), but can affect the PPA of cows and so the herd reproductive performance could be compromised in the long term.
Keywords: Simulation; Stochastic models; Beef cattle; Feeding strategies

Erika Takagi Nunes, Maria Izabel Camargo Mathias, Gervasio Henrique Bechara, Structural and cytochemical changes in the salivary glands of the Rhipicephalus (Boophilus) microplus (CANESTRINI, 1887) (Acari: Ixodidae) tick female during feeding, Veterinary Parasitology, Volume 140, Issues 1-2, 31 August 2006, Pages 114-123, ISSN 0304-4017, DOI: 10.1016/j.vetpar.2006.03.010.
(http://www.sciencedirect.com/science/article/B6TD7-4JRVD9P-6/2/dc9401979ce932a6aeedceafbb6825c5)
Abstract:
This study describes the morphology of salivary glands of Rhipicephalus (Boophilus) microplus female ticks at beginning of feeding (24-48 h of attachment) and semi-engorged (4-5 days of attachment) to verify the degenerative characteristics of these organs and the secretory phase in which the process begins. At the beginning of feeding, secretion granules had been observed only in the cytoplasm of cells b, c1, c2, c4 (type II acinus) and d (type III acinus), as well as large nuclei with regular and preserved morphology. In the semi-engorged females the acini presented few normal cells, few partially preserved ones, and the remaining ones in several stages of degeneration, that is, with retraction and cytoplasmic vacuolization, and nuclei with chromatin in

several stages of condensation, picnotic and/or in fragmentation. In type I acinus and in the excretory ducts of the studied glands, at both feeding stages, no degenerative characteristic was observed. In females of R. (B.) microplus, the salivary glands degenerate asynchronically and precociously when compared with those of others tick's species.
Keywords: Rhipicephalus (Boophilus) microplus; Cattle-tick; Salivary glands; Histology; Histochemistry; Cytochemistry; Degeneration; Cell death; Apoptosis

Takehisa Yamamoto, Toshiyuki Tsutsui, Takashi Nonaka, Sota Kobayashi, Akiko Nishiguchi, Itsuro Yamane, A quantitative assessment of the risk of exposure to bovine spongiform encephalopathy via meat-and-bone meal in Japan, Preventive Veterinary Medicine, Volume 75, Issues 3-4, 17 August 2006, Pages 221-238, ISSN 0167-5877, DOI: 10.1016/j.prevetmed.2006.03.003.
(http://www.sciencedirect.com/science/article/B6TBK-4K07FHM-1/2/e5722423b3684ddb255c790fe1325706)
Abstract:
The feeding of meat-and-bone meal (MBM) derived from cattle infected with bovine spongiform encephalopathy (BSE) is a major source of BSE infection. The risks of BSE infection via MBM in Japan were examined quantitatively to estimate infectivity to cattle via MBM derived from a single clinically infected animal being rendered. Three routes of exposure were modeled: (i) feeding cattle concentrates containing MBM as an ingredient, (ii) feeding cattle concentrates contaminated with MBM from non-ruminant feed at feed plants and (iii) directly feeding MBM in supplemental form to cattle on farms. The effectiveness of measures designed to restrict the feeding of ruminants with ruminant MBM (feed restriction) as well as differences in the risk of exposure among regions were examined using the model.
The model revealed that the median total infectivity fed to dairy cattle via MBM derived from one infected animal was approximately 0.49 cattle oral ID50 (5th percentile = 0.43 ID50, 95th percentile = 0.54 ID50). This value was reduced by 55% after the addition of MBM to cattle concentrates was restricted in 1996. The risk of exposure in dairy cattle was twice that in beef cattle. Comparisons of regional differences in exposure risk indicated that the risk was highest in a region where 14 of the 20 BSE cases reported to date were born. Our model suggested that the routes of exposure via MBM were unlikely to result in increased propagation of BSE in Japan. Furthermore, despite some regional variation, the risk of exposure declined further after the feed restriction was imposed in 1996.
Keywords: BSE; Meat-and-bone meal; Risk assessment

S. De Campeneere, D.L. De Brabander, J.M. Vanacker, Milk urea concentration as affected by the roughage type offered to dairy cattle, Livestock Science, Volume 103, Issues 1-2, August 2006, Pages 30-39, ISSN 1871-1413, DOI: 10.1016/j.livsci.2005.12.007.
(http://www.sciencedirect.com/science/article/B7XNX-4JTRTPF-1/2/02f464174f98806139a9935016473839)
Abstract:
Milk urea content (MUC) is used to manage protein nutrition and predict nitrogen excretion of dairy cows. However, MUC might depend on the roughage type offered and hence, for comparable MUC values, different N-excretions might be found. To evaluate this, three diets were compared in a feeding trial with 18 lactating Holstein cows in a Latin square design with as roughages 100% maize silage (treatment 100 MS), 50%/50% maize silage/prewilted grass silage (treatment 50 MS) and 100% prewilted grass silage (treatment 100 PGS). For all treatments, cows were fed to supply 105% of their net energy and digestible protein requirements and to have a daily rumen degraded protein balance (RDPB) intake of 100 g. This was only possible by feeding soybean meal as a protein corrector to 100 MS and 50 MS and by feeding citruspulp as an energy corrector in 100

PGS. The same balanced concentrate was fed to all groups. In a separate trial, N-balance was determined for both 100% rations.
In the feeding trial, the MUC of 100 MS (230 mg/l) and 50 MS treatment (214 mg/l) were significantly ($P < 0.001$) different from that of 100 PGS (171 mg/l). Cows on treatments 50 MS and 100 PGS ingested the same amount of RDPB (71 and 73 g/day), but when fed 100 MS cows ingested -16 g/day. After correction for differences in energy and protein supply, MUC of the 100 MS was 71 mg/l higher than that of 100 PGS.
N-balances indicated that total N-excretion (faecal, urinary and milk) was almost identical for both treatments: 392 for 100 MS versus 389 g/day for 100 PGS, as was environmental N-excretion (faecal and urinary): 259 for 100 MS versus 272 g/day for 100 PGS. However, the MUC content for 100 MS was significantly higher: 248 mg/l versus 180 mg/l for 100 PGS. From a correction for differences in energy and protein supply, this difference increased up to 84 mg/l between 100 MS and 100 PGS.
These results suggest that MUC is roughage dependent and that a system to predict N-excretion should account for these differences. Therefore the exact mechanism behind the determined roughage influence should be investigated further.
Keywords: Milk urea content; N-excretion; N-balance

M.G. Keane, M.J. Drennan, A.P. Moloney, Comparison of supplementary concentrate levels with grass silage, separate or total mixed ration feeding, and duration of finishing in beef steers, Livestock Science, Volume 103, Issues 1-2, August 2006, Pages 169-180, ISSN 1871-1413, DOI: 10.1016/j.livsci.2006.02.008.
(http://www.sciencedirect.com/science/article/B7XNX-4JRKJM0-2/2/10f251767489ce4a7bace8d33474af93)
Abstract:
Winter finishing of beef cattle is expensive so feed costs per kg carcass gain must be minimised. The objectives of this study with finishing beef steers were (1) to determine the production responses to varying levels of supplementary concentrates with grass silage, (2) to compare the effects of feeding silage and concentrates separately or as a total mixed ration (TMR), and (3) to compare short (S) and long (L) finishing periods. A total of 117 finishing steers were blocked on weight and assigned to 13 groups of 9 animals each comprising a pre-experimental slaughter group and 12 finishing groups arranged in a 6 (feeding treatments) x 2 (durations of finishing) factorial experiment. The 6 feeding treatments were: (1) silage only offered ad libitum (SO), (2) SO plus a low level of concentrates offered separately (LS), (3) SO plus a low level of concentrates offered as a TMR (LM), (4) SO plus a high level of concentrates offered separately (HS), (5) SO plus a high level of concentrates offered as a TMR (HM), and (6) concentrates ad libitum plus restricted silage (AL). Target low and high concentrate levels were proportionately 0.375 and 0.750 of daily dry matter (DM) intake, respectively. S and L finishing periods were 105 and 175 days, respectively. Silage DM intake decreased ($P < 0.001$) and total DM intake increased ($P < 0.001$) with increasing concentrate level. Maximum DM intake occurred at the high concentrate level but maximum net energy intake occurred on ad libitum concentrates. Live weight gains for SO, LS, LM, HS, HM and AL were 212, 900, 929, 1111, 1089 and 1207 (S.E. 46.2) g/day, respectively. Corresponding carcass weight gains were 119, 506, 540, 662, 633 and 746 (S.E. 25.4) g/day. Kill-out proportion, carcass conformation score and all measures of fatness increased significantly with increasing concentrate level. Feeding a TMR increased silage intake at the low concentrate level but otherwise had no effect on overall animal performance or carcass traits. Extending the finishing period reduced ($P < 0.001$) daily live weight gain, but the associated reduction in carcass weight gain was not statistically significant. It is concluded that the response to supplementary concentrates decreased with increasing level, there was no animal production advantage to a TMR over separate feeding of the dietary constituents, and extending the duration of the finishing period reduced mean daily live weight gain and increased fatness.

Keywords: Beef cattle; Concentrate supplementation; Total mixed ration; Winter finishing

Susana L. Amigot, Cecilia L. Fulgueira, Hebe Bottai, Juan Carlos Basilico, New parameters to evaluate forage quality, Postharvest Biology and Technology, Volume 41, Issue 2, August 2006, Pages 215-224, ISSN 0925-5214, DOI: 10.1016/j.postharvbio.2006.03.009.
(http://www.sciencedirect.com/science/article/B6TBJ-4K48N9D-2/2/753175bb91217ffc1493989ee94d407e)
Abstract:
The preservation of feedstuff for animal consumption (forages) by fermentation or dehydration is a common practice to supplement pastures and achieve better yields. Currently, the quality of a forage has been evaluated only through chemico-fermentative parameters. However, animals' health can also be affected by the presence of bacteria, molds, and/or some of their metabolites, e.g. mycotoxins.
The quality of 147 forage samples (55 sorghum, 49 lucerne, and 43 maize) used for feeding dairy cattle, was evaluated using chemico-fermentative (pH, ammonial nitrogen/total nitrogen ratio) characteristics, fungal propagule counts, and the presence of Aspergillus fumigatus and mycotoxins (aflatoxins and deoxynivalenol).
Most lucerne samples (55.1%) were of bad chemico-fermentative quality (risky for consumption). In addition, a high percentage of samples (38.8% lucerne, 65.1% maize and 69.1% sorghum) presented Fairly Good (doubtful) chemico-fermentative characteristics.
Maize samples showed the highest frequency of contaminated samples by high counts (25.6%), followed by lucerne (with a lower fermentative sugar content) (18.4%), and sorghum (16.4%). The mycoflora was distributed in 59 species belonging to 26 genera. In all forages, molds were the most numerous isolates, with the greatest number of isolates being Aspergillus species (17% isolates) with numerous isolates in the section Flavi, followed by Penicillium (9.7%) in maize, Fusarium (12.3%) in lucerne, and Byssochlamys (8.5%), Fusarium and Geotrichum (6.1% each) in sorghum.
Even though the lucerne and maize samples presented a high mycotoxin incidence, and in most of them the simultaneous presence of AF and DON was detected, average values were not very high (AF: 6.78 and 6.96 [mu]g/kg, DON: 1666.67 and 717.50 [mu]g/kg, respectively for lucerne and maize). The high degree of contamination registered in the samples (81.6% lucerne, 67.4% maize and 45.5% sorghum) indicates the need for improving the technology applied during the development of crops, their harvest and the preparation and conservation of forages. It could be determined ($p < 0.05$) that AF + DON are contamination markers in lucerne and maize silages. In sorghum forages, a significant association ($p < 0.01$) was detected between risk and storage method.
Keywords: Forages quality; Aflatoxin; Deoxynivalenol; Aspergillus; Fusarium; Dairy cattle

Guillermo Coward-Kelly, Vincent S. Chang, Frank K. Agbogbo, Mark T. Holtzapple, Lime treatment of keratinous materials for the generation of highly digestible animal feed: 1. Chicken feathers, Bioresource Technology, Volume 97, Issue 11, July 2006, Pages 1337-1343, ISSN 0960-8524, DOI: 10.1016/j.biortech.2005.05.021.
(http://www.sciencedirect.com/science/article/B6V24-4GV9S9B-1/2/873b1d6ffa8844bcd47488a3734227d2)
Abstract:
Chicken feather keratin was treated with lime (calcium hydroxide) to obtain a liquid product rich in amino acids and polypeptides that can be used as an animal feed supplement. The effect of treatment conditions and the properties of the soluble keratin were studied. At high temperatures (150 [degree sign]C), 80% of feather keratin was solubilized within 25 min, whereas a relatively longer reaction time (300 min) is needed at moderate temperatures (100 [degree sign]C). After 3 h of hydrolysis at 150 [degree sign]C, 95% of feather keratin was digested. For the recommended

conditions (100 [degree sign]C, 300 min, and 0.1 g Ca(OH)2/g dry feather), after lime treatment, about 54% of calcium can be recovered by carbonating. In rumen fluid, ammonia production from soluble keratin was similar to that of soybean and cottonseed meals and was greatly less than that of urea, indicating that no ammonia toxicity will result from cattle being fed soluble keratin.
Keywords: Chicken feathers; Keratin; Lime treatment; Thermo-chemical treatment; Animal feed

H.C.F. Wicks, J.D. Leaver, Influence of genetic merit and environment on somatic cell counts of Holstein-Friesian cows, The Veterinary Journal, Volume 172, Issue 1, July 2006, Pages 52-57, ISSN 1090-0233, DOI: 10.1016/j.tvjl.2005.02.027.
(http://www.sciencedirect.com/science/article/B6WXN-4G1V681-5/2/ca87d9954bbd351e1501f3cca87acde7)
Abstract:
Financially, mastitis is one of the most important diseases affecting dairy cattle in the United Kingdom. Seven commercial farms were monitored over a 2.5 year period and data from 1040 cows were included in a study that examined both straw yard and cubicle housing systems. The influence of genetic merit for milk production (PIN95 and PTAf+p) on somatic cell counts (SCC) as an indicator of mastitis under commercial farm conditions was assessed. The mean genetic potential ([pound sign]PIN95) was 39.0 (+/-0.80) and the mean 305-day milk yield (kg) was 7980 (+/-54.2). In all, 5618 monthly records of SCC and 1040 records of 305-day SCC were included in the analysis. A multiple regression model was used to assess the influence of genetic merit and the level of concentrate intake on SCC (the log10 transformation was used) under the two housing systems.
Significant interactions between genetic merit and housing system, and concentrate intake and housing system were found. Log10 SCC increased with genetic merit when cows were housed in straw yard accommodation, but decreased when cows were housed in cubicle accommodation. The increase in SCC with concentrate feeding was higher for straw yards. For parity 2 animals, there was a significant positive correlation between PIN95 and SCC (rp = 0.184, P = 0.003) but the correlations between 305-day milk production and SCC were negative for animals greater than parity 2.
Keywords: SCC; Environment; Genetic merit; On-farm; Holstein-Friesian

H. Malekinejad, R. Maas-Bakker, J. Fink-Gremmels, Species differences in the hepatic biotransformation of zearalenone, The Veterinary Journal, Volume 172, Issue 1, July 2006, Pages 96-102, ISSN 1090-0233, DOI: 10.1016/j.tvjl.2005.03.004.
(http://www.sciencedirect.com/science/article/B6WXN-4G6J8C0-1/2/6e8fc990623d39f734d101469ffd9221)
Abstract:
Zearalenone (ZEA), a Fusarium toxin, is frequently found in animal feed materials. It is known to exert oestrogenic effects in all animals tested but susceptibility varies between species, possibly reflecting differences in the metabolic processing of ZEA, which predominantly involves hydroxylations, assumed to be catalysed by 3[alpha]- and 3[beta]- hydroxysteroid dehydrogenases, as well as conjugation with glucuronic acid. In this study, the biotransformation of ZEA by hepatic subcellular fractions of various domestic animals was investigated and compared to the rat.
Notable inter-species differences in terms of the rate of absolute and relative metabolite production in the different subcellular fractions were identified. The highest amount of [alpha]-zearalenol ([alpha]-ZOL) was produced by pig hepatic microsomes (Vmax = 795.8 +/- 122.7 pmol/mg/min), whereas in chicken microsomes the highest amounts of [beta]-zearalenol ([beta]-ZOL) (Vmax = 1524 +/- 29.7 pmol/mg/min) could be measured. Except for sheep and cattle, the efficiency of [alpha]-ZOL production (expressed as the ratio of apparent Vmax/km) was higher in the microsomal fraction compared to the post-mitochondrial fraction. In contrast, the apparent

efficiency of [beta]-ZOL production was high in pigs, cattle, chickens and rats, but very low in sheep. Conjugation of ZEA with glucuronic acid was investigated, and the results indicated significant inter-species differences in the rate of glucuronidation, which was saturable at low concentrations in all species tested, except pigs. The significant differences between the percentages of glucuronidation of ZEA, [alpha]-ZOL, and [beta]-ZOL suggest not only differences in the affinity of the individual substrate, but might also indicate the presence of different isoforms of uridine diphosphate glucuronyl transferases (UDPGTs). The results are of clinical relevance, as they contribute to the understanding of the species-specific susceptibility towards exposure to ZEA.
Keywords: Zearalenone; [alpha]-Zearalenol ([alpha]-ZOL); [beta]-Zearalenol ([beta]-ZOL); Biotransformation; Glucuronidation

Pedro Banales, Leandro Fernandez, Maria V. Repiso, Andres Gil, David A. Dargatz, Takeshi Osawa, A nationwide survey on seroprevalence of Neospora caninum infection in beef cattle in Uruguay, Veterinary Parasitology, Volume 139, Issues 1-3, 30 June 2006, Pages 15-20, ISSN 0304-4017, DOI: 10.1016/j.vetpar.2006.03.004.
(http://www.sciencedirect.com/science/article/B6TD7-4JRVD9P-5/2/99d08316b5ca46c1ded3ef78e1b9285c)
Abstract:
Bovine abortions due to Neospora caninum infection have been reported worldwide and its economic impact on the beef industry has been acknowledged as a problem. Uruguay has the largest export value of beef per acre in South America. However, no data on the prevalence of N. caninum infection have been available in this country. The objective of this study was to estimate the prevalence and distribution of N. caninum infection in beef cattle in Uruguay through a nationwide survey. A two stage sampling design was used with farms being selected in stage one and animals being selected in stage two. A brief questionnaire was administered on each farm. Seroprevalence of N. caninum in 4444 beef cattle from 229 farms in all the counties, except Montevideo, of Uruguay was determined by an ELISA. The data were then analyzed to identify associations between infection and variables such as type of animal (cow or heifer), herd size, use of veterinary advice, productivity of the soil in relation to the national average, use of improved grass, use of mineral salts, use of supplemental feed, and presence of a dog(s) on the farm. The estimated proportion of positive farms for all the beef cattle operations was 69.2% (95% confidence interval [CI], 53.7-84.7). The overall cattle seroprevalence was estimated as 13.9% (95% CI, 11.6-16.3). The prevalence estimation by animal category was 14.3% (95% CI, 11.4-17.2) for beef cows and 12.9% (95% CI, 10.0-15.8) for beef heifers. There was no significant difference in the estimated prevalence between the two animal types. There was no significant difference in the animal level prevalence of N. caninum infection among different herd sizes. None of the herd demographic or management variables was significantly associated with the seropositivity to N. caninum infection. In conclusion, these results show that N. caninum infection is common among beef herds across Uruguay. Since the beef industry is one of the key industries in Uruguay, the economic effect and risk factors of N. caninum infection among beef cattle in this country should be further evaluated in the near future.
Keywords: Neospora caninum; ELISA; Uruguay; Seroprevalence

C.J. Ward, Mathematical models to assess strategies for the control of gastrointestinal roundworms in cattle: 1. Construction, Veterinary Parasitology, Volume 138, Issues 3-4, 15 June 2006, Pages 247-267, ISSN 0304-4017, DOI: 10.1016/j.vetpar.2006.01.054.
(http://www.sciencedirect.com/science/article/B6TD7-4JDMVCD-2/2/171faaa4462d350ed442605ef311c1a4)
Abstract:

Mathematical models were constructed to simulate the effect of Ostertagia ostertagi infections on the growth of young cattle. The equations are based on System Dynamics using the DYSMAP 2 software package in their construction. A pasture and animal growth model simulates the growth of pasture and the influences of management and climate on it; cattle feed intake and conversion into energy for maintenance and liveweight gain; the effect of the parasite burden on feed intake and utilization of energy. This model was then combined with one of the life cycle of O. ostertagi in order to determine the effect of worm burdens on animal growth rate in a range of farm conditions, such as stocking rate, grazing history of the pasture, and rainfall. By converting the resultant liveweight gain into a monetary value, an economic assessment of alternative worm control strategies can be made. In this paper the construction of the models with equations and assumptions is given in detail.
Keywords: Ostertagia ostertagi; Cattle-Nematoda; Control methods-Nematoda; Growth performance; Mathematical model

C.J. Ward, Mathematical models to assess strategies for the control of gastrointestinal roundworms in cattle: 2. Validation, Veterinary Parasitology, Volume 138, Issues 3-4, 15 June 2006, Pages 268-279, ISSN 0304-4017, DOI: 10.1016/j.vetpar.2006.01.053.
(http://www.sciencedirect.com/science/article/B6TD7-4JD0YH9-4/2/8947bd6adb3e8a23b1177ab2bfb07c31)
Abstract:
A computer model of the population biology of Ostertagia ostertagi in young cattle and the effect of the parasite on animal growth has been constructed. It was validated against results from field trials where worm populations and rate of growth of cattle treated with anthelmintics were compared to similar groups of untreated animals. A close correlation between observed and predicted values for faecal egg and pasture larval counts was seen in the cattle which had been treated with an oxfendazole pulse release bolus at turnout. Timings and peak values were less accurately predicted in the untreated cattle. Although predictions for live weight gain during the grazing season indicated that the model may be overestimating the potential growth rate of cattle, it is considered that the model provides a suitable tool for comparing the effectiveness of different worming programmes under farm conditions. The computer simulation also allowed examination of the underlying influences and interactions between parasitological factors, such as numbers of immature and adult worms, and animal and pasture factors, such as sward height, grass consumption and feed conversion, in the parasite's influence on animal performance.
Keywords: Ostertagia ostertagi; Cattle--Nematoda; Control methods--Nematoda; Growth performance; Mathematical model; Oxfendazole

H. Diaz-Solis, M.M. Kothmann, W.E. Grant, R. De Luna-Villarreal, Application of a simple ecological sustainability simulator (SESS) as a management tool in the semi-arid rangelands of northeastern Mexico, Agricultural Systems, Volume 88, Issues 2-3, June 2006, Pages 514-527, ISSN 0308-521X, DOI: 10.1016/j.agsy.2005.07.008.
(http://www.sciencedirect.com/science/article/B6T3W-4H2FY9S-1/2/daddbfd7aec13495634f9b6fa6e3d216)
Abstract:
We use a simple ecological sustainability simulator (SESS) [Diaz-Solis, H., Kothmann, M.M., Hamilton, W.T., Grant, W.E., 2003. A simple ecological sustainability simulator (SESS) for stocking rate management on semi-arid grazinglands, 76, 655] for rangelands with mean annual precipitation of 500 mm to evaluate tendencies in range productivity and cattle production under four management options: (1) supplemental feeding, (2) short-term reduction of stocking rate, (3) early weaning, and (4) adjustment of breeding seasons. We have made five modifications to SESS for the present paper. (1) Cattle mortality now occurs each month as a function of body condition. (2) Cows that are not pregnant 2 months after the end of the breeding season are sold. (3) Forage

intake is calculated separately for each cohort of cows. (4) Cows that have been sold or have died are replaced just before the beginning of each breeding season (except for the short-term reduction of stocking rate strategy). (5) The calculation of stocking rate now includes cows, bulls, nursing calves, weaned heifers less than 20 months of age, and pre-reproductive heifers aged 20 months or older.
Simulation results suggest the four management options might be ranked from best to worst, in terms of increasing cattle production while maintaining range productivity, as: (1) short-term reduction of stocking rate, (2) adjustment of breeding seasons, (3) early weaning, and (4) supplementation. Short-term reduction of high stocking rates reduces the deterioration of range productivity because of the reduction in the number of stock. Adjustment of breeding seasons such that periods of highest energy requirements of cows and calves coincide with periods of highest forage production increases percentage pregnancy. Early weaning of calves improves the body condition of cows and increases annual production of weaned calves, but does not reduce the stocking rate and thus does not improve range productivity. Supplemental feeding, and other management practices that artificially sustain herbivores, break the negative feedback that promotes good range productivity and maintains long-term system stability. In general, strategies to increase cattle production in semi-arid rangelands should be based on the improvement of natural forage production.
Keywords: Cattle production; Grazinglands; Range productivity; Rangelands; Simulation models; Stocking rate; Supplemental feeding; Semi-arid zones; Sustainability

Richard G. Nelson, Mark D. Schrock, Energetic and economic feasibility associated with the production, processing, and conversion of beef tallow to a substitute diesel fuel, Biomass and Bioenergy, Volume 30, Issue 6, June 2006, Pages 584-591, ISSN 0961-9534, DOI: 10.1016/j.biombioe.2005.09.005.
(http://www.sciencedirect.com/science/article/B6V22-4JCCJMS-1/2/f0ece188f1d085a60444a00a50870fa2)
Abstract:
This study investigates the resource availability, energetic efficiency, and economic feasibility of converting edible and inedible beef tallow into biodiesel, a substitute diesel fuel.
A resource assessment of edible and inedible beef tallow generation in the United States was performed for the period of 1997-2001. At that time, an average of more than 1.8 Mt (4 billion pounds) of edible and inedible tallow were generated each year in the 11 largest commercial cattle slaughtering states, which would equate to more than 2.08 GL (551 million gallons) of biodiesel (~1% of the total US distillate consumption).
Tallow is a by-product of our meat production and processing system, which complicates its energy and economic analysis. Although tallow is available in significant quantities at relatively low cost, it is not intentionally produced as a feedstock for biodiesel. Because of this uncertainty, energetic (energy ratio) and economic (production cost per gallon) feasibilities were estimated for three different system boundaries: (1) conversion of tallow by a continuous-flow transesterification process only with co-product (glycerin) credit, (2) rendering plant operations plus tallow transesterification, and (3) growth and maintenance of the beef animal from conception through rendering and transesterification. Energy ratios varied from 17.29 to 0.81 within the three system boundaries based on various assignments of the co-product energy credit for glycerin.
Cost-sensitivity analyses were performed to determine the effect of feedstock cost and by-product (glycerin) credit on biodiesel cost. Feedstock cost had the greatest impact, while by-product credit effect was minimal. Cost of production ranged from $0.22 to $0.63 L-1 ($0.82-$2.38 gallon-1) produced.
Keywords: Biodiesel; Tallow; Energy ratio; Direct and embodied energies; Transesterification; Co-product credits; Economics

Jehan Frans Ettema, Soren Ostergaard, Economic decision making on prevention and control of clinical lameness in Danish dairy herds, Livestock Science, Volume 102, Issues 1-2, June 2006, Pages 92-106, ISSN 1871-1413, DOI: 10.1016/j.livprodsci.2005.11.021.
(http://www.sciencedirect.com/science/article/B7XNX-4K5SD89-6/2/6604b3de4bcc11fa50bdd1da7e48a989)
Abstract:
From an economic point of view, clinical lameness is considered to be one of the major health disorders in dairy cattle. The aim of this study was to establish the costs of lameness in different herds and to improve decision-making on prevention and control of clinical lameness. Economically feasible strategies of prevention and control were defined and the potential effects were calculated by a dynamic, stochastic and mechanistic Monte Carlo model, called SimHerd. The modelled risk factors on cow level for lameness were base-risk in the herd, parity, milk yield potential, disease interrelationship, disease recurrence and season. Milk yield reduction, reduced feed intake, weight loss, reduced conception rate and mortality were modeled as effects of lameness. To study the effect of herd differences on the efficacy of the preventive methods, four different herds representing different levels of reproductive management, conception rates and milk production were designed and compared to the default situation.
The loss per first case of lameness was found to be [euro]192 in the default herd that represents the modern, average Danish dairy herd. An increase of the margin per cow-year of [euro]22.7 was the result of halving the risk of lameness in the default herd. Implementation of footbaths and rubber flooring increased margin per cow-year by [euro]4.2 and [euro]17, respectively.
In a sensitivity analysis, 16 model parameters were changed to their lowest and highest value found in the literature. The model seemed most sensitive to the uncertainty of the effect of lameness on milk yield.
Keywords: Lameness; Dairy herds; Decision support system

L. Scott, P. McGee, D. Minihan, J.J. Sheridan, B. Earley, N. Leonard, The characterisation of E. coli O157:H7 isolates from cattle faeces and feedlot environment using PFGE, Veterinary Microbiology, Volume 114, Issues 3-4, 31 May 2006, Pages 331-336, ISSN 0378-1135, DOI: 10.1016/j.vetmic.2005.11.066.
(http://www.sciencedirect.com/science/article/B6TD6-4J021PM-2/2/d30593532d827177ce61b1dd9db2493d)
Abstract:
The objectives of this study were to investigate the diversity of Escherichia coli O157:H7 isolates obtained over a 3-month period from a cattle feedlot in order to assess the relationship between environmental and faecal isolates and to determine the pattern of transmission of E. coli O157:H7 between groups of cattle. Faecal samples were obtained from cattle housed in four adjacent feedlot pens at monthly intervals, with environmental pen samples collected simultaneously. All E. coli O157:H7 isolates obtained were examined by pulsed field gel electrophoresis (PFGE), polymerase chain reaction (PCR) to detect eaeA, ehxA, stx1 and stx2 genes and antibiotic sensitivity profiling. Ten isolates were subjected to acid shock to imitate conditions in the acidic cattle abomasum and assess the effect on PFGE profiles. E. coli O157:H7 was isolated from 69 faecal samples and 26 environmental samples. All isolates (n = 95) carried the genes for eaeA, ehxA and stx2 and were sensitive to all antibiotics tested. The PFGE profiles of all isolates differed by no more than two bands and clustered within 80% similarity following dendrogram analysis. Acid shock had no effect on the subsequent PFGE patterns. A total of 8.7% (6/69) of cattle were shedding E. coli O157:H7 in the first month with faecal shedding increasing to 52% (36/69) by the third month of the study. A single isolate of E. coli O157:H7 may be passed rapidly through cattle pens, with the environment acting as a significant reservoir for transmission. PFGE is a useful tool for tracking the direct and indirect transmission of E. coli O157:H7 isolates on the farm.
Keywords: Escherichia coli O157:H7; Cattle; Faeces; Environment; PFGE

S. Seo, L.O. Tedeschi, C. Lanzas, C.G. Schwab, D.G. Fox, Development and evaluation of empirical equations to predict feed passage rate in cattle, Animal Feed Science and Technology, Volume 128, Issues 1-2, 28 May 2006, Pages 67-83, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2005.09.014.
(http://www.sciencedirect.com/science/article/B6T42-4HHH4W7-2/2/c30a23590bd4bf29c7c988d03ad632d5)
Abstract:
Empirical equations were developed to accurately predict passage rate (Kp) in ration formulation models for all classes of dairy and beef cattle. The database was comprised of studies that used external markers, and 553, 195 and 766 treatment means were used to develop the Kp equations for forages, concentrates and liquid, respectively. A random coefficients model that used each study effect as a random variable was used to select statistically significant input variables to predict rate of passage. The parameters of the variables were estimated using ordinary least square method. The equations developed were: Kp forage = (2.365 + 0.0214FpBW + 0.0734CpBW + 0.069FDMI)/100; Kp concentrate = (1.169 + 0.1375FpBW + 0.1721CpBW)/100 and Kp liquid = (4.524 + 0.0223FpBW + 0.2046CpBW + 0.344FDMI)/100, where Kp is the passage rate, h-1; FpBW the forage DMI as a proportion of BW, g/kg; CpBW the concentrate DMI as a proportion of BW and FDMI is the forage DMI, kg. These Kp equations for forages, concentrates and liquid explained 87%, 95% and 94%, respectively of the variation in passage rates in the database used in equation development after adjustment for random study effect. These and other published equations were evaluated with an independent database. In this evaluation, the R2 of the new equations were 0.39, 0.40 and 0.25 for prediction of the passage of forages, concentrates and liquid, respectively, which was higher than the R2 of the previously published equations by 0.03-0.19, 0.01-0.14, and 0.04-0.16 for forages, concentrates and liquid, respectively. The root mean square prediction error (RMSPE) was reduced by 3-22%, 2-33%, and 4-31% in the prediction of Kp of forages, concentrates and liquid, respectively, with the new equations. These new empirical equations are suitable for predicting passage rate in cattle, but predictability overall is still low and increases in the accuracy of predicting passage rates requires development of a mechanistic model that accounts for more biologically important variables affecting passage rate (e.g. physical property of particles, water intake and flux, and within day variation in intake).
Keywords: Passage rate; Meta-analysis; Empirical model; Model comparison; CNCPS

I. Gonzalez-Martin, N. Alvarez-Garcia, J.L. Hernandez-Andaluz, Instantaneous determination of crude proteins, fat and fibre in animal feeds using near infrared reflectance spectroscopy technology and a remote reflectance fibre-optic probe, Animal Feed Science and Technology, Volume 128, Issues 1-2, 28 May 2006, Pages 165-171, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2005.11.007.
(http://www.sciencedirect.com/science/article/B6T42-4J0Y6R1-1/2/468563b60ac60b44b73911cfe12d920d)
Abstract:
In the present study we address the development of a rapid technique - near infrared reflectance spectroscopy (NIRS) technology and the use of a remote reflectance crude fibre (CF)-optic probe (fitted with a 5 cm x 5 cm quartz window) - to perform instantaneous analysis of quantitative parameters such as the ether extract (DM), crude protein (CP) and crude fibre in animal feed and fodder. The technique does not involve the destruction or treatment of the sample because it is based on direct application of a fibre-optic probe on the feed (with different physical characteristics, such as commercialisation in the form of meal, tablets and granules) given to cattle, swine, sheep, birds and rabbits that is used in different stages of animal development--juvenile development, growth, fattening, etc. The regression method employed was modified

partial least squares (MPLS). The calibration results using 72 samples permitted the determination of crude protein, the ether extract and crude fibre. This calibration is applicable within the ranges for crude protein of 5-495 g kg-1; the ether extract, 16-66 g kg-1; crude fibre, 23-111 g kg-1, with multiple correlation coefficients (RSQ) for crude protein, the ether extract and crude fibre of 0.991, 0.932 and 0.848, respectively. The standard errors of prediction corrected (SEPC) for the above parameters in g kg-1 were 12.5, 2.09 and 6.05, respectively. The robustness of the analytical method was confirmed by applying it to 10 samples for external validation.
The results obtained indicate that NIRS with a fibre-optic probe can be used as a quality control method in animal feeds and fodder for the determination of crude protein, the ether extract and crude fibre.
Keywords: Animal feeds; Near infrared spectrometry; Fibre-optic probe; Determination

Jeffrey T. LeJeune, Dale Hancock, Yngvild Wasteson, Eystein Skjerve, Anne Margrete Urdahl, Comparison of E. coli O157 and Shiga toxin-encoding genes (stx) prevalence between Ohio, USA and Norwegian dairy cattle, International Journal of Food Microbiology, Volume 109, Issues 1-2, 25 May 2006, Pages 19-24, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2006.01.005. (http://www.sciencedirect.com/science/article/B6T7K-4JCBN1T-1/2/8de57011fae868b4afcccb37f98500a7)
Abstract:
Environmental and food contamination with Shiga toxin-producing Escherichia coli (STEC) pose a threat to public health worldwide, with notable geographic differences in incidence of human disease caused by these organisms. The prevalence of E. coli O157 and total stx-positive specimens collected from mature dairy cattle in Ohio and Norwegian dairy farms was compared using identical laboratory methods in a cross-sectional survey. E. coli O157 was isolated from 5 / 750 (0.66%) of Ohio dairy cows from 4 / 50 (8%) different herds, whereas E. coli O157 was not isolated from any (0 / 680) cattle present in 50 Norwegian dairy herds. In contrast, at least one stx-positive faecal sample was identified by PCR on all (50 / 50) Norwegian farms but only on 70% (35 / 50) of Ohio farms. Average animal stx prevalence on Ohio farms was also lower; 14% vs. 61% in Ohio and Norwegian herds, respectively. Livestock feed contamination with generic E. coli was uncommon in Norway, 1 / 50 feeds testing positive, whereas 19 / 50 (38%) of feeds collected from Ohio farms were contaminated, some as high as 105 CFU/g. Despite extreme differences in on-farm management practices between countries, stx appear to be widely disseminated in cattle in both countries, while the human pathogenic O157 serotype is less widely disseminated in Norway than it is in Ohio. Geographic distribution differences of human pathogenic STEC serogroups in the bovine reservoir, as opposed to specific farm management practices affecting on farm STEC prevalence, may be an important defining factor influencing the incidence of human illnesses associated in different areas of the world.
Keywords: E. coli O157; Food safety; STEC; Shigatoxin

Luis G. Corbellini, David R. Smith, Caroline A. Pescador, Milene Schmitz, Andre Correa, David J. Steffen, David Driemeier, Herd-level risk factors for Neospora caninum seroprevalence in dairy farms in southern Brazil, Preventive Veterinary Medicine, Volume 74, Issues 2-3, 17 May 2006, Pages 130-141, ISSN 0167-5877, DOI: 10.1016/j.prevetmed.2005.11.004. (http://www.sciencedirect.com/science/article/B6TBK-4HTCT99-1/2/c2cddd2334121e84d611753b389e98c1)
Abstract:
A cross-sectional study was used to test the relationship between herd seroprevalence to Neospora caninum and various potential herd-level risk factors in 60 dairy farms located in two distinct regions in southern Brazil. Thirty farms were randomly selected from within each region. A questionnaire was designed to summarize each farm's production system as it might relate to N. caninum transmission. The questionnaire contained 105 closed questions relating to general

characteristics of the farms, farm facilities, management, source of food and water, herd health, environment and biosecurity, which included questions relevant to N. caninum transmission, including presence and number of dogs and other animals, purchase of animals and contact with man. Serum samples were collected from 40% of animals in each farm and N. caninum antibodies were detected by immunofluorescent antibody test (IFAT). The association between potential risk factors and the probability of an animal being seropositive was modeled using a generalized estimation equations (GEE) logistic regression model. The model accounted for multilevel correlation of data from multiple animals within herds. The mean (+/-S.D.) number of animals in the 60 herds was 64.5 (+/-45.6), ranging from 20 to 280 females. Blood samples were collected from 1549 animals. The size of the farms varied from 4 to 100 ha (mean 30.1 +/- 25.9 ha). At least one dog was found in 57 of the 60 dairy farms (95%). The mean number of dogs was 3.1 (+/-1.9), ranging from 0 to 10. All females were raised on pasture. For all cattle sampled, N. caninum seroprevalence was 17.8%. Overall, 93.3% of herds (56/60) had at least one seropositive animal identified. Four variables were significantly associated with N. caninum sero-response in the 57 dairy farms, which were included in the final multivariable model: the number of dogs on the farm, farm area (hectares), feeding pooled sources of colostrum and region. The odds of a cow being seropositive increased 1.13 times for each additional dog present on the farm ($P = 0.021$). Cattle from farms that fed calves colostrum pooled from multiple cows had 1.79 times greater odds for being seropositive for N. caninum ($P < 0.003$). The probability of being seropositive was inverse to the area of the farms, such that cattle had 0.92 times the odds to be seropositive ($P = 0.014$) for each additional 10 ha of farmland. Finally, cattle from farms in region one had 0.71 times the odds to be seropositive than cattle from region two ($P = 0.035$). Results of this study suggest that several risk factors may explain why dairy cattle in Brazil may become exposed to N. caninum. However, further investigation of these factors is necessary because the purpose of this study was to refine and generate hypotheses on N. caninum transmission.
Keywords: Neospora caninum; Bovine abortion; Risk factors; Reproductive diseases; Logistic regression; Dairy cattle

J.C. Wood, I.J. McKendrick, G. Gettinby, A simulation model for the study of the within-animal infection dynamics of E. coli O157, Preventive Veterinary Medicine, Volume 74, Issues 2-3, 17 May 2006, Pages 180-193, ISSN 0167-5877, DOI: 10.1016/j.prevetmed.2005.11.011. (http://www.sciencedirect.com/science/article/B6TBK-4J6X3K9-1/2/8daf760a80bf268b727d5d0205cfaf1b)
Abstract:
Escherichia coli 0157 can cause serious illness, even death, in humans. There is some consensus that the main reservoirs of this harmful bacterium are the rumens and intestines of cattle. Hence, a stochastic model of the bovine gut was developed to investigate the in vivo population dynamics of E. coli O157. Because bacterial numbers can reach minimal levels, a stochastic system was considered, with a birth-death process being used to represent bacterial growth and decay dynamics throughout the gastrointestinal tract. Reinfection through ingestion of bacteria present in the environment was allowed to occur and the required clustered distribution of inter-event times was implemented through the use of a random hazard doubly stochastic Poisson process. Due to the inclusion of multiple compartments, a feedback mechanism and an interest in the non-equilibrium dynamics of the process, it was not possible to obtain an analytical representation of the process and therefore, a simulation study was used to obtain results. The within-animal model can be used to explore the efficacy of control measures which act at an individual animal level.
Keywords: Mathematical model; Gastrointestinal tract; Poisson process; Birth-death process; Escherichia coli O157

Agnethe-Iren Sandem, Bjarne O. Braastad, Morten Bakken, Behaviour and percentage eye-white in cows waiting to be fed concentrate--A brief report, Applied Animal Behaviour Science, Volume

97, Issues 2-4, May 2006, Pages 145-151, ISSN 0168-1591, DOI: 10.1016/j.applanim.2005.08.003.
(http://www.sciencedirect.com/science/article/B6T48-4H2G8V6-1/2/1684ba3b91153f4d86ec99c850e46a7b)
Abstract:
A major task when developing methods of assessing animal welfare is to identify observable external indicators of internal subjective feelings. In this paper, we tested the hypothesis that the percentage of white in the eyes would change as a response to two emotional stimuli; waiting to be fed concentrate and acquiring this food. Twelve dairy cows in a tie-stall were observed for eye-white percentage and behaviour (continuous sampling), one trial day per cow, in a standard daily situation in which a stockman entered the house and fed all animals with concentrate feed within 10 min. The eye-white percentage increased significantly, although moderately, during the first minute and was kept moderately high during the waiting period. After food was obtained, the eye-white percentage decreased compared to the base level. We suggest that a high eye-white percentage may reflect a strong emotional response.
Keywords: Animal welfare; Behavioural indicators; Dairy cattle; Conditioned stimulus

Laura E. Scott, The feeding of poultry litter to cattle, Food Research International, Volume 39, Issue 4, May 2006, Page 512, ISSN 0963-9969, DOI: 10.1016/j.foodres.2005.12.004.
(http://www.sciencedirect.com/science/article/B6T6V-4J2TSFP-1/2/395791c72c1b32bd293ba1c6c96f7d44)

K. Suzuki, M. Kanameda, T. Ogawa, T.T.D. Nguyen, T.T.S. Dang, Q.H. Luu, D.U. Pfeiffer, Productivity and socio-economic profile of dairy cattle farmers amongst rural smallholder communities in northern Vietnam, Livestock Science, Volume 101, Issues 1-3, May 2006, Pages 242-250, ISSN 1871-1413, DOI: 10.1016/j.livprodsci.2005.11.015.
(http://www.sciencedirect.com/science/article/B7XNX-4JXS70Y-X/2/920389af71d07c9d668457db45066b27)
Abstract:
The objective of this field questionnaire survey was to describe the productivity and socio-economic profile of dairy cattle farmers in northern Vietnam considering regional differences in rural smallholder farming communities which have been targeted by a governmental dairy development policy. Using two-stage cluster sampling, a total of 99 dairy farming households (11 per commune) were recruited from 9 of 32 communes in Ba Vi District, Ha Tay Province, northern Vietnam. The results from this study indicate that there were regional differences in relation to basic management practices such as effective utilisation of agricultural by-products for feeding and hygiene practices. These can be explained by variation amongst the regions with respect to environmental factors affecting agricultural activities such as constraints on land use and access to water resources. There were also regional differences in the use of governmental support such as agricultural extension services and financial institutions. These can be attributed to proximity of the communities to each of the extension institutions as well as the phased and community-specific approach to the provision of governmental financial support for dairy development.
Keywords: Dairy cattle; Questionnaire interviews; Smallholders; Vietnam

J. Diez, P. Alberti, G. Ripoll, F. Lahoz, I. Fernandez, J.L. Olleta, B. Panea, C. Sanudo, A. Bahamonde, F. Goyache, Using machine learning procedures to ascertain the influence of beef carcass profiles on carcass conformation scores, Meat Science, Volume 73, Issue 1, May 2006, Pages 109-115, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.11.015.
(http://www.sciencedirect.com/science/article/B6T9G-4J2TSVY-1/2/159ac0af88f2a550e9593f1aa1b3ba3a)
Abstract:

In this study, a total of 163 young-bull carcasses belonging to seven Spanish native beef cattle breeds showing substantial carcass variation were photographed in order to obtain digital assessments of carcass dimensions and profiles. This dataset was then analysed using machine learning (ML) methodologies to ascertain the influence of carcass profiles on the grade obtained using the SEUROP system. To achieve this goal, carcasses were obtained using the same standard feeding regime and classified homogeneous conditions in order to avoid non-linear behaviour in grading performance. Carcass weight affects grading to a large extent and the classification error obtained when this attribute was included in the training sets was consistently lower than when it was not. However, carcass profile information was considered non-relevant by the ML algorithm in earlier stages of the analysis. Furthermore, when carcass weight was taken into account, the ML algorithm used only easy-to-measure attributes to clone the classifiers decisions. Here we confirm the possibility of designing a more objective and easy-to-interpret system to classify the most common types of carcass in the territory of the EU using only a few single attributes that are easily obtained in an industrial environment.
Keywords: Bovine carcass; Conformation assessment; SEUROP; Artificial intelligence; Machine learning; Relevancy

K. Nuss, B. Lejeune, C. Lischer, U. Braun, Ileal impaction in 22 cows, The Veterinary Journal, Volume 171, Issue 3, May 2006, Pages 456-461, ISSN 1090-0233, DOI: 10.1016/j.tvjl.2005.02.024.
(http://www.sciencedirect.com/science/article/B6WXN-4FTXXJS-5/2/1b536adab5f766bdb1a38e73ab882dd5)
Abstract:
The clinical signs, diagnosis, treatment and outcome of 22 cows with ileal impaction were investigated using the medical records of bovine patients referred to the Department of Farm Animals, Vetsuisse Faculty, University of Zurich from 1993 to 2003. Only 15 of the cows had signs of colic, which were subtle but slowly increased in severity in some patients. The results of haematological and biochemical analyses were mildly abnormal in only few animals. There was no correlation between the duration of the disorder before admission, the severity of symptoms and the results of the haematological and biochemical analyses. Dilated loops of small intestine in the right dorsal quadrant of the abdomen could be palpated transrectally and imaged via ultrasonography. A definitive diagnosis of ileal impaction was made during exploratory laparotomy by finding the impaction and ruling out other abnormalities. In 19 cows, the obstructing food mass was easily massaged into the caecum, and in three animals an enterotomy was carried out. All cows had an uneventful recovery with no recurrence of the disorder. It is concluded that the cause of the impaction was most likely due to seasonal influences and winter-feeding with a hay based ration. The short and long-term prognosis after surgical intervention was good.
Keywords: Cattle; Colic; Ileal impaction; Diagnosis-treatment

D.A. Llewellyn, R.C. Cochran, T.T. Marston, D.M. Grieger, C.G. Farmer, T.A. Wickersham, Influence of limited fall protein supplementation on performance and forage utilization by beef cattle grazing low-quality native grass pastures, Animal Feed Science and Technology, Volume 127, Issues 3-4, 28 April 2006, Pages 234-250, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2005.09.006.
(http://www.sciencedirect.com/science/article/B6T42-4H8MNWR-3/2/01885733fa7b302cd29b66457a29d5d0)
Abstract:
Two studies were conducted to evaluate the impact of feeding limited quantities of a high-crude protein (CP) supplement during the fall on beef cow performance and forage utilization. The supplement used in both experiments contained 455 g/kg CP (dry matter [DM] basis; rumen degradable protein [RDP] = 652 g/kg of CP) and was fed 3 days/week with the amount fed pro-

rated to deliver the designated daily allotments. In Study 1, 136 pregnant, Hereford x Angus cows (body weight [BW] = 490 +/- 46.7 kg) and their nursing calves were assigned to supplementation treatments. Control cows received no fall supplementation, while supplemented cows received 0.61 kg/day of supplement pre- and post-weaning (PRPO; 15/8 to 14/12; weaning = 15/10) or only post-weaning (POST; 15/10 to 14/12). During the winter, all cows received 1.62 kg supplement/day (14/12 to calving). Through weaning, PRPO cows gained more (P=0.03) BW. After weaning, PRPO and POST had higher (P=0.02) BW gains and lost less (P=0.02) body condition score (BCS) than did control cows. Cumulative BW gains were higher (P=0.05) for supplemented cows through calving, although BCS change did not differ among treatments. Calf birth weights did not differ among treatments, but the gain of calves from PRPO and POST was faster (P=0.03) than that of controls. Fall supplementation did not affect the proportion of cows cycling before the breeding season or pregnancy rates. In Study 2, 16 ruminally fistulated Hereford x Angus steers (initial BW = 259 +/- 22.7 kg) received either fall supplementation (FS) or no fall supplementation (NFS) during early (September) and late (November) fall. Steers were individually fed the same amount of supplement, relative to BW, as the cows in Study 1. The quality of the diet selected decreased with advancing season (i.e., the CP decreased and fiber increased) and, as a result, digestible organic matter intake and digestion were less (P=0.04 and 0.02, respectively) during November. Fall supplementation did not influence diet selection or forage intake, but did tend (P=0.06) to increase extent of digestion. Feeding beef cows a limited quantity of a high CP supplement during fall can positively affect BW and BCS. Under the conditions of this experiment, supplementation's effect on forage intake and digestion was less important than was provision of additional nutrients in eliciting treatment effects.
Keywords: Protein; Forage; Beef cattle; Digestion

Eva Schlecht, Pierre Hiernaux, Ibrahima Kadaoure, Christian Hulsebusch, Friedrich Mahler, A spatio-temporal analysis of forage availability and grazing and excretion behaviour of herded and free grazing cattle, sheep and goats in Western Niger, Agriculture, Ecosystems & Environment, Volume 113, Issues 1-4, April 2006, Pages 226-242, ISSN 0167-8809, DOI: 10.1016/j.agee.2005.09.008.
(http://www.sciencedirect.com/science/article/B6T3Y-4HRDXV5-1/2/8392cca92605cf3878e71b9e25b717f8)
Abstract:
Grazing itineraries of herded and free grazing cattle (n = 194), goats (n = 148), and sheep (n = 129) were monitored in a village territory over a 1-year cycle by direct observation of grazing and excretion behaviour and by parallel animal tracking using a Global Positioning System. During the study period, standing and litter biomass of spontaneous vegetation and crop residues was measured repeatedly on sample plots of fields (n = 16), fallows (n = 15) and rangeland (n = 8). Based on a land use map, a Geographic Information System on forage availability was produced for the territory and overlaid with the livestock grazing itineraries. The animals' behaviour at pasture was related to the forage mass encountered along their daily itineraries in order to analyse the spatial variation in behaviour as influenced by season, livestock species and herd management mode.
Maximum daily itinerary lengths were 25 km in cattle, 20 km in goats and 21 km in sheep; itinerary length varied significantly between species, herd management modes and season. Animals spent between 456 and 625 min per day on pasture, the grazing day of cattle being longer than that of sheep and goats. Across seasons, all three species spent on average about 60% of the daily grazing time feeding, 20-26% walking and 12-20% resting. The forage mass encountered along the animals' itineraries was higher than the average amount of forage available in the area. Particularly during the late dry and the rainy season, herding increased the amount of forage on offer to grazing livestock. Throughout the year, 39% of the observed excretions occurred on cropland, 31% on rangeland, 20% on fallows and 10% in and around settlements; the spatial

repartition of excreta deposits differed between herded and free grazing animals, with free grazing animals depositing a higher share of excretions on barren land.
The obtained information on the variation of grazing and excretion behaviour with respect to ruminant species, land use type, forage supply, season and herd management can be coupled with quantitative data on feed intake and excreta deposition, in order to compute livestock-mediated nutrient budgets for Sahelian agro-pastoral land use systems.
Keywords: Excretion frequency; Forage availability; GPS; Grazing behaviour; Herd management; Ruminants; Sahel

Nurcan Cetinkaya, Sema Yaman, Nadide Hulya Ozdemir Baber, The use of purine derivatives/creatinine ratio in spot urine samples as an index of microbial protein supply in Yerli Kara crossbred cattle, Livestock Science, Volume 100, Issues 2-3, April 2006, Pages 91-98, ISSN 1871-1413, DOI: 10.1016/j.livprodsci.2005.07.004.
(http://www.sciencedirect.com/science/article/B7XNX-4JMKVM1-4/2/a4bd8c7bbc137b8bcaedfa04686e57cc)
Abstract:
Three experiments were conducted to evaluate the use of purine derivatives (PD)/creatinine ratio in spot urine samples as an index of microbial protein supply in Yerli Kara crossbred cattle (YK-C). In Experiment I, response of daily PD excretion to feed intake in YK-C at state farm was measured. In Experiment II, spot urine sampling techniques was applied at state farm and four YK-C bulls were used. In Experiment III, spot urine sampling technique was applied at small-holder farms. There were significant correlations (R2 = 0.99) between PD excretion (mmol/day) and digestible organic matter intake (DOMI) (kg/day) in Experiment I, Y = 12.5 (+/- 0.5) + 19.7 (+/- 3.5)X (R2 = 0.99, n = 16). The equation obtained from Experiment I could be expressed as: Y = -2.3 (+/- 0.3) + 0.953 (+/- 0.06)X, (R2 = 0.99, n = 49) where Y is PD excretion (mmol/day) and X is the PDC index. The PDC index was calculated as the molar concentration ratio of PD to creatinine times the metabolic body weight (kg). The corresponding microbial-N values to PDC index of groups I, II and III in developed banding system are 15-25 g/day. Experimentally estimated DOMI was 2.21 +/- 0.15 kg/day. Estimated DOMI of groups I, II, and III were 2.8 +/- 0.6, 2.6 +/- 0.7 and 2.7 +/- 0.7 kg/day, respectively. In conclusion, the PDC index in spot urine samples could be used under similar farm condition as an indicator of microbial protein supply in YK-C cattle. Estimated DOMI from PDC index in spot urine samples under defined field conditions may help the development of feeding strategies for YK-C cattle held by small holders.
Keywords: Microbial protein synthesis; Purine derivatives; PDC index; Spot sampling

R.M. Kirkland, D.C. Patterson, The effect of quality of grass and maize silage on the intake and performance of beef cattle, Livestock Science, Volume 100, Issues 2-3, April 2006, Pages 179-188, ISSN 1871-1413, DOI: 10.1016/j.livprodsci.2005.08.015.
(http://www.sciencedirect.com/science/article/B7XNX-4JMKVM1-F/2/51b92b17b5b718faf38844d96a0cab72)
Abstract:
A study was undertaken to evaluate the effects of incorporating high (HMS) and low (LMS) maturity maize silages into diets based on low (LGS) and high (HGS) feed value grass silages offered to beef cattle. Seventy-two continental cross-bred steers were used in a 14-week continuous design, randomised block experiment. The six treatments were arranged as a 2 x 3 factorial design incorporating the LGS and HGS offered as the sole forage, along with each of the two grass silages offered in a 60:40 ratio (DM basis) with the HMS and LMS. All diets were supplemented with 3 kg/head/day concentrates. Total daily DM and metabolisable energy intakes were higher ($P < 0.001$) for diets based on HGS compared to those based on LGS. Intakes were similar ($P > 0.05$) between diets containing LMS and HMS, both of which were higher ($P < 0.001$) than diets containing grass silage as the sole forage. Highest DM intakes were recorded with a

mixture of HGS and HMS ($P < 0.05$ or greater). Cattle offered diets containing HGS had higher live-weight gain ($P < 0.05$), final live weight, carcass gain and carcass weight ($P < 0.001$) than those offered diets containing LGS. Feed conversion efficiency, assessed on a carcass gain basis, was poorer ($P < 0.05$) with diets containing LGS compared with those containing HGS, though differences between diets containing either LMS or HMS and GS as the sole forage were not significant ($P > 0.05$).
Keywords: Grass silage; Maize silage; Intake; Beef cattle; Animal performance

M.A. Hoque, P.F. Arthur, K. Hiramoto, T. Oikawa, Genetic parameters for carcass traits of field progeny and their relationships with feed efficiency traits of their sire population for Japanese Black cattle, Livestock Science, Volume 100, Issues 2-3, April 2006, Pages 251-260, ISSN 1871-1413, DOI: 10.1016/j.livprodsci.2005.09.006.
(http://www.sciencedirect.com/science/article/B7XNX-4JMKVM1-P/2/ba98609ac350ea8f30f47d2b77ef85a2)
Abstract:
Genetic parameters for carcass traits of 1774 field progeny (1281 steers and 493 heifers), and their genetic relationships with feed efficiency traits of their sire population (740 bulls) were estimated with REML. Feed efficiency traits included feed conversion ratio (FCR) and residual feed intake (RFI). RFI was calculated by the residual of phenotypic (RFIphe) and genetic (RFIgen) regression from the multivariate analysis of feed intake on metabolic weight and daily gain. Progeny traits were carcass weight (CWT), rib eye area (REA), rib thickness (RBT), subcutaneous fat, yield estimate (YEM), marbling score (MSR), meat quality grade, meat color, fat color, meat firmness and meat texture. The estimated heritability for CWT (0.70) was high and heritabilities for all the other traits were moderate (ranged from 0.32 to 0.47), except for meat and fat color and meat texture which were low (ranged from 0.02 to 0.25). The high genetic correlation (0.62) between YEM and MSR suggests that simultaneous improvement of high carcass yield and beef marbling is possible. Estimated genetic correlations of RFI (RFIphe and RFIgen) of sires with CWT (- 0.60 and - 0.53) and MSR (- 0.62 and - 0.50) of their progeny were favorably negative indicating that the selection against RFI of sires may have contributed to produce heavier carcass and increase in beef marbling. The correlated responses in CWT, REA and RBT of progeny were higher to selection against RFI than those to selection against FCR of sires. This study provides evidence that selection against RFI is preferred over selection against FCR in sire population for getting better correlated responses in carcass traits of their progeny.
Keywords: Genetic parameters; Beef cattle; Feed efficiency; Correlated response; Carcass traits

K. Marie Krause, Garrett R. Oetzel, Understanding and preventing subacute ruminal acidosis in dairy herds: A review, Animal Feed Science and Technology, Volume 126, Issues 3-4, Feed and Animal Health, 9 March 2006, Pages 215-236, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2005.08.004.
(http://www.sciencedirect.com/science/article/B6T42-4H3Y9R2-1/2/1a372ee509ab8150f18df6897c6bf439)
Abstract:
Feeding diets high in grain and other highly fermentable carbohydrates to dairy cows increases milk production, but also increases the risk of subacute ruminal acidosis (SARA). SARA is defined as periods of moderately depressed ruminal pH, from about 5.5 to 5.0. SARA may be associated with laminitis and other health problems resulting in decreased production.
Although ruminal pH varies considerably within a day, cows possess a highly developed system to maintain ruminal pH within a physiological range. However, if the acid production from fermentation is more than the system can buffer, ruminal pH compensation fails and ruminal pH may drop drastically.

