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PREFACE

Abstracts of Indonesian Agricultural Research Results contain the compilation of author abstracts which are synthesized based on subject and also authors name, and completed with Author Index, Subject Index, and Journal Index.

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Director of Indonesian Center for Agricultural Library and Technology Dissemination

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Food security of farmer household who produce organic rice. ***Ketahanan pangan rumah tangga petani penghasil beras organik*** / Hapsari, H.; Djuwendah, E.; Wulandari, E. Universitas Padjadjaran, Bandung (Indonesia), Fakultas Pertanian. Bandung (Indonesia): UNPAD, 2010: 82 p. 4 ill., 16 tables; 35 ref. Appendices. 338.439.6:631.147/HAP/k

RICE; ORGANIC AGRICULTURE; FOOD SECURITY; FARMERS; HOUSEHOLD; FARM INCOME; LAND PRODUCTIVITY; TENURE; PRODUCTS; WASTE MANAGEMENT; JAVA.

Rapid population growth rate needs to be balanced with the quality and quantity of basic foodstuffs, at least equal to the rate of population growth. This demand encouraged the emergence of productive agricultural system that is sustainable, and environmentally friendly such as organic farming. This study conducted to analyze the level of household food security of farmers producing organic rice, and to identify land ownership in supporting farmers' household food security. This research was using quantitative research methods design with cross sectional survey techniques. The population was households producing organic rice farmers who were members of Farmers Group (Kelompok Tani) Jembar Karya and Jembar II Jembar Margahayu Village, Manonjaya Subdistrict, Tasikmalaya District. Samples were randomly selected by 30 households size with consideration for normally distributes values. The results showed that the majority (85.2%) respondents were not classified as poor with an average income of Rp 462,500/capita/month. Households were categorized as food secure respondents of 85.2% and 14.8% food insecure. Determinant factors that affect food security were income, knowledge on organic farming management, land productivity, land ownership and waste treatment. For suitable to a minimum living needs, therefor, the ownership area for each household farmers were around 9492 m^2. In order to fullfil energy sufficiency, then there was minimum 1740 m^2 of land per household. Land ownership level at Manonjaya Subdistrict or Tasikmalaya District was insufficient to fullfil the needs of rice, with assuming by reason that the entire population only consume local produced rice.

152 ILHAM, N.

Factors that determine marketed the surplus of rice. ***Faktor-faktor yang menentukan marketed surplus gabah*** / Ilham, N. (Pusat Analisis Sosial Ekonomi dan Kebijakan Pertanian, Bogor (Indonesia)); Kusnadi, N.; Friyatno, S.; Suryani, E. *Informatika Pertanian* (Indonesia). ISSN 0852-1743 (2010) v.19(2) p. 45-75, 1 ill., 11 tables; 16 ref.

RICE; MARKETING; SURPLUSES; SOCIOECONOMIC ENVIRONMENT; AGROECOSYSTEMS; FARMING SYSTEMS; AGRICULTURAL POLICIES.

Food security policies is not enough just based on the scope of the macro study, but also information from the scope of micro study, as aspect of the marketed surplus at farmer households level. The purposes of this study are: (1) to know the socioeconomic characteristics of farmers in the context of the marketed surplus of rice; (2) to know how to sale and grade of paddy production produced by farmers and their implications for the characteristics of marketed surplus of rice, and (3) to analyze the factors influence on marketed surplus. The data used are household survey of farmers in the 9 provinces conducted in 2008. Analysis of data was conducted by using descriptive approach with cross tabulation techniques and econometrics approaches with Ordinary Least Squares techniques. The results of the analysis showed that: (1) along with socioeconomic development and

infrastructure, the orientation of rice farmers has changed from subsistence to commercial, however, the characteristics of subsistence is still attached; (2) most of farmers in rice agroecosystem in the rainy and dry seasons in Java and outside Java sell their rice at once sold in the form of harvest dried rice, followed by a gradual manner in the form of stored dried rice; (3) the price of rice, total household income and land area are statistically significant effect on the level of 3% of marketed surplus in rice agroecosystem in Java, whereas in rice agroecosystem outside Java only the number of household members and land area are statistically significant each at level 1% and 10%; (4) to improve the welfare of farmers, the development of rice-producing centers should focus on areas with irrigation systems and better supported by increased credit facilities, postharvest facilities such as dryer, blower and barns.

153 RACHMAT, M.

Existence and role of community barns in resolving food security problems. ***Lumbung pangan masyarakat: keberadaan dan perannya dalam penanggulangan kerawanan pangan*** / Rachmat, M.; Budhi, G.S.; Supriyati; Sejati, W.K. (Pusat Sosial Ekonomi dan Kebijakan Pertanian, Bogor (Indonesia)). *Forum Penelitian Agro Ekonomi* (Indonesia). ISSN 0216-4361 (2011) v. 29(1) p. 43-53, 6 ref.