The risk of developing SARA can be reduced by adopting a feeding regime, which balances ruminal buffering with the production of volatile fatty acids from fermentation of carbohydrates. This can be achieved by providing adequate dietary fibre containing sufficient long particles. However, excessive amounts of long particles might lead to sorting and ultimately increase the risk of SARA. The level of fibre and long particles needed to maintain rumen health depends on the fibre source used. SARA is also dependent on the grain source fed and the degree of grain processing. Feeding highly fermentable grain increases the requirement for fibre.
Feeding diet components separately appears to increase the risk for SARA compared to feeding a total mixed ration. Also, management practices that cause cows to eat fewer, larger, or irregular meals may be associated with increased incidence of SARA. Important management factors include feed access time, consistency of feeding schedule, and available bunk space. When dairy cows are fed for high production, good management practices are important even when dietary factors are optimal.
Keywords: Subacute ruminal acidosis; Dairy cattle; Nutritional management

Jesse P. Goff, Macromineral physiology and application to the feeding of the dairy cow for prevention of milk fever and other periparturient mineral disorders, Animal Feed Science and Technology, Volume 126, Issues 3-4, Feed and Animal Health, 9 March 2006, Pages 237-257, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2005.08.005.
(http://www.sciencedirect.com/science/article/B6T42-4H4T0TS-1/2/52af4f732a00faf523bafa7f58de9df9)
Abstract:
The periparturient cow undergoes a transition from non-lactating to lactating at calving. The animal is tremendously challenged to maintain calcium homeostasis. Those that fail can develop milk fever, a clinical disorder that is life threatening to the cow and predisposes the cow to a variety of other disorders. Less dramatic sub-clinical hypocalcemia can also reduce productivity of cattle by reducing feed intake in early lactation. The cause and prevention of milk fever will be discussed, focusing on the role of diet cation-anion difference and use of low calcium diets. The periparturient period also typically causes minor perturbations in blood potassium and phosphorus concentrations. Occasionally these disturbances are severe enough to be the cause of recumbency and the 'downer cow' syndrome. Pathogenesis of these syndromes will be discussed. Low blood magnesium concentrations are observed when animals are fed inadequate amounts of magnesium or some factor is present in the diet, which prevents adequate absorption of magnesium. Severe hypomagnesemia can cause tetany and the downer cow syndrome, but more commonly moderate hypomagnesemia impairs the ability of the cow to maintain calcium homeostasis and hypocalcemia occurs secondary to the hypomagnesemia.
Keywords: Milk fever; DCAD; Hypomagnesemia; Hypocalcemia; Hypophosphatemia; Hypokalemia

J.J. Robinson, C.J. Ashworth, J.A. Rooke, L.M. Mitchell, T.G. McEvoy, Nutrition and fertility in ruminant livestock, Animal Feed Science and Technology, Volume 126, Issues 3-4, Feed and Animal Health, 9 March 2006, Pages 259-276, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2005.08.006.
(http://www.sciencedirect.com/science/article/B6T42-4H4T0TS-2/2/216a1f1f06762c0ce6a26c09d00c5ad0)
Abstract:
In this review fertility is taken to be the successful establishment of pregnancy. Nutritional effects on fertility therefore embrace the formation of the foetal gonads, their post-natal development, the timing of puberty and in multiple ovulating species, their ovulation rates. The interval from parturition to rebreeding, ovum quality, embryo development and embryo survival are the other major contributors to fertility. In each of these areas there have been significant advances. For example recent research in ewes has demonstrated that during its early development the foetal

ovary is remarkably sensitive to maternal nutrition with subsequent lifetime effects on ovulation rate. The timing of puberty in both sexes and adult ovulation rates in ewes are influenced by post-natal nutrition. Nutrition during the period when ovarian follicles emerge from the primordial pool (approximately 6 months before they ovulate in ewes and 3-4 months in cows) can influence ovulation rate in ewes and oocyte quality in cattle. Donor nutrition, in particular selenium status, can affect the resilience of spermatozoa to freezing and thawing. In contrast to spontaneously ovulating animals in which high-plane feed immediately before ovulation enhances oocyte and embryo quality the opposite is the case in superovulated donor animals and those from which oocytes are harvested for in vitro embryo production. In high yielding dairy cows excessive negative energy balance reduces insulin and IGF-1 concentrations and increases growth hormone leading to delays in oestrous cyclicity and impaired oocyte quality and corpus luteum function. Recent research into diets specifically designed to stimulate insulin secretion, increase progesterone production by the corpus luteum and enhance the antiluteolytic mechanism is providing new opportunities for improving dairy cow fertility with associated benefits for suckling beef cows. The move to a more mechanistic approach in dealing with nutritional studies of fertility is providing information that can readily be adapted for the formulation of more efficient feeding strategies across a diverse range of ruminant species and production systems.
Keywords: Fertility; Nutrition; Ruminants

Mariana C. Rufino, Edwin C. Rowe, Robert J. Delve, Ken E. Giller, Nitrogen cycling efficiencies through resource-poor African crop-livestock systems, Agriculture, Ecosystems & Environment, Volume 112, Issue 4, March 2006, Pages 261-282, ISSN 0167-8809, DOI: 10.1016/j.agee.2005.08.028.
(http://www.sciencedirect.com/science/article/B6T3Y-4HKCYMH-1/2/b680490e3ab2729df0efadc9bab62821)
Abstract:
Success in long-term agricultural production in resource-poor farming systems relies on the efficiency with which nutrients are conserved and recycled. Each transfer of nutrients across the farming system provides a risk of inefficiency, and how much is lost at each step depends on the type of farming system, its management practices and site conditions. The aim of this review was to identify critical steps where efficiency of nitrogen (N) cycling through livestock in smallholder crop-livestock farming systems could be increased, with special emphasis on Africa. Farming systems were conceptualised in four sub-systems through which nutrient transfer takes place: (1) livestock: animals partition dietary intake into growth and milk production, faeces and urine; (2) manure collection and handling: housing and management determine what proportion of the animal excreta may be collected; (3) manure storage: manure can be composted with or without addition of plant materials and (4) soil and crop conversion: a proportion of the N in organic materials applied to soil becomes available, part of which is taken up by plants, of which a further proportion is partitioned into grain N. An exhaustive literature review showed that partial efficiencies have been much more commonly calculated for the first and last steps than for manure handling and storage. Partial N cycling efficiencies were calculated for every sub-system as the ratio of nutrient output to nutrient input. Estimates of partial N cycling efficiency (NCE) for each sub-system ranged from 46 to 121% (livestock), 6 to 99% (manure handling), 30 to 87% (manure storage) and 3 to 76% (soil and crop conversion). Overall N cycling efficiency is the product of the partial efficiencies at each of the steps through which N passes. Direct application of plant materials to soil results in more efficient cycling of N, with fewer losses than from materials fed to livestock. However, livestock provide many other benefits highly valued by farmers, and animal manures can contain large amounts of available N, which increases the immediate crop response. Manures also can contribute to increase (or at least maintain) the soil organic C pool but more quantitative information is needed to assess the actual benefits. Making most efficient use of animal manures depends critically on improving manure handling and storage, and on synchrony

of mineralisation with crop uptake. Measures to improve manure handling and storage are generally easier to design and implement than measures to improve crop recovery of N, and should receive much greater attention if overall system NCE is to be improved.
Keywords: Cattle; Compost; Feed intake; Manure; Nitrogen use efficiency; N losses

R. Marino, M. Albenzio, A. Girolami, A. Muscio, A. Sevi, A. Braghieri, Effect of forage to concentrate ratio on growth performance, and on carcass and meat quality of Podolian young bulls, Meat Science, Volume 72, Issue 3, March 2006, Pages 415-424, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.08.007.
(http://www.sciencedirect.com/science/article/B6T9G-4H6XM85-2/2/6c38b12eaedcd8d29e77f601e5758ed3)
Abstract:
The effect of forage to concentrate ratio: 60-40 [high concentrate group (HC) and 70-30 [low concentrate group (LC)] on growth, slaughtering performance and meat quality were evaluated in twenty organically farmed Podolian young bulls. Meat quality characteristics were measured on three different muscles [Longissimus dorsi (LD), Semimembranosus (SM) Semitendinosus (ST)], vacuum-packaged and chilled stored at 2-4[degree sign]C for 15 days. The animals in the HC group had higher weight gain than those in the LC group ($P < 0.05$). Slaughter data were not influenced by ration composition. The higher forage to concentrate ratio produced an improvement in fatty acid composition of the three muscles, with a higher polyunsaturated to saturated ratio ($P < 0.001$). Vitamin E and malondialdehyde (MDA) contents were not affected by the feeding treatment. Panel scores for tenderness and flavour ($P < 0.01$) and Warner-Bratzler Shear force ($P < 0.001$) were significantly affected by muscle, the LD muscle being the most tender and the richest in flavour but they not affected by dietary treatment.
Keywords: Forage to concentrate ratio; Podolian cattle; Meat fatty acid composition; Organic farming; Meat quality

Andrzej Maj, Jolanta Oprzadek, Edward Dymnicki, Lech Zwierzchowski, Association of the polymorphism in the 5'-noncoding region of the bovine growth hormone receptor gene with meat production traits in Polish Black-and-White cattle, Meat Science, Volume 72, Issue 3, March 2006, Pages 539-544, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.09.001.
(http://www.sciencedirect.com/science/article/B6T9G-4HG68B2-3/2/afc0898ce15a1c3d4fe959b3a5bcbcee)
Abstract:
Single and combined effects of polymorphisms in the 5'-noncoding region of the bovine growth hormone receptor (GHR) gene on the traits related to meat production were examined in Polish Black-and-White (BW; Friesian) cattle. Four single nucleotide polymorphisms (SNPs) located in the P1 promoter region were analysed. One-hundred and fifty young bulls were included in the study. The traits analysed were daily weight gain, feed intake and conversion, and carcass parameters. Individual SNPs had no effect on growth rates, feed consumption and conversion but showed marked effect on carcass composition traits. The (-/-) genotype at RFLP-AluI appeared favorable for weight of carcass, carcass dressing percentage, and weight of lean in valuable cuts. Animals with the RFLP-NsiI (+/+) genotype seemed better for most of the carcass parameters. In addition, statistically significant associations were found between combined GHR genotypes and feed consumption, carcass weight and dimensions.
Keywords: Growth hormone receptor; Gene polymorphism; Cattle; Meat production traits

J.H. Pruett, J.M. Pound, Biochemical diagnosis of organophosphate-insensitivity with neural acetylcholinesterase extracted by sonication from the adult tick synganglion, Veterinary Parasitology, Volume 135, Issues 3-4, 18 February 2006, Pages 355-363, ISSN 0304-4017, DOI: 10.1016/j.vetpar.2005.09.013.

(http://www.sciencedirect.com/science/article/B6TD7-4HHH50G-2/2/f961df695202d30ec80eec7191d677cb)
Abstract:
A sonication method for the homogeneous extraction of acetylcholinesterase (AChE) from the synganglia of adult ticks is described. The method provides for the extraction of sufficient AChE for multiple assays of enzyme activity in the presence of specific organophosphate (OP) inhibitors for the rapid diagnosis of OP-insensitivity and assignment of homozygous susceptible (SS), heterozygous resistant (RS), and homozygous resistant (RR) genotypes to individual ticks. A single synganglion from adult ticks of either gender and various stages of feeding can successfully be used for AChE extraction. The study presents the results of diagnostic screening of four Boophilus microplus strains for OP-insensitivity. The extraction method and these findings should find utility in support of researchers involved in the mitigation of acaricide resistance in tick populations worldwide, and in particular, the Cattle Fever Tick Surveillance and Quarantine Program maintained by USDA-APHIS/Veterinary Services along the south Texas border that prevents reentry of Boophilus spp. into the United States from endemic populations in Mexico.
Keywords: Acaricide resistance; Acetylcholinesterase; Organophosphate insensitivity

Mee-Sun Lee, Kang-Kun Lee, Yunjung Hyun, T. Prabhakar Clement, David Hamilton, Nitrogen transformation and transport modeling in groundwater aquifers, Ecological Modelling, Volume 192, Issues 1-2, 15 February 2006, Pages 143-159, ISSN 0304-3800, DOI: 10.1016/j.ecolmodel.2005.07.013.
(http://www.sciencedirect.com/science/article/B6VBS-4H4T12D-2/2/badb0d6f05b318db146ff4dff6312fc9)
Abstract:
Nitrogen pollution in urban and rural groundwater is a common problem and it poses a major threat to groundwater-based drinking water supplies. In this study, a kinetic model is developed to study nitrification-denitrification reactions in groundwater aquifers. A new reaction module for the reactive transport in three-dimensions (RT3D) code is developed and tested to describe the fate and transport of nitrogen species, dissolved oxygen (DO), dissolved organic carbon (DOC) and biomass. The proposed model is verified against some published numerical results and analytical solutions. The model is later used to study the field-scale nitrogen transformations at a cattle feedlot site within the Vasse Research Station, located south of Busselton in Western Australia. Modeling results compare favorably with the field data. The developed model describing nitrification and denitrification reactions is a useful framework for simulating the fate and transport of nitrogen species in groundwater aquifers.
Keywords: Nitrogen model; Transformation; Transport; Nitrification; Denitrification; RT3D

Miloslav Simek, Petr Brucek, Jaroslav Hynst, Eva Uhlirova, Soren O. Petersen, Effects of excretal returns and soil compaction on nitrous oxide emissions from a cattle overwintering area, Agriculture, Ecosystems & Environment, Volume 112, Issues 2-3, Mitigation of Greenhouse Gas Emissions from Livestock Production, February 2006, Pages 186-191, ISSN 0167-8809, DOI: 10.1016/j.agee.2005.08.018.
(http://www.sciencedirect.com/science/article/B6T3Y-4HC6KKW-1/2/aa5dd1c66c4b2ed331c680617a3c2bd1)
Abstract:
Excretal returns and physical disturbance due to treading can greatly influence nitrogen flows in grazed pastures. Dung and urine depositions stimulate microbial transformations, while soil compaction and poaching change the physical environment in which these transformations take place. In this study, a cattle overwintering area in the Southwest Czech Republic was characterized with respect to bulk density, porosity, water-filled pore space (WFPS), organic C, total N, pH, microbial biomass C and denitrifying enzyme activity (DEA). Carbon dioxide and

nitrous oxide (N2O) emissions were measured on four different dates between October 2001 and May 2002. Sampling took place along a transect away from an open barn with access to feed. Soil chemical and biological properties showed that deposition of excreta declined with distance from the barn. In contrast, N2O emissions were highest at intermediate positions along the transect. At the section with the greatest animal impact, the ratio of N2 versus N2O produced was five-fold higher, and the soil pH was 2 units higher, compared to the section with the least animal impact, which indicated that soil conditions favoured production of N2 rather than N2O in the area where excretal returns and treading was intense. A multiple linear regression was conducted using data from the last sampling. There were significant effects of WFPS and pH on log-transformed N2O emissions, while effects of NH4+ and NO3-, and interactions between NH4+ and, respectively, WFPS and pH were nearly significant. The observations indicate that, whereas pasture management to achieve a better distribution of animal impact may improve N retention in the soil, it is not clear whether this will reduce N2O emissions.
Keywords: Cattle overwintering; Emissions; Nitrous oxide; Carbon dioxide; Soil compaction

A.I. Sandem, A.M. Janczak, R. Salte, B.O. Braastad, The use of diazepam as a pharmacological validation of eye white as an indicator of emotional state in dairy cows, Applied Animal Behaviour Science, Volume 96, Issues 3-4, February 2006, Pages 177-183, ISSN 0168-1591, DOI: 10.1016/j.applanim.2005.06.008.
(http://www.sciencedirect.com/science/article/B6T48-4GSJX77-1/2/3ba3ae2f3d6c27da359f0adc55ca8fb2)
Abstract:
This experiment aims at validating the percentage of visible white in the eye as an emotional indicator, related to the frustration-contentedness axis, in cattle. Earlier experiments showed that the calculated percentage of white in the eyes was larger in frustrated or scared cows compared to cows that were offered a positive stimulus. This eye change was therefore suggested to be a dynamic indicator of emotions in dairy cattle, a high percentage of white in the eye indicating frustration, and a low percentage indicating satisfaction. In the present paper, the hypothesis was that treatment with the anti-anxiety drug diazepam should reduce the percentage of white in the eye in frustrated cows, but have no effect on the percentage of eye white in non-frustrated or rewarded cows.
The test animals were 20 randomly selected commercial dairy cows (Norwegian Red Cattle). Two experiments were performed on hungry cows. The four different groups in the first experiment are described in the following. Ten cows were introduced to a frustrating situation, being thwarted from access to visible food (treatment I). Ten cows were introduced to a positive situation, access to food (treatment II). The 10 cows in group I were introduced to the same frustrating situation, but were now pretreated with diazepam (treatment III). The 10 cows in group II were introduced to the same positive situation after pretreatment with diazepam (treatment IV). The two groups in the second experiment were 20 untreated (treatment I) and 20 diazepam-treated (treatment II) cows introduced to a positive, conditioned stimulus, a stockman entering the stall at concentrate feeding time.
All predictions were confirmed, supporting the hypothesis that increased percentage of eye white is an emotional indicator of frustration in cows.
Keywords: Animal welfare; Behavioural indicators; Emotional expression; Food deprivation; Diazepam; Eye-white

M.A. Hoque, P.F. Arthur, K. Hiramoto, T. Oikawa, Genetic relationship between different measures of feed efficiency and its component traits in Japanese Black (Wagyu) bulls, Livestock Science, Volume 99, Issues 2-3, February 2006, Pages 111-118, ISSN 1871-1413, DOI: 10.1016/j.livprodsci.2005.06.004.

(http://www.sciencedirect.com/science/article/B7XNX-4J989G9-3/2/397802011dd46dcc87c12ee27f25c7b8)
Abstract:
Genetic parameters of average daily gain (ADG), metabolic body weight (MWT), body weight at finish (BWF), daily feed intake (DFI), feed conversion ratio (FCR), and residual feed intake (RFI) were estimated in 740 Japanese Black bulls. RFI was calculated as the difference between actual and expected feed intake predicted by the residual of multiple regression (RFIphe) and genetic regression (RFIgen) from the multivariate analysis for DFI, MWT, and ADG. The estimations were made for the test periods of 140 days (77 bulls) and 112 days (663 bulls). The mean for RFIphe was close to zero and RFIgen was negative. Most of the traits studied were moderately heritable (ranging from 0.24 to 0.49), except for ADG and FCR (0.20 and 0.15, respectively). The genetic correlations among growth traits (ADG, MWT and BWF) and between DFI and growth traits were high, while the phenotypic correlations between them were moderate to high. The genetic and phenotypic correlations between RFIphe and RFIgen were > 0.95 implying that they are regarded as the same trait and the genetic correlations of RFI (RFIphe and RFIgen) with FCR and DFI were favorably high. RFIphe was phenotypically independent of its component traits, MWT (rp = - 0.01) and ADG (rp = 0.01). RFIgen was genetically independent of MWT (rg = - 0.07), while there was a weak genetic relationship (rg = 0.18) between RFIgen and ADG. These results provide evidence that RFIgen should be included for genetic improvement of feed efficiency in Japanese Black breeding program.
Keywords: Beef cattle; Feed efficiency; Growth; Genetic parameters

Maria Jose Milan, Jordi Bartolome, Raquel Quintanilla, Maria Dolores Garcia-Cachan, Manuel Espejo, Pedro Luis Herraiz, Jose Manuel Sanchez-Recio, Jesus Piedrafita, Structural characterisation and typology of beef cattle farms of Spanish wooded rangelands (dehesas), Livestock Science, Volume 99, Issues 2-3, February 2006, Pages 197-209, ISSN 1871-1413, DOI: 10.1016/j.livprodsci.2005.06.012.
(http://www.sciencedirect.com/science/article/B7XNX-4J989G9-C/2/98eb2342b5cbfcf10a6b7dee9e12bc76)
Abstract:
The structure and typology of beef cattle farms from three autochthonous Spanish breeds (Avilena-Negra Iberica, Morucha and Retinta) located in 'dehesa' areas have been characterised from a survey including 130 farms. The questionnaire provided information on the structure of the farms, feeding practices, reproductive and sanitary management, production and commercialisation of the product. Descriptive statistics and multivariate analysis (multiple correspondences analysis and cluster analysis) were used to understand the relationships between variables and to establish farm typologies. We have found that the farms are large (an average of 125 cows and 548 ha), with an average stocking rate of 0.4 livestock unit/ha of agricultural area. Most of the farms are family managed, but with an important presence of external employees. Feeding depends largely on grazing, with seasonal supplementation. The presence of other livestock species, such horses, sheep and swine is frequent. The typology of the farms has been established on the basis of (1) farm size, (2) productivity of labour, (3) degree of specialisation, and (4) degree of extensification. Three groups of farms have been differentiated. The first group has followed a strategy of intensification of the system and includes the smallest farms. The second group is constituted by farms of intermediate size, very specialised in beef production. The third group includes large farms that have followed a strategy of extensification, complementing farm incomes by the exploitation of other livestock species.
Keywords: Beef cattle; Spanish dehesa; Livestock farming systems; Farm typology; Structural characterisation; Multiple correspondence analysis

S. De Campeneere, J.L. De Boever, D.L. De Brabander, Comparison of rolled, NaOH treated and ensiled wheat grain in dairy cattle diets, Livestock Science, Volume 99, Issues 2-3, February 2006, Pages 267-276, ISSN 1871-1413, DOI: 10.1016/j.livprodsci.2005.08.003.
(http://www.sciencedirect.com/science/article/B7XNX-4J989G9-M/2/712ba3e6c6690727f8b4f055f043235b)
Abstract:
The effect of three wheat grain treatments on the zootechnical performance (feed intake, milk production and milk fat and protein production) of dairy cattle was studied with 18 Holstein cows in each of two feeding trials (both a 3 x 3 Latin square design). Rolled wheat, NaOH treated wheat and immature wheat ensiled with Graintona-Plus (Vee-lik, Zuienkerke, Belgium) were compared in a ration with fixed DM proportions of wheat, maize silage and prewilted grass silage. The nutritive value of the three wheat treatments was derived from in situ rumen degradability studies and from in vivo digestibility experiments.
In situ rumen incubations showed that NaOH treatment strongly decreased protein and starch degradability of the wheat. Due to that importantly decreased starch degradability NaOH treated wheat may be a source of starch with a reduced risk of rumen acidosis as compared to rolled wheat. On the other hand, due to the ensiling, immature wheat had a very high washable starch fraction, despite the Graintona-Plus treatment. The protein value differed importantly, with the DPI (true protein digested in the small intestine; [Tamminga, S., van Straalen, W.M., Subnel, A.P.J., Meijer, R.G.M., Steg, A., Wever, C.J.G., Blok, M.C., 1994. The Dutch protein evaluation system: the DVE/OEB-system. Livest. Prod. Sci. 40, 139-155]) value being 103, 125 and 76 g/kg DM for rolled, NaOH treated and ensiled wheat, respectively. The RDPB (degraded protein balance; [Tamminga, S., van Straalen, W.M., Subnel, A.P.J., Meijer, R.G.M., Steg, A., Wever, C.J.G., Blok, M.C., 1994. The Dutch protein evaluation system: the DVE/OEB-system. Livest. Prod. Sci. 40, 139-155]) value of the NaOH treated wheat was - 51 vs. - 37 and- 33 g/kg DM for rolled and ensiled wheat. In vivo digestibility trials with Holstein cows indicated that the net energy value of the wheat treatments was not significantly different.
In Trial 1, all diets were formulated to supply 105% of the requirements of DPI and net energy lactation (NEL; [Van Es, A.J.H., 1978. Feed evaluation for ruminants: I. The system in use from May 1977 onwards in the Netherlands. Livest. Prod. Sci. 5, 331-345]) and a safe RDPB level (+/- 200 g/day). On average 4.6 kg wheat DM was fed daily. Following trial 1, trial 2 was carried out, with the maize silage, grass silage and wheat fed in the same proportions as in trial 1, but fed ad libitum, to compare the intake level of the three diets. In both trials, the NaOH treated wheat resulted in the best performance with importantly increased milk yield and the highest yield of fat and protein corrected milk. Ensiled immature wheat resulted in a significant lower milk production and milk protein yield and in a higher milk fat content. In trial 1, DM-intake of the three groups was comparable due to the experimental design. In trial 2 intake of the cows fed NaOH treated wheat was significantly higher (23.5 vs. 21.1 kg/day for the other two groups).
Keywords: Ensiled immature wheat; Rolled wheat; NaOH treated wheat; Rumen degradability; Digestibility; Milking performance

Robert J. Van Saun, Nutrient requirements of South American camelids: A factorial approach, Small Ruminant Research, Volume 61, Issues 2-3, South American Camelids, February 2006, Pages 165-186, ISSN 0921-4488, DOI: 10.1016/j.smallrumres.2005.07.006.
(http://www.sciencedirect.com/science/article/B6TC5-4GY8944-3/2/8fd6c03aaa7f2f8da8de6082cf722c99)
Abstract:
Literature describing digestive physiology and defining specific nutrient requirements for llamas and alpacas was reviewed. Using data from studies defining maintenance energy and protein requirements, llamas and alpacas have lower energy and protein requirements compared to other ruminants; however, they have a greater protein requirement per unit of energy. This is consistent

with observed differences in urea and glucose metabolism between camelids and other ruminants suggesting a reliance on protein catabolism to maintain blood glucose concentrations. Evidence suggests llamas and alpacas may have a greater requirement for Vitamin D, but no other evidence of significant differences in requirements between camelids and other ruminants. There are limited data defining other nutrient requirements or differences in requirements based on physiologic state for llamas and alpacas. In spite of limited data, a factorial approach to estimate nutritional requirements of llamas and alpacas was described. Defined maintenance energy and protein requirements were extrapolated to other physiologic states using beef cattle, sheep and goat data as templates. Models were developed to predict energy, protein, mineral and vitamin requirements for growth, pregnancy and lactation. Model development was based on determining beef cattle and sheep nutrient requirements on an amount per kg of body weight and assuming no inherent metabolic differences among species. An averaged value was calculated and used as a basis for defining requirements for llamas and alpacas. Amount per kg body weight requirements were converted to a recommended dietary nutrient density basis using an observed lower dry matter intake per unit body weight. Factorially derived models were in better agreement with North American feeding recommendations compared to predicted requirements using current North American-based requirement models. North American-based requirement equations over predicted energy and protein, resulting in required dietary nutrient densities in excess of practical feeding practices. The proposed factorial models need to be critically validated, but provides a starting point for discussion in advancing the study and application of llama and alpaca nutrient requirements. There are tremendous gaps in our knowledge of llama and alpaca requirements, requiring further basic research especially in the areas of neonatal and fetal growth and composition, lactational performance and mineral bioavailability.
Keywords: Llama; Alpaca; Nutrient requirements; Digestion; Nutrition

M.G. Colazo, J.P. Kastelic, R.C. Mainar-Jaime, Q.A. Gavaga, P.R. Whittaker, J.A. Small, M.F. Martinez, R.E. Wilde, D.M. Veira, R.J. Mapletoft, Resynchronization of previously timed-inseminated beef heifers with progestins, Theriogenology, Volume 65, Issue 3, February 2006, Pages 557-572, ISSN 0093-691X, DOI: 10.1016/j.theriogenology.2005.06.001.
(http://www.sciencedirect.com/science/article/B6TCM-4GP1V8M-1/2/d5f4955a5feb164a178e165bf6f93cf0)
Abstract:
The objective was to determine the efficacy of a previously used CIDR or melengestrol acetate (MGA; 0.5 mg/head/day) for resynchronization of estrus in beef heifers not pregnant to timed-AI (TAI). In three experiments and a field trial, heifers were reinseminated 6-12 h after first detection of estrus. Pregnancy diagnosis was done from approximately 25-43 days after either TAI or reinsemination. In Experiment 1, 79 heifers received a once-used CIDR from 13 to 20 days after TAI and 80 heifers were untreated controls. For these two groups, there were 34 and 35 heifers, respectively, not pregnant to TAI; median +/- S.E. intervals from TAI to onset of estrus were 22 +/- 0.2 days versus 20 +/- 0.6 days ($P < 0.001$); estrus rates were 70.6% versus 85.7% ($P = 0.1$); conception rates were 62.5% versus 76.7% ($P < 0.3$); and pregnancy rates were 44.1% versus 65.7% ($P = 0.07$), for CIDR and untreated (control) groups, respectively. In Experiment 2, heifers ($n = 651$) were TAI (Day 0) and 13 days later randomly assigned to one of seven groups ($n = 93$ per group) to receive a once-used CIDR (three groups; Days 13-20), MGA (three groups; Days 13-19), or no treatment (control group). Groups given a CIDR or MGA also received: no further treatment (CIDR or MGA alone); 1.5 mg estradiol-17[beta] (E-17[beta]) and 50 mg progesterone (P4) in 2 mL canola oil on Day 13; or E-17[beta] and P4 on Day 13 and 0.5 mg E-17[beta] on Day 21 (24 h after CIDR removal or 48 h after the last feeding of MGA). Pregnancy rate to TAI was lowest ($P < 0.05$) for the group given a CIDR plus E-17[beta] and P4 on Day 13 and E-17[beta] on Day 21. Variability in return to estrus was greater ($P < 0.001$) in the control and MGA groups than in CIDR groups. Conception and pregnancy rates in heifers given a CIDR (65.1 and 61.4%) were

higher (P < 0.01) than those fed MGA (49.6 and 40.4%), but not different from controls (62.2 and 54.9%, respectively). In Experiment 3, 616 heifers received a once- or twice-used CIDR for 7 days, beginning 13 +/- 1 days after TAI, with or without a concurrent injection of 150 mg of P4 (2 x 2 factorial design). Pregnancy rate to TAI was 47.2%. In heifers that returned to estrus, there was no significant difference between a once- or twice-used CIDR for rates of estrus (68.8%, P < 0.3), conception (65.9%, P < 0.6) and pregnancy (45.3%, P < 0.8). Injecting progesterone at CIDR insertion increased the median interval from CIDR removal to onset of estrus (P < 0.05) and reduced rates of estrus (63.8% versus 73.8%, P < 0.05), conception (60.5% versus 70.6%, P = 0.1) and pregnancy (38.6% versus 52.2%, P < 0.02). In a field trial, 983 heifers received a once-used CIDR for 7 days, beginning 13 +/- 1 days after TAI. Pregnancy rate to TAI was 55.2%. The median (and mode) of the interval from CIDR removal to estrus was 2.5 days. Estrus, conception and pregnancy rates were 78.2, 70.3 and 55.0% (overall pregnancy rate to TAI and rebreeding, 78.7%). In summary, a once- or twice-used CIDR for 7 days, starting 13 +/- 1 days after TAI resulted in the majority of nonpregnant heifers detected in estrus over a 4-day interval, with acceptable conception rates; however, injecting progesterone at CIDR insertion significantly reduced both estrus and pregnancy rates, and estradiol treatment after CIDR removal was associated with a decreased pregnancy rate to TAI. Fertility was higher in heifers resynchronized with a once-used CIDR than with MGA.
Keywords: Resynchronization; Progestins; Estradiol; Estrus synchronization; Beef cattle

Ivana Klun, Olgica Djurkovic-Djakovic, Sofija Katic-Radivojevic, Aleksandra Nikolic, Cross-sectional survey on Toxoplasma gondii infection in cattle, sheep and pigs in Serbia: Seroprevalence and risk factors, Veterinary Parasitology, Volume 135, Issue 2, 30 January 2006, Pages 121-131, ISSN 0304-4017, DOI: 10.1016/j.vetpar.2005.08.010.
(http://www.sciencedirect.com/science/article/B6TD7-4H68T82-2/2/952871c369f8f73aef53b12029685059)
Abstract:
Toxoplasmosis is a globally distributed zoonosis with a clinical impact in the unborn fetus and in the immunosuppressed individual. In Serbia, studies of risk factors for Toxoplasma gondii infection in humans have shown that the relatively high prevalence is associated mainly with consumption of undercooked meat and/or meat products. However, data on T. gondii infection in domestic animals mostly used for human consumption are scarce. We thus conducted a cross-sectional survey on the seroprevalence of T. gondii infection in a representative sample of cattle, sheep and pigs from different regions of Serbia between June 2002 and June 2003, and analyzed the main risk factors associated with the infection. Sera from 611 cattle (yearlings and adults of both sexes), 511 ewes, and 605 pigs (market-weight and sows), were examined for T. gondii antibodies by the modified agglutination test. The seroprevalences determined were 76.3% in cattle, 84.5% in sheep and 28.9% in pigs. The antibody levels ranged from 1:25 to 1:400 in cattle, and up to 1:25,600 in sheep and to 1:12,800 in pigs. Among the seropositive, the proportion of high antibody levels (>=1:1600), suggestive of acute infection, was 10% in sheep, and 4% in pigs. Possible association of the infection with biologically plausible risk factors including gender, age, herd size/farm type, type of housing, feeding practices and region, was analyzed by univariate analysis, and variables significant at P <= 0.1 were included in multivariate logistic regression models. The results showed that risk factors for cattle were small herd size (odds ratio, OR = 2.19, 95% confidence interval, CI = 1.28-3.75, P = 0.004) and farm location in Western Serbia (OR = 2.04, 95% CI = 1.10-3.79, P = 0.024), while housing in stables with access to outside pens was protective (OR = 0.37, 95% CI = 0.21-0.67, P = 0.001). In sheep, an increased risk of infection was found in ewes from state-owned flocks (OR = 4.18, 95% CI = 2.18-8.00, P < 0.001) vs. private flocks, and, interestingly, also in those from Western Serbia (OR = 4.66, 95% CI = 1.18-18.32, P = 0.028). In pigs, the risk of infection was highly increased in adult animals (OR = 3.87, 95% CI = 2.6-5.76, P < 0.001), as well as in those from finishing type farms (OR = 3.96, 95% CI = 1.97-7.94, P < 0.001). In addition to

providing data on the current T. gondii seroprevalence in meat animals in Serbia, the results of this study show the main risk factors associated with infection, thereby pointing to the type of preventive measures to reduce T. gondii infection.
Keywords: Toxoplasma gondii; Cattle; Sheep; Pigs; Seroprevalence; Risk factors; Serbia

Pamela Zolda, Nematode communities of grazed and ungrazed semi-natural steppe grasslands in Eastern Austria, Pedobiologia, Volume 50, Issue 1, 26 January 2006, Pages 11-22, ISSN 0031-4056, DOI: 10.1016/j.pedobi.2005.08.002.
(http://www.sciencedirect.com/science/article/B7CW5-4H511H0-1/2/4187f5f8fa3c8fb218de5144d0bddd7d)
Abstract: Summary
Soil nematode communities were investigated at eight semi-natural steppe grasslands in the National Park Seewinkel, eastern Austria. Four sites were moderately grazed by horses, cattle and donkeys, four were ungrazed. Nematodes were sampled on four occasions from mineral soil, and their total abundance, diversity of genera, trophic structure and functional guilds were determined. Altogether 58 nematode genera inhabited the grasslands, with Acrobeloides, Anaplectus, Heterocephalobus, Prismatolaimus, Aphelenchoides, Aphelenchus, Tylenchus and Pratylenchus dominating. Mean total abundance at sites was 185-590 individuals per 100 g soil. Diversity indices did not separate communities well, but cluster analysis showed distinct site effects on nematode generic structure. Within feeding groups the relative proportion of bacterial-feeding nematodes was the highest, followed by the fungal- and plant-feeding group. Omnivores and predators occurred in low abundance. The maturity indices and plant parasite indices were characteristic for temperate grasslands, but the abundance of early colonizers (c-p 1 nematodes) was low. A high density of fungal-feeding c-p 2 families (Aphelenchoidae, Aphelenchoididae) resulted in remarkably high channel index values, suggesting that decomposition pathways are driven by fungi. Nematode community indices of all sites pointed towards a structured, non-enriched soil food web. At most sites, grazing showed little or no effect on nematode community parameters, but total abundance was higher at ungrazed areas. Significant differences in the percentage of omnivorous nematodes, the sum of the maturity index, the number of genera and Simpson's index of diversity were found at one long-term grazed pasture, and this site was also separated by multi-dimensional scaling (MDS).
Keywords: Soil nematodes; Grazing; Diversity; Trophic groups; Steppe grasslands

Dave L. Buckingham, Will J. Peach, Derren S. Fox, Effects of agricultural management on the use of lowland grassland by foraging birds, Agriculture, Ecosystems & Environment, Volume 112, Issue 1, January 2006, Pages 21-40, ISSN 0167-8809, DOI: 10.1016/j.agee.2005.06.019.
(http://www.sciencedirect.com/science/article/B6T3Y-4H27BTP-2/2/97f3257b1c24ded02d7dc038b2d683f5)
Abstract:
A field-scale correlative study was used to identify which factors had the greatest influence on the usage of agricultural grassland by foraging birds in the English West Midlands. The study extended previous work by directly comparing a more complete range of lowland grassland management practises, bird species and seasons. Sward structure had more influence on bird usage than botanical composition. Bird species fell into two groups based on their sward structure preferences, which closely reflected where they obtained their food. Species that feed on soil-dwelling invertebrates selected short swards, while species that feed on sward-dwelling invertebrates or seeds selected taller swards with greater spatial heterogeneity. Grazing had a greater influence on grassland usage than sward age and other management practices. Birds mainly responded positively to grazing, especially by cattle. Weed control reduced the usage of grass fields by granivorous birds during summer and winter. Intensive grazing systems create and maintain short, uniform swards that favour bird species foraging for soil-dwelling invertebrates, but

not those reliant on seeds or sward-dwelling invertebrates. It is proposed that excessive defoliation of agricultural grasslands (associated with intensive grazing and mowing regimes) impacts granivorous birds by reducing prey abundance. Reductions in grazing intensity and the avoidance of weed control should increase food availability for granivorous and insectivorous birds on grass fields.
Keywords: Farmland birds; Grassland management; Sward structure; Grazing; Mixed models

Dorota Majchrzak, Elisabeth Fabian, Ibrahim Elmadfa, Vitamin A content (retinol and retinyl esters) in livers of different animals, Food Chemistry, Volume 98, Issue 4, 2006, Pages 704-710, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2005.06.035.
(http://www.sciencedirect.com/science/article/B6T6R-4H2PJW7-2/2/942b502396d3453e43b0ff8696f97a43)
Abstract:
In the present study, 90 animal livers of five different species (pig, cattle, calf, chicken, turkey) were examined for their vitamin A contents. The investigation of extracted vitamin A included all-trans retinol, retinyl palmitate, stearate, oleate and linoleate, expressed as retinol equivalents (RE). The separation of the various chemical forms was done using HPLC. The liver vitamin A contents ranged between 6.5 and 18.9 mg RE/100 g in pigs, from 1.1 to 6.7 mg RE/100 g in cattle and from 1.6 to 16.6 mg RE/100 g and 2.7 to 21.5 mg RE/100 g in chickens and turkeys, respectively. The livers of calves contained the smallest amount of vitamin A, with variation from 1.3 to 3.2 mg RE/100 g. Retinyl palmitate was the predominant form of vitamin A in the livers of investigated animals and contributed about 40% (avids) up to 75% (calf) of the total liver vitamin A contents. The results indicated that the lower levels of animal liver vitamin A, observed in our study, could be a result of small-structured agriculture in Austria. The variations of liver vitamin A concentrations among the species were a result of differences in race, age and the different feeding regimen.
Keywords: Retinol; Retinyl esters; Liver; Animals

A.C.G. Monteiro, J. Santos-Silva, R.J.B. Bessa, D.R. Navas, J.P.C. Lemos, Fatty acid composition of intramuscular fat of bulls and steers, Livestock Science, Volume 99, Issue 1, January 2006, Pages 13-19, ISSN 1871-1413, DOI: 10.1016/j.livprodsci.2005.04.010.
(http://www.sciencedirect.com/science/article/B7XNX-4J8C7C7-3/2/cdfe63c08d4e709f38bfe947d4f209b5)
Abstract:
The aim of this trial was to evaluate the influence of castration on fatty acid composition of intramuscular fat. Twenty-four bull calves of Mertolenga breed were randomly assigned to two groups: castrates and intact males. Castration was done at weaning (6 to 8 months of age). After weaning, all animals grazed a rye-grass pasture through 1 year and were then placed in a feed-lot and fed a finishing diet. Three animals of each treatment were slaughtered after a period of 0 (pasture only), 50, 100 and 150 days of feed-lot feeding. All the animals were subjected to the same feeding and management regimes. Fatty acid composition of the intramuscular fat was analyzed in samples of muscle Longissimus lumborum taken after 7 days of ageing.
After adjustment for equal intramuscular fat, entire males had significant higher values of C17:0, C18:1trans, C18:2n-6, P/S, n - 6/n - 3 and C18:2n-6/C20:4n-6 ratios and lower values of C16:0 and C18:1cis-9, indicating that castration has an effect on the fatty acid composition of intramuscular fat of Longissimus lumborum.
Keywords: Beef cattle; Castration; Intramuscular fat; Fatty acids

R.W. Lawrence, J. Doyle, R. Elliott, I. Loxton, J.P. McMeniman, B.W. Norton, D.J. Reid, R.W. Tume, The efficacy of a vitamin D3 metabolite for improving the myofibrillar tenderness of meat from Bos indicus cattle, Meat Science, Volume 72, Issue 1, January 2006, Pages 69-78, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.06.005.

(http://www.sciencedirect.com/science/article/B6T9G-4GTW92P-4/2/2728d144d316beeb32332ec65a2ff22e)
Abstract:
The influence of a once only administration of a metabolite of vitamin D3 (HY [middle dot] D(R)-25-hydroxy vitamin D3) on myofibrillar meat tenderness in Australian Brahman cattle was studied. Ninety-six Brahman steers of three phenotypes (Indo-Brazil, US and US/European) and with two previous hormonal growth promotant (HGP) histories (implanted or not implanted with Compudose(R)) were fed a standard feedlot ration for 70 d. Treatment groups of 24 steers were offered daily 10 g/head HY [middle dot] D(R) (125 mg 25-hydroxyvitamin D3) for 6, 4, or 2 d before slaughter. One other group of 24 steers was given the basal diet without HY [middle dot] D(R). Feed lot performance, blood and muscle samples and carcass quality data were collected at slaughter. Calcium, magnesium, potassium, sodium, iron and Vitamin D3 metabolites were measured in plasma and longissimus dorsi muscle. Warner-Bratzler (WB) shear force (peak force, initial yield) and other objective meat quality measurements were made on the longissimus dorsi muscle of each steer after ageing for 1, 7 and 14 d post-mortem at 0-2 [degree sign]C.
There were no significant effects of HY [middle dot] D(R) supplements on average daily gain (ADG, 1.28-1.45 kg/d) over the experimental period. HY [middle dot] D(R) supplements given 6 d prior to slaughter resulted in significantly higher ($P < 0.05$) initial yield values compared to supplements given 2 d prior to slaughter. Supplementation had no significant effect on meat colour, ultimate pH, sarcomere length, cooking loss, instron compression or peak force. There was a significant treatment (HY [middle dot] D(R)) by phenotype/HGP interaction for peak force ($P = 0.028$), in which Indo-Brazil steers without previous HGP treatment responded positively (increased tenderness) to HY [middle dot] D(R) supplements at 2 d when compared with Indo-Brazil steers previously given HGP. There were no significant effects of treatment on other phenotypes. HY [middle dot] D(R) supplements did not affect muscle or plasma concentrations of calcium, potassium or sodium, but did significantly decrease plasma magnesium and iron concentrations when given 2 d before slaughter. There were no detectable amounts of 25-hydroxyvitamin D3 in the blood or muscle of any cattle at slaughter.
Keywords: Brahman cattle; 25-hydroxyvitamin D3; Myofibrillar meat tenderness; Muscle calcium; Muscle magnesium; Muscle iron; Plasma calcium; Plasma magnesium

I. Yeruham, D. Elad, Y. Avidar, T. Goshen, A herd level analysis of urinary tract infection in dairy cattle, The Veterinary Journal, Volume 171, Issue 1, January 2006, Pages 172-176, ISSN 1090-0233, DOI: 10.1016/j.tvjl.2004.04.005.
(http://www.sciencedirect.com/science/article/B6WXN-4HNS6MK-1/2/d8e10efe4db75ef8cb06f947db8d12cb)
Abstract:
Cystitis, urethritis and pyelonephritis in cattle most commonly result from ascending urinary tract infection with Corynebacterium renale, Corynebacterium cystidis, Corynebacterium pilosum or Escherichia coli. We describe the clinical, bacteriological, clinical-pathological and epidemiological findings in a dairy cattle herd with urinary tract infection (UTI). Blood and urine samples from 17 calves and 19 cows were submitted to laboratory examinations. Depression, muscle wasting, weakness and frequent urine dribbling were the main characteristics of UTI in calves. Affected cows showed weight loss and an abrupt reduction in feed intake and milk production. Enlargement of the left kidney and loss of normal lobulation were evident on rectal examination. E. coli was the most frequent cause of UTI but C. renale, [alpha]-haemolytic Streptococcus spp., Proteus spp. Pseudomonas aeruginosa, Klebsiella spp. and Oligella urethralis were isolated as well. Differences in total protein and several protein fractions were found between affected and healthy animals.

D. Biagini, C. Lazzaroni, Carcass dissection and commercial meat yield in Piemontese and Belgian Blue double-muscled young bulls, Livestock Production Science, Volume 98, Issue 3, 30 December 2005, Pages 199-204, ISSN 0301-6226, DOI: 10.1016/j.livprodsci.2005.05.007. (http://www.sciencedirect.com/science/article/B6T9B-4GGWGM3-1/2/66bcfc8cf39da816b83ef1a882332224)
Abstract:
To study the differences in meat yield in hypertrophied cattle, a commercial dissection trial was carried out on 48 carcasses obtained from 24 Piemontese (P: 12 reared with a restricted feeding, P-R, and 12 fed ad libitum, P-L), and 24 Belgian Blue (B: 12 reared with a restricted feeding, BB-R, and 12 fed ad libitum, BB-L) young bulls. The animals were reared under the same environmental condition and slaughtered at the same age and fattening degree. During commercial dissection, the weights of the retail cuts were recorded. Three fore-quarter meat cuts were heavier in P than in BB, while nine meat cuts (two from fore-quarter and seven from hind-quarter), hind-quarter meat and prime quality meat were heavier in BB than in P. Fat weight was higher in BB than in P, whereas meat production as a percentage of carcass side weight was higher in P than in BB. Only one hind-quarter meat cut was heavier in the ad libitum (L) than in the restricted (R) group, whereas meat yield was higher in R than in L. In comparing the meat yield in carcass sides of P-R, P-L, BB-R and BB-L fed young bulls, four meat cuts (one from fore-quarter and three from hind-quarter), hind-quarter, prime quality and 3rd quality meat were heavier in BB-L ($P <= 0.05$), while one shoulder cut and fore-quarter were heavier in P-R group.
Keywords: Muscular hypertrophy; Feeding systems; Meat cuts; Bone weight; Fat weight

M. Busquet, S. Calsamiglia, A. Ferret, C. Kamel, Screening for effects of plant extracts and active compounds of plants on dairy cattle rumen microbial fermentation in a continuous culture system, Animal Feed Science and Technology, Volumes 123-124, Part 2, 7 December 2005, Pages 597-613, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2005.03.008. (http://www.sciencedirect.com/science/article/B6T42-4G5BJJJ-1/2/fe39cf4cd94d55fe61b0fc7b9cd69c20)
Abstract:
Eight dual-flow continuous culture fermenters were used to study effects of plant extracts (Experiment 1) and active compounds of plants (Experiment 2) on rumen microbial fermentation. Each experiment consisted in two replicated periods of 9 days. Fermenters were fed 95 g dry matter (DM)/day in three feedings of a 600 g/kg (DM basis) alfalfa hay and 400 g/kg concentrate (178 g/kg crude protein, CP; 325 g/kg neutral detergent fibre, NDF diet), and maintained at constant temperature (38.5 [degree sign]C), pH 6.4, and solid (0.05/h) and liquid (0.10/h) dilution rates. Both experiments included a negative control with no extract (CTR) and a positive control with monensin (MON). Treatments in Experiment 1 were: Trigonella foenum graecum, Juniperus oxycedrus, Syzygium aromaticum (CLO), Anethum graveolens, Zingiber officinale, and Melaleuca alternifolia. Treatments in Experiment 2 were: benzyl salicylate, anethol, carvacrol (CAR), cinnamaldehyde (CIN), eugenol, and d-carvone. During the adaptation period (i.e., days 1 through 7), samples for ammonia N and volatile fatty acid (VFA) concentrations were collected 2 h after feeding. On days 8 and 9, samples for VFA (2 h after feeding), and large peptide (LPep), small peptide plus amino acid (SPepAA), and ammonia N concentrations (0, 2, 4, 6 and 8 h after feeding) were also collected. During the adaptation period of Experiments 1 and 2, total VFA and ammonia N concentrations were not affected by treatments. During the first 6 days of fermentation in Experiments 1 and 2, MON resulted in lower acetate and higher propionate proportions compared with CTR. However, these differences disappeared after day 6. On days 6 and 7, CLO in Experiment 1 resulted in lower acetate, and higher butyrate, proportions compared with CTR. On day 7, the proportion of acetate was lower in CIN in Experiment 2 compared with CTR. After the adaptation period, CLO resulted in lower acetate, and higher propionate, proportions compared with CTR. The LPep N concentration was higher in CLO compared with CTR,

suggesting that CLO reduced peptidolytic activity of rumen microorganisms. In Experiment 2, the LPep N concentration was lower in CAR, and MON resulted in lower SPepAA N concentrations and higher ammonia N concentrations compared with CTR, suggesting that MON stimulated deamination activity of rumen microorganisms. Results indicate that ruminal microbes may adapt to additives within 7 days. However, some plant extracts modified rumen microbial fermentation patterns and may allow manipulation of ruminal fermentation under current commercial practices.
Keywords: Rumen fermentation; Plant extracts; Protein degradation

Byeng R. Min, William E. Pinchak, Jerry D. Fulford, Richard Puchala, Effect of feed additives on in vitro and in vivo rumen characteristics and frothy bloat dynamics in steers grazing wheat pasture, Animal Feed Science and Technology, Volumes 123-124, Part 2, 7 December 2005, Pages 615-629, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2005.04.050.
(http://www.sciencedirect.com/science/article/B6T42-4GBD6PG-1/2/450f48c16166b164bb5c016035a9e653)
Abstract:
Research was conducted to determine the potential efficacy of feed additives (FA) to mitigate frothy bloat in yearling cattle grazing wheat pasture. Two experiments were conducted to: (1) quantify in vitro effect of FA on total rumen and methane gas production and foam potential and (2) quantify the influence of FA on rumen protein characteristics, bloat potential and weight gain of steers grazing wheat pasture. In Exp 1, duplicated analyses of in vitro gas production were measured as sequential plunger displacement (cc) at 0, 1, 2, 3, 4, 5, and 6 h incubation periods. In vitro rumen foam production and strength was measured at 0, 2, and 6 h incubation of minced wheat forage. In Exp 2, eight ruminally cannulated steers (386 +/- 35.8 kg/steer) were randomly allocated to one of four FA treatments that included control, monensin, poloxalene, and condensed tannins (CT). Treatments were administered daily through rumen cannulla as pre-mixes with a mixed ration (300 mg/steer/day; as-fed basis). Steers grazed on wheat during a 2-week adaptation period prior to data collection from 05 March to 12 April, 2004. Rumen contents were collected 2 h post-FA infusion (1030 to 1130 h) on day -5, 0, 5, 15, and 22. Cattle were weighed at 28-days intervals. Bloat was visually scored weekly. In Exp 1, in vitro ruminal gas and methane gas production per gram of forage were similar between control and poloxalene, but were lower for monensin ($P<0.01$) and CT ($P<0.05$) treatments. The lowest ($P<0.01$) in vitro foam strength occurred with the addition of poloxalene and the highest occurred in control and monensin treatments. CT was intermediate in rumen foam strength. Mean bloat score was lower in poloxalene and CT than that in monensin and control treatments. Among six-rumen protein components assayed, steers receiving CT after 10, 15, and 22 day had greater protein concentrations in whole rumen content, particulate matter, cheese-cloth filtrate, and protozoa and plant particle fractions than steers fed other treatments. Bacterial and cell-free supernatant protein fractions were comparable among treatments. Ruminal dry matter (DM) content, cell-free supernatant, protozoal and bacterial fractions were similar between the bloated and non-bloated steers. In bloated animals, ruminal pH was lower, and whole rumen content and cheese-cloth filtrate protein fractions tended to be greater ($P=0.08$) than in non-bloated animals. Animal average daily gain (ADG) was not affected by FA during experimental period. The results of this trial suggest that wheat pasture bloat was associated with dietary protein and low ruminal pH. Feeding FA can be used to decrease either ruminal gas or foam production or both, and it may protect against the incidence of frothy bloat.
Keywords: Feed additives; Frothy bloat; Gas production; Wheat forage

R.A. Ware, R.A. Zinn, Effect of pelletizing on the feeding value of rice straw in steam-flaked corn growing-finishing diets for feedlot cattle, Animal Feed Science and Technology, Volumes 123-124, Part 2, 7 December 2005, Pages 631-642, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2005.04.051.

(http://www.sciencedirect.com/science/article/B6T42-4GD4SH6-1/2/9fb46dc1f08b14cb652e6deaa188365f)
Abstract:
Trial 1. Three cannulated crossbred steers were used to compare the effects of ground versus pelletized rice straw on characteristics of digestion. Treatments consisted of a steam-flaked corn-based diet containing 120 g/kg sudangrass (SG, positive control), ground rice straw (GRS) or pelletized rice straw (PRS). Ruminal digestion of organic matter was similar across treatments (P<0.10). Ruminal digestion of neutral detergent fiber was low, averaging 140 g/kg, and not affected (P>0.10) by forage source. Ruminal starch digestion was lower (5%; P<0.05) for sudangrass than for rice straw diets, and greater (8%, P<0.01) for pelletized versus ground straw. Ruminal microbial efficiency was greater (9.7%; P<0.05) for ground than for pelletized rice straw. Total tract digestion of dry matter was greater (3%, P<0.10) for sudangrass than for rice straw treatments and NDF digestion was lower (26%; P<0.05) for rice straw than for sudangrass diets. Total tract starch digestion was greater (2%, P<0.01) for pelletized than for ground rice straw diets, due largely to greater ruminal starch digestion. Treatment effects were numerically similar for ground sudangrass and ground rice straw diets. Pelletized rice straw increased (P<0.05) ruminal total volatile fatty acid (VFA) and propionate concentrations by 24 and 47% respectively, and decreased ruminal pH (9%, P<0.05), ruminal acetate:propionate molar ratio (27%, P<0.05), and estimated methane production (28%, P<0.05). Trial 2. Ninety crossbred yearling steers were used in a 112 day finishing trial to evaluate the influence of pelletizing on the feeding value of rice straw. Treatments were the same as Trial 1. Substituting ground rice straw for sudangrass had no detrimental effects (P>0.10) on energy intake or average daily gain (ADG). However, DMI and ADG were greater (11%, P<0.05, and 12%, P<0.10, respectively) for ground than for pelletized rice straw supplemented diets. There were no treatment effects (P>0.10) on dressing percentage, which had a carcass to live weight ratio averaging 0.642. Steers fed the sudangrass diet had a lower yield grade (16%; P<0.01), marbling score (13%; P<0.05), and fat thickness (15%; P<0.10) than those fed the rice straw diets. Feeding pelletized straw reduced marbling score (10%, P<0.10), and fat thickness (20%; P<0.10) when compared with ground rice straw. As expected, NEm and NEg were greater (5%; P<0.01) for sudangrass than for rice straw diets. Pelletizing rice straw did not decrease (P=0.56) the dietary net energy (NE) value of the rice straw supplemented diets. Thus, the difference in ADG due to feeding ground versus pelletized rice straw is attributable solely to treatment effects on DMI. We conclude that at lower levels of rice straw inclusion (<150 g/kg) fed to steers in growing-finishing diets, pelletizing the straw may reduce intake and gain through a satiety response mechanism, possibly associated with increased propionate production.
Keywords: Pellet; Pelletized; Rice straw; Cattle

K.M. McCaughey, E.J. DePeters, P.H. Robinson, J.E.P. Santos, S.J. Taylor, J.W. Pareas, Impact of feeding whole Upland cottonseed, with or without cracked Pima cottonseed with increasing addition of iron sulfate, on milk and milk fat composition of lactating dairy cattle, Animal Feed Science and Technology, Volumes 123-124, Part 2, 7 December 2005, Pages 667-685, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2005.08.001.
(http://www.sciencedirect.com/science/article/B6T42-4H5DYBR-1/2/0a61577da8c79a7445940fb7963953ea)
Abstract:
Primiparous and multiparous lactating Holstein cows were fed one of four diets containing either whole Upland cottonseed (WCS) or cracked Pima cottonseed (CrP), the latter with two levels of iron sulfate. Effects of supplemental iron sulfate, and the impact of substitution of 2/3 of the WCS with CrP, on milk and milk fat composition were determined. All diets contained 490 g/kg concentrate, 100 g/kg cottonseed and 410 g/kg chopped alfalfa hay on a dry matter basis. The cottonseed portion of the WCS diet contained only WCS and the other three diets contained 67 g/kg CrP and 33 g/kg WCS. Diets containing CrP were supplemented with 0, 250 or 500 mg Fe

(from iron sulfate)/kg of diet. Four primiparous and four multiparous cows were used in a double 4 x 4 Latin square design experiment with 28-day periods. Yields of milk and milk components were not affected by substitution of WCS with CrP cottonseed, but they declined linearly with increasing level of dietary iron sulfate. Milk composition was not affected by either dietary treatment, but the fatty acid (FA) composition of milk fat varied to a modest extent. Increases in C18:2 and C18:3, with a decrease in C18:1 n11 trans, when WCS was replaced with CrP suggests less perturbation of ruminal biohydrogenation, and increased ruminal escape of dietary FA, in cows fed CrP. Although the linear decrease in the unsaturated FA in milk fat, and decrease in the amount of long chain FA in milk fat triglycerides, with supplemental iron sulfate indicates that it may have affected ruminal biohydrogenation of dietary FA to some degree, the modest extent of these changes suggests that it was small and unlikely to be of biological or practical relevance.
Keywords: Iron sulfate; Pima; Upland; Cottonseed; Milk fat; Fatty acids; Phospholipids

U. Bleul, K. Hollenstein, W. Kahn, Laparoscopic ovariectomy in standing cows, Animal Reproduction Science, Volume 90, Issues 3-4, December 2005, Pages 193-200, ISSN 0378-4320, DOI: 10.1016/j.anireprosci.2005.01.022.
(http://www.sciencedirect.com/science/article/B6T43-4FW7MDF-1/2/5264f19b1aa35d4acacad490ace525bf)
Abstract:
The main objective of this study was to evaluate laparoscopic ovariectomy and to develop an optimal surgical technique for this procedure in standing cattle.
Eight cows underwent laparoscopic ovariectomy. In two cows, a bilateral flank approach was used and in six cows, both ovaries were removed via a left flank approach.
An important prerequisite for ensuring sufficient intrabdominal space for instrumentation, optimal endoscopic orientation and easy access to the ovaries and uterus was withholding feed for at least 36 h prior to surgery. The cows were sedated with xylazine and the portal sites infiltrated with lidocaine. The portal for the laparoscope was at the ventral angle of the left paralumbar fossa, approximately 10 cm cranioventral to the tuber coxae. The instruments were inserted through two portals approximately 20 cm and 30 cm ventral to the tuber coxae. After abdominal insufflation with carbon dioxide, the left ovary was grasped and local anesthetic was injected into the mesovarium and mesosalpinx. The mesovarium was transected using bipolar cauterization and the ovary removed through an extended instrument portal. The right ovary was removed in the same way. The incisions were closed with single interrupted absorbable sutures in the musculature and single interrupted non-absorbable sutures in the skin. The procedure lasted 120-150 min.
Bilateral laparoscopic ovariectomy via left flank approach in standing cows is feasible. This procedure involves special instrumentation, but is minimally invasive and allows optimal visualization of the ovaries and uterus.
Keywords: Cattle; Laparoscopy; Ovariectomy; Minimal invasive surgery

P. Ezanno, Dynamics of a tropical cattle herd in a variable environment: A modelling approach in order to identify the target period and animals on which concentrating management efforts to improve productivity, Ecological Modelling, Volume 188, Issues 2-4, 10 November 2005, Pages 470-482, ISSN 0304-3800, DOI: 10.1016/j.ecolmodel.2005.02.016.
(http://www.sciencedirect.com/science/article/B6VBS-4G002YJ-1/2/00bc7fb9e2e55a70eea8f9e118c7b938)
Abstract:
The ever increasing demand for animal products in tropical environments requires urgent improvements in herd productivity. Animal production in the tropics is often limited by resource availability. In this context, the effects of potential management strategies are difficult to test experimentally, and a modelling approach can therefore be useful. Modelling can also be used to

evaluate the sensitivity of the dynamics of cattle herds to such management strategies. Here, I use a deterministic matrix model based on methods widely used in ecology to represent the reproductive cycle of cattle in an extensive production system with minimal management. Seasonal variations in demography and management are described on a monthly time scale. Cows are grouped into classes according to their reproductive state and their body condition, a field measure of phenotypic quality, which is related to performance. Improved feeding conditions are assumed to result in an increase in the body condition score of the supplemented cows, so the feeding strategy is represented by variations in the ratio of fat/thin reproductive cows in the herd. I show that the population dynamics of the herds is sensitive to a change in this ratio. When the proportion of fat cows in late gestation increases, milk production increases, but the numerical productivity of the herd slightly declines. An increase in the proportion of fat non-pregnant cows gives rise to an increase in the numerical productivity, and an increase in milk production, although the effect varies strongly among seasons. The model predicts that an increase in cows body condition will be most effective in the late dry season.
Keywords: Cattle; Seasonal matrix model; Elasticity; Productivity; Body condition score; Senegal

H.R. Ketchum, P.D. Teel, O.F. Strey, M.T. Longnecker, Feeding predilection of Gulf Coast tick, Amblyomma maculatum Koch, nymphs on cattle, Veterinary Parasitology, Volume 133, Issue 4, 5 November 2005, Pages 349-356, ISSN 0304-4017, DOI: 10.1016/j.vetpar.2005.05.052.
(http://www.sciencedirect.com/science/article/B6TD7-4GHBPPP-5/2/4574b5fb09a5c381ea566611255ec143)
Abstract:
Gulf Coast tick nymphs successfully attached and fed on cattle after being freely released. Six Hereford heifers were each infested with approximately 2000 Gulf Coast tick nymphs, three with a strain originating from Refugio Co., TX, and three with ticks from Osage Co., KS by free release on the head and legs to simulate field acquisition of questing nymphs. Two re-infestations were conducted, the first at 7 days and the second at 28 days. Nymph dispersal was estimated by daily inspection of 22 body areas and removal of engorging ticks from the third to the fifth days post-infestation. Total recovery of engorging Texas nymphs was 3.0, 10.2, and 0% and Kansas nymphs was 21.5, 3.3, and 0% for infestations one, two and three, respectively. Immunological resistance to tick infestation expressed as cellular hypersensitivity was evident against Kansas nymphs in the second infestation and against both tick strains in the third infestation. Ticks removed from the withers, midline, and tail-head areas accounted for 68% of the total nymphs recovered in the first two infestations. Within these areas, nymphs were observed to aggregate in small spots where the hair was less dense or naturally parted and the remainder were found scattered in dense hair.
Keywords: Amblyomma maculatum; Gulf Coast tick; Heartwater; Nymph; Feeding; Attachment

Jeremy Bryant, Nicolas Lopez-Villalobos, Colin Holmes, Jennie Pryce, Simulation modelling of dairy cattle performance based on knowledge of genotype, environment and genotype by environment interactions: current status, Agricultural Systems, Volume 86, Issue 2, November 2005, Pages 121-143, ISSN 0308-521X, DOI: 10.1016/j.agsy.2004.09.004.
(http://www.sciencedirect.com/science/article/B6T3W-4DPGXTK-1/2/dc2dc6635c6de7a711f705b78a823a79)
Abstract:
Prediction and modelling of the phenotypic performance of dairy cattle is based on knowledge of cattle genotype and the environment in which they are managed. Interactions between genotype and environment (G x E) for feed intake and phenotypic performance are becoming increasingly important as cattle genotypes are now being managed in a diverse range of environments worldwide. These G x E interactions are generally classified as scaling effects, where the difference in phenotypic performance between genotypes is larger in one environment than in another environment, or re-ranking, where genotypes are ranked differently according to

environment. The objective of this paper is to outline and assess the approaches used in simulation models to account for G x E interactions. The GrazFeed, CamDairy and Cornel Net Carbohydrate and Protein System (CNCPS) simulation models are used as illustrative examples. Each model was used to quantify the phenotypic responses of different genotypes managed in a range of environments. These simulations highlighted the inability of these commonly used models to demonstrate re-ranking of genotypes, and to a lesser extent, to display scaling effects. This was largely due to their design, which resulted either in inadequate specification of animal genotype or a lack of interaction between the genetic and environmental components within each model. An environmental sensitivity trait, which is the derivative of phenotypic performance as a function of an environmental variable, could be a useful tool to develop a better understanding the phenotypic responses of specific genotypes. The environmental sensitivity trait could then be used, along with traditional estimated breeding values, to more accurately model the responses of animals to different environments.
Keywords: Dairy cattle; Genotype environment interaction; Simulation; Phenotypic plasticity

B. Dumont, A. Boissy, C. Achard, A.M. Sibbald, H.W. Erhard, Consistency of animal order in spontaneous group movements allows the measurement of leadership in a group of grazing heifers, Applied Animal Behaviour Science, Volume 95, Issues 1-2, November 2005, Pages 55-66, ISSN 0168-1591, DOI: 10.1016/j.applanim.2005.04.005.
(http://www.sciencedirect.com/science/article/B6T48-4G4MM9H-2/2/31492f364e2ab799fa764110daa47871)
Abstract:
The term `leadership' has been used in several different senses, resulting in very different ways of identifying leaders and apparently inconsistent conclusions on how leadership is determined in herbivores. We therefore propose the following definitions: (i) a leader is the individual that is consistently the one who initiates long-distance, spontaneous group movements toward a new feeding site and (ii) long-distance spontaneous group movements are movements which happen when an animal changes activity and location and is immediately followed by a similar change in activity and location by other members of the group. Using these definitions, we tested for consistency of movement order across time and situation within a group of fifteen 2-year-old heifers. We found that the same individual was recorded as the very first animal in 48% of movements toward a new feeding site and could therefore be identified as the `leader'. We also showed that movement order when the animals entered an experimental plot, or progressed slowly through the field during a grazing bout, did not produce the same result. This method, which enables us to identify leaders in groups of animals at pasture, should improve our knowledge of how leadership is determined in grazing herbivores.
Keywords: Cattle; Grazing; Leadership; Movement order; Walking

Cecile Ginane, Michel Petit, Constraining the time available to graze reinforces heifers' preference for sward of high quality despite low availability, Applied Animal Behaviour Science, Volume 94, Issues 1-2, October 2005, Pages 1-14, ISSN 0168-1591, DOI: 10.1016/j.applanim.2005.02.010.
(http://www.sciencedirect.com/science/article/B6T48-4FV357D-2/2/50f87ad939b62776ccced4665bb47141)
Abstract:
We studied, over 1 month (mid-June to mid-July), the effects of a restriction of available daily grazing time on the diet choices of heifers between a vegetative sward (VS) and a reproductive sward (RS) evolving from the earing to the flowering stage. The aim was to mimic a situation of extensively exploited pastures where resource quality varies against availability (height). The VS was either tall (13.5 cm) or short (7.5 cm), and was crossed with the available daily grazing time (24 h versus 5 h per day) to form four treatments. Twenty 18-month-old Charolais heifers were

divided into four groups of five, with each group allocated to one treatment throughout the experiment.
The effects of the constraints (VS height and available grazing time) varied with RS maturity. At the earing stage, the heifers, as expected, increased their proportion of grazing time spent on RS as access time and/or VS height decreased. However, at the flowering stage heifers maintained their grazing time on VS as VS height decreased, and reduced the time spent on RS more than on VS as grazing time was restricted, more so as VS was shorter. Thus, they accentuated their preference for VS as available time decreased.
To examine these choices in terms of trade-off between diet quality and total daily energy intake, we estimated total intake and diet digestibility. The VS height constraint affected neither total intake nor diet digestibility. The time constraint caused both total intake and diet quality to decline, and intake seemed to be more markedly affected than diet digestibility. When the available grazing time was limited, heifers, by spending more than 0.60 of this time grazing VS, probably ate less than they would have done by grazing longer on RS, which provided higher intake rates. This marked preference for grazing VS of high quality indicates that heifers prioritised quality over intake when faced with the proposed trade-off.
Keywords: Cattle; Grazing time; Feeding choice; Sward height

Robin C. Anderson, Mandy A. Carr, Rhonda K. Miller, David A. King, Gordon E. Carstens, Kenneth J. Genovese, Todd R. Callaway, Thomas S. Edrington, Yong Soo Jung, Jack L. McReynolds, Micheal E. Hume, Ross C. Beier, Robert O. Elder, David J. Nisbet, Effects of experimental chlorate preparations as feed and water supplements on Escherichia coli colonization and contamination of beef cattle and carcasses, Food Microbiology, Volume 22, Issue 5, October 2005, Pages 439-447, ISSN 0740-0020, DOI: 10.1016/j.fm.2004.09.002.
(http://www.sciencedirect.com/science/article/B6WFP-4FDJN7C-9/2/aad417d09ac2d6cbcd38ce7938bf5975)
Abstract:
The effects of feed or water administration of experimental chlorate preparations on recovery of generic Escherichia coli and E. coli O157:H7 from the gut, hide and carcasses of feedlot cattle were tested. Sixty-four naturally colonized cattle were randomly assigned to one of four feed treatments with or without a 12 h chlorate-containing water treatment. An analysis of variance revealed a main effect of feed treatment (P=0.002) on generic E. coli concentrations in feces collected before shipment to slaughter. Main effect means were 5.57, 4.75, 5.00 and 4.08 log10 cfu/g for animals fed an experimental chlorate product at 0, 0.01% in last meal, 0.01% for last 5 d and 0.05% of body weight in last meal, respectively. A main effect of feed treatment was observed (P=0.041) on generic E. coli concentrations in feces collected at slaughter (means for the respective treatments were 4.92, 3.57, 3.98 and 3.20 log10 cfu/g) as well as on numbers of generic E. coli recovered (P=0.034) from hide swabs collected at the rump (means for the respective treatments were 4.86, 3.92, 3.87 and 4.06 log10 cfu/swab). A main effect of water treatment was observed (P<0.016) on generic E. coli concentrations in rumen contents (3.44 vs. 2.72 cfu log10 cfu/g for animals administered 0 or 2500 ppm active chlorate ion, respectively). Logistic regression analysis revealed a main effect of feed treatment (P<0.001) on the incidence of E. coli O157:H7 recovered from feces collected at slaughter (75%, 33%, 20% and 25% for animals fed an experimental chlorate product at 0%, 0.01% in last meal, 0.01% for last 5 d and 0.05% of body weight in last meal, respectively). Animals exhibited no symptoms of chlorate toxicity and negative effects on feed or water intake or animal performance were not observed.
Keywords: Beef cattle; Escherichia coli; Experimental chlorate product; Feed additive; Water additive

P. Morand-Fehr, Recent developments in goat nutrition and application: A review, Small Ruminant Research, Volume 60, Issues 1-2, Plenary papers of the 8th International Conference on Goats, October 2005, Pages 25-43, ISSN 0921-4488, DOI: 10.1016/j.smallrumres.2005.06.004.
(http://www.sciencedirect.com/science/article/B6TC5-4H2PJNJ-2/2/bf60536502d6c50d8f483fc8d1ce8036)
Abstract:
This paper analyses the progress in recent research in goat nutrition since the last International Conference on Goats (Tours, 2000). This review reveals clear progress in the quality of papers, now similar to those on cattle or sheep, particularly on nutritional aspects in tropical areas. Topics dealt with in goat nutrition are feeding behaviour, particularly on pastures or rangelands, feed digestibility, tree leaf or by-product utilization, effects of nutritional factors on growth, milk and hair production, while nutritional adaptation to harsh environments, underfeeding, factors influencing energy consumption, quality of goat products (milk, cheese, meat) and reproduction performance along with the connection between nutrition and pathology require more attention. Goat nutrition in a tropical environment follows the same physiological mechanisms as under temperate conditions, but genotypes can present specificities enabling a better adaptation to feeding conditions. Complete and precise information on the nutritive value of tropical forage, rangeland vegetation in accordance with the season, and new feed or by-products is still missing. Researchers in goat nutrition frequently use different methods, making it difficult to compare results from several research teams. Agreement on the methodology in goat nutrition is easier when the research teams are organized in networks at the national or international level. To be successful with technological transfer in goat nutrition, the message for the end users must be clear and well adapted. At the present time, we are short of review papers that provide an analysis of all results already published to establish quantitative relationships between variables, which can clarify the messages for the field. Methods of meta-analysis can be used to analyse the quantitative results from experimental data banks and to establish response laws and define limits of application. Finally, if we implement a research project on goat nutrition dedicated to application in the field, not only the research works but also the actions of technological transfer must be financed.
Keywords: Goat nutrition; Intake; Nutrition application; Feed utilization; Goat product quality; Research efficiency

Ives C.S. Bueno, Sergio L.S. Cabral Filho, Sarita P. Gobbo, Helder Louvandini, Dorinha M.S.S. Vitti, Adibe L. Abdalla, Influence of inoculum source in a gas production method, Animal Feed Science and Technology, Volumes 123-124, Part 1, The in vitro Gas Production Technique: Limitations and Opportunities, 30 September 2005, Pages 95-105, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2005.05.003.
(http://www.sciencedirect.com/science/article/B6T42-4G9Y4P2-2/2/92ab58a6f736c047eb30665af47ea202)
Abstract:
Gas production techniques are used in many laboratories to study fermentation kinetics of ruminant feeds, and the major source of variation is often the inoculum. Fifteen substrates (two legume hays, two tropical grass hays, one fresh tropical grass, five temperate grasses, soybean meal, maize grain, maize silage, wheat straw, sugarcane bagasse) were used to measure fermentation gas release with a semi automated system, and a sigmoidal model was fitted to gas production data from rumen fluid collected from eight fistulated sheep and two cows. Comparisons were made between cattle and sheep inocula and between inocula prepared using different proportions (v/v) of rumen liquid and solid phases (1:0, 0.75:0.25, 0.67:0.33 and 0.5:0.5). There were no differences between estimates of asymptotic gas production, and organic matter digestibility, with the different species inocula, but rates of fermentation were higher with rumen fluid inocula from cattle versus sheep. Rumen contents with no solid phase produced more gas,

whereas a 1:1 ratio of liquid:solid increased digestibility. However, the rate of gas production was not affected by the proportion of solid phase in the rumen inoculum.
Keywords: Degradability; Fermentation; Sheep; Cattle; Inoculum preparation

Carlos A. Sandoval-Castro, Henry L. Lizarraga-Sanchez, Francisco J. Solorio-Sanchez, Assessment of tree fodder preference by cattle using chemical composition, in vitro gas production and in situ degradability, Animal Feed Science and Technology, Volumes 123-124, Part 1, The in vitro Gas Production Technique: Limitations and Opportunities, 30 September 2005, Pages 277-289, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2005.04.057.
(http://www.sciencedirect.com/science/article/B6T42-4G9Y4P2-1/2/e01c2e931cc0185c57e06ce54b9d5312)
Abstract:
Short term preference for five tree fodders by cattle was assessed by their chemical composition, as well as in situ and in vitro gas production, in two studies. In study 1, five heifers (341 +/- 36 kg liveweight) were offered Brosimun alicastrun (BA), Piscidia piscipula (PP), Leucaena leucocephala (LL), Lysiloma latisiliquum (TL) and Guazuma ulmifolia (GU) in a 6 h `cafeteria' study over 5 consecutive days. In study 2, the same 5 heifers and tree fodders were used, but each heifer was offered a single tree fodder and fresh Taiwan grass (Pennisetum purpureum) ad libitum for 6 h. After 6 h, refusals were weighed and, for the rest of the day, only Taiwan grass was offered ad libitum. Forages offered in both studies were analyzed for dry matter (DM), crude protein, ash, neutral detergent fibre, acid detergent fibre, lignin, total polyphenols and condensed tannins, as well as for in situ DM degradation (0, 3, 6, 12, 24, 48, 72 and 96 h) and in vitro gas production (3, 6, 9, 12, 15, 18, 21, 24, 30, 36, 48, 60, 72, 96 and 120 h). In situ degradability was fitted to the equation p = a + b(1-e-ct), while the equation gas = GV(1 + (B/t)C-1) was used for in vitro gas production. Residues from in vitro gas production were used to estimate in vitro DM and organic matter digestibility. Relationship between tree fodder intake, chemical composition, and in situ and in vitro digestibility was assessed using Pearson correlation analysis. In study 1, tree fodder intake (g DM/kg LW0.75) was: PP 5.41, TL 5.62, LL 15.62, GU 17.31 and BA 55.36 (S.E.D. 1.63). Intake was correlated with lignin (Pearson coefficient, -0.898, P=0.039), IVDMD (r = 0.916, P=0.029) IVOMD (r = 0.902, P=0.036), parameter `b' and `c' from in situ degradability (r = 0.926, P=0.034 and r = 0.926, P=0.024, respectively) and with the 12, 24, 48, 72 and 96 h measurements, as well as parameter GV from in vitro gas production (r = 0.873, P=0.053) and 12, 15, 18, 21, 24, 30, 36 and 48 h cumulative gas readings. In study 2, tree fodder intake (g DM/kg LW0.75) was: PP 17.74, TL4.08, LL 22.18, GU 13.47 and BA 38.56 (S.E.D. 0.52). Grass intake (g DM/kg LW0.75) during the same time was: 79.41, 89.64, 87.69, 86.30 and 77.43 (S.E.D. 0.83) when PP, TL, LL, GU and BA, respectively, was offered. Total DM intake (in 6 h) increased (P<0.05) when LL and BA were offered. Tree fodder intake was related to IVDMD (r = 0.950, P=0.013), IVOMD (r = 0.942, P=0.017), parameter `c' from in situ degradability (r = 0.908, P=0.033) and 12 and 24 h measurements, as well as parameter GV from in vitro gas production (r = 0.910, P=0.032) and 3, 6, 9, 12, 15, 18, 21, and 24 h cumulative gas readings. As feed preference is a short term response, lignin might be an indicator of intake preference.
Keywords: Tree fodder; Preference; Cattle; In vitro; In situ; Chemical composition

G. Getachew, P.H. Robinson, E.J. DePeters, S.J. Taylor, D.D. Gisi, G.E. Higginbotham, T.J. Riordan, Methane production from commercial dairy rations estimated using an in vitro gas technique, Animal Feed Science and Technology, Volumes 123-124, Part 1, The in vitro Gas Production Technique: Limitations and Opportunities, 30 September 2005, Pages 391-402, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2005.04.056.
(http://www.sciencedirect.com/science/article/B6T42-4GBD6PG-6/2/8a4aadab5b79237974c4932477beba3d)
Abstract:

An in vitro gas production technique was used to measure total gas and methane (CH4) production from commercial total mixed rations (TMR) for lactating dairy cows. The TMR were collected from six commercial dairy farms in the San Joaquin Valley of California (USA), and the campus dairy at the University of California in Davis, for evaluation using an in vitro gas production technique to determine the CH4 concentration of total gas. The TMR samples were analyzed for nutritional components and in vitro assays were conducted to measure neutral detergent fibre digestibility, and total gas and CH4 production. The TMR were similar in nutrient composition, with CP ranging from 163 to 185 g/kg DM. There were differences among TMR in total gas production at 6, 24, 30, 48 and 72 h of in vitro incubation, and the TMR differed ($P<0.05$) in rate of, and potential, gas production. The proportion of CH4 in total gas did not differ among TMR at 6 and 24 h of incubation, but differences did occur at 48 and 72 h. An average of 33.8 ml CH4/g DM incubated was produced by 24 h of incubation, and approximately 0.80 of total CH4 was produced during the first 24 h of incubation. Estimates of the quantity of CH4 produced from this procedure were similar to those previously reported in vivo, suggesting that it can be used to estimate CH4 production from rations fed to dairy cows. This may make it a suitable tool to evaluate the extent to which CH4 emissions by dairy cattle can be altered, either by changes in rations or by feeding compounds to modify rumen fermentation.
Keywords: Methane production; In vitro gas production; Total mixed ration

J.A. Simoes, J.F.F. Mira, J.P.C. Lemos, I.A. Mendes, Dressing percentage and its relationship with some components of the fifth quarter in Portuguese cattle breeds, Livestock Production Science, Volume 96, Issues 2-3, 30 September 2005, Pages 157-163, ISSN 0301-6226, DOI: 10.1016/j.livprodsci.2005.01.016.
(http://www.sciencedirect.com/science/article/B6T9B-4G002YD-2/2/5792940e6950284e430286e891d57be6)
Abstract:
Dressing percentage, inter-breed variations and its relationship to carcass fat and several components of the fifth quarter (visceral fat, alimentary tract, visceral organs, hide, feet and head) were studied. A total of 165 animals from the large (Alentejana, Mirandesa and Marinhoa) and small (Arouquesa, Barrosa, Maronesa and Mertolenga) breeds, submitted to the same feeding regime and serially slaughtered according to the respective size group, were involved. In relation to dressing percentage, our results indicated that, as the empty body weight increased, carcass fat and visceral fat were not directly accounted for by the 5% increase in dressing percentage from the first to the last slaughter point. The alimentary tract and hide, which exhibited a decreasing proportion as empty body weight increased, accounted for most of the variation in dressing: alimentary tract, alone, accounted for 0.61 and hide accounted for an additional 0.13. As regards dressing differences between breeds, at the same carcass subcutaneous fat level (42 g/kg carcass weight), our findings show that the two large breeds (Marinhoa and Mirandesa) had the highest values (about 3.5% more), which were significantly different from small breeds. However, Alentejana, also a large breed, showed a value for dressing close to the small breeds. The lowest proportion of visceral organs and hide in large breeds accounted for most of the differences between large and small breeds. Carcass fat, visceral fat, alimentary tract, feet and head tended towards homogeneity. In relation to carcass fat only, Mertolenga, with 31 g/kg empty body weight, was significantly different from Mirandesa and Marinhoa. Regarding visceral fat, only the Marinhoa breed, with 10 g/kg empty carcass weight lower, was significantly different from Barrosa. The figures for alimentary tract, excepted for Marinhoa, were not significant different between breeds.
Keywords: Dressing; Breed comparisons; Indigenous beef cattle

Adrienne Ekelund, Rolf Sporndly, Henk Valk, Michael Murphy, Effects of varying monosodium phosphate intake on phosphorus excretion in dairy cows, Livestock Production Science, Volume

96, Issues 2-3, 30 September 2005, Pages 301-306, ISSN 0301-6226, DOI: 10.1016/j.livprodsci.2005.02.010.
(http://www.sciencedirect.com/science/article/B6T9B-4FY3P6C-1/2/e37a1546ca415ac1c302395e84a476fc)
Abstract:
Phosphorus excretion in faeces was measured by total collection using dairy cows fed five amounts of P in a 5 x 5 Latin square design with three week periods. Milk production was 23 +/- 4 kg per day at the onset of the trial (DIM 185 +/- 11). Different quantities of monosodium phosphate (MSP) were added to a basal diet to obtain daily P intake levels of 44, 67, 92, 117 and 142 g (2.4, 3.7, 5.1, 6.4 and 7.8 g P kg- 1of DM, respectively). Faecal P excretion increased linearly (r2 = 0.97) as dietary P intake increased and the apparent digestibility of P was calculated to be 0.37, 0.28, 0.22, 0.21 and 0.22, respectively. The relatively low apparent digestibility is explained by excess P intake in relation to the requirements. The concentration of P in faeces ranged from 4 to 23 g kg- 1 of DM corresponding to the lowest and highest level of P intake, respectively. Variation of P in faecal output was substantial among days, though total DM and P intake was constant throughout the collection periods. Results indicate a requirement for sampling over at least 5 consecutive days, even when using total faecal collection.
Keywords: Dairy cattle; Apparent digestibility; Inorganic phosphorus; Phosphorus excretion

S. Boqvist, I. Vagsholm, Risk factors for hazard of release from Salmonella-control restriction on Swedish cattle farms from 1993 to 2002, Preventive Veterinary Medicine, Volume 71, Issues 1-2, 30 September 2005, Pages 35-44, ISSN 0167-5877, DOI: 10.1016/j.prevetmed.2005.05.003.
(http://www.sciencedirect.com/science/article/B6TBK-4GMGW4V-1/2/6f5ce0ecaaeecf73004f06bae43589ca)
Abstract:
In Sweden, only a few cattle farms are infected with salmonella each year and this can be attributed to the Swedish salmonella control programme. All findings of salmonella in animals, feed and food of animal origin are notifiable and restrictions are always put on infected herds until they have been cleaned up from the infection. However, there has been concern about increasing costs for clean-up of salmonella-infected farms as well as increasing length of the restriction periods. Our aim was to investigate potential risk factors associated with the length of restriction periods on Swedish cattle farms between 1993 and late 2002. All 112 cattle farms that were notified to the Swedish Board of Agriculture as infected with salmonella during the study period, were included in this longitudinal and retrospective study. The putative risk factors were analysed using the proportional-hazards model.
There was a lower hazard for release from salmonella control restrictions after the European Union (EU) accession in 1995, and/or change of testing from one to two negative herd tests for release of restrictions (hazard ratio (HR) = 0.56, 95% confidence interval (CI) = 0.38, 0.84), for every additional number of 100 cows (HR = 0.83; CI = 0.7, 0.97), if rodents and/or wild birds were abundant (HR = 0.5, CI = 0.27, 0.98) and if there was more than one farm site in the company (HR = 0.47, CI = 0.28, 0.81).
Keywords: Cattle; Restriction period; Salmonella; Sweden; Survival analysis; Persistence

Amanda N. van der Vinne, Reggie Y.C. Lo, Patricia E. Shewen, Construction and analysis of a Mannheimia haemolytica A1 luxS mutant, Veterinary Microbiology, Volume 110, Issues 1-2, 30 September 2005, Pages 53-66, ISSN 0378-1135, DOI: 10.1016/j.vetmic.2005.06.011.
(http://www.sciencedirect.com/science/article/B6TD6-4GSJR4K-1/2/0cf58825299a892519b2f735dc1f4263)
Abstract:
Mannheimia haemolytica A1 is the causative agent of bovine pneumonic pasteurellosis, a major cause of sickness, death, and economic loss to the feedlot cattle industry. M. haemolytica A1

produces autoinducer-2 (AI-2) like molecules that are capable of inducing quorum sensing system 2 of Vibrio harveyi. This interspecies quorum sensing system has been shown to regulate the expression of virulence genes in several pathogenic bacteria. The protein central to the production of AI-2 is LuxS. To determine if quorum sensing is involved in the regulation of virulence genes in M. haemolytica A1, a luxS mutant was constructed by replacing luxS with a cat cassette. This mutant was verified by PCR analysis, Southern hybridization, as well as its inability to induce bioluminescence in the V. harveyi reporter strain. RT-PCR analysis showed there was no difference in leukotoxin (lktC) mRNA levels, however there were increased mRNA levels of putative virulence associated genes, transferrin binding protein B (tbpB), adhesin (ahs) and capsule biosynthesis (nmaA). Electron microscopy showed that the level of encapsulation in the mutant is higher than the parent. Additionally, the mutant was slightly more adherent to bovine tracheal cells than the parent. In vitro competition assays showed the mutant out-competed the parent under iron-restricted conditions. However, in a calf challenge, the parent was the dominant isolate recovered.
Keywords: Quorum sensing; luxS mutant; Virulence gene expression; In vivo competition

A.M. Sogstad, T. Fjeldaas, O. Osteras, K. Plym Forshell, Prevalence of claw lesions in Norwegian dairy cattle housed in tie stalls and free stalls, Preventive Veterinary Medicine, Volume 70, Issues 3-4, 12 September 2005, Pages 191-209, ISSN 0167-5877, DOI: 10.1016/j.prevetmed.2005.03.005.
(http://www.sciencedirect.com/science/article/B6TBK-4G0YT78-1/2/fa5d015081673e4829b40a78da14bb5b)
Abstract:
Approximately 88% of Norwegian dairy cattle are housed in tie stalls. Free-stall housing will be implemented for all cattle within 20 years. This means that most existing barns have to be rebuilt in the near future. We designed our study to estimate the prevalence of claw lesions in Norway and to reveal possible differences between tie stalls and free stalls. Fifty-five tie-stall herds and 57 free-stall herds were sampled by computerized systematic selection and 2665 cows were trimmed by 13 claw trimmers, during the late winter and spring of 2002. The claw trimmers had been taught diagnosing and recording of claw lesions. Environmental factors, management and feeding routines also were recorded. Forty-eight percent of cows housed in tie stalls had one or more claw lesions versus 71.8% in free stalls. Prevalences recorded in the hind claws were: 4.2% of the animals had dermatitis in tie stalls versus 5.7% in free stalls; 7.9% versus 38.0% had heel-horn erosions; 7.3% versus 13.6% had haemorrhages of the white line; 11.7% versus 20.4% had haemorrhages of the sole; 2.8% versus 3.2% had sole ulcers and 5.5% versus 9.7% had white-line fissures. Most lesions were mild. A model was designed to estimate cluster effects within herd and within claw trimmer. The cluster effect within herd was significant for all lesions. The cluster effect within claw trimmer was only significant for heel-horn erosions in front and hind claws and for white-line fissures in front claws. Agreements between some of the claw lesions were revealed. The study confirms that in Norwegian dairy cattle, most claw lesions are more prevalent in free stalls than in tie stalls.
Keywords: Claw lesions; Prevalence; Housing; Tie stalls; Free stalls

C.P. Fossler, S.J. Wells, J.B. Kaneene, P.L. Ruegg, L.D. Warnick, J.B. Bender, L.E. Eberly, S.M. Godden, L.W. Halbert, Herd-level factors associated with isolation of Salmonella in a multi-state study of conventional and organic dairy farms: I. Salmonella shedding in cows, Preventive Veterinary Medicine, Volume 70, Issues 3-4, 12 September 2005, Pages 257-277, ISSN 0167-5877, DOI: 10.1016/j.prevetmed.2005.04.003.
(http://www.sciencedirect.com/science/article/B6TBK-4GDK9HD-1/2/c5502509366dfda935b30fdd0998af7c)
Abstract:

The objective of this study was to evaluate associations between herd characteristics and the isolation of Salmonella from dairy cows in Minnesota, Wisconsin, Michigan, and New York. Study farms were 129 conventional and organic farms enrolled without regard to previous history of Salmonella infection. Herds were sampled at 2-month intervals over a 1-year period. This is the largest study to date on Salmonella shedding in dairy cows and the only study evaluating herd-level risk factors using longitudinal sampling to characterize Salmonella shedding on dairy farms. Salmonella was isolated in fecal samples from 1026 (4.9%) of 20,089 cows. Over the course of the study, 113 (87.6%) of 129 farms had at least one positive cow sample. Multi-variable logistic regression using the generalized estimating equations approach was used to test the association between herd-level risk factors and the dependent variable of within-herd prevalence by visit (number of Salmonella-positive cows/number of cows sampled) after adjustment for effects of herd size, season, state of origin, and the multiple sampling occasions per herd. Factors retained in the final model included lack of use of tiestall or stanchion facilities to house lactating cows (OR = 1.9; 95% CI: 1.1-3.3), not storing all purchased concentrate or protein feeds in an enclosed building (OR = 2.5; 95% CI: 1.3-4.9), not using monensin in weaned calf or bred heifer diets (OR = 3.2; 95% CI: 2.0-5.4), access of lactating or dry cows to surface water (e.g., lake, pond, river, or stream) (OR = 2.3; 95% CI: 1.3-3.9), disposal of manure in liquid form (slurry or irrigation, as opposed to disposal of manure by broadcast/solid spreader only) on owned or rented land (OR = 1.8; 95% CI: 1.3-3.9), and cows eating or grazing of roughage from fields where manure was applied in solid or liquid form and not plowed under during the same growing season (OR = 1.8; 95% CI: 1.0-3.0). A seasonal association was also present as cows were more likely to be Salmonella-positive in summer, spring, and fall compared to winter. Herd size was not associated with Salmonella shedding in the final multi-variable model. The herd-level risk factors identified in this study could potentially be implemented in Salmonella control programs on dairy farms.
Keywords: Salmonella; Herd-level risk factors; Dairy cattle; Organic

C.P. Fossler, S.J. Wells, J.B. Kaneene, P.L. Ruegg, L.D. Warnick, J.B. Bender, L.E. Eberly, S.M. Godden, L.W. Halbert, Herd-level factors associated with isolation of Salmonella in a multi-state study of conventional and organic dairy farms: II. Salmonella shedding in calves, Preventive Veterinary Medicine, Volume 70, Issues 3-4, 12 September 2005, Pages 279-291, ISSN 0167-5877, DOI: 10.1016/j.prevetmed.2005.04.002.
(http://www.sciencedirect.com/science/article/B6TBK-4GDBT2Y-1/2/a33410e38c37469c28d8819cac458a58)
Abstract:
The objective of this study was to evaluate associations between herd-level factors and the isolation of Salmonella in calves from dairy farms in Minnesota, Wisconsin, Michigan and New York. Study farms were 129 conventional and organic farms enrolled without regard to previous history of Salmonella infection. Herds were sampled at 2-month intervals over a 1-year period. Salmonella was isolated in fecal samples from 176 (3.8%) of 4673 preweaned calves with 40 (31.0%) of 129 farms having at least one positive calf sample over the course of the study. Multivariable logistic regression using the generalized estimating equations approach was used to evaluate risk factors for Salmonella shedding after adjustment for effects of herd size, season, state of origin and the multiple sampling occasions per herd. Factors retained in the final model that were associated with an increased odds for Salmonella shedding were lack of routine feeding of milk replacer containing antimicrobials to preweaned calves (OR = 2.8, 95% CI: 1.4, 5.8), use of maternity housing as a hospital area for sick cows more than once a month (OR = 2.1, 95% CI: 1.1, 4.0), and cow prevalence level by visit, categorized into the following four-levels: >=20% (OR = 11.6, 95% CI: 5.7, 23.7), 10-19.9% (OR = 4.7, 95% CI: 2.0, 11.5), 0.1-9.9% (OR = 3.6, 95% CI: 1.5, 8.7) and 0% (reference level). Herd size was not associated with Salmonella shedding in the final multivariable model.
Keywords: Salmonella; Herd-level risk factors; Dairy cattle; Dairy calves; Organic

Z. Henkin, M. Gutman, Hava Aharon, A. Perevolotsky, E.D. Ungar, N.G. Seligman, Suitability of Mediterranean oak woodland for beef herd husbandry, Agriculture, Ecosystems & Environment, Volume 109, Issues 3-4, 1 September 2005, Pages 255-261, ISSN 0167-8809, DOI: 10.1016/j.agee.2005.03.004.
(http://www.sciencedirect.com/science/article/B6T3Y-4G4MM9B-1/2/cd26714ec2b7ceea18fd006650e931f7)
Abstract:
Traditionally, the evergreen Mediterranean woodland dominated by dense Kermes oak thickets has been grazed mainly by multi-species herds dominated by goats. With the continuing decline of goat husbandry, commercial beef husbandry in such woodland was considered as a possible alternative. A case study to determine the feasibility of this option was conducted over a period of 20 years on oak woodland in the Galilee region in Israel. The woodland was initially thinned manually to enable better access for cattle. For the first 11 years (1982-1992), the study site was grazed by a beef herd managed by a nearby communal settlement (Hatal1); it was consequently subject to the advantages and limitations of integration into a larger beef ranching operation and a complex socio-economic organization. During the following 10 years, the range was grazed by a beef herd belonging to a family in a nearby village (Hatal2) and subject to the accompanying limited manpower and economic constraints of a family farm. During both periods, one paddock was grazed at a heavier stocking rate than the other. Under heavy grazing (175-206 cow grazing days ha-1 yr-1), the basal regrowth of the oaks was closely cropped and the vegetation was maintained as predominantly open woodland. In the paddock that was grazed more moderately (122-148 cow grazing days ha-1 yr-1), the vegetation tended to return to dense thicket. It was concluded that after initial thinning, the relatively dense Mediterranean oak woodland sustained a viable beef herd with moderate supplementation, especially when grazing pressure was maintained at a relatively high level. In addition, the open woodland contributed to landscape diversity and increased the amenity value of the area for hiking and recreation.
Keywords: Animal performance; Cattle; Farming system; Feed supplementation; Landscape ecology; Quercus calliprinos

K.M. McCaughey, E.J. DePeters, P.H. Robinson, J.E.P. Santos, J.W. Pareas, S.J. Taylor, Impact of feeding whole Upland cottonseed, with or without cracked Pima cottonseed with increasing addition of iron sulfate, on productivity and plasma gossypol of lactating dairy cattle, Animal Feed Science and Technology, Volume 122, Issues 3-4, 1 September 2005, Pages 241-256, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2005.02.031.
(http://www.sciencedirect.com/science/article/B6T42-4G7X9N6-1/2/6217a87d4d1e7a318d8dff4cff63ca46)
Abstract:
Lactating Holstein cows were fed one of four diets containing either whole Upland cottonseed (WCS) or whole Upland cottonseed and cracked Pima cottonseed (CrP) with increasing levels of iron sulfate. Effects of supplemental iron sulfate, and the impact of substitution of two-thirds of the WCS with CrP, on milk yield and dry matter (DM) intake of cows fed these diets containing relatively high levels of gossypol were determined. All diets contained 490 g/kg DM of a grain based concentrate, 100 g/kg DM of cottonseed and 410 g/kg DM of chopped alfalfa hay. The cottonseed portion of the Control diet contained 100 g/kg DM of WCS and the other three diets contained 67 g/kg DM of CrP and 33 g/kg DM of WCS. Cottonseed meats (i.e., the interior of the seeds after decortication) were analyzed for gossypol concentration, and whole cottonseed, whole Pima and CrP contained 6.5, 9.9 and 9.6 g/kg DM of free gossypol and 2.7, 5.2 and 5.2 g/kg DM of the minus (-) isomer of gossypol, respectively, in `meats'. Diets containing CrP were supplemented with 0, 250 or 500 mg of iron from iron sulfate/kg of diet DM. Eight cows (i.e., four primiparous and four multiparous) were used in a duplicated 4 x 4 Latin square design with periods

of 28 d. Milk yield (P = 0.02) and DM intake (P < 0.01) decreased linearly with increasing levels of iron sulfate in the diet. Total plasma gossypol ([mu]g/ml) increased (P < 0.01) with substitution of CrP for WCS, and decreased at an increasing rate (linear P < 0.01; quadratic P = 0.04) with increasing inclusion of iron sulfate in the diet. Substitution of CrP for WCS increased DM intake (P < 0.03) but milk yield was unaffected. Although addition of iron sulfate to the CrP diets reduced plasma gossypol concentrations, the reduced yield of milk and DM intake suggests that this method of reducing plasma gossypol concentrations is not commercially applicable.
Keywords: Iron sulfate; Pima cottonseed; Gossypol; Dairy cows

B.A. Woodcock, R.F. Pywell, D.B. Roy, R.J. Rose, D. Bell, Grazing management of calcareous grasslands and its implications for the conservation of beetle communities, Biological Conservation, Volume 125, Issue 2, September 2005, Pages 193-202, ISSN 0006-3207, DOI: 10.1016/j.biocon.2005.03.017.
(http://www.sciencedirect.com/science/article/B6V5X-4G1GFGN-2/2/a15f48e9371230f8c23dd180a1d80720)
Abstract:
Calcareous grasslands are an important habitat for floral and faunal communities in the UK and Europe. Declines due to changes in management, scrub invasion and agricultural improvement have left much of the remnants of this habitat in a degraded and fragmented state. Grazing, by cattle or sheep, is one of the main management practices used to maintain and improve the floral and faunal quality of calcareous grassland. The long-term impacts of different grazing regimes, however, are poorly understood, particularly in terms of the invertebrate communities. This study contrasted the impacts of recently introduced and long-term sheep or cattle grazing on beetle communities present on one of the largest areas of calcareous grassland in Europe, the Salisbury Plain military training Area, UK. No effects of grazing management on beetle abundance, species richness or evenness were found, but plant diversity and overall percentage cover of grasses did influence beetle diversity. Proportions of the total number of individuals and overall species richness within beetle guilds (predatory, phytophagous, flower/seed feeders, root feeders and foliage feeders) were strongly influenced by both the duration and type of grazing animal. At the species level, beetle community structure showed significant differences between ungrazed, long-term cattle and long-term sheep grazing treatments. Changes in plant community structure were found to influence beetle community structure. The significance of these results is discussed in terms of the long-term impacts of grazing on beetle community structure, and the benefits of different grazing regimes for the conservation management of calcareous grasslands.
Keywords: Biodiversity; Chalk grassland; Coleoptera; Conservation management; Guilds; Restoration

G.H. Loneragan, M.M. Brashears, Pre-harvest interventions to reduce carriage of E. coli O157 by harvest-ready feedlot cattle, Meat Science, Volume 71, Issue 1, 51st International Congress of Meat Science and Technology (ICoMST), September 2005, Pages 72-78, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.04.005.
(http://www.sciencedirect.com/science/article/B6T9G-4GH4B1P-2/2/5d94e861db448859e442a4631b79a797)
Abstract:
Escherichia coli O157 is an important cause of food-borne illness. The primary reservoir for this organism is cattle and at present the major site of control is within abattoirs. Recent data have highlighted the importance of the pathogen load entering abattoirs on harvest-ready feedlot cattle. The likelihood for in-plant intervention failure increases as the proportion of cattle carrying E. coli O157 within a pen increases. Pre-harvest reduction of E. coli O157 colonization will require targeted intervention strategies and should reduce contamination of carcasses thereby enhancing public health. Several pre-harvest interventions show substantial promise, such as specific strains

of direct-fed microbials, vaccine technology, sodium chlorate, and neomycin sulfate, whereas others such as Brown Seaweed or chlorination of water have little or no detectable benefit. Selection of validated interventions strategies will be important as efforts to control pre-harvest carriage of E. coli O157 increase.
Keywords: Food safety; E. coli O157; Interventions; Feedlot; Cattle

D.L. Robinson, Assessing the accuracy of modelling weight gain of cattle using feed efficiency data, Livestock Production Science, Volume 95, Issue 3, 15 August 2005, Pages 187-200, ISSN 0301-6226, DOI: 10.1016/j.livprodsci.2004.12.016.
(http://www.sciencedirect.com/science/article/B6T9B-4FSNXX8-1/2/fbb204f2d8c4238aef7c8877e5113e0f)
Abstract:
Different methods of estimating weight gain were compared for accuracy and utility, using the amount of error variation from fitting the residual feed intake (RFI) model. Data were collected on 1481 cattle of temperate and tropically adapted breeds, feedlot-finished for the domestic (liveweight 400 kg), Korean (520 kg), or Japanese (steers only; 600 kg) markets. Cattle were tested in 36 groups over 4 years. The aim was to estimate weight gain over the period feed intake was measured, which was at least 49 days and averaged 63 days, including time for animals to adapt to the automatic feeding system. The different estimates were derived from linear and quadratic regressions of weight over time fitted to: F1) all weighings in the feedlot and F2) all weighings in the feedlot excluding atypical records in the first few weeks following feedlot entry. More complex linear and quadratic models were also fitted to weighings when feed intake was being measured, using the amount of feed eaten on the day of weighing, and previous days, to adjust for gut fill. Finally, a random regression model including general trends in the growth of each animal and short term measurement error was fitted to dataset F2 to estimate weight gain for the period feed intake was measured.
The RFI equation: feed intake=intercept(s)+[beta]w*mean(weight0.73)+[beta]g*weight gain+error (i.e. RFI) was fitted using the different weight gain estimates. Based on mean squared errors from fitting this equation, longer measurement periods generally resulted in more accurate estimates of weight gain. The increased accuracy from using all weight measurements in the feedlot outweighed the loss from not measuring over the desired time interval--i.e. the period for which feed intake was measured.
Keywords: Beef cattle; Weight gain; Accuracy; Feed intake; Feed efficiency; Residual feed intake

M. Wolfova, J. Wolf, J. Pribyl, R. Zahradkova, J. Kica, Breeding objectives for beef cattle used in different production systems: 1. Model development, Livestock Production Science, Volume 95, Issue 3, 15 August 2005, Pages 201-215, ISSN 0301-6226, DOI: 10.1016/j.livprodsci.2004.12.018.
(http://www.sciencedirect.com/science/article/B6T9B-4FJXNG3-1/2/fb448de3b7ba37a72de3c5f6c8ad5cf5)
Abstract:
A bio-economic model was developed to evaluate utilization of beef bulls in a variety of production systems. The model can simulate life-cycle production of both beef and dairy cow herds with or without an integrated feedlot system. The Markov chain approach is used to simulate herd dynamics. The herd is described in terms of animal states and possible transitions among them. Equilibrium herd structures of the integrated production systems are calculated in their stationary states. The economic efficiency of each system is a function of biological traits of animals and of management and economic parameters. The model allows estimation of marginal economic values for 16 traits separately in each system. The economic weight for each trait or direct and maternal trait component in each selection group and breed of interest is then calculated as the weighted sum of the economic values for the trait in all production systems in which the selection group has an impact. Weighting factors for each system are computed as the product of the

number of discounted expressions for direct and maternal trait components transmitted in that system by the selection group and the proportion of total cows belonging to each system.
Keywords: Cattle; Bio-economic model; Economic weight; Breeding objective; Production system; Profit function

B. Horan, P. Dillon, D.P. Berry, P. O'Connor, M. Rath, The effect of strain of Holstein-Friesian, feeding system and parity on lactation curves characteristics of spring-calving dairy cows, Livestock Production Science, Volume 95, Issue 3, 15 August 2005, Pages 231-241, ISSN 0301-6226, DOI: 10.1016/j.livprodsci.2004.12.021.
(http://www.sciencedirect.com/science/article/B6T9B-4FPJB9K-1/2/704b072f615629e6f7d0a3c59ee7093f)
Abstract:
The purpose of the present study was to investigate the influence of strain of Holstein-Friesian (HF) cow and feeding system (FS) on the lactation curve characteristics of spring-calving cows. The Wilmink model was used to analyse the lactation curves. The three strains of HF cows compared were high production North American (HP), high durability North American (HD) and high Breeding Worth New Zealand (NZ). The three FS compared were a high milk output from pasture feed system (MP), a high concentrate feed system (HC) and a high stocking rate feed system (HS). A repeated measures model with a factorial arrangement of treatments was used to determine the influence of strain of HF, FS, parity and their interactions on the shape of the lactation curve. The curve was described based on yield at calving, the degree of ascendancy between calving and peak yield, and the persistency after peak yield. Analysis of the residuals indicated a good fit of the Wilmink curve to the data set. Strain of HF, FS, parity and the interaction of strain of HF with FS had significant effects on lactation curve characteristics. In all three FS, the HP strain achieved the highest milk production post-claving and peak yield, with the lowest persistency of lactation. In the HC system, milk production post-claving and at peak yield were higher for all three strains. Offering higher levels of concentrate supplementation to the HP strain on a pasture-based system improved their persistency of lactation. The highest persistency of lactation was achieved with NZ strain. The highest milk production post-claving and at peak and lowest persistency was achieved with third parity cows. The existence of strain by feed system interactions for lactation curve parameters clearly exhibits that the optimum system of production varies with strain of HF.
Keywords: Cattle; Feed system; Parity; Strain of Holstein-Friesian; Lactation curve

Peter Kuhnert, Christoph R. Dubosson, Markus Roesch, Esther Homfeld, Marcus G. Doherr, Jurg W. Blum, Prevalence and risk-factor analysis of Shiga toxigenic Escherichia coli in faecal samples of organically and conventionally farmed dairy cattle, Veterinary Microbiology, Volume 109, Issues 1-2, 10 August 2005, Pages 37-45, ISSN 0378-1135, DOI: 10.1016/j.vetmic.2005.02.015.
(http://www.sciencedirect.com/science/article/B6TD6-4GDSDY2-2/2/c608eb95343c78407d5f33abc7e726df)
Abstract:
Cattle are a natural reservoir for Shiga toxigenic Escherichia coli (STEC), however, no data are available on the prevalence and their possible association with organic or conventional farming practices. We have therefore studied the prevalence of STEC and specifically O157:H7 in Swiss dairy cattle by collecting faeces from approximately 500 cows from 60 farms with organic production (OP) and 60 farms with integrated (conventional) production (IP). IP farms were matched to OP farms and were comparable in terms of community, agricultural zone, and number of cows per farm. E. coli were grown overnight in an enrichment medium, followed by DNA isolation and PCR analysis using specific TaqMan(R) assays. STEC were detected in all farms and O157:H7 were present in 25% of OP farms and 17% of IP farms. STEC were detected in 58% and O157:H7 were evidenced in 4.6% of individual faeces. Multivariate statistical analyses of over

250 parameters revealed several risk-factors for the presence of STEC and O157:H7. Risk-factors were mainly related to the potential of cross-contamination of feeds and cross-infection of cows, and age of the animals. In general, no significant differences between the two farm types concerning prevalence or risk for carrying STEC or O157:H7 were observed. Because the incidence of human disease caused by STEC in Switzerland is low, the risk that people to get infected appears to be small despite a relatively high prevalence in cattle. Nevertheless, control and prevention practices are indicated to avoid contamination of animal products.
Keywords: STEC; VTEC; O157:H7; Organic farming

Michael Schwertl, Karl Auerswald, Rudi Schaufele, Hans Schnyder, Carbon and nitrogen stable isotope composition of cattle hair: ecological fingerprints of production systems?, Agriculture, Ecosystems & Environment, Volume 109, Issues 1-2, 1 August 2005, Pages 153-165, ISSN 0167-8809, DOI: 10.1016/j.agee.2005.01.015.
(http://www.sciencedirect.com/science/article/B6T3Y-4FHJGCK-2/2/e58dd6db5cc83f8cf640ceb7cce020b1)
Abstract:
Societal interest in food safety, animal welfare, and environmental quality attributes of food production is increasing, creating a need for reliable indicators of such factors. Here we test the hypothesis that cattle farming systems create unique and meaningful isotopic fingerprints, which can be characterized by analysing cattle tail switch hair. To this end we analysed feeding practices and nutrient fluxes, and sampled hair, feed components and fertilizers from 13 different farms in Upper Bavaria, Germany. The farms represented the range of cattle farming types present in the region and included: conventional confinement dairy, pasture based organic and conventional dairy, suckler cow, and bull and steer and heifer fattening enterprises. Samples were analysed for their carbon (C) and nitrogen (N) stable isotope composition ([delta]13C and [delta]15N). Feed samples could be assigned to one of three groups with characteristic [delta]13C, which varied very little between and within farms: C3 forages (including fresh forage, hay or silage from grassland and clover-grass mixtures) with -28.4[per mille sign] (+/-0.5[per mille sign] S.D.), maize (Zea mays L.) with -12.5[per mille sign] (+/-0.4[per mille sign]), and C3-derived concentrates (including mainly cereal grain and legume seeds) with -26.8 (+/-1.1[per mille sign]). The dry matter fraction of maize in the diet explained 96% of the farm average [delta]13C of hair. Hair was approx. 2.7[per mille sign] enriched in 13C relative to the diet (trophic level shift), and this effect was very similar for growing animals and cows, and seemingly independent of the fraction of maize in the diet. In contrast to [delta]13C, the [delta]15N of individual feed types differed very strongly between - and also within - farms. Only legume seeds had relatively constant [delta]15N (1.2 +/- 0.5[per mille sign]). [delta]15N of cow hair was correlated with stocking rate (r2 = 0.55) and N input surplus (farm gate) (r2 = 0.78), respectively. This correlation was probably caused by increasing losses of 15N-depleted N via ammonia volatilisation, nitrate leaching and denitrification with increasing farm-level N surplus. Heterogeneity of feed 15N signatures indicated within-farm heterogeneity of N fluxes and cycling that was at (least partially) integrated in cattle hair. Thus, cattle hair 15N signature appears to indicate the `leakiness' of cattle production systems for N. Conversely, the 13C signatures reliably indicates maize feeding and, thus, the type of land use (arable forage cropping versus grassland farming) on which cattle production in the region is based.
Keywords: 13C; 15N; Food traceability; Environmental indicators; Livestock farming; Nitrogen balance

J. Carol Petherick, Animal welfare issues associated with extensive livestock production: The northern Australian beef cattle industry, Applied Animal Behaviour Science, Volume 92, Issue 3, International Society for Applied Ethonolgy Special Issue, 2003 - A Selection of Papers from the 37th International Congress Abano Terme, Italy, June 2003, August 2005, Pages 211-234, ISSN 0168-1591, DOI: 10.1016/j.applanim.2005.05.009.

(http://www.sciencedirect.com/science/article/B6T48-4GCX19D-2/2/1bc9547886f7f5f7652e51d13c8feb02)
Abstract:
The animal welfare issues faced by the northern Australian beef cattle industry are similar to those faced by extensive livestock production industries in other countries. However, northern Australia is characterised by climatic extremes and large areas/distances and these factors, together with low management inputs, mean that the industry faces significant challenges to assure high standards of animal welfare. In this review, the following issues are discussed: behavioural restriction; `natural disasters'; nutrition; health; a number of aspects relating to human-animal interactions, particularly mustering (gathering/rounding up) and moving cattle, and the consequences for welfare of the timing and frequency of handling; `surgical' procedures; identification; transportation, including live export; and predation.
The use of cattle adapted to the northern Australian environment alleviates many potential welfare problems. In addition, significant improvements to animal welfare could be made very quickly with a few straightforward management changes, such as improved planning for extended dry periods and drought; wider use of conservative stocking rates and supplementary feeding; broader implementation of vaccination programs; and greater implementation of weaner training programs. Further, a dramatic improvement for very large numbers of cattle could be made through the selection and use of polled genotypes to eliminate horned cattle.
Research from Europe suggests that current Australian recommendations for the duration of land transportation journeys may be excessive and could compromise welfare, but further research under northern Australian conditions is required. Research and development is also needed in non-invasive alternatives to castration and spaying, but in the meantime the welfare of males could be improved by castrating earlier in the animals' lives. However, it is acknowledged that this would require major changes to current cattle management practices.
Further research and development is required in relation to animal handling, and in particular the type, timing and frequency of experiences with stockpeople and also, on the assembly and sea transportation of cattle. Finally, a moral question exists as to whether cattle should continue to be exported to a particular country for which there is strong evidence of inhumane treatment.
Keywords: Extensive livestock management; Animal welfare; Beef cattle; Animal production

Frank Andre Maurice Tuyttens, The importance of straw for pig and cattle welfare: A review, Applied Animal Behaviour Science, Volume 92, Issue 3, International Society for Applied Ethonolgy Special Issue, 2003 - A Selection of Papers from the 37th International Congress Abano Terme, Italy, June 2003, August 2005, Pages 261-282, ISSN 0168-1591, DOI: 10.1016/j.applanim.2005.05.007.
(http://www.sciencedirect.com/science/article/B6T48-4GD4S69-2/2/bc57ae4ffac72cf4afca4f409ab8a54d)
Abstract:
The provision of straw in animal production systems is widely presumed to be beneficial for the welfare of the animals. The aim of this paper is to review the scientific basis of this assumption for pigs and cattle. As there are important disadvantages (cost, labour, hygiene and incompatibility with manure drainage systems) associated with the use of straw, studies investigating whether there are suitable alternatives to straw that fulfil the same welfare functions are also reviewed.
It is concluded that straw has many positive effects on the welfare of pigs. Bedding improves the physical comfort of the floor, and--unless temperatures are high--straw enables pigs to somewhat control their microclimate thereby increasing thermal comfort. Straw also functions as an important stimulus and outlet for exploration, foraging, rooting and chewing behaviours. Pigs that are feed restricted or housed in barren environments, in particular, can be strongly motivated to express these behaviours and the inability to do so may result in behavioural problems or anomalies. In addition, it has been demonstrated that preparturient sows are highly motivated to obtain nesting

material and that straw can have a beneficial effect on maternal behaviour after farrowing. Although there may be superior alternatives for each of these functions of straw separately, it remains unlikely that these alternatives can adequately replace the total combination of these functions and also offer advantages regarding hygiene, environment, labour and economics. The importance of straw for the welfare of cattle mainly concerns floor-comfort. However, it appears that the provisioning of (high quality) synthetic lying mats, perhaps in combination with soft walking floors, may provide floor-comfort equal to that of straw. Although the consumption of straw reduces feeding motivation, and hence, the development of oral stereotypies, the behavioural function of straw is less for cattle compared to pigs. Moreover, it is possible to compose more appropriate roughage-feeds that better fulfil the behavioural as well as the dietary needs of cattle.
For both pigs and cattle, there is weak evidence that concrete flooring rather than straw is a risk factor for increased overall morbidity and mortality. However, the relation between straw and health is complex, equivocal and disease specific.
Keywords: Bedding; Housing; Comfort; Floor; Lying area; Leg injuries

T.M. Brown-Brandl, D.D. Jones, W.E. Woldt, Evaluating Modelling Techniques for Cattle Heat Stress Prediction, Biosystems Engineering, Volume 91, Issue 4, August 2005, Pages 513-524, ISSN 1537-5110, DOI: 10.1016/j.biosystemseng.2005.04.003.
(http://www.sciencedirect.com/science/article/B6WXV-4GK1GMR-1/2/041f66a47f6218d00431ae73ec35c449)
Abstract:
Researchers have traditionally predicted animal responses by means of statistical models. This study was conducted to evaluate modelling techniques. One hundred and twenty-eight feedlot heifers were observed during a 2-month period during the summer of 2002. Respiration rate and surface temperature were taken on a random sample of 40 animals twice a day. Five different models (two statistical models, two fuzzy inference systems, and one neural network) were developed using 70% of this data, and then tested using the remaining 30%. Results showed that the neural network described the most variation in test data (68%), followed by the data-dependent fuzzy model (Sugeno type) (66%), regression models (59 and 62%), while the data-free fuzzy model (Mamdami type) described only 27%. While the neural-network model may be a slightly better approach, the researcher may learn more about responses using a fuzzy inference system approach. For all models tested, respiration rate is over-predicted at low stress conditions and under-predicted at high stress conditions. This suggests that all models are lacking a key piece of input data, possibly the accumulative effects of prior weather conditions, to make an accurate prediction.

O.A. Rego, H.J.D. Rosa, P. Portugal, R. Cordeiro, A.E.S. Borba, C.M. Vouzela, R.J.B. Bessa, Influence of dietary fish oil on conjugated linoleic acid, omega-3 and other fatty acids in milk fat from grazing dairy cows, Livestock Production Science, Volume 95, Issues 1-2, 1 August 2005, Pages 27-33, ISSN 0301-6226, DOI: 10.1016/j.livprodsci.2004.11.040.
(http://www.sciencedirect.com/science/article/B6T9B-4FBM1NW-3/2/f877c754c0bfe3b99d5264de079f9fd2)
Abstract:
The main objective of this study was to evaluate the effect of supplementation with fish oil on fatty acid (FA) composition of milk fat from grazing dairy cows with particular emphasis on omega-3 and conjugated linoleic acid. Twelve dairy cows in mid-lactation were blocked by live weight, days in lactation and milk production and randomly assigned to the experimental groups corresponding to 3 different feeding regimens which were applied 3 times with 28-day duration according to a Latin square design. Cows were stocked at 2.5 heads per hectare and supplemented with 4 kg concentrate/cow/day (C), concentrate mixed with 160 g sardine oil (LFO) and concentrate mixed

with 320 g sardine oil (HFO). Supplementation with fish oil (FO) resulted in a significant ($P<0.05$) decrease in milk production and milk fat content and production. Supplementation with 320 g FO decreased ($P<0.05$) milk protein content and production. The ratio protein/fat in milk increased with the level of FO supplemented ($P<0.05$). Significant correlations were detected between some FA in milk fat and milk fat content. FO supplementation had no effect on concentration of medium chain FA but originated a decrease ($P<0.05$) in concentration of short and long chain FA in milk fat. The sum of saturated FA decreased ($P<0.05$) with the inclusion of FO in diet while the sum of unsaturated FA remains unchanged. Proportions of stearic and oleic FA in milk fat decreased and trans-vaccenic FA increase with FO supplementation ($P<0.05$). Milk fat concentration of polyunsaturated n-3 FA was higher in treatment HFO. Concentration of very long chain omega FA in milk fat (i.e. C20:5-EPA e C22:6-DHA) increased by 2.7-fold with 160 g FO and by 5- to 7-fold with 320 g FO. However, the level of transfer efficiency of these FA from FO to milk fat was only 3.3% in treatment LFO and 4.0% in treatment HFO. CLA concentrations in milk fat were particularly high in this experiment and increased with the level of FO supplementation ($P<0.05$).
Keywords: Dairy cattle; Pasture grazing; Fish oil; Fatty acid composition; Milk fat

Ingunn Schei, Harald Volden, Lars Baevre, Effects of energy balance and metabolizable protein level on tissue mobilization and milk performance of dairy cows in early lactation, Livestock Production Science, Volume 95, Issues 1-2, 1 August 2005, Pages 35-47, ISSN 0301-6226, DOI: 10.1016/j.livprodsci.2004.11.039.
(http://www.sciencedirect.com/science/article/B6T9B-4FB93XM-1/2/db12d098a3c1c15208d9450349b27b1b)
Abstract:
The objective of this study was to investigate the effect of dietary energy and metabolizable protein supply on feed intake, milk production, blood metabolites and tissue mobilization in dairy cows during the first 14 weeks of lactation. In the experiment, 36 Norwegian Dairy Cattle were used. Three dietary treatments were evaluated, (1) protein and energy supply according to standard recommendations (SS) for amino acids absorbed in the small intestine (AAT) and net energy lactation (NEL), (2) low protein and low energy (LL; 50% of the concentrate energy fed to SS) and (3) high protein (135% of that fed to LL) and low energy (HL). Energy corrected milk (ECM) was not significantly different between SS and HL but both were higher than LL ($P<0.05$), 4.6 and 2.8 kg higher, respectively. Increased AAT supply at low energy intake increased ($P<0.05$) ECM, protein yield and stimulated increased mobilization of fat. The latter was verified by higher levels ($P<0.05$) of non-esterified fatty acids and acetoacetate in blood and acetone in milk. However, increased fat mobilization showed no effect on incidence of ketosis. It is concluded that the AAT supply in early lactation is an important factor in regulating milk yield and milk protein production.
Keywords: Dairy cows; Energy deficiency; Amino acids absorbed in the small intestine; Concentrate amount; Blood and milk urea; Body condition; Milk performance

D.L. Robinson, Accounting for bias in regression coefficients with example from feed efficiency, Livestock Production Science, Volume 95, Issues 1-2, 1 August 2005, Pages 155-161, ISSN 0301-6226, DOI: 10.1016/j.livprodsci.2004.12.017.
(http://www.sciencedirect.com/science/article/B6T9B-4FTJ0D5-1/2/630c0cf44cbd9a269996f4620cfc5a25)
Abstract:
Estimates of regression coefficients are biased if the independent (or `x') variables contain errors (for example, measurement errors). Equations are derived for the amount of bias in bivariate regression where one independent variable contains significant error, but errors in the other are negligible. Results are tabulated for differing amounts of error and a range of correlations (from 0.1 to 0.9) between the two independent variables.

The process of estimating residual feed intake (RFI) is used to illustrate biases present in real-life data. RFI is defined as the amount of feed eaten by an animal less what would be expected from the animal's metabolic weight and weight gain. Measurement errors of metabolic weight, especially if calculated from the mean of several weighings, are relatively small. In contrast, errors in weight gain may be substantial. Regression coefficients from fitting the RFI equation using two different estimates of weight gain are compared with equations derived from genotypic regression and feed standards tables. The unadjusted coefficients differ substantially, but are shown to be much more consistent after adjusting for bias using equations derived in this paper.
Keywords: Bias; Regression coefficients; Residual feed intake; Feed efficiency; Beef cattle

Marja Mikkola, Paivi Mantysaari, Niina Tammiranta, Jaana Peippo, Juhani Taponen, Effect of dietary protein on embryo recovery rate and quality in superovulated heifers, Animal Reproduction Science, Volume 87, Issues 3-4, July 2005, Pages 193-202, ISSN 0378-4320, DOI: 10.1016/j.anireprosci.2004.11.008.
(http://www.sciencedirect.com/science/article/B6T43-4F2V58G-2/2/5aee238dd99706322fb63c33dd263d89)
Abstract:
For almost 3 decades, superovulation and embryo transfer have been used in cattle breeding to increase the number of offspring from genetically superior female animals. Several factors including nutrition affect the number of transferable embryos recovered. We compared the effects of two different dietary protein levels easily achieved in practical conditions on embryo number and quality in superovulated heifers. Finnish Ayrshire heifers (n = 37) were allocated to isoenergic diets containing either 14% (D14) or 18% (D18) crude protein (CP). Estruses were synchronized, and the heifers were subsequently superovulated and inseminated using a standard FSH-protocol. Embryos were collected 7 days after inseminations (71-72 days after the beginning of the treatment period) by uterine flushing. The number of corpora lutea, and the number and quality of embryos were determined. Protein feeding did not affect superovulatory response, the number of embryos or the number of transferable embryos recovered. Proportionally more poor-quality embryos were found in group D14 than in group D18 (20.2% versus 13.2%, respectively, P = 0.053). It is concluded that a long-term moderate increase in the content of crude protein fed to energy-adequate heifers does not seem to affect superovulatory response and the number of embryos recovered, but it may be advantageous to the quality of embryos.
Keywords: Heifer; Superovulation; Dietary protein; Embryo quality

Y. Chilliard, C. Delavaud, M. Bonnet, Leptin expression in ruminants: Nutritional and physiological regulations in relation with energy metabolism, Domestic Animal Endocrinology, Volume 29, Issue 1, Farm Animal Endocrinology Special Issue Part 1, July 2005, Pages 3-22, ISSN 0739-7240, DOI: 10.1016/j.domaniend.2005.02.026.
(http://www.sciencedirect.com/science/article/B6T62-4FWS4TG-3/2/da213cc8e0c9e5f0151edefa538830b7)
Abstract:
Leptin, mainly produced in adipose tissue (AT), is a protein involved in the central and/or peripheral regulation of body homeostasis, energy intake, storage and expenditure, fertility and immune functions. Its role is well documented in rodent and human species, but less in ruminants. This review is focused on some intrinsic and extrinsic factors which regulate adipose tissue leptin gene expression and leptinemia in cattle, sheep, goat and camel: age, physiological status (particularly pregnancy and lactation) in interaction with long-term (adiposity) and short-term effects of feeding level, energy intake and balance, diet composition, specific nutrients and hormones (insulin, glucose and fatty acids), and seasonal non-dietary factors such as photoperiod. Body fatness strongly regulates leptin and its responses to other factors. For example, leptinemia is higher after underfeeding or during lactation in fat than in lean animals. Physiological status per

se also modulates leptin expression, with lactation down-regulating leptinemia, even when energy balance (EB) is positive. These results suggest that leptin could be a link between nutritional history and physiological regulations, which integrates the animal's requirements (e.g., for a pregnancy-lactation cycle), predictable food availability (e.g., due to seasonal variations) and potential for survival (e.g., body fatness level). Reaching permissive leptin thresholds should be necessary for pubertal or postpartum reproductive activity. In addition to the understanding of leptin yield regulation, these data are helpful to understand the physiological significance of changes in leptin secretion and leptin effects, and how husbandry strategies could integrate the adaptative capacities of ruminant species to their environment.
Keywords: Leptin; Adipose tissue; Energy metabolism; Pregnancy-lactation; Ruminants

D.A. Zieba, M. Amstalden, G.L. Williams, Regulatory roles of leptin in reproduction and metabolism: A comparative review, Domestic Animal Endocrinology, Volume 29, Issue 1, Farm Animal Endocrinology Special Issue Part 1, July 2005, Pages 166-185, ISSN 0739-7240, DOI: 10.1016/j.domaniend.2005.02.019.
(http://www.sciencedirect.com/science/article/B6T62-4G05H4M-1/2/4428c73ae0aeab6bbba24328982a860f)
Abstract:
Leptin plays an important role in signaling nutritional status to the central reproductive axis of mammals and appears to be at least a permissive factor in the initiation of puberty. The expression and secretion of leptin are correlated with body fat mass and are acutely affected by changes in feed intake. Moreover, circulating leptin increases during pubertal development in rodents, human females and heifers. Effects of leptin are mediated mainly via receptor activation of the JAK-STAT pathway; however, activation of alternative pathways, such as MAP kinase, has also been reported. Although the leptin receptor (LR) has not been found on GnRH neurons, leptin stimulates the release of GnRH from rat and porcine hypothalamic explants. Moreover, leptin increases the release of LH in rats and from adenohypophyseal explants and/or cells from full-fed rats and pigs. In contrast, stimulation of the hypothalamic-gonadotropic axis by leptin in cattle and sheep is observed predominantly in animals and tissues pre-exposed to profound negative energy balance. For example, leptin prevents fasting-mediated reductions in the frequency of LH pulses in peripubertal heifers, augments the magnitude of LH and GnRH pulses in fasted cows, and enhances basal secretion of LH in vivo and from adenohypophyseal explants of fasted cows. However, leptin is incapable of accelerating the frequency of LH pulses in prepubertal heifers, regardless of nutrient status, and has no effect on the secretion of GnRH and LH in full-fed cattle or hypothalamic/hypophyseal explants derived thereof. Similar to results obtained with LH, basal secretion of GH from anterior pituitary explants of fasted, but not normal-fed cows, was potentiated acutely by low, but not high, doses of leptin. Mechanisms through which undernutrition hypersensitize the hypothalamic-gonadotropic axis to leptin may involve up-regulation of the LR. However, an increase in LR mRNA expression is not a requisite feature of heightened adenohypophyseal responses in fasted cattle. To date, leptin has not been successful for inducing puberty in ruminants. Future therapeutic uses for recombinant leptin that exploit states of nutritional hypersensitization, and identification of genetic markers for genotypic variation in leptin resistance, are currently under investigation.
Keywords: Leptin; Hypothalamus; Adenohypophysis; Reproduction; Cattle

O. Schmidt, J.M. Quilter, B. Bahar, A.P. Moloney, C.M. Scrimgeour, I.S. Begley, F.J. Monahan, Inferring the origin and dietary history of beef from C, N and S stable isotope ratio analysis, Food Chemistry, Volume 91, Issue 3, July 2005, Pages 545-549, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2004.08.036.
(http://www.sciencedirect.com/science/article/B6T6R-4DTBV2F-4/2/965b55596a1dffdc2d86e3bf215b2ce9)

Abstract:
There is a pressing need for scientific methods that provide independent proof of the authenticity of animal produce for human consumption. Results of two feasibility studies suggest that the analysis of natural stable isotope compositions of carbon, nitrogen and sulphur is one potential tool for the verification of the geographical origin and feeding history of beef cattle. Beef reared in the USA (23 samples) and Brazil (10 samples) was isotopically different from northern European beef (35 samples), mainly because of contrasting proportion of plants with C3 and C4 photosynthetic pathways in the cattle diets. Combined C, N and S stable isotope ratio analysis also separated organically (15 samples) and conventionally (17 samples) produced Irish beef, even though underlying mechanisms are not yet fully understood.
Keywords: Authenticity; Food safety; Isotope ratio mass spectrometry; Meat; Organic production; Traceability

Paivi Mantysaari, Pekka Huhtanen, Juha Nousiainen, Markku Virkki, The effect of protein-feeding strategy during lactation on performance of primiparous dairy cows fed total mixed ration, Livestock Production Science, Volume 94, Issue 3, July 2005, Pages 189-198, ISSN 0301-6226, DOI: 10.1016/j.livprodsci.2004.11.022.
(http://www.sciencedirect.com/science/article/B6T9B-4F1GRF8-9/2/a59f0d2caeceab2829d662151730b043)
Abstract:
Fifty primiparous Finnish Ayrshire cows were used in 2x2 factorial study. The factors were the protein-feeding strategy: constant (cCP) or variable (vCP) protein content in concentrate during lactation and the use of a commercial health product from 2 weeks pre- to 8 weeks postpartum. On treatment cCP, the CP content of the concentrate was 180 g/kg in dry matter (DM) throughout the lactation, and on vCP treatment, the CP content was 210, 180 and 150 g/kg DM during lactation days 0-100, 101-200 and 201-305, respectively. The concentrate blends included barley, oats, rapeseed meal, molassed sugar beet pulp and minerals and vitamins. Grass silage and ensiled wet sugar beet pulp (100 g/kg DM in TMR) were used as forage. The forage-to-concentrate ratio in TMR was 55:45 on both treatments. The experimental period was 305 days of the first lactation.
The average daily milk yield (cCP: 26.3 kg/day vs. vCP: 27.5 kg/day) was higher ($P<0.05$) when feeding concentrate with decreasing protein content, but the effect was not seen in an energy-corrected milk (cCP: 28.1 kg/day vs. vCP: 29.0 kg/day). Milk composition was not affected by the protein-feeding strategy. Protein-feeding strategy had no effect on DM intake (cCP: 18.5 kg/day vs. vCP: 18.9 kg/day). The efficiency of CP utilization (milk protein/CP intake) was higher (0.327 vs. 0.301; $P<0.05$) on vCP treatment during the last 100 days of lactation, but during the first 200 days of lactation, no significant difference was found. The average efficiency of CP utilization throughout the lactation was 0.32 with no difference between treatments. The protein-feeding strategy had no effect on the development of body condition scores of the cows. In mid-lactation, the cows on cCP treatment gained more weight than the cows on vCP treatment. The health product had no significant effect on production or feed intake. The results suggest that only small benefits can be obtained from feeding TMR to primiparous cows differing in CP content at various stages of lactation.
Keywords: Dairy cattle; Protein-feeding strategy; Total mixed ration; Milk yield

E. Solanas, C. Castrillo, X. Serrano, H. Janacua, M. Fondevila, J.A. Guada, Effect of concentrate extrusion and castration on diet digestion and performance of intensively reared male calves, Livestock Production Science, Volume 94, Issue 3, July 2005, Pages 225-236, ISSN 0301-6226, DOI: 10.1016/j.livprodsci.2004.12.003.
(http://www.sciencedirect.com/science/article/B6T9B-4FMK8M7-1/2/dd304cefaec964c6c646baaf84201d71)

Abstract:
Fifty-six male Friesian calves, half of them castrated, were used to study the effects of concentrate extrusion and animal castration on diet digestibility and performance in two different growth phases (from 91 to 250 and from 250 to 400 kg live weight). Diets consisted of a compound meal, extruded or nonextruded, and barley straw, both of them fed ad libitum. Half of the animals were slaughtered at 250 kg and the remaining at 400 kg live weight. Extrusion increased the gelatinization grade, resulting in a higher ($p<0.01$) fermentation rate, and reduced nitrogen solubility and degradation after 12 h of rumen incubation ($p<0.05$). Calves receiving the extruded meal showed a lower rumen ammonia concentration just before the first meal ($p<0.001$), the differences disappearing afterwards. Neither the pH nor the total VFA concentrations were affected, although butyrate, isobutyrate and isovalerate proportions before the first meal decreased with the extruded diet. Concentrate extrusion did not affect the apparent OM digestibility of total diet but caused a reduction of NDF ($p<0.01$) and CF ($p<0.05$) digestibility. In the first growth phase, concentrate and total DM intake decreased with extrusion ($p<0.001$), without affecting the average daily gain (ADG). Consequently, the concentrate and total feed conversion ratios were significantly lower ($p<0.001$ and $p<0.01$, respectively) with the extruded meal. Bulls showed a higher ADG than steers ($p<0.001$), resulting in lower feed conversion ratios ($p<0.01$) given that intake was not affected by castration. In the second growth phase, extrusion did not affect any of the performance parameters, however bulls showed a higher DM intake and ADG ($p<0.05$), but no differences in the feed conversion ratio were found between entire and castrated animals.
Keywords: Beef cattle; Extrusion; Digestibility; Growth

Henrik J. Andersen, Niels Oksbjerg, Jette F. Young, Margrethe Therkildsen, Feeding and meat quality - a future approach, Meat Science, Volume 70, Issue 3, 50th International Congress of Meat Science and Technology,(ICoMST), 8-13 August 2004, Helsinki, Finland, July 2005, Pages 543-554, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2004.07.015.
(http://www.sciencedirect.com/science/article/B6T9G-4FKYF15-1/2/ba4ab9e3471f46ba01d15399139ee1a1)
Abstract:
The continuous demand for high standards of quality assurance in the meat production of today and tomorrow calls for development of new tools capable of meeting such demands. The present paper aims to re-think the traditional way of using feeding as a quality control tool in the production of meat and to introduce the potential of a nutrigenomic approach as a first step in the development of pro-active quality control systems which fulfil future demands from industry and consumers. A few chosen examples present how specific feeding strategies can manipulate (i) muscle protein turnover and thereby meat tenderness as well as the cost and sustainability of the production and (ii) muscle energy levels at slaughter and thereby the pH decline, water-holding capacity and the sensory characteristics of meats. The examples are discussed in relation to exploiting essential and basic understanding of physiological and physical processes, which can subsequently be included in a systems biology line of thought of importance for development of unique decision support systems in future meat production.
Keywords: Pigs, Cattle, Pork, Beef; Post-genomic area; Nutrigenomics; Quality control; Systems biology; Decision support systems

Nicolas C. Friggens, Mizeck G.G. Chagunda, Prediction of the reproductive status of cattle on the basis of milk progesterone measures: model description, Theriogenology, Volume 64, Issue 1, 1 July 2005, Pages 155-190, ISSN 0093-691X, DOI: 10.1016/j.theriogenology.2004.11.014.
(http://www.sciencedirect.com/science/article/B6TCM-4F4NYR9-2/2/5d47124afee7d08758fbac0616e2f91b)
Abstract:

Reproductive management, in particular timely oestrus detection, is important for profitable dairy production. The aim of this study was to develop a biological model to predict reproductive state on the basis of milk progesterone measures. A number of additional inputs were incorporated to make use of other known effectors of reproductive performance that are not reflected in progesterone levels. These are: days from calving, breed, parity, signs of behavioural oestrus, insemination dates, pregnancy determinations, energy status, body fat status, milk urea content and reproductive disorders associated with calving. A dynamic, deterministic model was developed. It is designed to run each time a new trigger input (progesterone, behavioural oestrus, inseminations, pregnancy determinations) occurs using the current and previous values and can run in the absence of the additional inputs. The milk progesterone values are smoothed using an extended Kalman filter before being processed in the biological component of the model. The model predicts the reproductive status of the cow, which can be one of three mutually exclusive states: postpartum anoestrus, oestrus cycling, and potentially pregnant. The other model outputs are all reproductive status specific with the exception of days to next sample (DNS), which is calculated in each model run regardless of reproductive status. DNS is designed to feedback to the sampling system so that the frequency of milk sampling (i.e. progesterone measurement) can be varied according to the predicted likelihood of a future reproductive event, such as onset of oestrus cycling. The other model outputs are: risk of prolonged postpartum anoestrus, risk and type of ovarian cyst, onset of oestrus, likelihood of a potential insemination succeeding, and likelihood of being pregnant (following oestrus). The model was evaluated using three simulated datasets consisting of a timeseries of progesterone values centred on each of the three reproductive statuses and including relevant additional information. Test runs were carried out on the full datasets and then on reduced data. The data reductions were made by using only those values that would have been available if the model days to next sample function was used to control sampling frequency. The sensitivity of the model to noise in the raw progesterone data was examined by adding 1, 2, or 3 residual standard deviations (1.85 ng/ml) random variation to the original data and evaluating model performance. The model was found to be able to readily identify and distinguish reproductive states. A reduction in sampling frequency to 36% of original sample resulted in an average increase in days to detection of oestrus of 0.36. The addition of 1 S.D. noise did not cause additional oestruses to be detected and all oestruses were correctly identified. However, when 2 or 3 S.D. noise were added, the model found on average 1.4 and 3 extra oestruses. It was concluded that reproductive status can be predicted from milk progesterone values using a biological model and that such a model is robust to reductions in sampling frequency number and to a doubling in the random variation in the raw progesterone values. It therefore has the potential to provide the basis for a useful reproductive management tool.
Keywords: Anoestrus; Model; Oestrus detection; Pregnancy; Progesterone; Reproduction

M.A. Stevenson, R.S. Morris, A.B. Lawson, J.W. Wilesmith, J.B.M. Ryan, R. Jackson, Area-level risks for BSE in British cattle before and after the July 1988 meat and bone meal feed ban, Preventive Veterinary Medicine, Volume 69, Issues 1-2, 10 June 2005, Pages 129-144, ISSN 0167-5877, DOI: 10.1016/j.prevetmed.2005.01.016.
(http://www.sciencedirect.com/science/article/B6TBK-4FJ8C1K-1/2/aff9ceee118c91a62e1c90dc6d593e20)
Abstract:
In this paper we investigate area-level risk factors for BSE for the cattle population present in Great Britain between 1986 and 1997. By dividing this population into two birth cohorts, those born before the July 1988 ban on feeding ruminant-derived meat and bone meal to ruminants and those born after, second-order regional influences are distinguished from the strong first-order south-to-north gradient of area-level BSE risk using Bayesian hierarchical models that account for structured (spatially correlated) and unstructured heterogeneity in the data. For both cohorts area-

level risk of BSE was increased by a more southerly location and greater numbers of dairy cattle, relative to non-dairy cattle. For the cohort of cattle born after the July 1988 ban on feeding ruminant-derived meat and bone meal area-level BSE risk was additionally associated with greater numbers of pigs, relative to cattle. These findings support the role of low level cross-contamination of cattle feed by pig feed as an influence on BSE incidence risk as the epidemic evolved. Prior to the 1988 meat and bone meal ban unexplained BSE risk was relatively uniformly distributed across the country whereas after the ban there were spatially aggregated areas of unexplained risk in the northern and eastern regions of England suggesting that local influences allowed BSE control measures to be less-successfully applied in these areas, compared with the rest of the country. We conclude that spatially localised influences were operating in divergent ways during the two phases of the epidemic.
Keywords: Bovine spongiform encephalopathy; Epidemiology; Spatial epidemiology

Giulio Cozzi, Flaviana Gottardo, Feeding behaviour and diet selection of finishing Limousin bulls under intensive rearing system, Applied Animal Behaviour Science, Volume 91, Issues 3-4, June 2005, Pages 181-192, ISSN 0168-1591, DOI: 10.1016/j.applanim.2004.10.004.
(http://www.sciencedirect.com/science/article/B6T48-4DXJY9B-1/2/19f65d028d35158ea36fb2c60974b0d0)
Abstract:
Twenty Limousin finishing bulls (initial body weight = 425.9 +/- 22.0 kg) were assigned to four balanced groups reared in separate pens with a space allowance of 3.6 m2 per head and a manger space of 95 cm per head. The finishing period lasted 138 days during which the animals received the same diet provided ad libitum as total mixed ration (TMR) in a single daily distribution at 09:30 h. The average daily gain of the bulls was satisfactory (1.35 +/- 0.23 kg per day) and no specific medical treatments were required throughout the finishing period. Three observation sessions of 24 h were carried out at days 23, 78 and 113 to describe bulls feeding behaviour and its partition during three following time intervals after diet delivery (0-8, 9-16 and 17-24 h). Average dry matter intake (DMI) was 8.29 +/- 0.99 kg per day but the bulls showed a predominant ingestive behaviour during the day-light hours. More than 64.0% of the total dry matter intake was consumed within 8 h from diet delivery with two peaks of eating activity: the first one, right after the diet distribution and the second one around sunset. Feed intake was reduced during the evening (21% of total DM from 8 to 16 h) and overnight (15% the total DM from 17 to 24 h). Bulls spent on average 332 min per day ruminating and this activity was performed mainly after sunset (117 min from 9 to 16 h) and overnight (132 min from 17 to 24 h) during the lying. Diet selection activity performed by the bulls was assessed by measuring the change in particle size distribution and chemical composition of dietary samples taken from each pen at 0 (diet delivery), 8, 16 and 24 h. There was no selection activity within the first 8 h after diet delivery when the eating rate was the fastest (9.1 min/kg DM). In the following time interval (9-16 h), eating rate was slow (15.3 min/kg DM) and bulls performed a selection activity towards the more structured particles (>8 mm) of the diet. This behaviour may represent an attempt to maintain a sufficient intake of long fibre roughage. Although the pens had a wide manger space, the most frequent eating condition showed one or two bulls standing at the manger at the same time. The simultaneous presence of more than three bulls was rare and it was observed only during the first 8 h after diet delivery when the fresh diet was available.
Keywords: Beef cattle; Feeding behaviour; Diet selection; Intensive rearing

Chirathalattu S. Thomas, Josephina Nordstrom, Kerstin Svennersten-Sjaunja, Hans Wiktorsson, Maintenance and milking behaviours of Murrah buffaloes during two feeding regimes, Applied Animal Behaviour Science, Volume 91, Issues 3-4, June 2005, Pages 261-276, ISSN 0168-1591, DOI: 10.1016/j.applanim.2004.11.002.

(http://www.sciencedirect.com/science/article/B6T48-4FBWH8Y-1/2/1de449db34b5325666d21030134756f1)
Abstract:
Diurnal maintenance behaviour and behaviour during milking in a mechanised system with two feeding regimes were studied in 14 Murrah buffaloes managed in a highly mechanised system. Normal fixed rations of roughage and concentrates and established milking routines (T-I) were compared to a regime with increased access to roughage and 50% reduction in in-parlour feeding (IPF) of concentrate (T-II). Reduced concentrate was compensated in the out of parlour feeding system (AFS). Buffaloes spent 23, 39, and 33% of their time eating, resting, and standing, respectively. This is comparable to what has been observed in cattle under similar management systems. Significant diurnal differences were observed in all behaviours except walking. Buffaloes ruminated significantly longer at night when standing in T-I while in T-II, they ruminated significantly longer when lying at night ($P < 0.05$). Total sleeping behaviour was significantly longer in T-II than T-I ($P < 0.05$). This could indicate that the animals were more satisfied and restful as a consequence of extended access to roughage. Milk let down and time to 500 g of milk was significantly earlier in T-I than in T-II ($P < 0.05$). Average daily milk yield tended to be lower in T-II than T-I ($P < 0.10$). Disturbances due to the changed IPF routines were reflected in a significantly higher oral behaviour in the parlour ($P < 0.05$). In conclusion, buffaloes are sensitive to the slightest change in milking routines, which is reflected in milk flow and the milk yield.
Keywords: Maintenance behaviour; Milking; Milking characteristics; Murrah buffalo

M. Sassahara, D. Pontes Netto, E.K. Yanaka, Aflatoxin occurrence in foodstuff supplied to dairy cattle and aflatoxin M1 in raw milk in the North of Parana state, Food and Chemical Toxicology, Volume 43, Issue 6, June 2005, Pages 981-984, ISSN 0278-6915, DOI: 10.1016/j.fct.2005.02.003.
(http://www.sciencedirect.com/science/article/B6T6P-4FMK8M3-1/2/dfd5d495a35bea4bb0b4c781ce1f33e9)
Abstract:
Moulds occur in a great variety of foods, including the concentrated and roughage destined for animal feeding, and can produce mycotoxins under certain conditions. The ingestion of mycotoxin AFB1 by dairy cattle leads to the biotransformation of that substance, which is eliminated via milk as AFM1, and also causes damage to human health. The present study aimed to analyze the presence of aflatoxins in foodstuff destined for dairy cattle and in the milk produced by these animals. The contamination of the foodstuff by aflatoxins happened mainly in the feeds and the silages did not present contamination by aflatoxins. Out of the 42 samples of milk analyzed, 10 (24%) were contaminated by AFM1, and 3 (7%) were above the 0.5 [mu]g/l limit.
Keywords: Mycotoxin; Aflatoxin; AFB1; AFM1; Dairy cattle

Karin Nuernberg, D. Dannenberger, G. Nuernberg, K. Ender, J. Voigt, N.D. Scollan, J.D. Wood, G.R. Nute, R.I. Richardson, Effect of a grass-based and a concentrate feeding system on meat quality characteristics and fatty acid composition of longissimus muscle in different cattle breeds, Livestock Production Science, Volume 94, Issues 1-2, Product quality and livestock systems, June 2005, Pages 137-147, ISSN 0301-6226, DOI: 10.1016/j.livprodsci.2004.11.036.
(http://www.sciencedirect.com/science/article/B6T9B-4F4NYH0-2/2/d4ab5e8f6f910c8d3c9de597fa995752)
Abstract:
The objective of this study was to examine the effects of feeding system and breed on the content of the beneficial n-3 polyunsaturated fatty acids and conjugated linoleic acids (CLA) in beef muscle. German Simmental (GS) (n=31) and German Holstein (GH) (n=33) bulls were produced on either an indoor concentrate system or a grass-based system consisting of a period of summer pasture feeding followed by a winter indoor period on grass silage and a concentrate containing linseed. All animals were slaughtered at 620 kg. The grass-based system increased ($P<0.05$) the

percentage of n-3 fatty acids in the longissimus muscle lipids of bulls (GS 2.22 vs. 0.46%, GH 1.61 vs. 0.34%). The n-6 fatty acid proportions were not affected by the feeding system in GS and GH loin muscle. Therefore, the n-6/n-3 ratio of grass-based GS bulls was 2.0 and of GH was 1.9 in contrast to 8.3 and 6.5 for bulls fed concentrates indoors. The grass-based system increased the percentage of C18:1trans fatty acid isomers in both breeds. The percentage of CLAcis-9,trans-11 (0.87% vs. 0.72% in GS, 0.84% vs. 0.75% in GH) in muscle was significantly higher in animals on the grass-based system.
Keywords: Beef; n-3 fatty acids; Sensory traits; CLA; Shelf life

D.A. King, R.C. Anderson, R.K. Miller, M.A. Carr, G.E. Carstens, J.W. Savell, Y.S. Jung, T.R. Callaway, T.S. Edrington, K.J. Genovese, D.J. Nisbet, Effects of pre-harvest supplemental chlorate on beef carcass and meat quality, Meat Science, Volume 70, Issue 2, June 2005, Pages 215-221, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2004.12.019.
(http://www.sciencedirect.com/science/article/B6T9G-4FXNRP6-1/2/90d1cf4dd178ff038aa524c96ea35c6a)
Abstract:
Effects of feeding sodium chlorate on carcass quality, tenderness and color stability were evaluated. Heifers (n = 64) were fed chlorate at either 0.01% or 0.05% of body weight (BW) in the last feeding or 0.01% for the last 5 d before harvest, while control cattle received no chlorate. During the 12 h period between feed withdrawal and transport to the harvest facility, the cattle were provided water containing either no sodium chlorate or sodium chlorate (approximately 30 mM). Feed treatments at 0.01% of BW produced higher marbling scores than feeding 0.01% of BW for 5 d. However, neither of these treatments produced marbling scores that were different from non-treated controls. Water supplementation increased tenderness in cattle fed 0.01% of BW for 5 d, but decreased tenderness in cattle fed 0.05% of BW at the last feeding. Although tenderness differences existed, it is not clear whether or not they were caused by the feed or water treatments or by pre-existing variation in the cattle. Neither feed nor water supplementation affected color stability. These data suggest that chlorate preparations could be used to reduce pathogens without adversely impacting meat quality or display life. However, further research is needed to further substantiate these findings.
Keywords: Beef; Carcass quality; Color; Sodium chlorate; Tenderness

Joseph J. Nocera, Glen J. Parsons, G. Randy Milton, Alan H. Fredeen, Compatibility of delayed cutting regime with bird breeding and hay nutritional quality, Agriculture, Ecosystems & Environment, Volume 107, Issues 2-3, 20 May 2005, Pages 245-253, ISSN 0167-8809, DOI: 10.1016/j.agee.2004.11.001.
(http://www.sciencedirect.com/science/article/B6T3Y-4F3FF0S-1/2/26a0d10e2a6129f3dc1ca53a842d7ac9)
Abstract:
The breeding phenology of three grassland bird species was studied in managed hayfields of Nova Scotia, Canada: bobolink (Dolichonyx oryzivorus), savannah sparrow (Passerculus sandwichensis), and Nelson's sharp-tailed sparrow (Ammodramus nelsoni subvirgatus), under delayed hay cutting regimes (post-1 July). Weekly changes were monitored in several measures of hay nutritional quality (percent crude protein (CP %), acid detergent fibre (ADF), calcium (Ca) and phosphorus (P)). Timing of peak fledging was variable across years, but generally occurred in the first week of July. Delay of cutting by 1 week in late June or early July resulted in a small reduction in hay nutritional quality. However, that hay would still meet energy and CP % requirements for non-lactating beef cows. Regression models showed that a delay of 1.5 weeks (from 20 June to 1 July) in cutting translated to a mean decrease in CP % of 2.1. Conversely, this delay secured an increase in the rate of fledgling, from 0 to 20% for bobolink, 56% for savannah sparrow, and 44% for Nelson's sharp-tailed sparrow. Postponing cut by 1 more week (to a minimum of 7 July) gave

the benefit of allowing maximum fledging rates for all species, while CP % lost 3.5. While this level of CP % is unlikely to support high maintenance periparturient cows and feeder/finisher cattle, it could be made profitable through mineral supplementation. ADF levels were considerably elevated, while Ca and P improved in the same time period. These trends show delayed hay cutting can be a viable option for farmers opting to conserve breeding birds on hayfields. The feasibility of delaying cut varies with a farm's specialization, and to a degree, breed kept. Such practices can be incorporated into a holistic approach to agroecosystem management.
Keywords: Bobolink; Breeding phenology; Crude protein; Fledging rate; Grassland birds; Hay cutting; Livestock nutrition

A.F. Bouwman, K.W. Van der Hoek, B. Eickhout, I. Soenario, Exploring changes in world ruminant production systems, Agricultural Systems, Volume 84, Issue 2, May 2005, Pages 121-153, ISSN 0308-521X, DOI: 10.1016/j.agsy.2004.05.006.
(http://www.sciencedirect.com/science/article/B6T3W-4D1R2W8-1/2/03e2156d5e708f1dd8a94eded7badddc)
Abstract:
In the past 30 years world production of ruminant meat and milk has increased by about 40%, while the global area of grassland has increased by only 4%. This is because most of the increase in ruminant meat and milk production has been achieved by increasing the production in mixed and landless production systems and much less so in pastoral systems. Pastoral systems depend almost exclusively on grazing, while mixed and landless systems rely on a mix of concentrates (food crops) and roughage, consisting of grass, fodder crops, crop residues, and other sources of feedstuffs. A model was developed to describe these two aggregated production systems for different world regions, each having typical production characteristics, such as milk production per animal for dairy cattle, and off-take rates and carcass weights for non-dairy cattle, sheep and goats. The energy needed by the animals for the production of meat and milk is calculated on the basis of requirements for maintenance, grazing and labour, pregnancy, and lactation. We implemented the FAO Agriculture Towards 2030 projection for crop and livestock production and assumed that the past trend in the area of grassland will continue in the coming three decades. This assumption implies a rapid intensification of grassland management with a 33% increase in global grass consumption, which will only be possible with increasing fertilizer inputs, use of grass-clover mixtures and improved grassland management.
Keywords: Livestock production; Ruminant; Feed; Grassland

R.A. Eigenberg, T.M. Brown-Brandl, J.A. Nienaber, G.L. Hahn, Dynamic Response Indicators of Heat Stress in Shaded and Non-shaded Feedlot Cattle, Part 2: Predictive Relationships, Biosystems Engineering, Volume 91, Issue 1, May 2005, Pages 111-118, ISSN 1537-5110, DOI: 10.1016/j.biosystemseng.2005.02.001.
(http://www.sciencedirect.com/science/article/B6WXV-4FTS31D-1/2/6bfa01f72861c840efec54af2ad5faac)
Abstract:
Summer heat provides stressful conditions for Bos taurus feeder cattle; in extreme instances these conditions can be fatal. One management option is to provide shade structures for feedlot animals. This study was conducted during the summer of 2001 to compare physiological responses of cattle with shade access or no-shade access. Eight steers were selected from a group of 12, and assigned individual pens. Four pens were fitted with shade structures that allowed the steers to choose shade; the remainder had no shade option. The animals were rotated through pen assignments during the summer season. Continuous measures of respiration rate and body temperature were recorded as response variables to the shade treatments. Environmental conditions were monitored for the experimental period. Daytime means and standard errors were 86[middle dot]0+/-0[middle dot]39 breaths min-1 for respiration rate shade, and were significantly

lower (probability P<0[middle dot]05) than respiration rate No-shade of 102[middle dot]3+/-0[middle dot]36 breaths min-1. Linear regression fit for daytime data showed the slope for No-shade to be 4[middle dot]5+/-0[middle dot]15 breaths min-1 and 1[middle dot]5+/-0[middle dot]11 breaths min-1 for Shade. Thresholds for humidity and treatment of Shade and No-shade were determined to exist between 25 and 30 [degree sign]C. Linear regression equations were developed for respiration rate including effects of temperature, humidity, wind speed, and solar radiation for animals in either Shade or No-shade feedlot pens.

Tran Dang Khanh, Nguyen Huu Hong, Tran Dang Xuan, Ill Min Chung, Paddy weed control by medicinal and leguminous plants from Southeast Asia, Crop Protection, Volume 24, Issue 5, May 2005, Pages 421-431, ISSN 0261-2194, DOI: 10.1016/j.cropro.2004.09.020.
(http://www.sciencedirect.com/science/article/B6T5T-4DXBSSN-2/2/cdae7afc165f19d53ca7e8fb86fe1255)
Abstract:
Four common medicinal and two leguminous plant species from Southeast Asia were selected from a preliminary survey and examined for their potential use in paddy weed control. The screening indicated that all species exhibited strong allelopathic activities, the strongest of which was Nerium oleander. Allelopathic potentials of plant parts were ranked in the order: leaf>root>stem. The only exception was for Alocasia cucullata, where the stem displayed the highest potential. In a bioassay, N. oleander and Helianthus tuberosus showed the highest suppression of germination and growth of Echinochloa crus-galli (barnyardgrass) and Monochoria vaginalis (monochoria). Other than for Passiflora incarnata, the spontaneous growth of paddy weeds was significantly suppressed in a greenhouse at 1 t ha-1. At 1.5 t ha-1, all examined species markedly reduced weed plant growth and the dry weight of weeds by 60-100% and 70-100%, respectively. In paddy fields, weed biomass was reduced by 70-80%, and rice yield was increased by an average of 20% compared with the control. Stylosanthes guianensis, a leguminous plant widely used in Southeast Asia and Africa as a cattle feed, cover crop, mulch, and for soil improvement, gave the greatest increase in rice yield (25.8%). These plants might be useful as natural herbicides and might also contain numerous growth inhibitors that could be used for the development of biological pesticides.
Keywords: Allelopathy; Inhibition; Medicinal plant; Leguminous plant; Paddy field; Weed

G. E. Meglia, A. Johannisson, S. Agenas, K. Holtenius, K. Persson Waller, Effects of feeding intensity during the dry period on leukocyte and lymphocyte sub-populations, neutrophil function and health in periparturient dairy cows, The Veterinary Journal, Volume 169, Issue 3, May 2005, Pages 376-384, ISSN 1090-0233, DOI: 10.1016/j.tvjl.2004.02.003.
(http://www.sciencedirect.com/science/article/B6WXN-4C1FCJR-B/2/d7402d7dc6e22d41f7ed2cb578e5b197)
Abstract:
The objective of this investigation was to study (1) the numbers of leukocytes, (2) the proportions of lymphocytes expressing CD4, CD8, WC1, B or IL2R and (3) neutrophil phagocytosis and oxidative burst activity in blood around parturition in three groups of dairy cows fed different levels of a total mixed ration during the last eight weeks before calving. All cows were fed ad libitum during the first eight weeks of lactation. Serum concentration of the acute phase protein serum amyloid A (SAA), the milk somatic cell count (SCC) and disease incidence were also recorded. Special emphasis was given to the weeks just before and just after calving as dairy cows are known to be immune suppressed during this period.
Dry period diet had only minor effects on leukocyte numbers, and did not influence neutrophil phagocytosis and oxidative burst. In addition, no effect was observed on disease incidence or SAA concentrations. However, an increase in the proportion of B-lymphocytes and a decrease in the proportion of WC1+ T lymphocytes were observed after calving in cows fed high or low energy

rations during the dry period, but not in cows fed a medium energy ration. The weeks just before and after parturition were characterised by neutrophilia, eosinopenia, lymphopenia and monocytosis, but time had no effect on neutrophil phagocytosis and oxidative burst. The proportions of CD4+, CD8+, B+ and IL-2R+ lymphocytes increased in early lactation relative to the mid dry period. In addition, the concentration of SAA increased dramatically at calving. The results emphasise the need for more studies to clarify the complex interactions between nutrition and immunity during the peripartum period in dairy cattle.
Keywords: Dairy cows; Dry period feeding; Leukocytes; Lymphocytes; Neutrophil functions; SAA

K. A. Leach, J. E. Offer, I. Svoboda, D. N. Logue, Effects of type of forage fed to dairy heifers: Associations between claw characteristics, clinical lameness, environment and behaviour, The Veterinary Journal, Volume 169, Issue 3, May 2005, Pages 427-436, ISSN 1090-0233, DOI: 10.1016/j.tvjl.2004.03.023.
(http://www.sciencedirect.com/science/article/B6WXN-4CT5YV0-2/2/c5e03194ed2f73c2df56d2fb326910ec)
Abstract:
Heifers were reared separately on wet fermented (WF) (grass silage based) or dry unfermented (DU) (straw based) diets. Clinical lameness was recorded and physical claw attributes were measured regularly, up to six months after calving at approximately two years of age. Two months before calving, some aspects of animal behaviour and the properties of slurry were studied. The incidence of lameness due to claw horn lesions was significantly higher ($P<0.01$) in WF than in DU. WF suffered more serious heel erosion prior to calving ($P<0.05$) and had softer claw horn at two (heel and axial sole) out of five sites throughout ($P<0.01$ and $P<0.05$). The slurry produced by WF had lower total solids content ($P<0.05$) and viscosity ($P<0.001$). WF spent longer standing and feeding ($P<0.001$). It is proposed that standing for longer in less viscous slurry contributed to softer claw horn and more severe heel erosion, predisposing WF to claw horn lesions causing lameness. Reducing contact with low dry matter slurry is recommended for improving claw health.
Keywords: Dairy cattle; Lameness; Diet; Slurry; Claw horn; Heifers

K.C. Garossino, B.J. Ralston, M.E. Olson, T.A. McAllister, D.N. Milligan, B.M.A. Genswein, Individual intake and antiparasitic efficacy of free choice mineral containing fenbendazole for grazing steers, Veterinary Parasitology, Volume 129, Issues 1-2, 20 April 2005, Pages 35-41, ISSN 0304-4017, DOI: 10.1016/j.vetpar.2004.12.014.
(http://www.sciencedirect.com/science/article/B6TD7-4FF9HF9-1/2/6a444e3d58abeac768312e5ae414248d)
Abstract:
A 95-day study (June 25-September 27, 2001) was conducted using 120 steers (311.9 +/- 2.4 kg) randomly allocated to two treatments: (1) mineral containing 0.55% fenbendazole (FBZ) and (2) control, no FBZ in the mineral. Animals in the FBZ group were individually identified by an electronic tag that was read each time an animal attended the mineral feeder. The feeder was equipped with load cells that enabled individual mineral intakes to be estimated. The FBZ group was provided with non-medicated mineral during a 14-day adaptation period (July 23-August 5) and an 8-day post-medication period (September 17-24). The intake of FBZ was monitored for 14 days during each of the two treatment periods; August 6-19 and September 3-16, separated by a 14-day non-medicated period, August 20-September 2. Control animals had access to non-medicated mineral for the entire 95-day study period. All steers were grazed on alfalfa-grass pasture for the duration of the study and had free access to flocculated, filtered and chlorinated water via an automatic waterer. Fecal samples were collected from steers three times during the experiment July 23, August 27 and September 27, and analyzed for nematode eggs and Giardia sp. cysts. Seventy-five and 83% of the steers in the FBZ group visited the mineral feeder during the first and second treatment periods, respectively. Individual daily mineral and FBZ intake for the

first and second treatment periods was 52.9 +/- 6.6 g per day and 10.1 +/- 1.2 mg/kg BW; 72.3 +/- 8.4 g per day and 11.8 +/- 1.4 mg/kg BW, respectively. FBZ animals were separated into three groups during each treatment period based on the recommended dose (RD) of FBZ (5 mg/kg/BW), those that received >the RD, those that received <RD but >50% RD and those that received <50% of RD. Nematode egg counts and the number of animals infected with nematodes was reduced ($p < 0.05$) in all cattle that consumed FBZ as compared to control animals. In contrast to nematode eggs, numbers of Giardia cysts was not reduced ($p > 0.05$) by FBZ as compared to controls in either treatment period. These results may be a reflection of Giardia re-infection occurring following treatment and highlight the need for variation in treatment regimes specifically targeted at the parasite of interest.
Keywords: Giardia; Nematodes; Fenbendazole; Cattle; Intake; Mineral

C.M. Rontved, J.B. Andersen, J. Dernfalk, K.L. Ingvartsen, Effects of diet energy density and milking frequency in early lactation on tumor necrosis factor-alpha responsiveness in dairy cows, Veterinary Immunology and Immunopathology, Volume 104, Issues 3-4, 8 April 2005, Pages 171-181, ISSN 0165-2427, DOI: 10.1016/j.vetimm.2004.11.001.
(http://www.sciencedirect.com/science/article/B6TD5-4F31PV6-2/2/f3103cac6e896c40a64c3469ea8d550e)
Abstract:
A whole blood stimulation assay (WBA) with Escherichia coli lipopolysaccharide (LPS) and an enzyme-linked immunosorbent assay (ELISA) were established to measure the production of tumor necrosis factor-alpha (TNF-[alpha]) in bovine plasma. The assays were used to study the effect of time around parturition, and diet energy density, and milking frequency on TNF-[alpha] responsiveness of dairy cows in early lactation. Forty cows were included in a 2 x 2 factorial block design. One factor was high (H) versus low (L) diet energy density and the other factor was two versus three daily milkings. Blood samples were collected in weeks -3, -1, 2, 3, 5, 9, and 13 around parturition, and investigated for the TNF-[alpha] production ex vivo and CD14+ monocytes. The TNF-[alpha] response, CD14+ monocyte number, and CD14 expression level on monocytes were significantly increased in the weeks close to parturition. However, dips of varying sizes were observed for the measured parameters in week 3 after calving. Diet and milking frequency had no effect on the TNF-[alpha] response ex vivo or CD14 expression level on monocytes, but cows fed diet H had significantly higher numbers of CD14+ monocytes than cows fed diet L. The WBA with LPS was a fast reliable method for repeated measurements of TNF-[alpha] responsiveness in cattle. Previous findings of increased TNF-[alpha] responses in periparturient cows were confirmed, whereas diet energy concentration and milking frequency had no effect on the TNF-[alpha] responsiveness in early lactation.
Keywords: Dairy cows; TNF-[alpha]; Whole blood stimulation assay; E. coli LPS; CD14

D.S. Hammon, G.R. Holyoak, T.R. Dhiman, Association between blood plasma urea nitrogen levels and reproductive fluid urea nitrogen and ammonia concentrations in early lactation dairy cows, Animal Reproduction Science, Volume 86, Issues 3-4, April 2005, Pages 195-204, ISSN 0378-4320, DOI: 10.1016/j.anireprosci.2004.08.003.
(http://www.sciencedirect.com/science/article/B6T43-4DCDD1W-3/2/dc93aa00f1c5a14c4a336c9457686995)
Abstract:
Two experiments were conducted to study the relationship of blood plasma urea nitrogen (PUN) concentrations with NH3, urea nitrogen, K, Mg, P, Ca, and Na concentrations in fluid of preovulatory follicles (experiment 1) and the relationships of PUN concentration and stage of estrus cycle with ammonia and urea nitrogen concentrations in uterine fluids (experiment 2) in early lactation dairy cows. Mean PUN levels were used to distribute cows into two groups: cows with PUN >= 20 mg/dl (HPUN), and cows with PUN < 20 mg/dl (LPUN). In experiment 1, blood

and follicular fluids from preovulatory follicles of 38 early lactation dairy cows were collected on the day of estrus (day 0) 4 h after feed was offered. Follicular fluid NH3 was higher (P < 0.01) in HPUN cows (339.0 [mu]mol/L +/- 72.2) compared to LPUN cows (93.9 [mu]mol/L +/- 13.1). Follicular fluid urea N was higher (P < 0.001) in HPUN cows (22.4 mg/dl +/- 0.4) compared to LPUN cows (17.0 mg/dl +/- 0.3). PUN and follicular fluid urea N were correlated (r2 = 0.86) within cows. In experiment 2, blood and uterine fluids were collected from 30 cows on day 0 and on day 7. Uterine fluid NH3 was higher (P = 0.05) in HPUN cows (1562 [mu]mol/L +/- 202) than in LPUN cows (1082 [mu]mol/L +/- 202) on day 7, but not on day 0. Uterine fluid urea N was higher (P < 0.001) in HPUN cows than in LPUN cows on day 0 (26.9 mg/dl +/- 1.3 and 20.4 mg/dl +/- 0.7) and day 7 (26.5 mg/dl +/- 1.1 and 21.4 mg/dl +/- 1.1). There was a correlation (r2 = 0.17) between PUN and uterine fluid urea N within cows. The results of this study indicate that high PUN concentrations were associated with elevated NH3 and urea N concentrations in the preovulatory follicular fluids on the day of estrus and in the uterine fluid during the luteal phase of the estrous cycle in early lactation dairy cows. Elevated NH3 or urea N concentrations in the reproductive fluids may contribute to reproductive inefficiency in dairy cows with elevated plasma urea nitrogen due to embryo toxicity.
Keywords: Cattle; Urea; Ammonia; Reproduction; Uterus

T.M. Brown-Brandl, R.A. Eigenberg, J.A. Nienaber, G.L. Hahn, Dynamic Response Indicators of Heat Stress in Shaded and Non-shaded Feedlot Cattle, Part 1: Analyses of Indicators, Biosystems Engineering, Volume 90, Issue 4, April 2005, Pages 451-462, ISSN 1537-5110, DOI: 10.1016/j.biosystemseng.2004.12.006.
(http://www.sciencedirect.com/science/article/B6WXV-4FJTP5W-1/2/6fa450f1d07bdae8efa7bffda018af05)
Abstract:
Heat stress in feedlot cattle can cause decreases in feed intake and growth, and in extreme cases may result in death. Providing shade during hot weather has shown inconsistent results, reducing direct and indirect losses in some areas of the United States, but not in others. The objectives of this study were to evaluate the dynamic responses of feedlot cattle to environmental conditions with and without access to shade, and to determine the most appropriate physiological measurement for monitoring feedlot cattle during hot weather as a guide for improved management. Eight crossbred steers (initially weighing 294[middle dot]7+/-10[middle dot]8 kg) were randomly assigned to one of eight individual pens, where one of two treatments were applied: shade access, or no-shade access. Respiration rate, daily feed intake, and core body temperature were collected, using automated systems during eight periods, for a total of 37 days. The data were analysed using four categories of daily maximum temperature humidity index (maximum ITH) values (Normal for maximum ITH <74; alert for 74[less-than-or-equals, slant] maximum ITH<78; Danger for 78[less-than-or-equals, slant]maximum ITH<84; Emergency for maximum ITH[greater-or-equal, slanted]84). Shade was found to impact the physiological responses in all ITH categories, with the largest impacts in the Danger and Emergency categories. Shade lowered respiration rate and core body temperature during the peak temperature hours of the day. It was concluded that respiration rate is the most appropriate indicator of thermal stress to monitor because it was consistently affected in all ITH categories, it is easy to monitor without the need for costly equipment, and there is little or no lag associated with it.

D. Perry, J.M. Thompson, The effect of growth rate during backgrounding and finishing on meat quality traits in beef cattle, Meat Science, Volume 69, Issue 4, April 2005, Pages 691-702, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2004.10.020.
(http://www.sciencedirect.com/science/article/B6T9G-4F2VS7V-1/2/d177b077c6d03b42872dcd6c0bc809cf)
Abstract:

The relationship between growth rate and meat tenderness was investigated in [approximate]7000 cattle from temperate and tropically adapted breeds, finished on either pasture or in a feedlot to one of three market weights. Growth rate was calculated from weaning to the beginning of finishing (backgrounding) and over the finishing period, for both contemporary groups and individuals within these groups. Shear force and compression of longissimus lumborum (striploin) and semitendinosus (eye round) were measured at two days ageing, and palatability of the striploin at 14 days ageing. Analyses assessed the importance of growth rate during backgrounding and finishing on both a within group and between group basis. Where significant in individual animals, increased growth rate resulted in more palatable or tender meat, but the results were not consistent between breed types, locations, or the two muscles sampled. The most consistent relationship was an increase in palatability of the striploin with increased growth rate during finishing. Increased growth rate of groups during backgrounding improved palatability consistently across breedtypes, finish and location, however most of this relationship was accounted for by difference in mean group age at slaughter.
Keywords: Growth rate; Tenderness; Meat quality; Palatability; Shear force; Compression

Bruce A. Halley, Renate Winter, Stephen Yoon, S.E. Marley, Steffen Rehbein, The environmental safety of eprinomectin to earthworms, Veterinary Parasitology, Volume 128, Issues 1-2, 10 March 2005, Pages 109-114, ISSN 0304-4017, DOI: 10.1016/j.vetpar.2004.11.007.
(http://www.sciencedirect.com/science/article/B6TD7-4F2VS7T-3/2/57f06421ad0bb8ff57879bfe7a199672)
Abstract:
A study was conducted to assess the environmental safety of the endectocide eprinomectin to the earthworm Lumbricus terrestris under conditions mimicking typical product use on pasture. The LC50 value of eprinomectin in artificial soil after 28 days of exposure is higher than the levels expected in feces from dosed cattle or in soil fertilized with manure from dosed cattle, which indicates a wide margin of safety for this compound to earthworms. However, the no-observed-effect concentration has not been established. Therefore, the current study was conducted to determine whether there would be any effects on earthworms from feces from cattle treated with the commercial formulation of eprinomectin. Feces were collected rectally from grazing cattle on Day 0 before treatment and on Days 2, 4, 7 and 14 after treatment with EPRINEX(R) (eprinomectin) Pour-On for Beef and Dairy Cattle (Merial Limited) at 0.5 mg eprinomectin per kg bodyweight. Assays of eprinomectin B1a (the major component of eprinomectin) were 0, 0.427, 0.152, 0.0512 and 0.00185 mg kg-1 wet weight of feces (equivalent to 0, 3.34, 1.19, 0.40 and 0.010 mg kg-1 on a dry weight basis, respectively). No significant differences ($p > 0.05$) were observed at any day post-treatment in the survival or behavioral effects of any worms fed post-dose feces relative to the worms fed control feces. All post-dose comparisons of weight changes of living earthworms to the control group were not significantly different ($p > 0.05$), indicating that treatment of cattle with EPRINEX(R) (eprinomectin) Pour-On for Beef and Dairy Cattle did not affect feeding or weight gain of the earthworms. The LC50 value and the results of this study establish the wide margin of safety afforded to earthworms by eprinomectin under typical usage conditions.
Keywords: Eprinomectin; Earthworm; Environmental safety; Lumbricus terrestris; Ivermectin

J.C. Petherick, A review of some factors affecting the expression of libido in beef cattle, and individual bull and herd fertility, Applied Animal Behaviour Science, Volume 90, Issues 3-4, March 2005, Pages 185-205, ISSN 0168-1591, DOI: 10.1016/j.applanim.2004.08.021.
(http://www.sciencedirect.com/science/article/B6T48-4DFK8RV-3/2/4570d2142804c5db9ca6cb213128c20d)
Abstract:

This paper examines some of the factors that affect the expression of libido in beef cattle, focusing on the male and the free-ranging situation. The ways in which bull libido is assessed and the relationship between libido test results and fertility are discussed. Genetics play a role in determining libido, but there are many environmental factors affecting its expression, and a number of these factors influence sexual activity in both tests of libido and paddock mating. Herd fertility is multi-factorial and, consequently, it is difficult to draw definitive conclusions about the relationship between libido and fertility. Multiple males increase the expression of libido, but it is uncertain whether this translates into improvements in herd fertility. However, there are consequences for individual bull fertility, as there is ample evidence of inherent differences between bulls. Male:female ratios appear to have minor effects on libido and fertility. Anecdotal evidence indicates that multiple matings with the same or different bulls may reduce the duration of oestrus. Social relationships between bulls can affect the expression of libido, with subordinate bulls being inhibited by the presence of dominant bulls. There is evidence that dominant bulls may achieve more matings at pasture, but this is not necessarily shown in their fertility. Older bulls show greater expression of libido in tests and appear more efficient in serving, although these changes may reflect greater sexual experience. Provided bulls are sexually mature and physically able to mate, age per se appears not to affect fertility, but age interacts with dominance, which can influence fertility. There is evidence of breed differences in expression of libido, but this appears not to be demonstrated in fertility. There is anecdotal evidence that bulls and females prefer to mate with similar genotypes/phenotypes with implications for fertility. Limited research on thermal and nutritional effects indicate some adverse consequences for libido of climatic extremes for unadapted bulls and of over-feeding, but not under-feeding. Limited research has investigated the effects on libido and fertility of multiple stressors associated with relocation; relocation to dramatically different environments has long-lasting detrimental consequences for fertility. Too few studies have been conducted to draw conclusions about the effects of topography and herd dispersion on libido and fertility. Temperament is likely to affect the expression of libido when animals are put into new situations, but this has not been critically researched. In the light of this review, the implications for managing cattle to optimise fertility are discussed and suggestions made as to areas where further research is needed.
Keywords: Beef cattle; Libido; Fertility; Sexual behaviour; Cattle reproduction; Bull

Y. Aharoni, A. Brosh, Y. Harari, Night feeding for high-yielding dairy cows in hot weather: effects on intake, milk yield and energy expenditure, Livestock Production Science, Volume 92, Issue 3, March 2005, Pages 207-219, ISSN 0301-6226, DOI: 10.1016/j.livprodsci.2004.08.013.
(http://www.sciencedirect.com/science/article/B6T9B-4DN9YG0-1/2/7e3b8524d9bcf407c58ce268a07fbab1)
Abstract:
Heat load impairs the feed intake and milk yield of dairy cows: The higher their milk yield and energy expenditure (EE), the larger the expected effect. Our objective was to examine the efficacy of feeding such cows at night, which avoiding their access to feed for 5 1/2 h during the hot hours of the day, to reduce the heat load upon them in a hot climate. Approximately 120 cows in a herd in a hot region in Israel were allocated to two treatments: day (DFT) or night (NFT) feeding, which differed only in the schedule of feed allocation. The experiment was conducted from May to September 2000 (118 days). The cows were group fed on a total mixed ration, and the daily amounts of feed offered and of orts collected were recorded. The daily group average milk yield was also recorded. Ten cows in each group were selected for individual measurements. The energy expenditure of these cows was estimated once before and three times during the experiment, by monitoring heart rates and measuring oxygen consumption. The rectal temperatures and respiration rates (RR) of these cows were measured in the morning and afternoon on two consecutive days in August. Cows on NFT had lower feed intake but similar milk yield to that of DFT cows, and NFT cows had better milk yield persistence over time. The effects of

the temperature-humidity index (THI) on milk yield and intake were similar in the two treatments. The rectal temperature and respiration rate, and the increase in these measures from morning to afternoon hours, did not differ from DFT and NFT cows. The energy expenditure of NFT cows was lower than that of DFT cows, and their efficiency of energy utilization for milk production was higher.
Keywords: Dairy cattle; Night feeding; Intake; Milk yield; Energy expenditure; Climate

B.F. McNamee, V.B. Woods, D.J. Kilpatrick, C.S. Mayne, R.E. Agnew, F.J. Gordon, The prediction of the intake potential of grass silage in the supplemented diets of lactating dairy cows, Livestock Production Science, Volume 92, Issue 3, March 2005, Pages 233-240, ISSN 0301-6226, DOI: 10.1016/j.livprodsci.2004.08.015.
(http://www.sciencedirect.com/science/article/B6T9B-4DS6JND-1/2/6a3a8d5dc9292e29e817aaa4b9bd4d43)
Abstract:
This study was undertaken to develop models which could be used in conjunction with the near infrared reflectance spectroscopy (NIRS) analysis of grass silage to accurately predict the intake potential of grass silage when offered to lactating dairy cows as part of a mixed diet. Empirical models were developed with data collected from two large-scale studies carried out at the Institute. The models comprised of (1) a linear equation for converting the NIRS-based predicted intake of a given silage for beef cattle to dairy cows and (2) a model which corrected the intake potential of the grass silage for supplementary concentrates. Furthermore, a milk yield adjustment factor of 0.14 kg DM/kg milk was utilised to standardise milk yields. Both linear and exponential models were developed to describe the decrease in silage intake as concentrate intake increased, with y-axis intercepts corresponding to unsupplemented silage intakes (NIRS-based predictions for beef cattle adjusted for dairy cows) and common x-axis intercept of 168.0 (SE=20.50) and 203.8 (SE=5.64) g/kg W0.75, respectively, corresponding to concentrate intake when offered as a sole feed. A common r parameter (model curvature) of 1.0047 (SE=0.00397) was assumed for the exponential model. When the models were validated against the data from an independent study, the predictions from the two models were not significantly different, giving R2 values of 0.70. The intercept and slope from the linear model were 5.39 and 1.01, respectively, and the intercept and slope from the exponential model were 6.10 and 0.98, respectively. Both intercepts and slopes were not significantly different from 0 and 1, respectively. Ninety-three percent of predictions were within 10% of observed intakes in the validation data.
Keywords: Dairy cattle-feeding and nutrition; Predicted grass silage ad libitum intake; Concentrate supplementation; Empirical model; Substitution rate

F. Napolitano, C. Pacelli, G. De Rosa, A. Braghieri, A. Girolami, Sustainability and welfare of Podolian cattle, Livestock Production Science, Volume 92, Issue 3, March 2005, Pages 323-331, ISSN 0301-6226, DOI: 10.1016/j.livprodsci.2004.08.012.
(http://www.sciencedirect.com/science/article/B6T9B-4DKH0SD-3/2/5c6f182f6114e701cefd11367c5383bb)
Abstract:
The aim of the present study was to evaluate the sustainability and welfare of extensively farmed Podolian cattle. A trained interviewer visited 50 farms and filled in a checklist which included four cards corresponding to the following animal categories: calves, replacements, feeders and adults. The analysis of the farming system showed that animals were able to express their main behavioural patterns. In addition, recorded animal-related variables indicated that Podolian cattle could benefit from high standards of welfare. Sustainability of the Podolian farming system in terms of human edible returns was evaluated for two production systems producing 10-month-old calves (10 month) and 18-month-old young bulls (18 month), respectively. Edible returns for humans were low when all animal intakes were considered for both production systems. However,

if returns were computed using not only the amount of food used by the animals but also consumable by humans, yields were much higher for 18-month systems [103% crude protein (CP) and 37.1% gross energy (GE)] and so high that they could not be computed for 10-month systems. These results indicate either a low degree of competition (18-month system) or no competition (10-month system) between humans and Podolian cattle. Perceptions of sustainability and welfare of Podolian cattle may promote a favourable positioning of products in premium-price markets and help preserving this breed and the related traditional farming system.
Keywords: Sustainability; Animal welfare; Podolian cattle; Natural behaviour

F. Noci, P. O'Kiely, F.J. Monahan, C. Stanton, A.P. Moloney, Conjugated linoleic acid concentration in M. Longissimus dorsi from heifers offered sunflower oil-based concentrates and conserved forages, Meat Science, Volume 69, Issue 3, March 2005, Pages 509-518, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2004.09.006.
(http://www.sciencedirect.com/science/article/B6T9G-4DPYKYY-2/2/1c342c48d2d00b3cac8c4f4daeb97544)
Abstract:
Dietary inclusion of polyunsaturated fatty acid (PUFA)-rich plant oils is one approach to improving the fatty acid profile of ruminant meat and meat products from a human health perspective. Whole crop wheat silages represent a possible alternative forage to grass silage for beef production, however, they may adversely impact the fatty acid profile of ruminant muscle since grass silage is rich in C18:3n - 3. The first objective of this experiment was to investigate the relationship between an increase in the dietary supply of C18:2n - 6 from sunflower oil (SFO) and conjugated linoleic acid (CLA) concentration in the muscle tissue of beef cattle. The second objective was to investigate the effect of the basal forage type on the muscle fatty acid composition and its response to increasing inclusion of SFO. One hundred and five heifers were blocked according to initial bodyweight and assigned to one of seven silage treatments. The silage treatments were: (1) grass silage (GS), (2) whole crop wheat silage with 38% dry matter (DM) (W1), (3) GS and W1 at a ratio of 1:2 (DM basis) (W1GS) (4) GS and W1 at a ratio of 2:1 (DM basis) (GSW1), (5) whole crop wheat silage with 52% DM (W2), (6) GS and W2 at a ratio of 1:2 (DM basis) (W2GS), (7) GS and W2 at a ratio of 2:1 (DM basis) (GSW2). Within each silage treatment, 5 animals were assigned to one of three concentrate rations, differing in the content of SFO. The levels of inclusion of SFO in the concentrate were 0, 55, 110 g/kg concentrate. Inclusion of SFO in the diet led to an increase in the n - 6:n - 3 fatty acid ratio in muscle. In animals fed grass silage or mixed silages the n - 6:n - 3 ratio was lower in muscle compared with those fed whole crop wheat silages, with the exception of animals fed 55 g SFO/kg, for which feeding W1GS led to a higher ratio than W1. Other than the n - 6:n - 3 ratio there were no significant interactions between the effect of type of silage and the level of SFO on the concentration of fatty acids in intramuscular fat. Increasing the inclusion of SFO led to a linear increase in the CLAcis-9,trans-11 and PUFA concentration in intramuscular fat ($P < 0.001$). This study confirmed the potential for modification, and improvement from a human health perspective, of the fatty acid composition of beef muscle by dietary manipulation.
Keywords: Conjugated linoleic acid; Fatty acids; Silage; Muscle

Jan Willem van Groenigen, Peter J. Kuikman, Willy J.M de Groot, Gerard L. Velthof, Nitrous oxide emission from urine-treated soil as influenced by urine composition and soil physical conditions, Soil Biology and Biochemistry, Volume 37, Issue 3, March 2005, Pages 463-473, ISSN 0038-0717, DOI: 10.1016/j.soilbio.2004.08.009.
(http://www.sciencedirect.com/science/article/B6TC7-4DF41CD-3/2/491d93b2d8af00187140d1e9f4b92993)
Abstract:

Urine patches from cattle and sheep on pastures represent considerable, highly localized N applications. Subsequent nitrification and denitrification of the nitrogenous compounds may result in high nitrous oxide (N2O) emissions. Not much is known about the extent of these emissions, or about possible mitigation options. The aims of this study were to experimentally quantify the effects of urine composition, dung addition, compaction and soil moisture on N2O emissions from urine patches. For an incubation study at 16 [degree sign]C, soil was collected from a typic Endoaquoll, and N2O production was monitored during a 103-day period. Emissions for the whole period averaged 0.3 and 0.9% of the applied urine-N for dry and moist soil, respectively. When compacted or when dung was added, emissions from moist soils increased to 4.9 and 7.9%, respectively. Both addition of dung and soil compaction resulted in a delay of the peak N2O emission of approximately 10-15 days. No significant effect of amount of urine-N on emission percentages was detected. Changing the volume of urine with equal amounts of urine-N resulted in highly significant effects, peaking with an emission of 2.3% at a water-filled pore space (WFPS) of 78%. When the soil was water-saturated, N2O production was delayed until evaporation had decreased moisture contents. We concluded that denitrification was the main N2O forming process in the incubation study. Emission factors for urine reported in the literature do not generally include the potentially considerable effects of compaction or combination with dung. We conclude that realistic emission factors should take into account such an effect, together with estimates for the occurrence of camping areas in pastures. From our results, the best mitigation strategies appear to be increasing the volume of urine through feed additives, and avoiding compaction and promoting more homogeneous application of N through a lower cattle stocking rate. Also, research efforts may be targeted at management practices to avoid camping areas in pastures.
Keywords: Climate change; Mini-review; Urine; Emission factors; Dung; Compaction

J.C. Hobson, T.F. Duffield, D. Kelton, K. Lissemore, S.K. Hietala, K.E. Leslie, B. McEwen, A.S. Peregrine, Risk factors associated with Neospora caninum abortion in Ontario Holstein dairy herds, Veterinary Parasitology, Volume 127, Issues 3-4, 28 February 2005, Pages 177-188, ISSN 0304-4017, DOI: 10.1016/j.vetpar.2004.09.025.
(http://www.sciencedirect.com/science/article/B6TD7-4DTKP77-1/2/de92359a23620f8ce4288372813179f1)
Abstract:
The objective of this epidemiological study was to identify risk factors for Neospora caninum-related abortions in Ontario Holstein dairy herds. A total of 88 herds, consisting of 5080 cattle, and utilizing Dairy Herd Improvement (DHI) services, were divided into three groups. Case (n = 30) and first control (n = 31) herds were selected from 1998 and 1999 fetal abortion submissions to the Animal Health Laboratory, University of Guelph, that were histopathologically positive or negative, respectively, for N. caninum. A second control group (n = 27) was selected from multiple sources of herds sampled within the previous 4 years that had a low seroprevalence (<7%) to N. caninum. Between May and December 1999, all available cows on all farms, in parity one or greater, were blood sampled. The sera were then analyzed for antibody to N. caninum using a kinetic ELISA. A survey administered at the time of sampling recorded information on housing, animal species present, manure management, reproduction, biosecurity practices, wildlife observations, peri-parturient cow management, herd disease history and nutrition. Production and other herd parameters were obtained from DHI records. Logistic regression indicated that the following parameters were positively associated with a N. caninum abortion in a herd: the N. caninum herd seroprevalence (OR = 1.1), the total number of dogs on a farm (OR = 2.8), the frequency that dogs were observed defecating in mangers (OR = 2.8), the number of horses on a farm (OR = 3.1), the observed annual rate of retained fetal membranes (OR = 1.2) and the observed annual rate of cows returning to estrus after pregnancy confirmation (OR = 1.2). Factors negatively associated were the frequency of stray cats and wild canids observed on a farm (OR =

0.4 and OR = 0.7, respectively) and the housing of heifers on loafing packs (a housing pen divided into feed manger, scrape alley and bedded pack areas, OR = 0.1).
Keywords: Neospora caninum; Serology; Risk factor; Abortion; Cow; Dog

M. Wulf, K.-H. Sudekum, Effects of chemically treated soybeans and expeller rapeseed meal on in vivo and in situ crude fat and crude protein disappearance from the rumen, Animal Feed Science and Technology, Volume 118, Issues 3-4, 4 February 2005, Pages 215-227, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2004.11.001.
(http://www.sciencedirect.com/science/article/B6T42-4F29HTT-2/2/29b46c7abbd4214b3e92fbeda2a3082e)
Abstract:
In vivo and in situ methods were used to determine whether chemical methods designed to protect feed crude protein (CP) against ruminal degradation were also effective in protecting crude fat (CF). Four diets were formulated: two rapeseed diets, consisting of (g/kg dry matter (DM)) 400 grass hay, 250 ground barley grain and 350 untreated (RM) or xylose-treated (RMT) expeller rapeseed meal and two soybean diets, consisting of (g/kg DM) 400 grass hay, 300 ground barley grain and 300 untreated (SB) or formaldehyde-treated (SBT) ground soybeans. Four German Red Pied steers, fitted with a ruminal cannula, were used in a 4 x 4 Latin square arrangement of treatments and fed once daily at 07:00 h. Each treatment period lasted 11 days. Ruminal fluid samples were collected and pH values were measured before feeding (0 h) and 2, 3 and 5 h after beginning of feeding on day 9. On day 11, the rumens of the steers were completely emptied manually 24 h after the last feeding. Additionally, feed samples were incubated in situ in the rumen of the steers for 0, 2, 4, 8, 16, 24, 48, 72 and 336 h. In vivo, steers fed the soybean diets had less CF and more DM, organic matter, neutral detergent fibre and acid detergent fibre in the rumen compared to the steers fed the rapesed diets at 24 h after feeding. In situ, CF of all feedstuffs extensively disappeared from the bags and no treatment effect occurred. Concentrations of ammonia-N in ruminal fluid were lower for RMT and SBT than for RM and SB, indicating that CP of the treated feeds was protected against ruminal degradation, findings that are consistent with the in situ data. Treating ground soybeans with formaldehyde and expeller rapeseed meal with xylose, did not protect against CF degradation in the rumen, although CP protection was effective. Both in vivo and in situ methods were suitable to assess CP degradation in the rumen and both methods also indicated that chemical treatment had no effect on ruminal CF degradation, but the estimated extent of CF disappearance differed between the in vivo and in situ estimates.
Keywords: Cattle; Rumen; Fat; Protein; Soybeans; Expeller rapeseed meal

M. Shane Gadberry, Paul A. Beck, D. Wayne Kellogg, Stacey A. Gunter, Digestion characteristics and growth of steers fed a corn-grain based supplement compared to a de-oiled rice bran plus cottonseed supplement with or without extrusion processing, Animal Feed Science and Technology, Volume 118, Issues 3-4, 4 February 2005, Pages 267-277, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2004.10.012.
(http://www.sciencedirect.com/science/article/B6T42-4F1J8RB-1/2/be28b8c25de3eff39492f27730149928)
Abstract:
This study evaluated ruminal digestion characteristics and performance of beef steers supplemented with either a conventional or co-product based feed, and the effects of extrusion of the co-product supplement. In experiment 1, a 3 x 3 Latin square design was used to evaluate ruminal digestion characteristics in cannulated beef steers fed hay plus (1) corn and cottonseed meal (71:29, w/w DM; CCSM); (2) de-oiled rice bran and whole cottonseed (62:38, w/w DM; DRCS) or; (3) extrusion processed DRCS supplement (EXT) with the de-oiled rice bran and cottonseed supplement being mixed before extrusion. Supplements were offered at 10 g/kg body weight (BW). Contrasts were used to evaluate differences between supplements, (1) CCSM

versus the average of the DRCS and EXT and, (2) DRCS versus EXT. Neither supplement type nor processing affected predicted hay dry matter (DM) intake, supplement DM intake, or total DM intake, and supplement DM degradation rate in the rumen did not differ. However, rate of passage of the CCSM (58.4 g/kg/h) supplement was higher (P = 0.01) than the DRCS (44.1 g/kg/h) and EXT (45.3 g/kg/h) supplements. Passage rate also tended (P = 0.08) to be higher with EXT versus DRCS. Supplement type or processing did not affect hay DM degradation rate or passage rate (P > 0.10). Supplement type tended (P = 0.06) to change the ruminally degradable crude protein to ruminally degradable organic matter (OM) ratio (g/kg, RDP:RDOM) with CCSM supplement having a RDP:RDOM of 185 compared to 114 for DRCS and EXT. Supplement type or processing did not affect overall diet RDP:RDOM or total tract DM digestibility. Seventy-two crossbred beef steers were used in experiment 2. Hay DM intake tended (P = 0.07) to be higher for CCSM supplemented versus DRCS or EXT supplemented calves. Despite the tendency for higher hay intake of CCSM calves, ADG did not differ. De-oiled rice bran plus whole cottonseed can effectively replace corn plus cottonseed meal as a supplement for growing cattle fed low-quality hay, and extruding the de-oiled rice bran plus cottonseed supplement did not alter animal performance.
Keywords: Beef cattle; De-oiled rice bran; Cottonseed; Extrusion

J.W. Blum, Y. Zbinden, H.M. Hammon, Y. Chilliard, Plasma leptin status in young calves: effects of pre-term birth, age, glucocorticoid status, suckling, and feeding with an automatic feeder or by bucket, Domestic Animal Endocrinology, Volume 28, Issue 2, February 2005, Pages 119-133, ISSN 0739-7240, DOI: 10.1016/j.domaniend.2004.06.011.
(http://www.sciencedirect.com/science/article/B6T62-4CXKPYD-1/2/c36dc5c83941a248becbde5faa1b8edb)
Abstract:
Plasma leptin concentrations depend on energy intake and fat stores and are modified by hormones, such as glucocorticoids. We have measured plasma leptin concentrations in pre-term calves (born on day 277 of gestation) during the first week of life, in full-term calves (290 days of gestation), fed similar amounts of nutrients with colostrum or a milk-derived formula, combined with or without dexamethasone treatment (to simulate a high glucocorticoid status), during the first five days of life, and in calves fed with an automatic feeder or by bucket or suckling on dams up to day 28. Leptin concentrations increased (P < 0.05) from birth to day 7 in pre-term calves. In full-term calves leptin concentrations were stable from day 1 to day 4 in colostrum-fed animals, but decreased (P < 0.05) and were lower (P < 0.05) if fed a formula with similar amounts of energy and macronutrients as colostrum. Concentrations increased (P < 0.05) from day 1 to day 2 in calves suckling on dams and then remained elevated, but did not change and were lower in calves fed with the automatic feeder or by bucket than in suckling calves. Dexamethasone only slightly elevated leptin concentrations. There was no episodic secretion pattern, and there were no consistent associations of leptin with various metabolites and hormones. In conclusion, plasma leptin in young calves with respect to effects of nutrition (low energy intake) and hormones (glucocorticoids) and in association with metabolic changes behaved differently from what is known in mature cattle.
Keywords: Plasma leptin; Colostrum; Suckling; Glucocorticoid;Young calves; Dexamethasone treatment

J.A.B. Robinson, M.M. Buhr, Impact of genetic selection on management of boar replacement, Theriogenology, Volume 63, Issue 2, Proceedings of the V International Conference on Boar Semen Preservation, 15 January 2005, Pages 668-678, ISSN 0093-691X, DOI: 10.1016/j.theriogenology.2004.09.040.
(http://www.sciencedirect.com/science/article/B6TCM-4DS8F3B-3/2/879018516692f68b34d65770fc17092c)

Abstract:
Boars in an artificial insemination centre have been selected for their superior genetic potential, with `superior' being defined as having traits the customer wants transmitted to his herd. The ability to meet the customers' needs depends on the heritability of the trait, the geneticist's success in devising a selection scheme for the trait in balance with other economically important traits, and the boar's ability to produce sperm that can fertilise oocytes. Genetic evaluation research over the past 20 years has greatly increased the number of traits for which a boar can be selected: currently in the Canadian national program, these include age at 100 kg, backfat at 100 kg, feed efficiency, lean yield and litter size. In the near future, traits that are very likely to be added to this selection list include piglet survival, marbling, loin eye area and structure traits. In Canada, sires are ranked on two estimated breeding value (EBV) indices; one, focused on development of terminal sire lines, is based on the growth and yield traits and another, primarily focused on maternal line development, de-emphasises these traits and incorporates litter size.
Boars that are in Canadian AI centres because of their excellent growth traits are typically in the top 5-10% of the national population for terminal sire line index, but they may be only average or substandard for litter size. Conversely, boars selected to be in the top 5-10% for conveying such reproductive traits as litter size may only be in the top 33% for growth traits. The more offspring from a superior boar in either of these indices, the faster the population average for the trait improves. The original sire gets knocked out of the elite group, is culled and replaced by a higher ranked young boar from the now improved general population.
Although genetic superiority should govern an AI centre's selection and culling of boars, decision-making in real life is seldom that simple. Selection criteria may be contradictory as above, or a boar with truly superior traits may be excluded because a newly-developed molecular genetics test determines he carries an undesirable gene such as PSS, RN or others being developed. Selection for terminal sire or maternal line traits can ignore important practical factors that affect an AI centre--boars with superior genetics may not produce good semen because skeletal or penile problems prevent ejaculation, or because sperm production is poor due to a genetic flaw, disease, or some other cause. Interestingly, selection pressure for one trait may inadvertently select for a trait that is linked but whose linkage is unrecognised, and such unintentionally selected genes could benefit, harm, or have no effect on production traits.
An AI centre serving a variety of customers must select boars in anticipation of their customers' needs (including new, foreign and niche markets). A centre should also review its genetic evaluation results and progeny records, both to critique its own selection success and to try to detect unexpected linkages. Finally, an AI centre needs to predict its own future, selecting not just for production traits for the swine producer, but also for factors that enhance the centre's efficiency including boar conformation and temperament, and sperm quantity, quality and hardiness. Can we select for efficiency? Our colleagues in dairy cattle AI evaluate bull performance--should the swine industry consider evaluation of male fertility traits?
Keywords: Boar replacement; Genetic selection; Pig breeding; Artificial insemination centre; Customer needs

F. Montiel, C. Ahuja, Body condition and suckling as factors influencing the duration of postpartum anestrus in cattle: a review, Animal Reproduction Science, Volume 85, Issues 1-2, January 2005, Pages 1-26, ISSN 0378-4320, DOI: 10.1016/j.anireprosci.2003.11.001.
(http://www.sciencedirect.com/science/article/B6T43-4DCDD1W-1/2/8a14844163262af40ae30416f5178f7d)
Abstract:
Prolonged postpartum anestrus is a main factor limiting reproductive efficiency in cattle, particularly in Bos indicus and Bos taurus/Bos indicus cows from tropical regions, because it prevents achievement of a 12 month calving interval. During anestrus, ovulation does not occur despite ovarian follicular development, because growing follicles do not mature. Although many

factors affect postpartum anestrus, nutrition and suckling are the major factors influencing the resumption of postpartum ovarian cycles, as they affect hypothalamic, pituitary and ovarian activity and thus inhibit follicular development. Under-nutrition contributes to prolonged postpartum anestrus, particularly among cows dependent upon forages to meet their feed requirements and it apparently interacts with genetic, environmental or management factors to influence the duration of anestrus. The nutritional status or balance of an animal is evaluated through body condition score (BCS), as it reflects the body energy reserves available for metabolism, growth, lactation and activity. There is a converse relationship between energy balance and time to resumption of postpartum ovarian activity; inadequate nutrient intake results in loss of weight and BCS and finally cessation of estrous cycles. Suckling interferes with hypothalamic release of GnRH, provoking a marked suppression in pulsatile LH release, resulting in extended postpartum anestrus. The effects of suckling on regulation of tonic LH release are determined by the ability of the cow to identify a calf as her own or as unrelated. Vision and olfaction play critical roles in the development of the maternal-offspring bond, allowing the cow to identify her own calf, and abolition of both senses attenuates the negative effects of suckling on LH secretion. Thus, the maternal-offspring bond is essential for prolonged postpartum suckling-induced anovulation, and the suppressive influence of suckling is independent of neurosensory pathways within the teat or udder.
Keywords: Anestrus; Body condition score; Cattle; Suckling; Postpartum

David Abrial, Didier Calavas, Nathalie Jarrige, Christian Ducrot, Spatial heterogeneity of the risk of BSE in France following the ban of meat and bone meal in cattle feed, Preventive Veterinary Medicine, Volume 67, Issue 1, January 2005, Pages 69-82, ISSN 0167-5877, DOI: 10.1016/j.prevetmed.2004.10.004.
(http://www.sciencedirect.com/science/article/B6TBK-4F2B7F0-2/2/035cf8ecc8b185dd38fde80643635774)
Abstract:
In France, meat-and-bone meal (MBM) has been prohibited for cattle feeding since 1990, but bovine spongiform encephalopathy (BSE) cases, called `NAIF', appeared in animals born after this feed ban. Furthermore, in 1996 a new measure was taken: removal of cadavers and specified risk materials (SRM) from the processing of MBM dedicated to animal feed. Nevertheless, BSE cases (called `super-NAIF') appeared in cattle born after this measure was in force. We analysed the spatial distribution of 445 `NAIF' and 58 `super-NAIF' cases detected in France from July 1, 2001 to July 31, 2003. The detection of BSE was based both on the mandatory reporting system (MRS) and the systematic test screening of cattle at the abattoir and at the fallen-animal plant with rapid tests. The background population was based on the adult-cow census.
The disease mapping of the BSE risk was based on the standardised incidence ratio (stochastic Poisson process). A spatial component, which takes into account the spatial dependence between the geographical units by a notion of adjacency was used to eliminate the over-dispersion in the risk assessment. The geographical units were defined by hexagons with a side of 23 km (France had 1264 hexagons). The parameters were estimated by a Metropolis Gibbs sampling algorithm using the Markov-chain Monte Carlo methods.
The BSE cases were not randomly distributed. Furthermore, the areas at risk for the `super-NAIF' matched part of the areas at risk for the `NAIF' cases--which suggests that it might be a common source of contamination.
Keywords: BSE; Bovine; Spatial Analysis; Disease Mapping; Markov-chain Monte Carlo

Carine H. Cohen-Sabas, Dagmar Heim, Andreas Zurbriggen, Katharina D.C. Stark, Age-period-cohort analysis of the Bovine Spongiform Encephalopathy (BSE) epidemic in Switzerland, Preventive Veterinary Medicine, Volume 66, Issues 1-4, 15 December 2004, Pages 19-33, ISSN 0167-5877, DOI: 10.1016/j.prevetmed.2004.07.009.

(http://www.sciencedirect.com/science/article/B6TBK-4DM2CNY-1/2/81147aa5281887bdc0a3955f9e9555da)
Abstract:
Cattle born after animal-feed control measures were implemented in 1990 have become BSE cases in Switzerland, indicating sub-optimal effectiveness of these measures. To evaluate these measures, the incidence of BSE cases in Switzerland recorded through clinical case reporting from January 1991 to June 2000 (categorized into age groups and birth cohorts of 6-month duration) was analyzed by Poisson log-linear regression using an age-period-cohort model. The incidence was maximum in the cattle cohort born from October 1989 to March 1990, and dropped to zero in the cohort born from April to September 1991. A second peak was observed in a cohort born from April to September 1994. The first drop of incidence is interpreted as a result of initial implementation of the feed ban in 1990. The second peak might be related to exposure of cattle to feed intended for pigs and poultry.
Keywords: Bovine spongiform encephalopathy (BSE); Modelling; Cohort; Age; Poisson regression

M.E. Arnold, J.W. Wilesmith, Estimation of the age-dependent risk of infection to BSE of dairy cattle in Great Britain, Preventive Veterinary Medicine, Volume 66, Issues 1-4, 15 December 2004, Pages 35-47, ISSN 0167-5877, DOI: 10.1016/j.prevetmed.2004.07.007.
(http://www.sciencedirect.com/science/article/B6TBK-4DKH0SY-1/2/11972ddef3cc8622e8796c7c87671751)
Abstract:
An important aspect of the bovine spongiform encephalopathy (BSE) epidemic has been an apparent age-dependent risk of infection, with younger cattle being more likely to become infected than older cattle. Our objective was to determine the age-dependent risk of infection of dairy cattle. We first reviewed unpublished data on the feeding patterns of proprietary concentrates for dairy-replacement cattle. These data showed that autumn- and spring-born cattle would receive different feeding patterns of proprietary concentrates, and so age-dependent risk of infection profiles were obtained separately for autumn- and spring-born cattle. We used back-calculation methods to analyse BSE-epidemic data collected in Great Britain between 1984 and 1996.
Dairy cattle were most at risk in the first 6 months of life; adult cattle were at relatively low risk of infection. Between 6 and 24 months of age, risk profiles reflected feeding patterns of proprietary concentrates in each of the autumn- and spring-born cohorts.
Keywords: Bovine spongiform encephalopathy; Modelling; Age-dependent susceptibility; Epidemiology; Back-calculation

B.M. de C. Bronsvoort, C. Nfon, S.M. Hamman, V.N. Tanya, R.P. Kitching, K.L. Morgan, Risk factors for herdsman-reported foot-and-mouth disease in the Adamawa Province of Cameroon, Preventive Veterinary Medicine, Volume 66, Issues 1-4, 15 December 2004, Pages 127-139, ISSN 0167-5877, DOI: 10.1016/j.prevetmed.2004.09.010.
(http://www.sciencedirect.com/science/article/B6TBK-4DTKYDJ-3/2/f02568e99359d11872898f100df22935)
Abstract:
We analysed responses from 147 Fulani herdsmen to a questionnaire about cattle herd-level risk factors for foot-and-mouth disease (FMD) in the previous year. The study used a cross-sectional design with a stratified, two-stage random sample of cattle herds in the Adamawa Province of Cameroon. The questionnaire was pre-tested at a local cattle market before a final version was translated into Foulfoulde (the local Fulani dialect). Variables were screened using a univariable analysis and logistic multiple-regression models were developed in a forward-selection process. Fifty-eight percent (50-65; 90% CIs) of herdsmen reported FMD in their herd in the previous 12 months. Important risk factors for FMD in the previous 12 months included going on transhumance (OR = 2.6), buying cattle from markets (OR = 2.2), mixing of herds at watering points (OR = 2.4),

feeding cotton-seed cake (OR = 3.3), buffalo near the herd (OR = 2.2) and administrative division. For the subset of herds that went on transhumance, coming in contact with an FMDV-diseased herd while on transhumance was the strongest factor (OR = 16).
Keywords: Risk factor; Foot-and-mouth disease; Cameroon; Logistic regression; Cattle

Jan M. Sargeant, Michael W. Sanderson, Robert A. Smith, D. Dee Griffin, Associations between management, climate, and Escherichia coli O157 in the faeces of feedlot cattle in the Midwestern USA, Preventive Veterinary Medicine, Volume 66, Issues 1-4, 15 December 2004, Pages 175-206, ISSN 0167-5877, DOI: 10.1016/j.prevetmed.2004.09.007.
(http://www.sciencedirect.com/science/article/B6TBK-4DTKYDJ-2/2/076345012df0c64136b0b8cda63858da)
Abstract:
Our objective was to generate hypotheses for potential on-farm control strategies for Escherichia coli O157 by identifying associations between management practices and climate, and the presence of E. coli O157 in feedlot cattle. Faeces were obtained from 10,622 cattle in 711 pens on 73 feedlots between May and August 2001. Management and climate information was obtained by questionnaire and observation at the time of sampling. The prevalence of E. coli O157 was 10.2% at the sample level, 52.0% at the pen-level, and 95.9% at the feedlot-level. The factors associated with the presence of E. coli O157 in cattle faeces were the frequency of observing cats in the pens or alleys (most common when observed daily), the presence of E. coli O157 in the water tanks (positive association), the historical use of injectable mass medication (positive association), the use of antibiotics in the ration or water (negative association), the wetness of the pen, number of cattle in the pen (negative association), wind velocity (positive association), and height of the feed bunk (positive association).
Keywords: E. coli O157; Feedlot; Management; Climate; Associations

Jan M. Sargeant, Michael W. Sanderson, D. Dee Griffin, Robert A. Smith, Factors associated with the presence of Escherichia coli O157 in feedlot-cattle water and feed in the Midwestern USA, Preventive Veterinary Medicine, Volume 66, Issues 1-4, 15 December 2004, Pages 207-237, ISSN 0167-5877, DOI: 10.1016/j.prevetmed.2004.09.006.
(http://www.sciencedirect.com/science/article/B6TBK-4DS804N-1/2/fd9879c37521d8326325d4260776e780)
Abstract:
Our objective was to generate hypotheses about associations between management, climate, and the presence of Escherichia coli O157 in feedlot-cattle water tanks and in feedlot-cattle feed. Water samples from 710 tanks on 73 feedlots, and feed-samples from a subset of 504 pens on 54 feedlots, in four US states were tested for E. coli O157. Management and climate factors were ascertained by survey and observation. Escherichia coli O157 were isolated from 13% of the water tanks and at least one water tank was positive on 60% of the feedlots. The factors significantly associated with E. coli O157 in water were greater percentage of cattle shedding E. coli O157 in faeces within the same pen, higher concentration of total E. coli in the water, lack of the clarity of the water, the use of fly traps, the reported frequency of rodent sightings in the pen or alley area, and the weather at the time of sampling. Escherichia coli O157 were isolated from 14.9% of the feed samples obtained from the feedbunks. Factors positively associated with E. coli O157 in feed were higher heat index at the time of sampling, the presence of cottonseed meal in the ration, and the feedlot location (state). Coliform counts in feed, presence of E. coli O157 in water tanks and faecal prevalence of E. coli O157 were not associated with the presence of E. coli O157 in feed.
Keywords: E. coli O157; Feedlot-cattle; Water; Feed; Management

M.Y. Al-Saiady, M.A. Al-Shaikh, S.I. Al-Mufarrej, T.A. Al-Showeimi, H.H. Mogawer, A. Dirrar, Effect of chelated chromium supplementation on lactation performance and blood parameters of Holstein

cows under heat stress, Animal Feed Science and Technology, Volume 117, Issues 3-4, 1 December 2004, Pages 223-233, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2004.07.008. (http://www.sciencedirect.com/science/article/B6T42-4DCMJB5-1/2/d3807951561190480c3aac00b4d5dcaa)
Abstract:
The objective of this study was to determine the effects of chelated chromium supplementation on lactation performance and blood components of Holstein cows under heat stress. One hundred and sixty multiparous lactating Holstein cows (120-130 days post-partum), were used in this study. Animals were divided equally (80 cows/treatment) and were randomly allocated to one of two treatment diets. Diet 1, was total mixed rations (TMR) without chromium (Cr) added and served as a control. Diet 2, basal diet, with chromium yeast (chelated chromium) added at manufacturer's recommended level (4 g/head per day). The average maximum and minimum air temperatures were 29.0 and 24.80[degree sign] C respectively. The averaged temperature-humidity index (THI) was 78.6 units. Adding chromium yeast to the diet of dairy cows increased milk yield and feed intake. No significant differences were found between the two treatments in milk fat, protein, lactose, and solids non-fat (SNF) percentage. Adding chromium to the diet of lactating cows did not show any effect on blood serum level of hemagglutination test (HA), albumen, and glucose, while concentration of total blood protein and globulin was decreased. The ratio of albumin/globulin and cholesterol level increased significantly by adding chromium ($P < 0.01$). Adding chelated chromium to the diet of dairy cows under heat stress improved milk yield and feed intake without affecting milk component.
Keywords: Chromium; Dairy cattle; Heat stress; Feed intake; Hemagglutination

H. Zahiroddini, J. Baah, W. Absalom, T.A. McAllister, Effect of an inoculant and hydrolytic enzymes on fermentation and nutritive value of whole crop barley silage, Animal Feed Science and Technology, Volume 117, Issues 3-4, 1 December 2004, Pages 317-330, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2004.08.013. (http://www.sciencedirect.com/science/article/B6T42-4DJBSGR-3/2/96b91b4154958587fdb0d9ecf57d7682)
Abstract:
Whole crop barley forage was chopped, wilted to 350 g/kg dry matter (DM) and treated with water (control), inoculant (Agri-Sile(R)), enzymes (primarily cellulase and amylase activities) or inoculant + enzymes (SilagePro(R)) prior to ensiling. Triplicate laboratory silos (3 l) for each silage (denoted C, I, E and I + E, respectively) were opened after 0.5, 1, 2, 3, 4, 7, 14 and 112 days for chemical and microbiological analyses. Silos were weighed after sealing and before opening for estimation of DM loss. A feedlot experiment was also conducted with treatments C, I and I + E, in which barley forage was ensiled in 3 m x 61 m plastic Ag Bags(R). Silage samples were collected from bags after 115, 136 and 157 days of ensiling, compiled and used to determine in situ disappearance of DM and neutral detergent fibre (NDF). Inoculation accelerated the decline of silage pH: treatments I and I + E attained pH 4.0 by day 3, whereas C and E were at pH 4.2 and 4.25, respectively, at day 14. At day 112, water soluble carbohydrates (g/kg DM) were lower ($P < 0.05$) in I and I + E (22.9 and 22.4, respectively) than in C and E (29.7 and 32.7, respectively). Crude protein (CP) contents were higher ($P < 0.05$) in I and I + E (132 and 126 g/kg DM, respectively) compared with C and E (117 and 118 g/kg DM, respectively). Also, less NH3-N (as g/kg of total N) was present (37.4 and 44.9 in I and I + E, versus 75.0 in C and 66.8 in E; $P < 0.01$), suggesting reduced proteolysis with additives. At day 112, C and E had more ($P < 0.01$) acetate and total (TB) and lactic acid producing (LAB) bacteria than did I or I + E. Lactate (g/kg DM) was higher ($P < 0.05$) in I + E (106.5) than in E (91.9) or C (83.7), and intermediate (96.0) in I. Treatment with either additive (I or I + E) did not ($P > 0.05$) alter the rate or extent of DM of NDF silage digestion, but I + E did increase ($P < 0.01$) the soluble NDF fraction as compared to C or I. In the feedlot study, DM intake did not differ among treatments, but average daily gain (ADG) by

steers fed diets I and I + E was higher (P = 0.1), by 4.8% and 7.6%, respectively, than ADG by steers fed diet C. Feed efficiency of steers fed I + E silage was improved (P = 0.01) relative to those fed C. The bacterial inoculant clearly enhanced fermentation and retention of DM and nutrients in barley silage and the combination of I + E improved the feed efficiency of cattle fed barley silage.
Keywords: Barley silage; Enzymes; Feedlot cattle; Inoculants; Lactic acid bacteria

B.J. Wood, J.A. Archer, J.H.J. van der Werf, Response to selection in beef cattle using IGF-1 as a selection criterion for residual feed intake under different Australian breeding objectives, Livestock Production Science, Volume 91, Issues 1-2, 1 December 2004, Pages 69-81, ISSN 0301-6226, DOI: 10.1016/j.livprodsci.2004.06.009.
(http://www.sciencedirect.com/science/article/B6T9B-4D67BWF-1/2/152f89b69c4561ae992e93f2605e25b6)
Abstract:
In this study various scenarios of selection in beef cattle using the physiological marker insulin-like growth factor (IGF-1) were investigated. Previous research shows that IGF-1 has favourable correlations with a number of important traits in beef cattle including residual feed intake (RFI), carcass fatness, average daily gain, live weight and carcass weight. The aim of this study was to compare the genetic response and profit to varying selection strategies that used direct selection for RFI and indirect selection with IGF-1 in association with other traits. Two breeding objectives for Australian producers were assessed relating to the high value Japanese export market, of which marbling is paid a premium, and the Australian domestic market. Selection for IGF-1 proved profitable in all scenarios for an export objective with the most optimal use as a first-stage selection tool before a feed intake trial for young bulls. Benefits of selection for IGF-1 with the domestic objective were similar to the export objective but increases in profit were marginal when used without feed intake information.
Keywords: IGF-1; Breeding program design; Two-stage selection; ZPLAN; Feed intake

Tomoko Oshita, Kazuhisa Nonaka, Shinichi Kume, Tadashi Nakui, Effects of forage type on particle size distribution of ruminal digesta and faeces of non-lactating cows fed high quality forage, Livestock Production Science, Volume 91, Issues 1-2, 1 December 2004, Pages 107-115, ISSN 0301-6226, DOI: 10.1016/j.livprodsci.2004.07.015.
(http://www.sciencedirect.com/science/article/B6T9B-4DG3DFW-1/2/8badd63978bace04a26983e22af23d23)
Abstract:
This experiment was conducted to determine the effects of forage type on particle comminution in the rumen and on the critical particle size (CPS) for escape from the rumen in cattle fed high-quality forages at maintain allowance of NRC. Twelve ruminal fistulated non-lactating Holstein cows were offered one of four forage diets (long alfalfa hay (ALH), chopped alfalfa round bale silage (ALS), long orchard grass hay (OGH), and chopped corn silage (CS) with similar dry matter digestibility using a random block design. Whereas the eating time per unit of dry matter (DM) intake was similar for ALH and OGH, mean particle size (MPS) of the ruminal digesta at 3-h post feeding for ALH was lower than that for OGH, and was similar to those for ALS or CS. The ruminating time per unit NDF intake for OGH was lower than those for other diets. MPS of the ruminal digesta at 24-h post-feeding for OGH was significantly lower than that for CS, and was similar to those for ALH or ALS. From these results, a large proportion of the particle size reduction seemed to occur during rumination for OGH, and a large proportion of the particle size reduction seemed to occur during eating for ALH. The weight percentage of faecal DM retained on the 1-mm screen was 28.0%, 25.2%, 12.6%, and 26.2%, for ALH, ALS, OGH and CS, respectively. The MPS of the faeces in the cows fed was 309, 181, 104 and 514 im for ALH, ALS, OGH and CS, respectively. These results indicate that the critical particle size for escape from the

reticular-rumen in non-lactating cows appeared to be larger than 1.18 mm and the particle size reduction and the passage of digesta from the rumen seemed to be due to factors intrinsic to the forage.
Keywords: Particle size; High quality forage; Digesta; Non-lactating cow

D.L. Robinson, V.H. Oddy, Genetic parameters for feed efficiency, fatness, muscle area and feeding behaviour of feedlot finished beef cattle, Livestock Production Science, Volume 90, Issues 2-3, November 2004, Pages 255-270, ISSN 0301-6226, DOI: 10.1016/j.livprodsci.2004.06.011.
(http://www.sciencedirect.com/science/article/B6T9B-4DCMJD9-1/2/a117e4ea0a10f7d6a1e5acbf6e2bf84c)
Abstract:
Feed intake (FI), weight gain (WG), metabolic weight (MW), feed conversion ratio (FCR), residual feed intake calculated by regression (RFI) and feeding standards formulae (RFIS) were recorded on 1481 steers and heifers of tropically adapted and temperate breeds of cattle feedlot finished on a grain based diet for the domestic (liveweight 400 kg), Korean (520 kg) or Japanese (steers only; 600 kg liveweight) markets. Also measured were subcutaneous fat at the rump (P8) and 12/13 rib sites, 12/13 rib eye muscle area and intra-muscular fat (IMF%), time spent eating, eating rate and number of meals per day. Estimated heritabilities of FI, MW, WG, FCR, RFI and RFIS were 0.27, 0.41, 0.23, 0.06, 0.18 and 0.13. RFI and RFIS had very high genetic (0.98) and phenotypic (0.94) correlations, suggesting that they represent very similar traits. RFI had relatively high genetic correlations with rump and rib fat (0.72 and 0.48 adjusted for age; 0.79 and 0.58 adjusted for carcase weight), but lower correlations with IMF% (0.22 and 0.25 adjusted for age and carcase weight, respectively). Selection for lower RFI is therefore possible in feedlot finished cattle, but fatness will also decrease. In this study, selection for reduced fatness was predicted to reduce RFI by more than direct selection. When appropriate, multivariate selection is therefore recommended to achieve increased feed efficiency together with the desired level of fatness, using an index including RFI, on-test weight gain and fat measurements.
There were large breed differences for number of meals per day; Brahman cattle ate more frequently than Belmont Red and Santa Gertrudis breeds which ate more often than temperate breed cattle. Within breeds, there was a tendency for more efficient animals to have fewer meals per day.
Keywords: Beef cattle; Feed intake; Weight gain; Feed efficiency; Residual feed intake; Fatness

Y. Wang, T.W. Alexander, T.A. McAllister, In vitro effects of Monensin and Tween 80 on ruminal fermentation of barley grain:barley silage-based diets for beef cattle, Animal Feed Science and Technology, Volume 116, Issues 3-4, 15 October 2004, Pages 197-209, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2004.06.006.
(http://www.sciencedirect.com/science/article/B6T42-4D3WHDM-1/2/edfe7b748d5f9ff946dc4b058d3719ee)
Abstract:
Two in vitro incubations utilizing batch rumen culture procedures were conducted to study the effects of Monensin and Tween 80, alone and in combination, on ruminal fermentation. Dried, ground backgrounding and finishing diets for feedlot cattle were used as substrates in experiments 1 and 2, respectively. The diets, formulated as total mixed rations, contained (DM basis) barley grain and barley silage in ratios of 58:42 (backgrounding diet, BKGD) or 93:7 (finishing diet, FNSH). Inoculum comprised ruminal fluid collected from cattle fed BKGD or FNSH diluted with two volumes of mineral buffer, and amended with Monensin (0, 2.5 or 15 [mu]g/ml) and Tween 80 (0, 0.1 or 0.5 [mu]l/ml) in a 3 x 3 factorial arrangement of treatments. Incubations were conducted anaerobically for 4, 12 or 24 h at 39 [degree sign]C (n = 3). 15N-labelled ammonium sulphate was included to enable measurement of microbial N production (MN). Interactive effects ($P < 0.001$) of Monensin and Tween 80 on acetate:propionate (A:P) ratios at 4 and 12 h of incubation, on MN at

4 and 24 h, and on accumulation of reducing sugars (RS) at 4, 12 and 24 h were observed with BKGD, but not with FNSH. Tween 80 applied at 0.5 [mu]l/ml increased ($P < 0.05$) in vitro true dry matter disappearance (TDMD) and RS accumulation at 4 h and MN at 24 h, but reduced ($P < 0.05$) A:P ratio at 12 h of incubation with BKGD. Similar effects of Tween 80 on RS and A:P ratio were observed with FNSH. In contrast, throughout 24 h of incubation with either substrate, Monensin reduced gas production (GP), TDMD, MN and the A:P ratio, and increased RS accumulation (BKGD, $P < 0.01$; FNSH, $P < 0.001$). These effects on A:P and RS were enhanced ($P < 0.001$) if Monensin and Tween 80 were supplemented together. Amylase, carboxymethylcellulase and [beta]-glucanase activities in the incubation liquid were increased ($P < 0.01$) by Monensin and Tween 80 supplemented in combination with both diets; xylanase activity was increased ($P < 0.001$) with BKGD only. Effects on enzyme activity when Monensin and Tween 80 were supplemented individually were diet-associated, but interactive effects of Monensin x Tween 80 on each of the four activities were observed both with BKGD ($P < 0.05$-$0.001$) and with FNSH ($P < 0.01$). Supplementing Tween 80 with Monensin synergistically enhanced the Monensin-mediated increase in RS concentration and reduction of A:P ratio in the incubation mixtures. This effect may have potential to improve energy efficiency in feedlot cattle.
Keywords: Barley diet; Feedlot cattle; In vitro fermentation; Ionophore; Surfactant

A. J. Rook, A. Harvey, A. J. Parsons, R. J. Orr, S. M. Rutter, Bite dimensions and grazing movements by sheep and cattle grazing homogeneous perennial ryegrass swards, Applied Animal Behaviour Science, Volume 88, Issues 3-4, October 2004, Pages 227-242, ISSN 0168-1591, DOI: 10.1016/j.applanim.2004.03.006.
(http://www.sciencedirect.com/science/article/B6T48-4CC30DG-1/2/edc05ccb99ef4ed8939c9b27f3df71f5)
Abstract:
Pairs of ewes or heifers were allowed to graze for short periods from previously prepared `homogeneous' areas of ryegrass, in order to study their bite dimensions and movement patterns and to investigate the role of different species in initiating spatial heterogeneity. Apparent bite area was calculated from number of bites and total bitten area when ewes or heifers took 10-15 bites from an 80 cmx80 cm area in a homogeneous Lolium perenne sward. Apparent bite depth was calculated from sward surface height (SSH) within and adjacent to bitten areas. Apparent bite mass was calculated from grazed stratum bulk density. Incisor arcade breadth was measured. Animals also grazed 20 mx40 m plots for 45 min. Position and activity were recorded and distance travelled calculated. Number of bites and steps, number and duration of grazing bouts, feeding station dimensions and horizontal head sweep were recorded. Bites per bout, per feeding station and per m forward movement, bite rate, inter-bout interval, and distance travelled, speed of movement, number of steps, step length and step rate within and between bouts were calculated. Distribution of grazing bout and inter-bout durations and the animals' foraging paths were tested for randomness.
Apparent bite area for heifers was 2.2 times that for ewes and incisor arcade breadth 1.8 times that for ewes. Apparent bite depths were similar at 0.35 of SSH. SSH distribution within bitten areas was non-normal and differed between animal species. Heifers' bite mass was 2.1 times that for ewes. Heifers had longer grazing bouts, more feeding stations per bout, moved farther per bout but had similar movement speed while grazing. Distance between feeding stations was similar between species but heifers' feeding station residence time was twice as long. Heifers' biting rate was lower but they took more bites per bout, per feeding station and per metre of forward movement. Mean head sweep distance was greater for heifers. Both species moved a similar distance between grazing bouts but ewes moved more slowly with more, shorter steps. For both species, grazing bout and inter-bout durations were not randomly distributed. At a 1 m2 scale for both species and a 5 m2 scale for heifers, movement was non-random with a strong propensity to walk in a straight line but at a 5 m2 scale sheep movement was uniformly distributed on the circle.

Keywords: Grazing behaviour; Cattle; Sheep; Spatial distribution

J.S. Guimaraes Jr., S.L.P. Souza, D.P. Bergamaschi, S.M. Gennari, Prevalence of Neospora caninum antibodies and factors associated with their presence in dairy cattle of the north of Parana state, Brazil, Veterinary Parasitology, Volume 124, Issues 1-2, 20 September 2004, Pages 1-8, ISSN 0304-4017, DOI: 10.1016/j.vetpar.2004.07.002.
(http://www.sciencedirect.com/science/article/B6TD7-4D5JW4R-4/2/d2dcb6b8121bc95f230fcf7f25007903)
Abstract:
To determine the prevalence of Neospora caninum antibodies and associated factors, blood sera from 623 female dairy cattle from 23 farms in the north of the state of Parana, Brazil, were analyzed by means of the indirect immunofluorescent-antibody test (IFAT >= 25). Serum samples from 134 dogs living on the same farms also were tested for N. caninum antibodies (IFAT >= 50), and the presence of dogs was associated with the prevalence of N. caninum antibodies in cattle. The overall seroprevalence in cattle was 14.3%, mainly in animals over 24 months of age. Seroprevalence in Holsteins (15.1% of 558) was greater than in mixed-breed cattle (7.7% of 65). Age (>=24 months) of cattle, feeding silage and/or concentrate produced on the farm were associated; antibodies were found in 21.6% of dogs; and the presence of dogs was associated with the prevalence of N. caninum antibodies in cattle.
Keywords: Neospora caninum; Dairy cattle; Epidemiology; Risk factors; Dogs

Kwong-Chung Tung, Feng-Pang Cheng, Cheng-Hung Lai, Kai-Sung Wang, Jiunn-Shiow Wang, Wei-Ming Lee, Demonstration of vector competence of Culex quinquefasciatus (Diptera: Culicidae) for Setaria digitata, Veterinary Parasitology, Volume 123, Issues 3-4, 2 September 2004, Pages 279-284, ISSN 0304-4017, DOI: 10.1016/j.vetpar.2004.07.001.
(http://www.sciencedirect.com/science/article/B6TD7-4D1DFVW-5/2/7fdbfc3060e1888ec8d84290f9fdf545)
Abstract:
In Taiwan, Setaria digitata infection causes a lumber paralysis in increasing number of cattle. Culex quinquefasciatus is one of the predominant mosquitoes, and it has been suspected that C. quinquefasciatus acts as a vector to Setaria nematodes prevalence but this was not confirmed. C. quinquefasciatus, Aedes albopictus and A. aegypti of various strains were investigated using an artificial infection system to evaluate their vector competence. After blood feeding at day 14, the number of larvae (stage III) per infected mosquito in A. aegypti (Liverpool strain), A. aegypti (Kaohsiung strain), A. aegypti (Tungan strain), C. quinquefasciatus (Taichung strain) and A. albopictus (Taichung strain) was 1.3 +/- 0.1, 1.3 +/- 0.1, 1.4 +/- 0.1, 1.0 +/- 0.0 and 0 +/- 0.0 (mean +/- S.E.M), respectively. The vector efficiency index of A. aegypti (Liverpool) was the highest among mosquitoes whereas A. albopictus showed a complete refractoriness to the infection. In conclusion, C. quinquefasciatus demonstrates its potential competence for serving as a transmission vector of S. digitata. This mosquito might therefore be responsible, at least in part, for the prevalence of cattle lumbar paralysis in Taiwan. This is the first report of C. quinquefasciatu demonstrating its vector competence for S. digitata.
Keywords: Aedes aegypti; Culex quinquefasciatus; Setaria digitata; Vector efficiency index (VEI); Lumbar paralysis

J. E. Turner, W. K. Coblentz, K. P. Coffey, R. T. Rhein, B. C. McGinley, N. W. Galdamez-Cabrera, C. F. Rosenkrans, Z. B. Johnson, D. W. Kellogg, J. V. Skinner, Effects of natural rainfall and spontaneous heating on voluntary intake, digestibility, in situ disappearance kinetics, passage kinetics, and ruminal fermentation characteristics of tall fescue hay fed to growing steers, Animal Feed Science and Technology, Volume 116, Issues 1-2, 1 September 2004, Pages 15-33, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2004.05.004.

(http://www.sciencedirect.com/science/article/B6T42-4CXYW9K-2/2/f2f2d0ecac79ec53d66e97eeedfbd6a0)
Abstract:
Relatively little is known about the combined effects of spontaneous heating and natural rainfall on the feeding value of `Kentucky 31' tall fescue (Festuca arundinacea Schrieb.) hay infested with the fungal endophyte Neotyphodium coenophialum (Morgan-Jones & Glenn, Bacon, and Hamlin comb. nov.). A digestion trial utilizing a 4 x 4 Latin square design was initiated to determine the effects of both natural rainfall before baling and spontaneous heating during storage on the voluntary intake, digestibility, in situ disappearance kinetics, and ruminal fermentation characteristics of tall fescue hay consumed by four 227 +/- 20.5 kg steers. The four tall fescue hays utilized in this experiment were baled at 99 (low, L), and 225 g/kg (high, H) moisture prior to rainfall, and at 246 g/kg moisture after a 23 mm rainfall event (H-R) and at 93 g/kg moisture after a total accumulation of 72 mm of rain (L-R). Daily voluntary intake of the total diet, and dry matter (DM) and organic matter (OM) intakes of hay (g/kg body weight) were greater (P <= 0.032) for steers consuming hays baled without rainfall prior to baling than for those receiving rainfall during the wilting period. However, hays altered by rain had greater (P <= 0.033) apparent digestibilities of DM, OM, NDF, and ADF than did hays baled without rainfall. Effective in situ disappearance of DM and N was poorer (P <= 0.033) for hays altered by rainfall, spontaneous heating, or both (H, H-R, and L-R) than for L hay, but effective NDF disappearance was not affected by treatment (P >= 0.361). Ruminal fermentation characteristics and passage kinetics varied little between the four diets. Although hay receiving no rainfall had slightly better characteristics of nutritive value and in situ degradation than hays altered by rainfall, apparent total tract digestibilities were higher for hays altered by rainfall. While depressed total tract digestibilities in hay baled without rainfall were clearly associated with higher voluntary intakes, statistically significant decreases in ruminal or total tract retention times could not be established clearly.
Keywords: Beef cattle; Fescue hay; Environmental influence

Gerhard Manteuffel, Birger Puppe, Peter C. Schon, Vocalization of farm animals as a measure of welfare, Applied Animal Behaviour Science, Volume 88, Issues 1-2, September 2004, Pages 163-182, ISSN 0168-1591, DOI: 10.1016/j.applanim.2004.02.012.
(http://www.sciencedirect.com/science/article/B6T48-4C59TRB-1/2/236837e2af5e37fa1e92f12dcd9dfd27)
Abstract:
Emotionally relevant external events, hormone concentrations affecting mood and appetitive behaviour, thirst and hunger are able to stimulate a complex central nervous network that regulates endocrine feedback and behaviour in order to maintain or regain homeostasis. Particular states of mood or emotion may thus be accompanied by specific behaviours, vocalization being one of them. Hence, in farm animals vocalizations may supply us with hints on their well-being in an easy way, given that the meanings of the respective calls are well-established. Then, it is possible to judge acoustically uttered current needs and impaired welfare by non-invasive, continuous monitoring. Vocalizations may also modulate emotions of the receivers such that welfare may also be affected in conspecifics hearing distress utterances, e.g., in an abattoir. For these reasons, the analysis of farm animal vocalization has gained increasing interest in the last years and a variety of attempts to decode the meaning has been made. Concentrating on important farm animal species (pig, cattle, poultry) an overview of the present state-of-the-art in this discipline is given and present problems as well as possible future developments are discussed.
Modern techniques of sound analysis have provided tools to discriminate, analyse and classify specific vocalizations. Taking advantage of this, future bioacoustical research for welfare assessment should focus on comprehensive studies of a broad spectrum of species specific distress vocalizations. Increasingly precise attributions of such utterances to environments,

behavioural contexts and relevant physiological parameters will lead to a deeper understanding of their meaning and significance with respect to well-being of farm animals. The result will offer applicable acoustic tools for farming environments where non-invasive techniques for welfare judgements are urgently needed.
Keywords: Vocalization; Farm animals; Pig; Cattle; Poultry; Animal welfare

T. W. J. Keady, C. S. Mayne, D. J. Kilpatrick, An evaluation of five models commonly used to predict food intake of lactating dairy cattle, Livestock Production Science, Volume 89, Issues 2-3, September 2004, Pages 129-138, ISSN 0301-6226, DOI: 10.1016/j.livprodsci.2004.02.009.
(http://www.sciencedirect.com/science/article/B6T9B-4CB0K9H-1/2/94caa0c4faf62b63f035ec763fdd6d66)
Abstract:
Five models commonly used to predict food intake of housed lactating dairy cattle were evaluated in the present study. Data from 2425 individual cows from 27 studies, undertaken at three research centres within the British Isles, were collated. The diet and cow characteristics differed considerably between studies with total dry matter intakes (DMI) varying from 8.5 to 29.4 kg/day (mean 17.0, S.D.=3.06), silage DMI varying from 3.8 to 18.8 kg/day (mean 9.4, S.D.=2.28) and milk yield varying from 7.7 to 49.7 kg/day (mean 26.5, S.D.=6.68). Predicted total DMI using the five equations, which incorporated a range of animal, feed and environmental variables, were compared against actual DMI using the mean-square prediction error (MSPE). The mean actual intake for the data set was 17.0 kg DM/day and the biases for the five models were: -0.03, +0.88, -2.18, -2.88 and -2.06 kg DM/day with MSPEs of 2.9, 5.5, 8.9, 11.4 and 10.8, respectively. It is concluded that with diets based on grass silage as the sole forage, actual DMIs are likely to be much lower than those predicted by three of the current models commonly used within the industry to formulate rations for lactating dairy cattle. Furthermore, the current evaluation clearly highlights the need for new models to accurately predict DMI for lactating dairy cows offered grass silage-based diets.
Keywords: Dairy cows; Food intake prediction models; Evaluation

F. Gottardo, R. Ricci, S. Preciso, L. Ravarotto, G. Cozzi, Effect of the manger space on welfare and meat quality of beef cattle, Livestock Production Science, Volume 89, Issues 2-3, September 2004, Pages 277-285, ISSN 0301-6226, DOI: 10.1016/j.livprodsci.2004.01.002.
(http://www.sciencedirect.com/science/article/B6T9B-4BV45JX-1/2/3bab63d09a2584aa67c2d9b6f9cae218)
Abstract:
Forty-eight Simmental young bulls (initial body WEIGHT=321.2+/-34.1 kg) were assigned to eight balanced groups reared in separate pens with a space allowance of 3 m2 per head. Two different manger spaces (60 vs. 80 cm per head) were tested in factorial arrangement with the type of floor of the pen (slatted vs. straw bedded). All the animals received the same diet provided ad libitum. No significant interaction was found between the two main factors considered in the study. Manger space did not affect bulls' daily gain, feed intake and feed efficiency. Health status of the animals was satisfactory and the neutrophil/lympocite ratio, blood indicator of chronic stress, was not modified by the different manger space. Behavioural observations showed no differences due to manger space. Regardless of the manger space, the ad libitum feeding promoted a high turnover of the bulls in the feeding area limiting the number of animals eating at same time. Bulls were slaughtered at 614.6+/-14.7 kg and carcass traits and meat quality were not affected by manger space. Regardless of the type of floor, a space at the manger of 60 cm per head should be sufficient for beef cattle fed ad libitum under intensive rearing system.
Keywords: Beef cattle; Manger space; Welfare; Meat quality

I. Prelle, C. J. C. Phillips, M. J. Paranhos da Costa, N. C. Vandenberghe, D. M. Broom, Are cows that consistently enter the same side of a two-sided milking parlour more fearful of novel situations or more competitive?, Applied Animal Behaviour Science, Volume 87, Issues 3-4, August 2004, Pages 193-203, ISSN 0168-1591, DOI: 10.1016/j.applanim.2004.01.014.
(http://www.sciencedirect.com/science/article/B6T48-4C605V8-1/2/7e55be824d19e930a8962993596e0f1e)
Abstract:
Two groups of 12 dairy cows were identified from a group of 70 cows according to the consistency with which they voluntarily entered one of two sides of a milking parlour during 25 milkings. The mean proportion for high consistency (HC) cows was 91% (range 86-97%), and for the low consistency (LC) cows was 60% (range 50-71%). We examined whether this characteristic related to their behaviour in a novel environment or to their ability to gain food in a competitive environment. The cows were observed in the novel environment, an empty pen near the parlour, for 15 min after milking. They were then subjected to a paired food-competition test, in which a particular cow was introduced to the pen and they were provided with a bucket of feed. This lasted for a maximum of 15 min or until the two cows stopped interacting or feeding. In the empty pen test, HC cows spent longer standing motionless (mean 665 s) than LC cows (mean 521 s) ($P=0.02$), which may indicate increased fear. However, the time spent sniffing the pen and the number of steps and vocalisations was similar for the HC and LC cows ($P>0.10$). In the food-competition test, HC cows took less time to start feeding (70 s) than LC cows (137 s) ($P=0.04$) and spent considerably more time in control of the food bucket (HC 151 s, LC 19 s) ($P=0.01$). They also instigated more aggressive interactions (C 3.4, IC 0.6) ($P=0.05$) and tended to push the other cow more times (HC 2.8, LC 0.5) ($P=0.06$). HC cows stood inactive for longer (222 s) than LC cows (373 s) ($P=0.04$). Thus there was some evidence that cows consistently entering one side of the parlour were more fearful in novel situations, but substantial evidence that they were more dominant over other cows in gaining access to resources.
Keywords: Cattle; Milking; Competition; Food; Dominance; Social strategies; Coping

Claudia Loretz, Beat Wechsler, Rudolf Hauser, Peter Rusch, A comparison of space requirements of horned and hornless goats at the feed barrier and in the lying area, Applied Animal Behaviour Science, Volume 87, Issues 3-4, August 2004, Pages 275-283, ISSN 0168-1591, DOI: 10.1016/j.applanim.2004.01.005.
(http://www.sciencedirect.com/science/article/B6T48-4C47R29-2/2/4225a724351c68a5a3e510fc2c12163d)
Abstract:
Loose housing of horned goats is more common than loose housing of horned cattle, and recommendations concerning the design of housing systems for horned goats are needed. In this study, we compared the behaviour of horned and hornless goats kept in deep litter pens to investigate their space requirements at the feed barrier and in the lying area.
Two experiments were carried out with eight groups each of 10 females, four groups with and four groups without horns. In experiment 1, the number of feeding places (width 35 cm) was restricted stepwise from an initial 20 to 15 and 10. In experiment 2, the size of the lying area was stepwise reduced from 2.0 to 1.5 m2 and 1.0 m2 per animal. With each experimental condition, the behaviour of the goats was observed directly for 4 h a day during the feeding periods on 4 days (experiment 1) or by means of video for 24 h a day on 3 days (experiment 2).
The average distance between the animals at the feed barrier was significantly lower in groups with horned goats (ANOVA with repeated measurements, $P<0.05$) and decreased significantly with decreasing number of feeding places available ($P<0.002$), because low ranking animals had to share a feeding place. The proportion of time the animals spent feeding was also significantly lower in groups with horned goats ($P<0.02$) and decreased significantly with increasing animal/feeding place ratio ($P<0.001$). The average distance between lying animals was not

significantly influenced neither by the presence of horns nor by the size of the lying area. On the other hand, the proportion of time the goats spent lying decreased significantly with decreasing space allowances ($P<0.05$), but was not significantly influenced by the presence of horns. It is concluded that the space requirements of horned goats at the feed barrier are higher than those of hornless goats, whereas space requirements in the lying area do not differ between horned and hornless goats.
Keywords: Goats; Space requirements; Feeding; Lying; Aggression; Loose-housing

Anne M. Healy, Deirdre Hannon, Kenton L. Morgan, Edwin Weavers, J. Dan Collins, Michael L. Doherty, A paired case-control study of risk factors for scrapie in Irish sheep flocks, Preventive Veterinary Medicine, Volume 64, Issues 2-4, 16 July 2004, Pages 73-83, ISSN 0167-5877, DOI: 10.1016/j.prevetmed.2004.06.002.
(http://www.sciencedirect.com/science/article/B6TBK-4CXMV4P-1/2/d4c7a16d26d6f776e279c45725dce1ca)
Abstract:
We did a case-control study of the association of several animal, flock and management factors with scrapie in Irish sheep flocks. The characteristics of 61 sheep flocks with at least one laboratory-confirmed case of scrapie (1990-1998) were compared to 61 flocks with no history of scrapie and matched by geographical location and attending veterinary surgeon. The 61 scrapie-affected flocks were from the database of known scrapie flocks in the Republic of Ireland at the start of the study. In conditional multiple logistic regression, factors associated with increased odds of scrapie in a sheep flock were (i) larger breeding-flock size, (ii) purchasing replacement sheep through the market, (iii) spreading sheep compost on the land and (iv) disposing of the placenta in the compost. Factors associated with decreased odds of scrapie were (i) using cattle slurry on the land and (ii) feeding proprietary concentrates to lambs.
Keywords: Scrapie sheep-microbiological disease; Case-control study; Risk factors; Ireland

Katsuaki Sugiura, Risk of introduction of BSE into Japan by the historical importation of cattle from the United Kingdom and Germany, Preventive Veterinary Medicine, Volume 64, Issues 2-4, 16 July 2004, Pages 191-200, ISSN 0167-5877, DOI: 10.1016/j.prevetmed.2004.05.001.
(http://www.sciencedirect.com/science/article/B6TBK-4CYNWV6-1/2/7b3c6382db03011be937951b655d1e12)
Abstract:
All cattle of UK and German origin imported to Japan since 1980 and slaughtered before 2002 were traced (n = 33 and 15 respectively) and the probability that none, one, two or three of these imported cattle had developed BSE (reached the end or last stage of incubation period) at the year of slaughter/death was calculated. The predicted risk that BSE was introduced into Japan by imported cattle was 0.18. Among cattle imported from these countries in various years, cattle imported from the UK in 1987 and 1988 presented the highest risk, while the risk that BSE entered Japan by live cattle imported from the UK in 1982 and from Germany in 1993 was negligible. Because there was no effective system to avoid the recycling of the BSE agent, those infected cattle imported from the UK in 1987 and 1988 most probably entered the feed chain in Japan in 1992 and 1993.
Keywords: Bovine spongiform encephalopathy (BSE); Import risk analysis; Japan; Live cattle; Simulation; Modelling

Thierry Hoch, Jacques Agabriel, A mechanistic dynamic model to estimate beef cattle growth and body composition: 1. Model description, Agricultural Systems, Volume 81, Issue 1, July 2004, Pages 1-15, ISSN 0308-521X, DOI: 10.1016/j.agsy.2003.08.005.
(http://www.sciencedirect.com/science/article/B6T3W-49VC776-6/2/900a8f407111294756391de0bab06771)

Abstract:
A mechanistic and dynamic model was designed and constructed to simulate beef cattle growth and related body composition for different animal types under various nutritional conditions. This model takes into account major processes involved in the evolution of body composition. We considered proteins and lipids in carcass and non-carcass tissues, which led to a total of four state variables and differential equations. The evolution of these state variables is controlled by synthesis and degradation processes, and depends on the physiological age of the animals and on metabolizable energy supply. Empty and full body weights are deduced from protein and lipid contents through allometric equations. Adaptation processes were considered in order to represent metabolic and gut fill changes that can occur at the beginning of a re-feeding phase after restriction. A total of 26 parameters is needed to run the model. Whenever possible, parameter values were taken from the literature or from our own expertise and measurements. Even so, the value of five of these parameters had to be fitted. An example is given to illustrate the relevance of the basic hypotheses governing the model.
Keywords: Beef cattle; Growth; Mechanistic dynamic model

Thierry Hoch, Jacques Agabriel, A mechanistic dynamic model to estimate beef cattle growth and body composition: 2. Model evaluation, Agricultural Systems, Volume 81, Issue 1, July 2004, Pages 17-35, ISSN 0308-521X, DOI: 10.1016/j.agsy.2003.08.006.
(http://www.sciencedirect.com/science/article/B6T3W-49VC776-7/2/51e06431b2ed2abec6c1a93f56ba408f)
Abstract:
A mechanistic dynamic model of beef cattle growth, which simulates the evolution of proteins and lipids in the body through synthesis and degradation equations, has been developed (see Hoch and Agabriel, 2003, for description). The present paper deals with the evaluation of this model by studying its behaviour and the simulated evolution of processes involved. A sensitivity analysis of model results to parameter values was performed. This model was then applied to three different data sets concerning various animal types. A comparison between continuously and discontinuously growing animals was also made. The model is shown to give a good prediction of metabolic processes such as synthesis, degradation and maintenance energies. The analysis of sensitivity to parameter values demonstrates the key role of parameters related to protein synthesis on the simulation of empty body weight. Calibration and validation on data sets representing two distinct feeding regimes for the same animals show that the model can take compensatory growth phenomena into account. Different maturing rates of animals generate different responses from the model in terms of protein synthesis.
Keywords: Beef cattle; Mechanistic dynamic model; Sensitivity analysis; Compensatory growth

S. G. Onetti, R. R. Grummer, Response of lactating cows to three supplemental fat sources as affected by forage in the diet and stage of lactation: a meta-analysis of literature, Animal Feed Science and Technology, Volume 115, Issues 1-2, 1 July 2004, Pages 65-82, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2004.02.009.
(http://www.sciencedirect.com/science/article/B6T42-4C6TJ2P-1/2/b37e1ea993516da1d93b70005e9bea52)
Abstract:
Research on fat supplementation has demonstrated that the production response of dairy cows to supplemental fats is highly variable, both among and within fat sources. Differential responses to dietary fats that have been observed when feeding the same type of fat to cows fed different basal diets suggests fat by diet interactions occur. A summary of the available literature on the effects of fat supplementation on dry matter intake (DMI), milk yield and composition and nutrient digestion in dairy cattle since 1980 was performed. Fat sources examined were tallow, calcium salts of palm fatty acids (CaS), and selected hydrolyzed tallow fatty acids (SHTFA). Responses of lactating

dairy cows to increased levels of added fat were evaluated as affected by fat source and the main forage in the basal diet. Effect of stage of lactation on the response to fat supplementation was also examined. Decreased DMI and modest milk yield increases occurred for the fat sources evaluated. Different responses to supplemental fats were observed depending on the main forage in the basal diet. Feeding tallow with diets high in corn silage decreased DMI and milk fat yield, with no effect on milk production. However, a moderate positive milk production response was observed when tallow was fed with alfalfa-based diets or diets with corn silage and alfalfa in similar proportions. Supplemental SHTFA resulted in moderate positive milk fat percentage and yield response, regardless of the main forage in the basal diet. A significant positive milk yield response was observed when CaS was fed with diets high in corn silage, but not with alfalfa-based diets or diets with alfalfa and corn silage in similar proportions. An interaction between stage of lactation and amount of supplemental fat was observed, with supplemental fat increasing milk production of early lactation cows but not that of mid lactation cows, where milk fat depression occurred. Interactions between fat type and characteristics of the basal diets must be identified in order to predict the production responses of dairy cows to supplemental dietary fats.
Keywords: Fat supplementation; Forage source; Stage of lactation

J. I. Arroquy, R. C. Cochran, M. Villarreal, T. A. Wickersham, D. A. Llewellyn, E. C. Titgemeyer, T. G. Nagaraja, D. E. Johnson, D. Gnad, Effect of level of rumen degradable protein and type of supplemental non-fiber carbohydrate on intake and digestion of low-quality grass hay by beef cattle, Animal Feed Science and Technology, Volume 115, Issues 1-2, 1 July 2004, Pages 83-99, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2004.02.005.
(http://www.sciencedirect.com/science/article/B6T42-4CBW66Y-1/2/5a53ae97611cd86df7cf2f98ced59bae)
Abstract:
Sixteen ruminally fistulated beef steers (BW=220+/-16 kg) were used to evaluate the interaction of non-fiber carbohydrate (NFC) type and level of rumen degradable protein (RDP) supplementation on low-quality forage utilization. Steers given ad libitum access to a low-quality grass hay (51 g/kg CP, 762 g/kg NDF) were used in a 15 treatment, two period crossover experiment. Steers were subjected to two 24-day periods that included intervals for measuring intake and total fecal output, ruminal evacuation, and monitoring ruminal fermentation. Treatments were arranged as a 2x7 factorial plus an additional treatment which served as a negative control (i.e., no supplemental NFC or RDP). Treatments within the supplemented groups consisted of feeding one of two sources of NFC (starch or dextrose) at 3.0 g/kg of initial BW in combination with one of seven levels of RDP (casein; 0, 0.15, 0.51, 0.87, 1.23, 1.59, 1.95 g/kg of initial BW). Supplements were ruminally dosed once daily. No NFC typexRDP level interactions occurred for intake or digestion measure. Total digestible OM intake increased with increasing supplemental RDP, but at a decreasing rate (quadratic; $P<0.05$). Both forage and total OM intake responded linearly ($P<0.01$) to increasing supplemental RDP and slight quadratic trends ($P=0.17$ and 0.18, respectively) were observed. Type of supplemental NFC did not affect forage, total or digestible OM intake. In response to increasing RDP supplementation, digestion of OM increased linearly ($P=0.03$) whereas NDF digestion tended (quadratic; $P=0.08$) to increase initially but plateaued. When compared with the negative control, digestion of NDF was depressed ($P<0.05$) when supplemental NFC was fed in combination with RDP levels of 0.51 g/kg of BW or less. Type of NFC did not affect OM or NDF digestion. Passage rate increased linearly ($P<0.01$) with supplemental RDP, but supplemental NFC type did not affect passage rate. Supplemental RDP exerted positive effects on forage intake and digestion and, when supplied in sufficient quantity, was able to overcame the negative effect of supplemental NFC on fiber digestion.
Keywords: Carbohydrate; Protein; Beef cattle; Starch; Sugar

C. Castillo, J. L. Benedito, J. Mendez, V. Pereira, M. Lopez-Alonso, M. Miranda, J. Hernandez, Organic acids as a substitute for monensin in diets for beef cattle, Animal Feed Science and Technology, Volume 115, Issues 1-2, 1 July 2004, Pages 101-116, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2004.02.001.
(http://www.sciencedirect.com/science/article/B6T42-4C1NFM2-2/2/208545e0ec53f92501d85c9afe981357)
Abstract:
Feeding cattle high-grain diets has brought concurrent problems with ruminal acidosis. Grain overload in feedlot cattle has gained the most attention because of its economic impact. In fact, ruminal acidosis is second only to respiratory diseases, in depressing animal performance and production efficiency. Much of the past research has focused on effects of antimicrobial compounds (such as monensin) on ruminal fermentation; they have become management tools to prevent or to control ruminal acidosis. Despite beneficial effects of such compounds, in 2002 the European Commission proposed to ban on antibiotic growth promotants including monensin. This legislation has important economic implications in production cost of beef. Several nutritional alternatives to monensin have been studied in vitro with diverse results. This paper provides an overview of research with organic acids (malate and fumarate) for beef cattle as a substitute for monensin. Although these organic acids may be considered as feed additives, more research is needed about the effects of malate and (or) fumarate on beef cattle performance. Dietary factors such as forage:concentrate ratio, and forage or cereal grain type may alter the response to these additives. In addition, appropriate timing for supplementing with malate or fumarate must be studied.
Keywords: Malate; Fumarate; Beef cattle nutrition; Rumen fermentation; Feedlot

C. R. Barb, R. R. Kraeling, Role of leptin in the regulation of gonadotropin secretion in farm animals, Animal Reproduction Science, Volumes 82-83, Research and Practice III. 15th International Congress on Animal Reproduction, July 2004, Pages 155-167, ISSN 0378-4320, DOI: 10.1016/j.anireprosci.2004.04.032.
(http://www.sciencedirect.com/science/article/B6T43-4CP13P5-1/2/723a6b34d617147fe32f145042806249)
Abstract:
The recently discovered protein, leptin, which is secreted by fat cells, has been implicated in regulation of feed intake or energy balance and the neuroendocrine axis in rodents, humans and large domestic animals. Leptin was first identified as the gene product found to be deficient in the obese (ob/ob) mouse. Administration of leptin to ob/ob mice restored reproduction as well as reducing feed intake and causing weight loss. The leptin receptor (LR) which has been cloned and is a member of the class 1 cytokine family of receptors, is found in the brain and pituitary of all species studied to date. Neuropeptide Y has been proposed as the primary mediator of leptin action in the hypothalamus to regulate luteinizing hormone (LH) and growth hormone (GH) secretion. In vitro studies using both hypothalamic explants and pituitary cell culture provided evidence that supports a direct action of leptin at the level of brain and pituitary gland in the pig, but only the pituitary in cattle. Central administration of leptin increased LH secretion in the fasted cow and ewe, but not in control fed animals, indicating that metabolic state is an important factor in modulating the hypothalamic-pituitary response to leptin. Changing serum leptin concentrations and leptin mRNA expression were associated with onset of puberty in heifers and gilts. Thus, leptin appears to be an important link between metabolic status and the neuroendocrine axis.
Keywords: Neuroendocrine; Leptin; Gonadotropin

G. P. Nogueira, Puberty in South American Bos indicus (Zebu) cattle, Animal Reproduction Science, Volumes 82-83, Research and Practice III. 15th International Congress on Animal

Reproduction, July 2004, Pages 361-372, ISSN 0378-4320, DOI: 10.1016/j.anireprosci.2004.04.007.
(http://www.sciencedirect.com/science/article/B6T43-4CFV6HJ-1/2/6ed0e4689907a1868966f3036776321f)
Abstract:
Puberty in Zebu heifers follows a pattern characterized by a decrease in the steroid feedback mechanism and an increase in LH concentration, which result in the first ovulation followed by a short estrous cycle and the onset of normal cycles thereafter. These events are similar to those observed in Bos taurus cattle but occur at a later age. The late onset of puberty is both genetic and environmental in origin and is reflected by the age at first calving that can be at 40 months of age or older in these animals. Age at puberty in Zebu heifers has been shown to have a high heritability. Consequently, selecting precocious heifers may be an effective means of reducing age at puberty in these animals and this approach is being adopted in commercial practice. Genetic selection is not the sole solution to the problem because environmental improvements are necessary, particularly in terms of improved nutrition. South American Zebu cattle are usually subject to sub-optimum nutritional and management conditions and, hence, exhibit late onset of puberty. Hybrids of Zebu and Bos taurus cattle exhibit heterosis in respect of the age of puberty with earlier onset than expected in crossbred animals. Recently, purebred South American Zebu cattle have been shown to have Bos taurus genes, indicating that there have been previous attempts to improve their productivity using this approach. It was concluded that the age at first calving in South American Zebu cattle can be reduced by exposing well-fed, yearling heifers to bulls and selecting, over several generations, those animals that become pregnant at an early age.
Keywords: Cattle; Bos indicus; Zebu; Puberty; Heifers; South America

H. Abeygunawardena, C. M. B. Dematawewa, Pre-pubertal and postpartum anestrus in tropical Zebu cattle, Animal Reproduction Science, Volumes 82-83, Research and Practice III. 15th International Congress on Animal Reproduction, July 2004, Pages 373-387, ISSN 0378-4320, DOI: 10.1016/j.anireprosci.2004.05.006.
(http://www.sciencedirect.com/science/article/B6T43-4CSG57R-1/2/e777db4331d3508bc9599302eaec588c)
Abstract:
Bos indicus breeds, commonly known as Zebu cattle, have spread from their center of origin in Western Asia into large areas of Asia (including the Asia-Pacific basin), Africa, South and Central America (including the Caribbean islands). The original Zebu genotype, however, has been modified by planned and unplanned cross-breeding programs involving many native and Bos taurus breeds in their new habitats. Though accurate estimates are not available, more than half of the world's cattle population includes a proportion of B. indicus germ plasm. B. indicus native breeds have developed by natural selection over centuries for their ability to survive in rough, harsh tropical environments. Most of these non-descript breeds still exhibit high fertility, in terms of calving rates, and disease resistance but they grow very slowly and take well over 3 years to reach puberty and produce only a few liters of milk over a short lactation period. Selection has been carried out in some areas and distinct Zebu breeds have been developed that have moderately high growth rate and milk production. However, they are slow breeders and have extended pre-pubertal and postpartum anestrous periods, compared to their temperate counterparts exposed to similar environment and management. The reproductive biology of B. indicus is similar to that of B. taurus. Most of the proven management, nutritional, hormonal and biotechnological interventions developed through experimentation with B. taurus breeds are equally applicable to B. indicus and their crosses. Zebu breeds predominate in most tropical countries where the majority of the human population lives. If meat and milk production are to be increased in the tropics, Zebu cow productivity, in terms of number of calves produced per lifetime or per unit area of land, must be increased and the time from birth to slaughter must be reduced. This goal could be achieved either

by selection within local Zebu populations or through planned cross-breeding with B. taurus breeds. Because the productive and reproductive potentials of Zebu cattle are relatively low, worthwhile gains could only be achieved by selection over many generations. This would require substantial investment in labor, feed and drugs that may not be economic since the return from such investment is relatively low. However, many studies have shown that cross-breeding with B. taurus, which combines additive, dominance and epistatic effects of the two genotypes, ensures high productive and reproductive performance. Therefore, planned cross-breeding with suitable B. taurus breeds, although demanding additional investment in labor, feed and drugs, will still be economic because the return far exceeds the costs.
Keywords: Zebu; Cattle; Puberty; Postpartum period; Genetic selection; Cross-breeding

M. G. Hunter, R. S. Robinson, G. E. Mann, R. Webb, Endocrine and paracrine control of follicular development and ovulation rate in farm species, Animal Reproduction Science, Volumes 82-83, Research and Practice III. 15th International Congress on Animal Reproduction, July 2004, Pages 461-477, ISSN 0378-4320, DOI: 10.1016/j.anireprosci.2004.05.013.
(http://www.sciencedirect.com/science/article/B6T43-4CNJ9Y4-5/2/b9dd8844275e476e9624d321e964b3f4)
Abstract:
Productivity in farm species is controlled by many factors, including ovulation rate. In cattle, single ovulations occur most frequently and in sheep (and goats) the number of ova released can range from one to many depending upon the breed, whilst the pig is polyovular. The processes of recruitment and selection determine the number of ovulatory follicles in all these species with FSH and subsequently LH playing major roles. GnRH-agonist models in which endogenous gonadotrophin secretion is suppressed and exogenous LH and/or FSH are administered at specific concentrations in defined patterns, are useful in all three species for elucidating the precise roles of specific hormones in stimulating follicular development. Differences in the hypothalamic-pituitary-ovarian feedback response lead to the differences in the number of ovulatory follicles, as does the pool of antral follicles from which the ovulatory ones are selected. Precocious development of follicles is also associated with more ovulations, as is the case with the Booroola due to the single gene acting through bone morphogenetic proteins (BMPs). It is well established that ovulation rate can also be influenced by exogenous hormone administration and by environmental factors such as nutrition. It has become apparent that these nuritional effects are mediated by a direct action at the level of the ovary, involving insulin, insulin-like growth factors (IGF) I and II and their binding proteins among other factors. These factors can also affect the quality of the oocyte and consequently embryo development and survival. Recently, the regulation of follicular angiogenesis has been shown to be important for the development of ovulatory follicles, particularly vascular endothelial growth factor (VEGF) which is produced primarily by the granulosa cells within the ovary and can be stimulated by gonadotrophins. Administration of VEGF has been shown to stimulate pre-antral follicular growth and increase the number of pre-ovulatory follicles. In summary both extra- and intra-ovarian factors are involved in the control of ovulation rate. Manipulation of the angiogenic process may also provide new opportunities for regulating the quality and number of follicles that ovulate.
Keywords: Follicle; Ovulation rate; Endocrinology; Growth factors; Angiogenesis

M. C. Lucy, S. McDougall, D. P. Nation, The use of hormonal treatments to improve the reproductive performance of lactating dairy cows in feedlot or pasture-based management systems, Animal Reproduction Science, Volumes 82-83, Research and Practice III. 15th International Congress on Animal Reproduction, July 2004, Pages 495-512, ISSN 0378-4320, DOI: 10.1016/j.anireprosci.2004.05.004.
(http://www.sciencedirect.com/science/article/B6T43-4CMMTJ8-1/2/5711849cc0385558473885219c334ca1)

Abstract:
Hormonal interventions have been used to increase the probability of estrous detection and insemination, and to increase pregnancy rates of dairy cattle under a variety of management systems. The present review addresses the basic principles of hormonal intervention and presents typical examples that illustrate the methodology. The hormones used to control the estrous cycle mimic the reproductive hormones found within the normal cow. Most estrous synchronization systems employ a method for controlling follicular wave development, promoting ovulation in anestrous cows, regressing the corpus luteum in cyclic cows, and synchronizing estrus and (or) ovulation at the end of treatment. A wide range of reproductive systems are in place on dairy farms. In most herds, a non-intervention period is practiced where postpartum cows are observed estrus estrus. Cows not observed in estrus are then treated. A number of studies in pasture-based and confinement systems have demonstrated net benefits of whole-herd synchronization. Despite the advantages of whole-herd reproductive programs, their uptake has been inconsistent globally. The benefits of a timed artificial insemination (AI) system increase under conditions of poor estrous detection rate and poor conception rate. The unpopular nature of timed AI programs in pasture-fed cows relates to high rates of estrous detection and conception for pasture-based dairying. Regardless of production system, some cows must be re-inseminated because they are not pregnant after first insemination. The presence of 'phantom cows' (non-pregnant cows that do not return to estrus) creates a serious reproductive challenge for both pasture-based and confinement-style operations. Early pregnancy diagnosis and second insemination timed AI may reduce the effects of phantom cows on dairy herds. Fundamental research into anestrous, the hormonal control of the estrous cycle, and early pregnancy detection should elucidate new methods that can be used to strengthen reproductive programs on dairy farms.
Keywords: Reproduction; Dairy; Estrous synchronization

T. Welp, J. Rushen, D. L. Kramer, M. Festa-Bianchet, A. M. B. de Passille, Vigilance as a measure of fear in dairy cattle, Applied Animal Behaviour Science, Volume 87, Issues 1-2, July 2004, Pages 1-13, ISSN 0168-1591, DOI: 10.1016/j.applanim.2003.12.013.
(http://www.sciencedirect.com/science/article/B6T48-4BRP57X-1/2/ec38e7af45b5d7f868c85795b77ce9e2)
Abstract:
Wild animals increase vigilance at the expense of feeding time in response to predation risk or threats from conspecifics. Increased vigilance may therefore indicate increased fear. We tested dairy cattle to determine whether time spent vigilant changed in response to the novelty of their location, the presence of a dog or the presence of an aversive, gentle or unfamiliar handler. We conducted 12 3 min trials per cow on 40 cows tested individually in a large outdoor enclosure containing an attractive food source. The feeders restricted the animal's view so that it could not feed and scan simultaneously, so vigilance time was defined as any time the animal's head was raised. During the initial trials, the degree of vigilance was high, but the amount of vigilance decreased significantly with number of trials. Time vigilant was significantly higher in the presence of a dog than in the presence of a human or when neither was present. In a second experiment, 20 cows, that had been trained to recognise an aversive and a gentle person for 3 weeks prior to testing, were tested in an indoor pen containing an attractive food source with the aversive, gentle, or an unfamiliar person nearby. The presence of the aversive person significantly increased vigilance time compared to the unfamiliar and gentle people. However, vigilance time did not decrease with repeated exposure to the enclosure, perhaps because the testing barn was already familiar. These results suggest that cows alter their vigilance according to their degree of fearfulness toward people and toward different environments, and that measures of vigilance may provide information on the degree of fearfulness of the animals.
Keywords: Dairy cattle; Fearful behaviour; Novelty; Human-animal relationships; Vigilance; Anti-predator behaviour

S. Landau, S. Friedman, S. Brenner, I. Bruckental, Z. G. Weinberg, G. Ashbell, Y. Hen, L. Dvash, Y. Leshem, The value of safflower (Carthamus tinctorius) hay and silage grown under Mediterranean conditions as forage for dairy cattle, Livestock Production Science, Volume 88, Issue 3, July 2004, Pages 263-271, ISSN 0301-6226, DOI: 10.1016/j.livprodsci.2003.11.011. (http://www.sciencedirect.com/science/article/B6T9B-4BP3MHN-1/2/d6e648747d3496a7d4e8728c7eff0bb6)

Abstract:
The value for dairy cattle of safflower grown under Mediterranean condition was investigated in two experiments. In experiment 1, safflower hay was given ad libitum as sole food to four dry dairy cows. The DM ingested from hay was of medium CP and NDF contents (148 and 406 g kg-1, respectively). Values of in vivo and in vitro Tilley and Terry DM digestibility were 723 and 646 g kg-1 DM, respectively. In the second experiment, 19 cows were fed a total mixed ration (TMR) including 4 kg (as DM) of corn plus wheat (CW) silage, and another 19 received the same TMR, with safflower silage (S) substituted for CW silage, on the same DM basis, for 62 days. Diets were of similar NDF content (314 and 331 g kg-1 DM, for CW and S, respectively), but cows fed S consumed less DM than those fed CW (20.2 and 22.5 kg, P<0.02). Milk production (30.2 kg day-1), and the contents of fat (35.4 g kg-1), lactose (46.4 g kg-1), and urea (0.32 g kg-1) were similar between groups. Milk CP tended to be lower in S than in CW (31.6 and 33.6 g kg-1, respectively, P=0.07). Changes in body live-weight and condition score were not affected by diet. Safflower silage has the potential for widespread adoption as a feed in Mediterranean countries, if special characteristics such as protein degradability are taken into account to optimize its inclusion in TMRs.

Keywords: Dairy cattle; Nutrition and feeding; Unconventional forages; Compositae

A. Varela, B. Oliete, T. Moreno, C. Portela, L. Monserrrat, J. A. Carballo, L. Sanchez, Effect of pasture finishing on the meat characteristics and intramuscular fatty acid profile of steers of the Rubia Gallega breed, Meat Science, Volume 67, Issue 3, July 2004, Pages 515-522, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2003.12.005. (http://www.sciencedirect.com/science/article/B6T9G-4BMTHFF-3/2/85ecc9767089e0263cfee5b78c24f524)

Abstract:
The Rubia Gallega cattle breed is the most important stock for beef production in Spain. A study about the influence of feeding systems on beef quality is needed. Comparison of the effect of a pasture finishing system and an indoors finishing system (maize silage and concentrate) on the meat quality and intramuscular fatty acid profile of Rubia Gallega steers (slaughter age 30 months) was determined using samples of Longissimus thoracis muscle. There were no differences between treatments in meat pH, drip loss, water holding capacity, cooking loss and muscle colour. Meat from pasture-fed steers was more tender than meat from indoors finished ones at 24 h post-mortem, but differences disappeared at 7 days. Subcutaneous fat of grass-fed steers showed higher yellowness at 24 h and 7 days post-mortem and lower brightness at 7 days post-mortem than indoors finished ones. Intramuscular fat of indoors finished steers presented higher concentrations of C18:2 and a less favourable ratio of n-6/n-3 polyunsaturated fatty acids than pasture finished steers.

Keywords: Pasture finishing; Meat quality; Fat quality; Steer

E. Cardinale, F. Tall, E. F. Gueye, M. Cisse, G. Salvat, Risk factors for Campylobacter spp. infection in Senegalese broiler-chicken flocks, Preventive Veterinary Medicine, Volume 64, Issue 1, 10 June 2004, Pages 15-25, ISSN 0167-5877, DOI: 10.1016/j.prevetmed.2004.03.006. (http://www.sciencedirect.com/science/article/B6TBK-4CG0SJJ-4/2/20fe4d6a75ab0a10511785b6d0faa279)

Abstract:
Our objective was to identify the risk factors for Campylobacter infection in Senegalese broiler flocks. Seventy broiler farms were studied around Dakar from January 2000 to December 2001 around Dakar. A questionnaire was administered to the farmers, and samples of fresh droppings were taken to assess the flocks' Campylobacter status. About 63% of the flocks were infected by Campylobacter spp.; Campylobacter jejuni was the most-prevalent species ($P<0.05$). An elevated risk of Campylobacter infection was associated with other animals (mainly laying hens, cattle and sheep) being bred in the farm, the farm staff not wearing their work clothing exclusively in the poultry houses, uncemented poultry-house floors and the use of cartons that transport chicks from the hatchery to the farm as feed plates (rather than specifically designed feed plates). Alternatively, thorough cleaning and disinfection of poultry-house surroundings and manure disposal outside the farm were associated with decreased flock risk.
Keywords: Campylobacter spp.; Broiler; Logistic regression; Risk factors; Senegal

B. J. Perillat, W. J. Brown, R. D. H. Cohen, A risk efficiency analysis of backgrounding and finishing steers on pasture in Saskatchewan, Canada, Agricultural Systems, Volume 80, Issue 3, June 2004, Pages 213-233, ISSN 0308-521X, DOI: 10.1016/j.agsy.2003.07.003.
(http://www.sciencedirect.com/science/article/B6T3W-49VC776-2/2/c240e8130973f05dc50f94a39df7fff6)
Abstract:
This paper combines an agricultural production decision support tool, GrassGro, with economic risk efficiency theory to examine several cattle feeding options that include various grazing systems for three climatic environments in Saskatchewan, Canada. Historical weather data were used to simulate a distribution of forage and cattle production data for each of several grazing systems during a 21-year period, 1978-1998. Price variability was included by varying year 2000 prices using historical price margin changes between the buying and selling weights of cattle. The risk efficiency analysis was completed using the Mean Standard Deviation (MSD) framework, and stochastic dominance principles.
Results of the study suggested that feeding systems, which included grazing, were economically competitive with traditional feedlot feeding systems and grain farming. Finishing cattle on pasture with the addition of a barley supplement was an attractive option, especially when high pasture productivity can be achieved. In all locations, more intense systems that included pasture fertilization and provision of an energy supplement, improved production and risk efficiency. Although the average net returns of all these feeding simulations were negative, the returns of traditional grain crops were even more negative. It is these negative returns in grain operations that lead to the incentive for producers to diversify into cattle production. Despite the negative net returns, the cash flow (range -$15.59 to $407.54 ha-1) was mostly positive in all three locations.

Shipra Rastogi, Premendra D. Dwivedi, Subhash K. Khanna, Mukul Das, Detection of Aflatoxin M1 contamination in milk and infant milk products from Indian markets by ELISA, Food Control, Volume 15, Issue 4, June 2004, Pages 287-290, ISSN 0956-7135, DOI: 10.1016/S0956-7135(03)00078-1.
(http://www.sciencedirect.com/science/article/B6T6S-48Y073R-1/2/9a74887f80174e6c983c9ea4d4c7085d)
Abstract:
The occurrence of Aflatoxin M1 (AFM1) contamination in Indian infant milk products and liquid milk samples was investigated by competitive ELISA technique. A total of 87 samples in categories of infant milk food (18), infant formula (17), milk based cereal weaning food (40) and liquid milk samples (12) showed that the incidence of contamination of AFM1 was of the magnitude of 87.3%. The range of contamination of AFM1 was comparatively higher in infant milk products (65-1012 ng/l) than liquid milk (28-164 ng/l). Almost 99% of the contaminated samples exceeded the

European Communities/Codex Alimentarius recommended limits (50 ng/l), while 9% samples exceeded the prescribed limit of US regulations (500 ng/l). The extrapolation of AFM1 data to estimate the Aflatoxin B1 (AFB1) contamination in dairy cattle feedstuffs indicate that the contamination may range from 1.4 to 63.3 [mu]g/kg with a mean of 18 [mu]g/kg which is substantially higher than the directive of European Communities regulation (5 [mu]g/kg). The results suggest a need to introduce safety limits for AFM1 levels (480 ng/kg) in infant milk products and liquid milk under Prevention of Food Adulteration Act of India as well as to prescribe the levels of AFB1 in dairy cattle feedstuffs so as to minimize the health hazard risk in infant population at large.

Michel Doreau, B. Michalet-Doreau, G. Bechet, Effect of underfeeding on digestion in cows. Interaction with rumen degradable N supply, Livestock Production Science, Volume 88, Issues 1-2, June 2004, Pages 33-41, ISSN 0301-6226, DOI: 10.1016/j.livprodsci.2003.11.005. (http://www.sciencedirect.com/science/article/B6T9B-4BJ21MR-1/2/54e2e8f607234b92fa76abea8c1844d8)
Abstract:
The effect of underfeeding on digestion was studied in cows fitted with ruminal cannulas. Four cows in a Latin square design received four diets made up of 60% hay, 30% straw and 10% maize. They were given either 80% or 27% of maintenance energy requirements, with or without urea to compensate for the shortage of rumen degradable N in the rumen. Contrary to the trend observed at higher levels of intake, the decreased intake resulted in a decrease in digestibility of OM (59.1% vs. 53.6%) and fibre. Neither N supply nor the interaction between intake and N supply significantly modified digestibility. The fall in digestibility could not be explained by retention time of particles in the rumen or by a disturbance of feeding behaviour, and in situ measurements did not reveal any impairment of theoretical DM degradability (56.2% vs. 55.0% for high and low intakes, respectively). Ruminal ammonia and non-protein non-ammonia N concentrations, and plasma urea concentration were decreased at low intake and/or low N supply, but there was no evidence that shortage of N compounds for ruminal microbes is responsible for decreased ruminal degradation at low intake. Further research has to be done in order to explain such disturbances in digestibility at very low intake.
Keywords: Cattle; Digestion; Underfeeding; N supply; Rumen

F. S. Schenkel, C. J. B. Devitt, J. W. Wilton, S. P. Miller, J. Jamrozik, Random regression analyses of feed intake of individually tested beef steers, Livestock Production Science, Volume 88, Issues 1-2, June 2004, Pages 129-142, ISSN 0301-6226, DOI: 10.1016/j.livprodsci.2003.09.017. (http://www.sciencedirect.com/science/article/B6T9B-4B2CNK1-2/2/c09a76752ff3fbda40d25c8657df5a67)
Abstract:
Objective of the study was to apply random regression models to daily dry matter intakes (DMI) of 376 beef steers fed for up to 168 days for evaluating genetic parameters and the optimum period of test. Steers were tested in a research station in Canada from 1997 to 2001. Models included fixed effects of biological breed type, test group, herd of origin and starting age and random additive genetic and permanent environmental effects of animal. Legendre polynomials on days of test were fitted for all fixed and random effects, except for biological types, which were estimated as linear regression on biological type composition. Heritability substantially improved from the first week up to 84 days on test (0.23 to 0.49), when it reduced the rate of increase. Genetic correlation between cumulative feed intake in the entire period of test and the intake up to 84 days was high (0.93). Results indicated that a test period of 84 days could be used for evaluating cumulative feed intake of steers for a 168 days growth period. Genetic eigenfunctions revealed that changes to the shape of the feed intake curve seem to be more difficult than changes to the overall level of intake of steers.

Keywords: Bayes factors; Beef cattle; Dry matter intake

A. K. Kahi, G. Nitter, Developing breeding schemes for pasture based dairy production systems in Kenya: I. Derivation of economic values using profit functions, Livestock Production Science, Volume 88, Issues 1-2, June 2004, Pages 161-177, ISSN 0301-6226, DOI: 10.1016/j.livprodsci.2003.10.008.
(http://www.sciencedirect.com/science/article/B6T9B-4BBMTS6-2/2/a7d57f405151307c9ab71469fe090217)
Abstract:
Economic values for milk production (milk yield, MY and fat yield, FY), reproductive (age at first calving, AFC and calving interval, CI), growth (preweaning daily gain, DG; postweaning daily gain, PDG; and mature live weight, LW), survival (preweaning survival rate, SR and postweaning survival rate, PSR) and longevity (productive lifetime, PLT) traits were calculated for a pasture based dairy production system in Kenya. Parameters in the profit functions reflected the production circumstances of pasture based dairy production systems, but can be modified to fit other production situations. Two evaluation bases were considered; fixed herd-size and fixed pasture-input. Within each of these evaluation bases, economic values were estimated under two situations of payment of milk; based on milk volume (VOLUME) and on volume and fat content (FAT). With a fixed herd-size and under VOLUME, economic values were KSh 18.93 (MY, kg), -2.76 (FY, kg), -2.72 (AFC, days), 2.65 (CI, days), 1.04 (DG, g/day), 3.40 (PDG, g/day), 7.95 (LW, kg), 9.96 (SR, %), 45.15 (PSR, %) and 0.07 (PLT, days). Under FAT, changes in the economic values were only observed for MY (KSh 16.05 per kg) and FY (KSh 79.44 per kg). With a fixed pasture-input, there was a significant reduction in the economic values for MY, FY and LW under both payment systems. Under VOLUME, economic values for MY, FY and LW were KSh 15.29, -140.46 and -43.15 per kg, respectively. The respective values were KSh 12.25, -62.76 and -45.03 per kg under FAT. Sensitivity analysis indicated that economic values for MY and FY increased significantly with higher prices of milk volume and fat content, respectively. With higher feed prices, the economic values for the fertility traits and longevity increased but decreased for milk production traits, survival traits and LW. This study suggests that genetic improvement of milk production, growth, fertility, survival and longevity traits will have a positive effect on profitability of pasture based dairy production systems in Kenya, especially when the availability of pasture is not limited.
Keywords: Breeding objective; Dairy cattle; Economic values; Profit function; Tropics

A. K. Kahi, G. Nitter, C. F. Gall, Developing breeding schemes for pasture based dairy production systems in Kenya: II. Evaluation of alternative objectives and schemes using a two-tier open nucleus and young bull system, Livestock Production Science, Volume 88, Issues 1-2, June 2004, Pages 179-192, ISSN 0301-6226, DOI: 10.1016/j.livprodsci.2003.07.015.
(http://www.sciencedirect.com/science/article/B6T9B-4BBHBM2-1/2/fa0cc0ac4781e991ce372d8582cd51f0)
Abstract:
A deterministic approach was used to evaluate alternative breeding objectives and schemes in a dairy cattle breed in Kenya. A two-tier open nucleus breeding scheme and a young bull system (YBS) were assumed with intensive recording and 100% artificial insemination (AI) in the nucleus and 35% AI in the commercial sector. The breeding objectives differed in the marketing scenario that each described and whether pasture feed for the cows was limited or not. Two marketing scenarios were distinguished; current (payment of milk is based on volume) and future (payment of milk would be based on volume and fat content). Therefore, four breeding objectives were considered: current no limitation (CUNL), current with limitation (CUWL), future no limitation (FUNL) and future with limitation (FUWL). The breeding schemes differed in the records available for use as selection criteria. The schemes ranged from one that only utilised fertility criteria

(scheme 1) to one that incorporated fertility, weights, milk and fat yield (FY) criteria (scheme 5). The annual monetary genetic gain and profit per cow for all schemes varied within breeding objectives but were highest in CUNL. Within each marketing scenario, the annual monetary genetic gain and profit per cow was higher in a no limitation situation than in a situation with limitation on pastures. Within each breeding objective, the annual monetary genetic gain and profit per cow was highest for the breeding scheme with the highest level of investments. In all objectives, the difference in the profit per cow between a scheme that incorporated fertility, weights and milk yield (MY) criteria (scheme 4) and scheme 5 was small (0.4-1.2%) indicating that there is little benefit including FY as a selection criterion. Therefore, a breeding scheme that requires records on FY seems not to be reasonable from an economic point of view. This study showed that a well-organised breeding programme utilising an open nucleus, YBS and the smallholder farms as the commercial sector could sustain itself. The practical implications of the results and how sustainable breeding programmes can be established are discussed.
Keywords: Breeding objectives; Breeding schemes; Dairy cattle; Selection; Tropics

A. S. Sami, C. Augustini, F. J. Schwarz, Effects of feeding intensity and time on feed on performance, carcass characteristics and meat quality of Simmental bulls, Meat Science, Volume 67, Issue 2, June 2004, Pages 195-201, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2003.10.006.
(http://www.sciencedirect.com/science/article/B6T9G-4B2CMGY-6/2/0f00d26baebb97b894641b061cc16fec)
Abstract:
Seventy two Simmental bulls, weighing 489 kg and approximately 15 months old fed extensively or intensively on maize silage and concentrate mixture for 100 or 138 days, were divided into four groups to assess the effect of time on feed and feeding intensity on the performance, carcass and meat quality traits. Bulls intensively fed for 138 days before slaughter had higher final body weight (673.7 kg) compared with the other three groups (610.6 kg, as overall mean). Intensive feeding significantly increased the average daily gain (1371 g/day) and improved the feed efficiency (6.95 kg DM/kg gain) compared with extensive feeding (943 g/day and 7.97 kg DM/kg gain). No significant differences were detected by time on feed. Hot carcass and kidney fat weights were significantly higher for intensively fed bulls compared with extensive ones. Dressing percentage significantly increased for 138 day groups compared with 100 day groups. Carcass conformation and fatness scores significantly improved by intensive feeding. L and b* values were not affected by time on feed or feeding intensity. Slaughtering after 138 days on feed significantly elevated the meat redness value (a*). Intensive feeding significantly decreased moisture and increased fat content of the longissimus dorsi muscle. Shear force, collagen content, juiciness, flavour and sarcomere length did not differ by time on feed or feeding intensity, while inconsistent effects were observed on tenderness and solubility of collagen.
Keywords: Cattle; Breed; Beef; Simmental; Feeding intensity; Performance; Meat quality

Nora L. Padola, Marcelo E. Sanz, Jesus E. Blanco, Miguel Blanco, Jorge Blanco, Analia I. Etcheverria, Guillermo H. Arroyo, Miguel A. Usera, Alberto E. Parma, Serotypes and virulence genes of bovine Shigatoxigenic Escherichia coli (STEC) isolated from a feedlot in Argentina, Veterinary Microbiology, Volume 100, Issues 1-2, 20 May 2004, Pages 3-9, ISSN 0378-1135, DOI: 10.1016/S0378-1135(03)00127-5.
(http://www.sciencedirect.com/science/article/B6TD6-48TMFN2-2/2/ed171bee0219b3b4d10c32248410d891)
Abstract:
Grazing-fed cattle were previously demonstrated to be reservoir of non-O157 Shigatoxigenic Escherichia coli (STEC) serotypes in Argentina. The acid-resistance of some STEC strains makes it reasonable to assume the presence in feedlot of particular STEC serotypes. Fifty-nine animals were sampled every 2 weeks during 6 months by rectal swabs. Twenty-seven of 59 animals

(45.8%) were shown to be Stx2+; 3/59 (5.1%) carried Stx1+ and 7/59 (11.9%) were Stx1+ Stx2+. Among 44 STEC isolates, 31 isolates were associated to 10 O serogroups (O2, O15, O25, O103, O145, O146, O157, O171, O174, O175) and 13 were considered non-typable (NT). Six H antigens (H2, H7, H8, H19, H21, H25) were distributed in 21 isolates whereas 23 were non-mobile (H-). Seventeen of 44 strains (38.6%) were eaeA+ and 14 (31.8%) harbored the 60 MDa plasmid. The megaplasmid (Mp) and eaeA gene were simultaneously found in a limited number of serotypes belonging to the enterohaemorrhagic E. coli (EHEC). E. coli O157:H7 strains, isolated from four (6.8%) animals, corresponded to the Stx2+, eaeA+, Mp+ pattern. Three O157:H7 strains belonged to phage type 4 and the other strain was atypical. Many serotypes isolated from grain-fed cattle (O2:H25, O15:H21, O25:H19, O145:H-, O146:H-, O146:H21, O157:H7, O175:H8) also differed from those isolated by us previously from grazing animals. The serotypes O15:H21, O25:H19 and O175:H8 had not been identified at present as belonging to STEC. This work provides new data for the understanding of the ecology of STEC in grain-fed cattle and confirms that cattle are an important reservoir of STEC.
Keywords: Escherichia coli; Enterohaemorragic E. coli; PCR; Shiga toxin; Virulence genes

P. H. Robinson, J. M. Moorby, M. Arana, T. Graham, Effect of feeding a high- or low-rumen escape protein supplement to dry Holstein cows and heifers within 3 weeks of calving on their productive and reproductive performance in the subsequent lactation, Animal Feed Science and Technology, Volume 114, Issues 1-4, 3 May 2004, Pages 42-57, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2003.12.003.
(http://www.sciencedirect.com/science/article/B6T42-4BHVGWJ-3/2/d4e951b0f086b7a47be765d1bdac6ee3)
Abstract:
Pregnant Holstein heifers (450) and dry cows (417) within 3 weeks of calving (i.e., close up) were assigned to one of three groups. These groups were offered a low-CP (0.117 of DM) ration based on corn silage, alfalfa cubes, oat hay, corn and barley grain, or a medium-CP (0.144) ration, as the low-CP ration plus 1 kg per day per cow of a supplement (0.60 canola meal or rumen protected (RP) canola meal and 0.40 other), or a high-CP (0.166) ration, as the low-CP ration plus 2 kg per day per cow of one of the supplements. Use of bovine somatotropin (bST), movement through production groups, and breeding events were determined by the herd manager after calving. Production parameters were pooled to means for cows that successfully completed the lactation. The RP canola meal had an average 0.720 rumen undegraded crude protein content, based upon 16 h in situ incubation, versus 0.252 for untreated canola meal. Primiparous cows produced no more milk or milk components in their full lactation, or had higher peak milk yields, if supplemented with canola meal at any level from either source. However average body condition score in lactation was higher ($P<0.01$) for cows supplemented with RP canola meal. While multiparous cows supplemented with RP canola meal in their close up dry period peaked at higher levels of milk ($P<0.01$), they did not produce more milk or milk components during their full lactation. There is no indication that time in the close up group (between 1 and 19 days) had a substantive impact on milk production of multiparous cows, although primiparous cows produced 71 kg more milk ($P<0.01$) in their subsequent lactation for each extra day close up. In general, reproductive performance was not affected by any treatment and small differences among treatments in use of bST were judged to have been unlikely to have impacted milk production among treatments. These results are broadly consistent with results of others, and supportive of recent NRC [Nutrient Requirements of Dairy Cattle, 7th rev. ed., update. National Academy of Science, Washington, DC, USA, 2001] protein recommendations for close up heifers and multiparous cows. However the milk production lactation curves of cows of both parities differed between the period prior to bST use and the period of bST use. During the period prior to use of bST, cows supplemented with RP canola meal in the close up period outperformed those supplemented with untreated canola meal, whereas during the period of bST use the reverse occurred, primarily due to cows supplemented

with RP canola meal being less responsive to bST. While no convincing explanation exists for this occurrence, its existence supports the high level of RUP determined in situ for the RP canola meal.
Keywords: Close up; Dry cows; Rumen escape; Canola meal

P. H. Robinson, D. I. Givens, G. Getachew, Evaluation of NRC, UC Davis and ADAS approaches to estimate the metabolizable energy values of feeds at maintenance energy intake from equations utilizing chemical assays and in vitro determinations, Animal Feed Science and Technology, Volume 114, Issues 1-4, 3 May 2004, Pages 75-90, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2003.12.002.
(http://www.sciencedirect.com/science/article/B6T42-4BHVGWJ-2/2/6799a12d8a70522331050d95492f2532)
Abstract:
Feed samples received by commercial analytical laboratories are often undefined or mixed varieties of forages, originate from various agronomic or geographical areas of the world, are mixtures (e.g., total mixed rations) and are often described incompletely or not at all. Six unified single equation approaches to predict the metabolizable energy (ME) value of feeds determined in sheep fed at maintenance ME intake were evaluated utilizing 78 individual feeds representing 17 different forages, grains, protein meals and by-product feedstuffs. The predictive approaches evaluated were two each from National Research Council [National Research Council (NRC), Nutrient Requirements of Dairy Cattle, seventh revised ed. National Academy Press, Washington, DC, USA, 2001], University of California at Davis (UC Davis) and ADAS (Stratford, UK). Slopes and intercepts for the two ADAS approaches that utilized in vitro digestibility of organic matter and either measured gross energy (GE), or a prediction of GE from component assays, and one UC Davis approach, based upon in vitro gas production and some component assays, differed from both unity and zero, respectively, while this was not the case for the two NRC and one UC Davis approach. However, within these latter three approaches, the goodness of fit (r2) increased from the NRC approach utilizing lignin (0.61) to the NRC approach utilizing 48 h in vitro digestion of neutral detergent fibre (NDF: 0.72) and to the UC Davis approach utilizing a 30 h in vitro digestion of NDF (0.84). The reason for the difference between the precision of the NRC procedures was the failure of assayed lignin values to accurately predict 48 h in vitro digestion of NDF. However, differences among the six predictive approaches in the number of supporting assays, and their costs, as well as that the NRC approach is actually three related equations requiring categorical description of feeds (making them unsuitable for mixed feeds) while the ADAS and UC Davis approaches are single equations, suggests that the procedure of choice will vary dependent upon local conditions, specific objectives and the feedstuffs to be evaluated. In contrast to the evaluation of the procedures among feedstuffs, no procedure was able to consistently discriminate the ME values of individual feeds within feedstuffs determined in vivo, suggesting that the quest for an accurate and precise ME predictive approach among and within feeds, may remain to be identified.
Keywords: Metabolizable energy; Prediction; Feedstuffs; Maintenance

W. Z. Yang, K. A. Beauchemin, D. D. Vedres, G. R. Ghorbani, D. Colombatto, D. P. Morgavi, Effects of direct-fed microbial supplementation on ruminal acidosis, digestibility, and bacterial protein synthesis in continuous culture, Animal Feed Science and Technology, Volume 114, Issues 1-4, 3 May 2004, Pages 179-193, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2003.12.010.
(http://www.sciencedirect.com/science/article/B6T42-4BV45J1-1/2/156aab2f3ef38202317feb4f811aa9ee)
Abstract:
A study was conducted to determine whether a bacterial direct-fed microbial (DFM) alone or with yeast could be used to minimize the risk of ruminal acidosis and to improve utilization of a feedlot

cattle diet containing high concentrate. A dual effluent continuous culture (CC) system was used to investigate the effects of DFM on fermentation, digestibility, and microbial protein synthesis in a 4x4 Latin square design. Treatments were control (without DFM), Propionibacterium P15 (PB), Enterococcus faecium EF212 (EF), and E. faecium EF212 combined with a yeast, Saccharomyces cerevisiae (EFY) (Chr. Hansen Inc., Milwaukee, WI). Fermenters were fed twice daily a feedlot finishing cattle diet that consisted of about 871 g/kg barley grain, 79 g/kg barley silage and 50 g/kg supplement (dry matter (DM) basis). The DFM products (1x109 or 6x108 colony-forming units (CFU)/g for PB or EF and EFY, respectively) were delivered equally twice daily into the fermenters just before feed provision. Mean fermenter pH ranged from 5.86 to 5.91, and did not differ among the treatments. Total VFA concentration and its molar proportions were not affected by the DFM supplementation except for caproic acid which was higher ($P<0.05$) for control than for DFM addition. The ratio of acetate to propionate was similar among the treatments but was relatively lower (range of 0.83-0.93) than that usually observed in the rumen of feedlot cattle (range of 1.5-2.0) due to a considerably lower proportion of acetate (395 mmol/mol) but high proportion of propionate (460 mmol/mol). Ruminal lactate-utilizing bacterial numbers were ($P<0.05$) greater for control and EF diets than for PB or EFY diets. In vitro digestibilities of DM, organic matter, starch and crude protein were all in the range of in vivo findings but digestibilities of fiber including acid or neutral detergent fibers were significantly lower than those of in vivo findings. However, no differences in digestion of any nutrients studied were detected among the treatments. Microbial protein synthesis (range of 0.9-1.0 g nitrogen [N]/day) and microbial efficiency (range of 18-20 g N/kg of truly fermented organic matter) were also similar among the treatments. The present results indicate that addition of DFM such as PB, EF or EF combined with yeast had no effect on preventing ruminal acidosis and on fermentation or nutrient digestion in CC. The CC technique can be used as an alternative to in vivo techniques to assess effect of DFM supplementation on ruminal acidosis and digestion of nutrients.
Keywords: Direct-fed microbials; Saccharomyces cerevisiae; Digestibility; Bacterial protein; Continuous culture

Gunnar Sundstol Eriksen, Hans Pettersson, Toxicological evaluation of trichothecenes in animal feed, Animal Feed Science and Technology, Volume 114, Issues 1-4, 3 May 2004, Pages 205-239, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2003.08.008.
(http://www.sciencedirect.com/science/article/B6T42-49V7C0P-2/2/9c3bf7d5dcc1fa1f8c8f7fc0be323ef0)
Abstract:
Trichothecenes are mycotoxins commonly found in cereals world-wide. Fusarium fungi are the main producers of trichothecenes in cereals. Trichothecenes are rapidly excreted from animals and residues of trichothecenes in animal-derived food products are not considered to pose any threat to consumers. The toxins are toxic to all tested species, but the sensitivity varies considerably between toxins and between species. Available feeding studies with the trichothecenes deoxynivalenol (DON), nivalenol (NIV) and T-2 toxin in feed to production animals have been reviewed. There are not sufficient available data about the effects of trichothecenes in ruminant feed to allow a scientifically-based risk assessment. The available studies of the metabolism of trichothecenes in cattle indicate that trichothecenes to a large extent are transformed to the much less toxic de-epoxide metabolite in the rumen before absorption. Furthermore, no effect has been found on milk production, feed intake or other parameters measured at levels used in the studies. It is concluded that trichothecenes are not likely to cause any harm in ruminants unless fed visibly damaged feed and no guideline value is probably needed.
Poultry are more sensitive to trichothecenes than ruminants. Levels from 9 mg DON/kg feed have lead to negative effects of chickens, while no effect was found in chicken fed 5 mg DON/kg feed, and a guideline value of 2.5 mg DON/kg feed is proposed. The available information about NIV

does not allow a guideline limit to be set, but the finding of minor pathological changes in chicken fed 1 mg NIV/kg feed indicates that NIV may be more toxic to poultry than DON. Oral lesions are observed in chickens and hens fed 1 mg T-2 toxin/kg feed. Other effects, including a reduction in feed intake, are found with increasing levels of T-2 toxin. A guideline limit of 0.5 mg T-2 toxin/kg is proposed. Pigs are more sensitive to trichothecenes than other farm animals. The effects occurring at the lowest levels of trichothecenes are reduced feed intake and weight gain, normally occurring at levels from 0.6 mg DON/kg feed in naturally contaminated feed. Pigs fed 0.5 mg T-2 toxin/kg feed reduced their feed intake. Impairment of the immune system has also been observed in pigs at this level of T-2 toxin in the feed. Guidelines of 0.3 mg DON/kg feed and 0.2 mg T-2 toxin/kg feed is proposed in pig feed.
Keywords: Trichothecenes; Cattle; Pig; Sheep; Poultry; Feed

D. O. Molina, I. Matamoros, A. N. Pell, Accuracy of estimates of herbage intake of lactating cows using alkanes: comparison of two types of capsules, Animal Feed Science and Technology, Volume 114, Issues 1-4, 3 May 2004, Pages 241-260, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2003.12.001.
(http://www.sciencedirect.com/science/article/B6T42-4BJX1HB-1/2/7089daacf80f82c1550dcde45ad27ec2)
Abstract:
A feeding study with fresh forage was completed to evaluate the reliability of the alkane technique for estimating voluntary herbage intake in tropical conditions and compare the accuracy of herbage dry matter intake (DMI) estimates from two types of capsules used to deliver the even chain length alkanes to the rumen. Twelve lactating Holstein cows were housed in individual stalls and separately fed chopped fresh Panicum maximum (cv. Tobiata) grass twice daily. From days 1 to 15 of the experimental period, six cows were dosed twice daily with a gelatin capsule containing synthetic C32 alkane. The remaining cows were dosed with a controlled release capsule (CRC) on day 1. Individual intakes were measured daily and herbage intakes were estimated for 5 days using the alkane technique. Herbage intake differed between treatment groups, 6.3 and 8.3 kg DM per day for the gelatin and the CRC group, respectively. A 7-day equilibrium period was sufficient for the marker to reach a steady concentration in the feces for both delivery methods. Regardless of the delivery system used to administer the synthetic marker, estimated herbage intake using the C33:C32 alkane pair did not differ from the mean measured intake (mean bias=0.55 kg DM per day for each treatment). No obvious trend for increased recovery with alkane chain length was observed. Concentrations of alkanes in fecal samples collected throughout the day, and the resulting intake predictions, varied diurnally with the highest variation observed with the C31:C32 alkane pair. When the C33:C32 ratio was used, the least accurate herbage DMI estimate was obtained from the 4.30 h samples, for both delivery methods. The alkane technique has the potential to predict herbage intake of cows in the tropics. Although there were some differences in DMI estimates, the two types of capsules used for the alkane administration performed similarly.
Keywords: Alkanes; Gelatin capsules; Controlled release capsules; Dairy cattle

D. O. Molina, I. Matamoros, Z. Almeida, L. Tedeschi, A. N. Pell, Evaluation of the dry matter intake predictions of the Cornell Net Carbohydrate and Protein System with Holstein and dual-purpose lactating cattle in the tropics, Animal Feed Science and Technology, Volume 114, Issues 1-4, 3 May 2004, Pages 261-278, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2003.11.010.
(http://www.sciencedirect.com/science/article/B6T42-4BJX1HB-2/2/8b6cc3efabe326a932844961d72f4f80)
Abstract:
Data from three separate experiments were used to evaluate the dry matter intake (DMI) predictions of version 5.0 of the Cornell Net Carbohydrate and Protein System (CNCPS). Experiment 1 was conducted with 12 lactating Holstein cows confined in individual stalls, receiving

known amounts of supplements and fresh, chopped Panicum maximum cv Tobiata grass. Experiments 2 and 3 were conducted with 12 and 13 crossbreed dual-purpose cows rotationally grazing Cynodon nlemfuensis cv Alicia and P. maximum cv Tobiata grass, respectively, with appropriate supplementation. Pasture intake in the grazing experiments was estimated for an 8-day period using the alkane technique. Model-predicted DMI based on measured feed analyses for the group of animals on Experiment 1 was very close to the observed values, with a mean bias of -0.19 kg DM per day, suggesting that the adjustment of DMI used by the CNCPS model in tropical conditions is accurate for confined lactating animals. The intake predictions by the CNCPS model for the grazing dual-purpose lactating cows were not as accurate. The CNCPS model underpredicted DMI in Experiment 2, and different degrees of accuracy and bias were evident in Experiment 3. For the three experiments, the slope of the regression between observed and predicted DMI was not different from unity, but the intercept was significantly different ($P<0.05$) from zero, suggesting a mean bias in the prediction. It should be recognized that accurate intake data on grazing animals is difficult to obtain and errors in the estimation of herbage intake using the alkane method could be contributing to the bias in the predictions by the CNCPS model.
Keywords: CNCPS; Alkanes; Dry matter intake; Tropical pasture

S. T. L. Ting, B. Earley, M. A. Crowe, Effect of cortisol infusion patterns and castration on metabolic and immunological indices of stress response in cattle, Domestic Animal Endocrinology, Volume 26, Issue 4, May 2004, Pages 329-349, ISSN 0739-7240, DOI: 10.1016/j.domaniend.2003.12.003.
(http://www.sciencedirect.com/science/article/B6T62-4BHT76V-1/2/413ac728a3c00aede0eeeceea3ae213a)
Abstract:
This study tested the hypotheses that: (1) either acute stress induced by Burdizzo castration, or cortisol infusion would modulate plasma glucose, insulin and growth hormone (GH) concentrations; and (2) immune modulation induced by cortisol would be dependent on the pattern, intensity and duration of circulating cortisol concentrations. Fifty 9.2-month-old HolsteinxFriesian bulls (232+/-2.0 kg) were blocked by weight and randomly assigned to one of five treatments (n=10 per treatment): (1) sham handled control; (2) Burdizzo castration; (3) hydrocortisone infusion to mimic the castration-induced secretion pattern of cortisol; (4) hourly pulse infusion of hydrocortisone; and (5) sustained infusion of hydrocortisone for 8 h. Blood samples were collected intensively on day 0, and weekly from days 1 to 35. Castration acutely increased plasma cortisol, GH and haptoglobin concentrations, suppressed lymphocyte in vitro interferon-[gamma] (IFN-[gamma]) production, but had no effect on plasma glucose and insulin concentrations. Cortisol infusion to simulate the castration-induced secretion pattern of cortisol, and pulse infusion of cortisol did not suppress the IFN-[gamma] production. A sustained infusion of cortisol resulted in the transient suppression of IFN-[gamma] production. Moreover, the sustained cortisol infusion resulted in increased plasma glucose, insulin and GH concentrations. The overall 14-day feed intakes and 35-day growth rates were not affected by treatments. In conclusion, cortisol infusion to induce immune suppression in vivo occurred only at pharmacological doses. Within physiological ranges, cortisol was not associated with the suppression of immune function, indicating that during castration cortisol per se is not responsible for the suppression of in vitro IFN-[gamma] production.
Keywords: Castration; Cattle; Cortisol; Interferon-[gamma]; Stress

Yudi Pawitan, John M. Griffin, John D. Collins, Analysis and prediction of the BSE incidence in Ireland, Preventive Veterinary Medicine, Volume 62, Issue 4, 16 April 2004, Pages 267-283, ISSN 0167-5877, DOI: 10.1016/j.prevetmed.2003.12.001.
(http://www.sciencedirect.com/science/article/B6TBK-4BM8G23-1/2/6964e88054f8930c87f61a7e42e9cda1)

Abstract:
Our purpose was to report the statistical methodology that was used to describe the nature of bovine spongiform encephalopathy (BSE) propagation in the Irish cattle population, to predict the number of future cases and to assess the risk to humans in terms of the number of infected animals that were processed. We used a nonlinear Poisson-regression model for the available birth-cohort data and an iterative method to compute the parameter estimates. Standard errors for the estimates were computed from the nonlinear model and these were validated using a bootstrap procedure.
We illustrated the use of the model for prediction and risk assessment using the BSE incidence data between 1981 and 2000. The change in case ascertainment or reporting level was a crucial parameter that determined the observed pattern of clinical BSE. Significant propagation risk was detected from 1985 onwards, with peaks in 1986 and 1994. The trough in the propagation risk in 1990 coincided with a ban of the use of meat-and-bone meal for ruminant feed. Excluding the newly adopted active surveillance method in 2001, the predicted and observed data were comparable.
Keywords: Back calculation; Bootstrap; Bovine spongiform encephalopathy; BSE; Infectious disease; Poisson regression

P. M. Dawuda, R. J. Scaramuzzi, S. B. Drew, H. J. Biggadike, R. A. Laven, R. Allison, C. F. Collins, D. C. Wathes, The effect of a diet containing excess quickly degradable nitrogen (QDN) on reproductive and metabolic hormonal profiles of lactating dairy cows, Animal Reproduction Science, Volume 81, Issues 3-4, April 2004, Pages 195-208, ISSN 0378-4320, DOI: 10.1016/j.anireprosci.2003.09.008.
(http://www.sciencedirect.com/science/article/B6T43-4BG3T9S-1/2/e9ffea259cab5cc91bd1382edd97b0a0)
Abstract:
The objective of this experiment was to examine the effects of an excess intake of quickly degradable nitrogen (QDN) on metabolic and reproductive parameters in lactating dairy cows. Twenty-two lactating dairy cows were fed a total mixed ration once daily. The control diet was a typical ration for high producing cows in the UK (CP=17.5%, ME=11.8 MJ/kg DM). The cows were randomly divided into two groups, control diet (control; n=12) and excess QDN diet (QDN; n=10). The QDN group was fed an additional 250 g of urea per cow per day, from 10 days before insemination (day 0) until the end of the experiment, 17 days after the second insemination. Ten days before insemination, a synchronized oestrus was induced and the cows inseminated twice, 48 and 72 h after synchronization, with commercial frozen semen from a single sire. Ovaries were scanned using B-mode ultrasonography 10 days before insemination and then daily from 3 days before insemination. Eighteen of the cows (9 control and 9 QDN) were sampled more intensively to determine the pulsatile pattern of secretion of luteinizing hormone (LH) and growth hormone (GH). Cows were slaughtered 17 days after insemination, the reproductive tracts recovered and flushed to retrieve embryos.
The excess QDN diet resulted in elevated ($P<0.05$) plasma urea concentrations 3 days after starting urea feeding and these were maintained until the end of the experiment. However, the excess QDN diet did not significantly affect daily milk production or plasma concentrations of insulin and IGF-I. The QDN treatment did not significantly affect pulsatile patterns of secretion of LH and GH or the number of small (<0.5 cm diameter) and medium to large follicles (>0.5 cm diameter). Twenty cows ovulated following synchronization (control 11/12; QDN 9/10). There were no significant differences between the control and the QDN groups in the peak concentrations of oestradiol during the follicular phase or in the post-ovulatory pattern of plasma and milk progesterone secretion. Embryos and/or foetal membranes were recovered from 10 cows (5 control and 5 QDN). The results of the current study show that feeding excess QDN, as urea, for 27 days commencing 10 days before insemination had no effect on reproductive or metabolic

hormonal parameters. Ovulation and the formation and function of the post-ovulatory corpus luteum were also unaffected by excess QDN. These data suggest that the harmful effects of excess intakes of QDN on fertility occur after 17 days following ovulation.
Keywords: Cattle feeding and nutrition; Urea feeding; LH; GH; QDN

Bharat D. Jethva, Yadvendradev V. Jhala, Foraging ecology, economics and conservation of Indian wolves in the Bhal region of Gujarat, Western India, Biological Conservation, Volume 116, Issue 3, April 2004, Pages 351-357, ISSN 0006-3207, DOI: 10.1016/S0006-3207(03)00218-0.
(http://www.sciencedirect.com/science/article/B6V5X-4956726-1/2/c234fbc702dace76be4cf52d04b296fd)
Abstract:
We determined the food habits of the endangered Indian wolf Canis lupus pallipes in the Bhal region of Gujarat, western India by analyzing 1246 wolf scats from five packs by estimating prey availability and by monitoring radio-tagged wolves from three packs for 1994 hour. The frequency of occurrence of blackbuck Antelope cervicapra remains in scats was 55.5%, followed by cattle (25.7%), nilgai Boselaphus tragocamelus (6.3%); and as others (<5%). The frequency of food items in scats of different wolf packs reflected their relative availability. For cattle the distinction between scavenging and predation was only possible through continuous monitoring. The average feeding interval obtained from monitoring was 3.6+/- 0.7 (S.E.) days and the average consumption/wolf/day was 1.8+/- 0.3 (S.E.) Kg. Adult male blackbuck formed most (70%) of the biomass consumed by wolves whereas cattle carcasses and cattle actually killed by wolves contributed 14 and 8%, respectively. Predation on cattle therefore was low and translated in an estimated loss of Rs. 821 (US$ 17) per village per annum. We propose that landscapes such as the Bhal with high wolf densities, high natural prey availability and consequently low human-wolf conflict levels should be prioritized as prime sites for wolf conservation efforts.
Keywords: Indian wolf; Diet; Foraging; Predation; Scavenging; Conservation

G. F. Schroeder, G. A. Gagliostro, F. Bargo, J. E. Delahoy, L. D. Muller, Effects of fat supplementation on milk production and composition by dairy cows on pasture: a review, Livestock Production Science, Volume 86, Issues 1-3, March 2004, Pages 1-18, ISSN 0301-6226, DOI: 10.1016/S0301-6226(03)00118-0.
(http://www.sciencedirect.com/science/article/B6T9B-499F6TK-1/2/7bd5fa63b90035a252ef14983396ed05)
Abstract:
Eighteen experiments involving 25 comparisons were reviewed to describe the main effects of fat supplementation on milk production and composition with grazing dairy cows. Results were analyzed comparing the fat supplemented and the control groups without supplemental fat, and were segmented according to the stage of lactation (early- or mid-lactation) and the degree of saturation of the fat supplement (unsaturated or saturated). Fat supplements, both saturated and unsaturated, did not affect ruminal fiber digestion. Pasture and total dry matter intake were not consistently affected by fat supplementation. Milk and 4% fat-corrected milk production were increased by 0.97 and 1.05 kg/cow per day with fat supplementation. Milk response to fat supplementation was higher in mid-lactation cows and when saturated fat sources were fed. Milk fat concentration was increased 5.1% with saturated fat supplementation and decreased 8.0% with unsaturated fat supplementation when compared to control groups. Feeding unsaturated fats increased long-chain unsaturated fatty acids in milk fat including conjugated linoleic acid. Milk protein concentration was reduced by feeding unsaturated fat supplements, although milk protein yield was not affected. The experimental results reviewed suggest that fat supplementation to the diet of dairy cows grazing high-quality pastures generally increases milk production although the effects on milk composition depend on the degree of saturation of the fat supplement.
Keywords: Dairy cattle; Fat supplementation; Milk production and composition

D. C. Patterson, R. W. J. Steen, C. A. Moore, B. W. Moss, D. J. Kilpatrick, Effects of primiparity and subsequent management on carcass composition and quality of continental beef heifers, Livestock Production Science, Volume 86, Issues 1-3, March 2004, Pages 19-34, ISSN 0301-6226, DOI: 10.1016/S0301-6226(03)00031-9.
(http://www.sciencedirect.com/science/article/B6T9B-4BCXK3B-1/2/a62ddbdf07c1d7945ced06c485afcd54)
Abstract:
A total of 81 continental maiden heifers (1/2 Blonde d'Aquitaine, 3/8 Charolais breeding) were committed to eight experimental treatments. The experiment had a core factorial design (2x3) based on the factors, bred status (unbred and bred) and stage (fresh calved, fresh weaned, and finished namely weaned plus finishing period). Within each stage, once-bred and unbred animals were slaughtered at similar carcass weights and ages. Bred and unbred animals were individually fed restricted allowances of grass silage/concentrate mixtures with the same proportion at any specific time, and the level of feeding was manipulated to provide the same rate of carcass gain for the bred and unbred animals. The target carcass gains were 45 kg for each of the three stages. In two additional treatments maiden heifers were also slaughtered at the mid service point to provide a baseline measurement, and a further treatment group was taken to the third parity and slaughtered at weaning. The data were analysed as a (3x2)+2 experimental design. Primiparity had a consistent negative effect on killing-out yield and the difference between bred and unbred became smaller with advance in stage (interaction $P<0.001$). No significant interactions between bred status and stage were obtained for other carcass data. Primiparity had no significant effect on carcass fat class, but produced significant increases in weights of fat depots in the abdominal cavity. In the bred animals the proportion of separable fat in the forerib joint and the estimated separable fat in the carcass were significantly higher, while separable lean was significantly lower. Breeding also significantly reduced the cross-sectional area of the m. longissimus dorsi and the proportion of high priced joints in the carcass. There was no difference in any of the measured meat quality parameters due to gestation. Increases in stage, i.e. carcass weight, also produced reductions in the proportion of high-priced joints, together with increases in all measurements of fatness, separable fat in both the forerib joint and carcass, and reduced separable lean in the carcass. Increases in stage resulted in a decrease in cooking loss and increase in yellowness of fat, but no change in any of the other meat quality parameters. It is therefore concluded that gestation in young heifers increased fatness in both the carcass and body cavity, and reduced carcass leanness, but had no effect on ultimate pH or tenderness of muscle. Animals slaughtered at the post-calving stage were underfinished, while those slaughtered at the weaned and finished stages had acceptable levels of carcass fatness.
Keywords: Beef cattle; Maiden; Once bred; Carcass composition; Meat quality

H. M. Burrow, K. C. Prayaga, Correlated responses in productive and adaptive traits and temperament following selection for growth and heat resistance in tropical beef cattle, Livestock Production Science, Volume 86, Issues 1-3, March 2004, Pages 143-161, ISSN 0301-6226, DOI: 10.1016/j.livprodsci.2003.06.001.
(http://www.sciencedirect.com/science/article/B6T9B-49W3554-1/2/05813608ae2de97390549f4439bf7767)
Abstract:
Selection experiments were established in zebu-derived beef cattle grazed at pasture in the tropics to determine direct and correlated responses to selection. Two lines (AX and UPWT) that differed marginally in their level of adaptation to environmental stressors were selected for high growth, measured by estimated breeding value (EBV) for weight at 600 days. A third line (TEMP) was selected for resistance to heat, measured by low EBV for repeated records of rectal temperature under conditions of heat stress. A control line, CONT (AXBX), was also established, with minimum

selection differential for 600-day weight. A derived control line, CONT (AX), based on differences between AX and AXBX lines in the foundation generation was used with CONT (AXBX) and genetic trends to measure responses.
Selection for high growth increased weights, period weight gains and direct and maternal genetic components of weights between birth and 18 months of age, but did not always increase mature cow weights. Calf birth and mature cow weights were restricted due to environmental effects. Resistance to heat stress improved in UPWT by selection for high growth. Resistance to ticks improved in the more tick-susceptible AX line, but did not change in the more resistant UPWT line. Resistance to worms consistently decreased (worm counts increased) in UPWT, but did not change in AX. Worm numbers over the experimental period were low and may not have biologically impacted on growth rates. There were no general changes in male or female fertility traits, carcass and meat quality attributes or feed efficiency due to selection for high growth. Selection for low EBV for rectal temperature reduced rectal temperatures in TEMP animals. Small correlated improvements in resistance to ticks and worms occurred in TEMP animals. Changes also occurred in pattern of fat distribution in the carcass. TEMP carcasses had higher marbling than CONT (AXBX) carcasses. There were no significant changes to other attributes through selection for low EBV for rectal temperature. Selection within this line may reflect selection for factors other than resistance to heat stress per se.
Keywords: Direct response; Correlated response; Genetic trends; Growth; Adaptation; Temperament; Male and female fertility; Beef cattle

L. Lezana, F. Campos, Preference for pelleted or ground cattle feed by Spotless Starlings (Sturnus unicolor), Livestock Production Science, Volume 86, Issues 1-3, March 2004, Pages 193-200, ISSN 0301-6226, DOI: 10.1016/S0301-6226(03)00163-5.
(http://www.sciencedirect.com/science/article/B6T9B-4B5JPG7-1/2/4acd581b608fe774b9f0a121633694c3)
Abstract:
The feeding behaviour of Spotless Starlings (Sturnus unicolor) on a cattle farm was analysed in terms of the choice and efficiency of consumption of two types of the same commercial feed (pelleted or ground). The starlings greatly preferred the pellets. During visits to the feeders, birds always consumed more pelleted feed than ground feed. The pelleted feed required less pecks and foraging time, while the ground feed was not easily handled due to its particle size. Yearling starlings consumed fewer pellets than adults (possibly due to competition) and their consumption was less efficient. Economic losses provoked by the starlings could be reduced by using ground feed and protecting the feeders in the pens during the winter season.
Keywords: Age classes; Bird pest; Cattle feed; Spotless Starling; Sturnus unicolor

C. E. Realini, S. K. Duckett, G. W. Brito, M. Dalla Rizza, D. De Mattos, Effect of pasture vs. concentrate feeding with or without antioxidants on carcass characteristics, fatty acid composition, and quality of Uruguayan beef, Meat Science, Volume 66, Issue 3, March 2004, Pages 567-577, ISSN 0309-1740, DOI: 10.1016/S0309-1740(03)00160-8.
(http://www.sciencedirect.com/science/article/B6T9G-49BY234-5/2/ec1e3bcbe804595c79f0e43c386f3bc7)
Abstract:
Thirty Hereford steers were finished either on pasture (n=10) or concentrate (n=20) to determine dietary and antioxidant treatment effects on carcass characteristics, fatty acid composition, and quality of Uruguayan beef. Half of the steers finished on concentrate were supplemented with 1000 I.U. vitamin E head-1 day-1 for 100 days. Postmortem vitamin C was added to ground beef (0.05% v/w) displayed for 8 days at 2 [degree sign]C. Carcasses from steers finished on concentrate had greater (P<0.05) carcass weight, conformation, degree of finishing, fat depth, and ribeye area than pasture finished animals. Carcasses from pasture-fed steers showed darker

(P<0.05) longissimus color and yellower (P<0.05) fat at 24 h postmortem than concentrate-fed. Initial longissimus Warner-Bratzler shear force (WBSF) values were similar (P>0.05) between pasture- and concentrate-fed animals. However, beef from pasture-fed cattle had lower (P<0.05) WBSF values at 7 and 14 days postmortem. Longissimus [alpha]-tocopherol concentrations were greater (P<0.01) for pasture- and concentrate-fed animals that were supplemented with vitamin E compared to concentrate-fed. Steaks from pasture-fed and vitamin E supplemented cattle had similar (P>0.05) TBARS values, which were lower (P<0.05) than steaks from concentrate-fed steers during 21 days of display. Ground beef from vitamin E supplemented steers had the lowest TBARS values; whereas samples from pasture-fed animals had the lowest lipid stability with higher TBARS levels than other treatments. Vitamin C addition to ground beef did not (P>0.05) reduce lipid oxidation. Vitamin E supplementation of concentrate-fed cattle had no effect (P>0.05) on color stability of ground beef or steaks. The a* (redness) and b* (yellowness) values were higher (P<0.05) when vitamin C was added to ground beef. Longissimus fatty acid content of concentrate-fed animals was twofold greater (P<0.01) than pasture-fed. The percentages of C14:0, C16:0, and C18:1 fatty acids were higher (P<0.01) in the intramuscular fat of concentrate-fed steers, whereas pasture-fed cattle showed greater (P<0.01) proportions of C18:0, C18:2, C18:3, C20:4, C20:5, and C22:5. Total conjugated linoleic acid (CLA) and CLA isomer c9t11 were higher (P<0.01) for pasture- than concentrate-fed cattle. Vitamin E supplementation of concentrate-fed steers increased lipid stability of ground beef and steaks, but was unable to improve color stability; whereas vitamin C addition to ground beef increased color stability without altering lipid oxidation. Finishing cattle on pasture enhanced the unsaturated fatty acid profile of intramuscular fat in beef including CLA and omega-3 fatty acids.
Keywords: Beef; Pasture; Concentrate; Antioxidants

Paivi Mantysaari, Pekka Huhtanen, Juha Nousiainen, Markku Virkki, The effect of concentrate crude protein content and feeding strategy of total mixed ration on performance of primiparous dairy cows, Livestock Production Science, Volume 85, Issues 2-3, 16 February 2004, Pages 223-233, ISSN 0301-6226, DOI: 10.1016/S0301-6226(03)00131-3.
(http://www.sciencedirect.com/science/article/B6T9B-49507B5-6/2/0265df637e59eb2cae8e94edea961286)
Abstract:
The effect of total mixed ration (TMR) with constant (TMR1) or decreasing (TMR3) proportion of concentrate in dry matter (DM) and with different crude protein (CP) content of concentrate (170 or 200 g/kg DM) on the performance of 51 first parity Ayrshire cows was studied. On TMR1 diet the forage to concentrate ratio in DM was 55:45 throughout the lactation. On TMR3 the forage to concentrate ratio was 45:55, 55:45 and 65:35 during the lactation days 0-100, 101-200 and 201-305, respectively. There was no significant interaction between feeding strategy (TMR1 or TMR3) and CP content of the concentrate on the performance parameters studied. Feeding strategy had no effect on energy corrected milk (ECM) production (26.6 vs. 27.1 kg/day), milk composition, DM intake (18.0 vs. 18.2 kg/day) or post partum development of the body condition score of the cows. The higher CP content of the concentrate increased (P<0.05) the milk (24.8 vs. 26.2 kg/day) and milk protein yield (871 vs. 922 g/day) and tended to increase (P=0.13) the ECM yield (26.3 vs. 27.4 kg/day). Milk composition was not affected by the CP content. DM intake was higher in early and mid lactation but not in late lactation when CP content of the concentrate was 200 g/kg DM compared to 170 g/kg DM. Increase in CP content of the concentrate decreased the protein conversion efficiency (milk protein/CP intake) in early and mid lactation but not in late lactation. It can be concluded that there is no advantage to primiparous cows of adjusting the forage to concentrate ratio in TMR with progressing lactation. Results also showed that the primiparous cows benefited from the protein content of the concentrate higher than 170 g/kg DM.
Keywords: Dairy cattle; Feeding strategy; Total mixed ration; Protein supplementation; Milk yield

N. E. Geerts, D. L. De Brabander, J. M. Vanacker, J. L. De Boever, S. M. Botterman, Milk urea concentration as affected by complete diet feeding and protein balance in the rumen of dairy cattle, Livestock Production Science, Volume 85, Issues 2-3, 16 February 2004, Pages 263-273, ISSN 0301-6226, DOI: 10.1016/S0301-6226(03)00126-X.
(http://www.sciencedirect.com/science/article/B6T9B-491J0HP-1/2/15fa86f1e9ffe816b90274c1e787cabb)
Abstract:
The effect of feeding a total mixed ration (TMR) and the effect of protein balance in the rumen (OEB) on milk urea concentration (MUC) was studied. Eighteen Holstein cows were offered three diets in a 3x3 Latin square design. Separate feeding (rations 1 and 3) of maize silage in the morning and prewilted grass silage in the evening was compared with a TMR (ration 2). Rations 1 and 2 provided a normal OEB level (+/-150 g/day), whereas ration 3 a high OEB level (+/-400 g/day). All diets were formulated to supply the same level of true protein digested in the small intestine (DVE) and net energy lactation (VEM). The MUC of the morning milk was higher than that of the evening milk with separate feeding, whereas no difference was observed with the TMR. However, feeding strategy had no significant effect on the mean daily MUC, which was 247 and 240 mg/l for ration 1 and 2, respectively. The high daily OEB supply resulted in a MUC of 331 mg/l, corresponding with an increase in MUC of 0.33 mg/l per g higher OEB. The ammonia (NH3) concentration in rumen fluid of three fistulated lactating cows was determined for each ration in a Latin-square design (3x3). The NH3 concentration reached a maximum about 2 h postfeeding. For the diets with equal OEB, peak NH3 levels were similar. The NH3 concentration took longer to decrease after prewilted grass silage was fed than after feeding maize silage. The highest NH3 concentrations were measured for the diet with the high OEB supply. Average daily rumen pH values were equal for all diets.
Keywords: Milk urea concentration; Feeding strategy; OEB level; Dairy cows

D. G. Fox, L. O. Tedeschi, T. P. Tylutki, J. B. Russell, M. E. Van Amburgh, L. E. Chase, A. N. Pell, T. R. Overton, The Cornell Net Carbohydrate and Protein System model for evaluating herd nutrition and nutrient excretion, Animal Feed Science and Technology, Volume 112, Issues 1-4, Mathematical modeling of Animal-Plant interactions in Livestock Enterprises, 10 February 2004, Pages 29-78, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2003.10.006.
(http://www.sciencedirect.com/science/article/B6T42-4B8BNCN-1/2/91b665ba37a5efe73afb5b43a1ee83a2)
Abstract:
The Cornell Net Carbohydrate and Protein System (CNCPS) is a mathematical model that estimates cattle requirements and nutrient supply based on animal, environmental, and feed compositional information in diverse production situations. Predicted animal requirements account for different physiological states (lactation, pregnancy, and growth), body reserves and environmental effects. The CNCPS uses feed carbohydrate and protein degradation and passage rates to predict extent of ruminal fermentation, microbial protein production, post-ruminal absorption, and total supply of metabolizable energy and protein to the animal. The CNCPS has been used successfully on beef and dairy cattle farms to evaluate and formulate rations. In an evaluation with individually fed growing cattle, the CNCPS accounted for 89% of the variation in ADG with a 7.4% underprediction bias. When the CNCPS was evaluated with data from individual dairy cows where the appropriate inputs were measured and changes in energy reserves were accounted for, the CNCPS accounted for 90% of the variation in actual milk production of individual cows with a 1.3% bias. The model accounted for 76% of the variation in individual cow milk production with an 8% underprediction bias when energy was first limiting in high producing cows, and accounted for 84% of the variation with a 1.1% overprediction bias when protein was first limiting.
Keywords: Modeling; Simulation; Cattle; Nutrient; Requirement; Supply; Rumen

P. J. Moate, W. Chalupa, T. C. Jenkins, R. C. Boston, A model to describe ruminal metabolism and intestinal absorption of long chain fatty acids, Animal Feed Science and Technology, Volume 112, Issues 1-4, Mathematical modeling of Animal-Plant interactions in Livestock Enterprises, 10 February 2004, Pages 79-105, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2003.10.007.
(http://www.sciencedirect.com/science/article/B6T42-4B5JPCK-2/2/adc27d845d59200d88c9bdffe4f2d599)
Abstract:
A sub-model developed within the structure of the Cornell-Penn-Miner Dairy System (CPM-Dairy) predicts ruminal metabolism and intestinal absorption of fat in dairy cows. Data from 36 dietary treatments in eight published experiments that reported intakes and flows (g per day) of long chain fatty acids (LCFA) to the duodenum and feces were used to estimate rate constants and develop equations in the model. Similar data on 36 diets from another eight published papers were used to validate the model. Fat from each feed ingredient is specified in terms of its content of the major lipid components: glycerol, pigment and 10 LCFA (C12:0, C14:0, C16:0, C16:1, C18:0, C18:1c, C18:1t, C18:2, C18:3 and `COther'). Dietary fat is assumed to exist mainly in the form of triglycerides. In the rumen, fat is either lipolysed (defined as enzymatic cleavage of ester linkages and dissociation of salts of fatty acids) or escapes the rumen to the small intestine in the non-lipolysed form. Estimated rates of lipolysis are presented for fats from 27 different feeds. The lipolysis rates for fat from corn silage, alfalfa silage, ground corn, alfalfa hay, ground-roasted soybeans, hydrogenated tallow and calcium salts of palm fatty acid distillate (Ca-PFAD) were 500, 500, 309, 65, 35, 18 and 6.3%/h, respectively. Ca-PFAD was the only ingredient that showed appreciable protection against lipolysis. Lipolysed LCFA undergo biohydrogenation in a stepwise process: C18:3-->C18:2-->C18:1t-->C18:0; C18:1c-->C18:0; C16:1-->C16:0. At each step, the specific LCFA either undergoes biohydrogenation or passes out of the rumen. The estimated mean biohydrogenation rates for C16:1, C18:1c, C18:1t, C18:2 and C18:3 were 39.3, 27.4, 22.8, 87.6 and 244%/h, respectively. In addition, within the rumen, small amounts of C16:0, C16:1, C18:0 and COther LCFA are produced de novo from dietary carbohydrate. Specific intestinal digestion coefficients are used to describe absorption of each of the 10 major LCFA in both the lipolysed and non-lipolysed forms. Digestion coefficients for most LCFA were generally in the range 0.7-0.9. For total LCFA and for the majority of individual LCFA, the model showed good concordance between measured and predicted duodenal flows and also for measured and predicted intestinal absorption. The quantity of specific LCFA absorbed from the intestines can influence milk fat percentage and fertility. This model allows nutritionists to more accurately formulate dairy cattle rations in terms of fat, and to examine productivity in terms of individual LCFA.
Keywords: Fat; Rumen; Model; Lipolysis; Biohydrogenation; Absorption

Anne Offner, Daniel Sauvant, Comparative evaluation of the Molly, CNCPS, and LES rumen models, Animal Feed Science and Technology, Volume 112, Issues 1-4, Mathematical modeling of Animal-Plant interactions in Livestock Enterprises, 10 February 2004, Pages 107-130, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2003.10.008.
(http://www.sciencedirect.com/science/article/B6T42-4B5JPCK-1/2/7e8107a03a603540231918580f195086)
Abstract:
This study was conducted to evaluate and compare three rumen models with observed experimental data covering a wide range of feeding situations. Molly (MOL), developed by Baldwin in 1987, the Cornell Net Carbohydrate and Protein System (CNCPS), developed in 1992, and the model developed by Lescoat and Sauvant (LES) in 1995 were evaluated. These mechanistic models were compared on their ability to predict various rumen parameters and digestive characteristics. A database of 47 references (194 treatments) was built with animal characteristics,

detailed rations and in vivo measurements on dairy cattle. A feedstuff library with all input parameters needed to evaluate the models was created for 73 feedstuff. Thus, the comparative simulations were based on identical and consistent feed inputs. Global regressions and general linear models within experiments were used to determine the ability of the models to predict global and within experiment variation. Evaluations involved four parameters: coefficient of determination, residual standard deviation, slope of the regression and mean deviation to the bisector (Y=X). Results underlined the fairly good capacity of the model of Lescoat and Sauvant to predict starch digestion in the rumen, with a residual standard deviation of 0.06 kg/kg starch and slope of 0.70. The duodenal flow of microbial N was best predicted by the CNCPS with a residual standard deviation of 28.6 g/day and slope of 0.91. Rumen pH was best predicted by LES with a residual standard deviation of 0.10 and slope of 0.90. Alternatively, the models did not accurately predict fiber digestion in the rumen or volatile fatty acids concentrations. The study demonstrates the strengths and weaknesses of the models. Future improvements of rumen modeling can be considered by pooling the advantages of each model.
Keywords: Rumen; Model; Model evaluation

E. Kebreab, J. A. N. Mills, L. A. Crompton, A. Bannink, J. Dijkstra, W. J. J. Gerrits, J. France, An integrated mathematical model to evaluate nutrient partition in dairy cattle between the animal and its environment, Animal Feed Science and Technology, Volume 112, Issues 1-4, Mathematical modeling of Animal-Plant interactions in Livestock Enterprises, 10 February 2004, Pages 131-154, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2003.10.009.
(http://www.sciencedirect.com/science/article/B6T42-4B8BC2W-1/2/04913299f1cdac1fb227bcd9baf8f281)
Abstract:
In the past decade, a number of mechanistic, dynamic simulation models of several components of the dairy production system have become available. However their use has been limited due to the detailed technical knowledge and special software required to run them, and the lack of compatibility between models in predicting various metabolic processes in the animal. The first objective of the current study was to integrate the dynamic models of [Brit. J. Nutr. 72 (1994) 679] on rumen function, [J. Anim. Sci. 79 (2001) 1584] on methane production, [J. Anim. Sci. 80 (2002) 248] on N partition, and a new model of P partition. The second objective was to construct a decision support system to analyse nutrient partition between animal and environment. The integrated model combines key environmental pollutants such as N, P and methane within a nutrient-based feed evaluation system. The model was run under different scenarios and the sensitivity of various parameters analysed. A comparison of predictions from the integrated model with the original simulation models showed an improvement in N excretion since the integrated model uses the dynamic model of [Brit. J. Nutr. 72 (1994) 679] to predict microbial N, which was not represented in detail in the original model. The integrated model can be used to investigate the degree to which production and environmental objectives are antagonistic, and it may help to explain and understand the complex mechanisms involved at the ruminal and metabolic levels. A part of the integrated model outputs were the forms of N and P in excreta and methane, which can be used as indices of environmental pollution.
Keywords: Dairy cows; Mathematical models; Pollution; Methane

John P. McNamara, Research, improvement and application of mechanistic, biochemical, dynamic models of metabolism in lactating dairy cattle, Animal Feed Science and Technology, Volume 112, Issues 1-4, Mathematical modeling of Animal-Plant interactions in Livestock Enterprises, 10 February 2004, Pages 155-176, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2003.10.010.
(http://www.sciencedirect.com/science/article/B6T42-4B4HK76-1/2/2a97dac3e05040ad1a393d550a059348)
Abstract:

Models are representations of reality. The fields of nutrition, metabolism and biomedicine have used models to aid in research and its applications since before World War II. A model, or a modeling approach, to research may also be defined as an ordered way of describing knowledge of some `real' system. Such models have been useful in ordering our knowledge into practical systems to describe nutrient requirements of agricultural animals. The ability to describe metabolic transactions, and their resultant affects on nutrient requirements, is critical to the continued ability to raise food-producing animals in efficient ways around the world. Models of increasing complexity, ever grounded in validated research data, will continue to improve. The only way to eventually define the true complexity of the organisms that we are dealing with is to have an ordered model approach which, in a planned iterative fashion, asks complex questions and increases our knowledge with the clear answers we receive. A mechanistic, dynamic model of metabolism exists in the dairy cow (Molly, Modelling Ruminant Digestion and Metabolism. Chapman & Hall, New York, USA, p. 469.) and allows testing of complex hypotheses on the nutrition of the dairy cow. A major area for which we still lack full understanding is metabolism in early lactation. A series of model challenges has determined that descriptions of basic processes (such as ion pumping, protein and fat turnover rates, and increased metabolic costs associated with increased intake) in this model are inadequate. Milk production can be described very well from feed inputs. However, errors in the biochemical transactions of viscera and muscle tissue result in excess energy accumulation in adipose tissue. A hypothesis, based on validated experimental evidence explicit in the Molly model, and on observations made since construction of the model, is that simulated rates of energy use in the viscera, probably due to the hormonal and nutrient intake changes that take place in early lactation, are too low in the model. A corollary hypothesis is that rates of energy use by the body, especially in protein turnover and its associated metabolic costs are also too low. Simulations increasing these energetic costs resulted in realistic reductions in body fat relative to observed experimental data. These hypotheses become the framework for continued experimentation and incorporation of new information into the model.
Keywords: Lactation; Mechanistic model; Body fat; Energy use; Dairy cows

Luis Orlindo Tedeschi, Danny G. Fox, Pablo J. Guiroy, A decision support system to improve individual cattle management. 1. A mechanistic, dynamic model for animal growth, Agricultural Systems, Volume 79, Issue 2, February 2004, Pages 171-204, ISSN 0308-521X, DOI: 10.1016/S0308-521X(03)00070-2.
(http://www.sciencedirect.com/science/article/B6T3W-48XD64K-3/2/7f3e4a29f724cfb159c3122a74933ff1)
Abstract:
A deterministic and mechanistic growth model was developed to dynamically predict growth rate, accumulated weight, days required to reach target body composition, carcass weight (CW) and composition of individual beef cattle for use in individual cattle management systems. The model can predict either average daily gain (ADG) when dry matter intake (DMI) is known or dry matter required (DMR) when ADG is known. For both scenarios, the following parameters are required: metabolizable energy of the diet and length of feeding period, animal characteristics [age, gender, breed, initial body weight (BW), body condition score, and adjusted final BW at 28% empty body fat (EBF)] and environmental information (temperature, humidity, hours of sunlight, wind speed, mud, hair depth, and hair coat). Two iterative methods based on gain composition were derived to compute the efficiency of metabolizable energy to net energy for growth (NEg). This growth model was evaluated with data from 362 individually fed steers with measured body composition and feed energy values predicted with the NRC (2000). The iterative method that used a decay equation to adjust NEg based on the proportion of retained energy as protein showed the best prediction of ADG and final BW. When dry matter intake was known, the model accounted for 89% of the variation with bias of -2.6% in predicting individual animal ADG and explained 83% of the variation with bias of -1% in estimating the observed BW at the actual total days on feed. When

ADG was known, the growth model predicted the dry matter required for that ADG with only 2% of bias and r2 of 74%. A sub-model was developed to predict accumulated body fat (FAT) for use in predicting carcass quality and yield grades (YG) during growth. With the unadjusted NEg method, this sub-model explained 84% of the variation and had -14.3% of bias in actual body fat when animal ADG was known. Additionally, an equation developed with 407 animals to predict YG from EBF (%) had an r2 of 0.49. Equations developed to predict CW from empty BW that adjust for stage of growth accounted for 89% of the variation with a 3 kg of bias. In conclusion, this dynamic growth model can predict animal performance and body composition within an acceptable degree of accuracy.
Keywords: Cattle; Growth; Management; Marketing; Modeling; Simulation

M. -Concepcion Aristoy, Cristina Soler, Fidel Toldra, A simple, fast and reliable methodology for the analysis of histidine dipeptides as markers of the presence of animal origin proteins in feeds for ruminants, Food Chemistry, Volume 84, Issue 3, February 2004, Pages 485-491, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2003.07.030.
(http://www.sciencedirect.com/science/article/B6T6R-49V3GS9-K/2/41f9cc3b824dabcf2ec2d57745b531dd)
Abstract:
A simple methodology, consisting in cation exchange HPLC separation combined with OPA postcolumn detection, has been succesfully applied to the analysis and detection of histidine dipeptides in feeds. The use of the proposed methodology, which is very simple and relatively fast, allows the detection of 2.63 ppm and 0.58 ppm of carnosine and anserine, respectively, in cattle feed. As balenine (3-methylhistidine) was not commercialy available, it was isolated from pork muscle and used as standard for its quantitation in feeds. These dipeptides have shown good stability against intense heat treatments, even at temperatures as high as 120 [degree sign]C for 20 min. So, these histidine dipeptides can be feasible used as markers of animal protein content in feeds.
Keywords: Histidine dipeptides; Carnosine; Anserine; Balenine; Animal proteins in feeds

G. F. W. Haenlein, Goat milk in human nutrition, Small Ruminant Research, Volume 51, Issue 2, Contribution of Goats to Mankind, February 2004, Pages 155-163, ISSN 0921-4488, DOI: 10.1016/j.smallrumres.2003.08.010.
(http://www.sciencedirect.com/science/article/B6TC5-49WMXM1-3/2/654dffe50e1e131477ccb7737a937baa)
Abstract:
Goat milk and its products of yoghurt, cheese and powder have three-fold significance in human nutrition: (1) feeding more starving and malnourished people in the developing world than from cow milk; (2) treating people afflicted with cow milk allergies and gastro-intestinal disorders, which is a significant segment in many populations of developed countries; and (3) filling the gastronomic needs of connoisseur consumers, which is a growing market share in many developed countries. Concerning (1), very much improvement in milk yield and lactation length of dairy goats, especially in developing countries must be accomplished through better education/extension, feeding and genetics. Concerning (2), little unbiased medical research to provide evidence and promotional facts has been conducted, but is very much needed to reduce discrimination against goats and substantiate the many anecdotal experiences about the medical benefits from goat milk consumption, which abound in trade publications and the popular press. Goats have many unique differences in anatomy, physiology and product biochemistry from sheep and cattle, which supports the contention of many unique qualities of dairy goat products for human nutrition. Concerning (3), a few countries like France have pioneered a very well-organized industry of goat milk production, processing, marketing, promotion and research, which has created a strong consumer clientele like in no other country, but deserves very much to be copied for the general

benefit to human nutrition and goat milk producers. The physiological and biochemical facts of the unique qualities of goat milk are just barely known and little exploited, especially not the high levels in goat milk of short and medium chain fatty acids, which have recognized medical values for many disorders and diseases of people. The new concept of tailor making foods to better fit human needs has not been applied to goat milk and its products so far, otherwise the enrichment of short and medium chain fatty acids in goat butter, and their greater concentration compared to cow butter, could have become a valued consumer item. Also revisions to human dietary recommendations towards admitting the health benefits of some essential fats supports the idea of promoting goat butter. While goat yoghurt, goat cheeses and goat milk powder are widely appreciated around the world, goat butter is not produced anywhere commercially in significant volume.
Keywords: Goat milk; Nutritional value; Short and medium chain fatty acids; Cow milk allergy; Goat cheese; Goat milk powder; Goat butter

Anne Offner, Daniel Sauvant, Prediction of in vivo starch digestion in cattle from in situ data, Animal Feed Science and Technology, Volume 111, Issues 1-4, 12 January 2004, Pages 41-56, ISSN 0377-8401, DOI: 10.1016/S0377-8401(03)00216-5.
(http://www.sciencedirect.com/science/article/B6T42-49FR865-1/2/80d160906ec4a7212a1f61ca3618ab4d)
Abstract:
Rate and site of starch digestion are important in terms of nutrient availability in ruminants. The objective was to predict starch digestion in the rumen and intestines of cattle based on the in situ technique. A database with in vivo observations of starch digestibility was collected from 87 references involving 316 treatments on cattle (47% with lactating cows). In situ values of feeds from Offner et al. (2003) were used to calculate the effective degradability (ED, kg/kg starch) for each diet. For treatments with reliable ED (n=179), the equation predicting starch digestibility in the rumen (Rd, kg/kg starch) from ED was: Rd=0.302+0.59ED (r2=0.28, RSD=0.138 kg/kg starch). Experiment explained about 50% of the residual variation: Rd=0.263+0.63ED (n=179, nexp=84, r2=0.92, RSD=0.061 kg/kg starch). Dry matter intake, expressed as a percentage of live weight (DMI, % LW), also improved the accuracy of the prediction: Rd=0.439+0.68ED-0.083DMI (n=179, R2=0.47, RSD=0.119 kg/kg starch). The effect of other factors was investigated. Starch digestibility in the small intestine (SId, kg/kg RES) could be predicted from the amount of rumen escape starch (RES, kg/kg DM): SId=0.740-1.22RES (n=51, nexp=18, r2=0.91, RSD=0.108 kg/kg RES). Digestion in this organ was influenced by both the quantity and the nature of rumen escape starch. The digestibility in the large intestine was around 0.5 kg/kg ileal starch and increased with DM intake. A compensatory role of the intestines was outlined in the study. Equations predicting starch digestibility in the rumen, small intestine and large intestine were then validated on the whole dataset. This study provides original information to allow empirical prediction of starch digestion in ruminants.
Keywords: Ruminant; Starch; Digestion; In situ degradation

P. K. Chelikani, J. D. Ambrose, D. H. Keisler, J. J. Kennelly, Effect of short-term fasting on plasma concentrations of leptin and other hormones and metabolites in dairy cattle, Domestic Animal Endocrinology, Volume 26, Issue 1, January 2004, Pages 33-48, ISSN 0739-7240, DOI: 10.1016/j.domaniend.2003.08.003.
(http://www.sciencedirect.com/science/article/B6T62-49W63NH-5/2/95403c84a3b11c0c9350db70986ad173)
Abstract:
We determined the effects of short-term fasting and refeeding on temporal changes in plasma concentrations of leptin, insulin, insulin-like growth factor- 1 (IGF-1), growth hormone (GH), glucose, and nonesterified fatty acids (NEFA), in early lactating cows, non-lactating pregnant

cows, and postpubertal heifers. In experiment 1, Holstein cows in early lactation were either fed ad libitum (Control, n=5) or feed deprived for 48 h (Fasted, n=6). Plasma leptin, insulin, and glucose concentrations rapidly declined (P<0.05) within 6 h, and IGF-1 by 12 h, but all these variables sharply returned to control levels (P>0.10) within 2 h of refeeding. Plasma NEFA and GH concentrations were elevated (P<0.05) by 4 and 36 h of fasting and returned to control levels (P>0.10) by 8 and 24 h after refeeding, respectively. In experiment 2, four ruminally cannulated pregnant non-lactating Holstein cows were used in a cross-over design and were fasted for 48 h (Fasted) or fasted with partial evacuation of rumen contents (Fasted-Evac). The plasma variables measured did not differ (P>0.10) between Fasted and Fasted-Evac cows. Plasma leptin, insulin, and IGF-1 concentrations were reduced by 10, 6, and 24 h of fasting, respectively, in Fasted-Evac cows; and these variables were reduced by 24 h in Fasted cows (P<0.05). Plasma glucose levels were reduced (P<0.05) by 48 h of fasting in both groups of fasted animals. Plasma NEFA and GH levels were increased (P<0.05) by 12 and 48 h of fasting, respectively. In experiment 3, postpubertal Holstein heifers were either fed ad libitum (Control, n=4) or feed deprived for 72 h (Fasted, n=5). Concentrations of leptin, insulin, IGF-1, and glucose in plasma were reduced (P<0.05) by 24, 10, 24, and 48 h of fasting, respectively. Plasma NEFA concentrations increased (P<0.05) by 4 h, of fasting while GH levels were not significantly (P>0.10) affected by fasting. Collectively, our data provide evidence that plasma leptin concentrations are reduced with short-term fasting and rebound on refeeding in dairy cattle with the response dependent on the physiological state of the animals. Compared to the rapid induction of hypoleptinemia with fasting of early lactation cows, the fasting-induced hypoleptinemia was delayed in non-lactating cows and postpubertal heifers.
Keywords: Dairy cattle; Leptin; Fasting

R. Sieber, M. Collomb, A. Aeschlimann, P. Jelen, H. Eyer, Impact of microbial cultures on conjugated linoleic acid in dairy products--a review, International Dairy Journal, Volume 14, Issue 1, January 2004, Pages 1-15, ISSN 0958-6946, DOI: 10.1016/S0958-6946(03)00151-1. (http://www.sciencedirect.com/science/article/B6T7C-49KSPDW-1/2/dd78141e46fb260f231470005a36701f)
Abstract:
The conjugated linoleic acid (CLA) isomers present in milk fat have a high health amelioration potential. Their high prevalence in fat of ruminants and in milk and dairy products has been described and confirmed over many years. The CLA isomers are formed during biohydrogenation of linoleic acid in the rumen and also through conversion of vaccenic acid in the mammary gland. In addition, several strains of Lactobacillus, Propionibacterium, Bifidobacterium and Enterococcus are able to form CLA from linoleic acid and thus could be used to increase the CLA level in fermented dairy products such as yoghurt and cheese. It appears likely that lactic acid bacteria and especially propionibacteria can form CLA during cheese ripening because free linoleic acid is formed in the ripening process. However, for the time being the reviewed data allow no final conclusion on whether these increased levels of CLA are mainly due to formation by microorganisms, or due to cattle feed or breed. Further studies including all these parameters will be necessary to elucidate the potential role of starter cultures to achieve physiologically relevant CLA levels in dairy products. It appears that contribution of presently used dairy starter bacteria to increased CLA content in cheese is relatively minor.
Keywords: Conjugated linoleic acid (CLA); Ruminants; Milk fat; Cheese; Lactic acid bacteria; Bifidobacteria; Propionibacteria

K. Kuoppala, S. Yrjanen, S. Jaakkola, R. Kangasniemi, J. Sariola, H. Khalili, Effects of increasing concentrate energy supply on the performance of loose-housed dairy cows fed grass silage-based diets, Livestock Production Science, Volume 85, Issue 1, January 2004, Pages 15-26, ISSN 0301-6226, DOI: 10.1016/S0301-6226(03)00119-2.

(http://www.sciencedirect.com/science/article/B6T9B-48YVX6F-3/2/bc9c314353f8997555a6a947bd7b2d88)
Abstract:
The effects of increased concentrate level on milk production was assessed during two consecutive indoor feeding seasons according to a continuous randomised block design using 44 (season 1) and 47 (season 2) Finnish Ayrshire cows. Treatments allocated according to a 2x2 factorial design consisted of two concentrate levels and two protein feeding systems. Low and high concentrate feeding regimens were applied to multiparous cows as 9 and 14 kg/day during days 1-150 of lactation and 8 and 11.5 kg for days 151-224, respectively. Primiparous cows received proportionately 0.80 of that fed to multiparous cows. In order to identify the effects of concentrate energy alone, concentrates were formulated so that increases in concentrate feeding resulted in either a constant supply of concentrate crude protein (CP) (mean 1.4 kg/day) or constant intake of rapeseed meal (RSM) (mean 1.7 kg DM/day). Consequently, concentrate CP content decreased with the increasing level of concentrate. Concentrate was offered through computerised self-feeders and silage was fed ad libitum. Increasing energy intake at a constant CP level seemed to have a more negative effect on silage dry matter (DM) intake compared with feeding a constant supply of RSM. Increases in concentrate DM intake resulted in mean substitution rates of 0.48 and 0.25 for CP and RSM diets, respectively. However, the positive effect of concentrate supplementation on milk yield was independent of protein feeding strategies. Milk production increased ($P<0.05$) from 24.4 to 26.4 kg energy corrected milk (ECM) when energy level was increased, and on average 0.58 kg milk per kg increase in concentrate DM intake. The response to increased concentrate energy corresponded well with the responses reported earlier with a fixed concentrate composition. It is concluded that it was not possible to compensate a high amount of concentrate with low CP content with low amounts of concentrate with high CP content. However, feed utilization (ECM kg/kg DM) was more efficient for diets containing low amounts of concentrate. The ratio of milk nitrogen/feed nitrogen was highest when a high amount of concentrate with low CP content was used.
Keywords: Dairy cattle; Grass silage; Concentrate amount; Milk production; Feed intake; Loose housed

O. Bellmann, J. Wegner, F. Teuscher, F. Schneider, K. Ender, Muscle characteristics and corresponding hormone concentrations in different types of cattle, Livestock Production Science, Volume 85, Issue 1, January 2004, Pages 45-57, ISSN 0301-6226, DOI: 10.1016/S0301-6226(03)00121-0.
(http://www.sciencedirect.com/science/article/B6T9B-4903F63-3/2/086bb46bbf40fc7e2e570e47f5484ce3)
Abstract:
Ruminants transform feed components preferentially in body mass or milk. The accretion type of cattle are apt in accreting feed as meat and fat, while the secretion type of cattle secrete metabolised feed as milk. The objective of this study was to investigate the growth- and type-related differences in muscle fibers, adipocytes, and hormones in two metabolic types of cattle. Biopsy samples of semitendinosus muscle and blood were taken at 6, 8, 10, 13, and 16 months of age from 13 bulls of each metabolic type (Charolais--CH, German Holstein--H). Postnatal growth was characterized by a nearly 2-fold increase in muscle fiber area, while a constant fiber type frequency was observed. Differences in the growth potential between CH and H bulls were not only found in a higher daily weight gain or higher weight for CH cattle, but were also caused by stronger muscle fiber growth in that cattle type. The higher muscle growth potential of CH was accompanied by lower fat accretion and metabolically linked with lower plasma concentrations of insulin, glucagon, and leptin. The amount of subcutaneous adipose tissue was directly correlated with leptin in CH and with insulin and glucagon in H bulls.
Keywords: Metabolism; Hormone; Muscle; Growth; Cattle; Leptin

Andre Eggen, Jean-Francois Hocquette, Genomic approaches to economic trait loci and tissue expression profiling: application to muscle biochemistry and beef quality, Meat Science, Volume 66, Issue 1, January 2004, Pages 1-9, ISSN 0309-1740, DOI: 10.1016/S0309-1740(03)00020-2. (http://www.sciencedirect.com/science/article/B6T9G-4834HXG-G/2/422bee88c26b19b46f2783b6f954ead1)
Abstract:
Genetic and environmental factors profoundly alter the phenotypes of animals. Nowadays, genomics allows large-scale analysis of gene characteristics (structural genomics) and expression (functional genomics). Genome mapping, comparative genomics and identification of quantitative trait loci and polymorphisms are the subject of active investigation to gain a better knowledge of the structure and function of genes. Gene expression profiling using DNA microarrays and proteomics holds great promise for the study of regulatory events which control the final biological functions. Combined with classical genetics and muscle biochemistry to form an integrative biology, these new approaches will bring a better understanding of complex traits and physiological processes. Major applications in meat science could be, for cattle, (1) the identification of new predictors of quality traits (for instance, tenderness), (2) the monitoring of beef quality (including traceability) through the production systems (nutrition level, growth path, grass-feeding), and (3) the improvement of animal selection (markers and gene assisted selection) which may also include quality traits.
Keywords: Genomics; Animal selection; Meat science; QTL; Mapping; Functional genomics

J. D. Wood, R. I. Richardson, G. R. Nute, A. V. Fisher, M. M. Campo, E. Kasapidou, P. R. Sheard, M. Enser, Effects of fatty acids on meat quality: a review, Meat Science, Volume 66, Issue 1, January 2004, Pages 21-32, ISSN 0309-1740, DOI: 10.1016/S0309-1740(03)00022-6. (http://www.sciencedirect.com/science/article/B6T9G-4834HXG-6/2/0b971e27d107a5634aa5d0c20474c1e6)
Abstract:
Interest in meat fatty acid composition stems mainly from the need to find ways to produce healthier meat, i.e. with a higher ratio of polyunsaturated (PUFA) to saturated fatty acids and a more favourable balance between n-6 and n-3 PUFA. In pigs, the drive has been to increase n-3 PUFA in meat and this can be achieved by feeding sources such as linseed in the diet. Only when concentrations of [alpha]-linolenic acid (18:3) approach 3% of neutral lipids or phospholipids are there any adverse effects on meat quality, defined in terms of shelf life (lipid and myoglobin oxidation) and flavour. Ruminant meats are a relatively good source of n-3 PUFA due to the presence of 18:3 in grass. Further increases can be achieved with animals fed grain-based diets by including whole linseed or linseed oil, especially if this is 'protected' from rumen biohydrogenation. Long-chain (C20-C22) n-3 PUFA are synthesised from 18:3 in the animal although docosahexaenoic acid (DHA, 22:6) is not increased when diets are supplemented with 18:3. DHA can be increased by feeding sources such as fish oil although too-high levels cause adverse flavour and colour changes. Grass-fed beef and lamb have naturally high levels of 18:3 and long chain n-3 PUFA. These impact on flavour to produce a `grass fed' taste in which other components of grass are also involved. Grazing also provides antioxidants including vitamin E which maintain PUFA levels in meat and prevent quality deterioration during processing and display. In pork, beef and lamb the melting point of lipid and the firmness/hardness of carcass fat is closely related to the concentration of stearic acid (18:0).
Keywords: Cattle; Fatty acids; Meat quality; Pigs; Sheep

P. I. Rekwot, O. P. Akinpelumi, V. O. Sekoni, L. O. Eduvie, E. O. Oyedipe, Effects of nutritional supplementation and exposure to bulls on resumption of post-partum ovarian activity in Bunaji

(Bos indicus) cattle, The Veterinary Journal, Volume 167, Issue 1, January 2004, Pages 67-71, ISSN 1090-0233, DOI: 10.1016/S1090-0233(02)00266-6.
(http://www.sciencedirect.com/science/article/B6WXN-48FSWN9-1/2/38b96cab2117d880d1468d46a62085ba)
Abstract:
A total of 51 pluriparous post-partum Bunaji (Zebu) cows belonging to agropastoralists were involved in a 2x2 factorial experiment for a period of 180 days. The cows were assigned randomly at calving to four treatments: (1) grazing only (no supplementation) and exposure to bull (NSBE); (2) grazing only (no supplementation) and no exposure to bull (NSNE); (3) grazing plus feed supplementation (each cow received 600 g of 20.8% crude protein of whole cottonseed supplement per day) and exposure to bull (FSBE); (4) grazing plus feed supplementation and no exposure to bull (FSNE). Cows with an increase in milk progesterone (P4) concentration of [greater-or-equal, slanted]1 ng/mL from the weekly milk samples were used to analyse the number of days from calving to the time of resumption of ovarian activity. The mean interval from parturition to cyclic ovarian activity for FSBE cows was 95 days, compared to 119 days for the FSNE cows. Intervals to onset of post-partum ovarian activity were 24, 33 and 39 days which were significantly earlier in the FSBE cows, than the FSNE, NSBE and NSNE cows, respectively. Intervals to cyclic activity were 9 and 15 days earlier in FSNE cows than in NSBE and NSNE cows. By 150 days post-partum, 100% and 92% of the cows in the supplemented groups (FSBE and FSNE), had resumed cyclic ovarian activity compared with 75% and 69% for the unsupplemented cows (NSBE and NSNE). It is concluded that nutritional supplementation and exposure to bulls synergistically shortened the length of post-partum anoestrus in zebu cattle. The economic benefits of using exposure to bulls and cottonseed supplementation in this study to enhance early resumption of post-partum ovarian activity of cattle may serve as a management tool in tropical areas where livestock production has some constraints.
Keywords: Feeding and nutrition; Exposure to bulls; Post-partum ovarian activity; Zebu (Bos indicus) cattle