RURAL COMMUNITIES; FOODS; BARNS; FOOD STOCKS; POVERTY; FOOD SECURITY; EMERGENCY RELIEF; FOOD SUPPLY.

Food barns are the food reserve institution commonly developed in rural areas and play roles in addressing community food insecurity. Food barns exist along with the rice culture and become a part of public food reserve system. The existence of food barns tend to decline due to some factors, namely: (a) the movement of green revolution which introduces improved rice varieties and agricultural modernization incompatible with the traditional food barn development; (b) the existence of BULOG with the role in stabilizing supply of food and rice price which is a disincentive to storing grain; (c) globalization leading to invention of various processed foods distributed to rural areas has changed people's consumption pattern, and (d) inconsistent and project-oriented technical assistance. Food barns are generally established in the areas accustomed to food insecurity due to lack of access. Food barns may play role to cope with common food insecurity; however not capable of dealing with unpredictable food insecurity, e.g. due to disaster. To deal with transient food insecurity it is necessary that the government establishes mobile food reserves such as conducted by BULOG. Food reserves institution is necessary in the autonomy regions along with decreased role of BULOG. Local government's food reserve institution may be Local Government Enterprises (BUMD), private institution, or collaboration between those of local governments and BULOG. Food insecurity management is also poverty alleviation exertion. Therefore, addressing food security is not only related to food production and provision but it is also infrastructure improvement and human resource development.

E11 LAND ECONOMICS AND POLICIES

154 HERIANSYAH

Land and climate resources for development of fruits horticultural area at Berau Regency of East Kalimantan [Indonesia]. ***Sumber daya lahan dan iklim untuk pengembangan kawasan hortikultura buah-buahan di Kabupaten Berau Provinsi Kalimantan Timur*** / Heriansyah; Handayani, F. (Balai Pengkajian Teknologi Pertanian Kalimantan Timur, Samarinda (Indonesia)). [Proceedings of the national seminar on Indonesia fruits] Bogor (Indonesia), 28-29 Oct 2009 / Taher, R.; Dwiastuti, M.E.; Devy,

N.F.; Prabawati, S.; Harlion, L.L. (eds.) Jakarta (Indonesia): Puslitbanghorti, 2009: p. 655-661 , 2 tables; 6 ref. 634.1/.7(594)/SEM/p

FRUIT CROPS; HORTICULTURE; LAND RESOURCES; CLIMATE; RESOURCES MANAGEMENT; PRODUCTION POSSIBILITIES; LAND USE; LAND SUITABILITY; KALIMANTAN.

The availability of land and climate resources is an important factor for the development and expansion of citrus planting areas. Analysis required to determine the availability of land and climate resources that support the development of horticultural areas. This analysis was intended to provide the information of availability of land and climate resources for regional development of fruit horticulture, especially for citrus in Berau Regency, East Kalimantan Province. Land availability analysis was carried out through spatial analysis with the software Arc View version 3.3 and ER Mapper. The analysis used maps that have been available. After obtaining the availability of land, a check using the GPS was performed. Climate analysis was conducteds using several methods: the determination of the characterization of rainfall pattern according to Trojer (1976), Agroclimate zone according to Oldeman (1975), and determination the rain type according to Schmidt and Fergusson (1941). Results obtained from the analysis was that the Non - Forestry Cultural Area Berau Regency (KNBK) of East Kalimantan Province was 559,354 ha. KBNK land was used for various kinds of mining licenced company covering an area of 216,074 ha, for the location of plantations was 132,413 ha and land available for development of dry land farming was 168,734 ha. Those available land were scattered in Talisayan, Biduk-Biduk, Gunung Tabur, Tepian Buah, Muara Lesa and Tanjung Redeb Subdistricts. The land was included into the zone IIax (Perennial Wet Lowland Plant) and zone IVax2 (Annual Wet Lowland Temperate Plant). Available land might be used for the development of horticultural crops, especially citrus plants. Based on climatic conditions, Berau was potential for horticultural development especially citrus. The area classified as wet climates (A to B) with rainfall patterns C and B. By using the potential of the region, citrus fruits could be harvested continuously throughout the year through improved farming systems.

155 JUARINI, E.

Land suitability and recommendation for buffalo development in Lebak District [Indonesia]. ***Kesesuaian dan arah pengembangan lahan ternak kerbau di Kabupaten Lebak*** / Juarini, E.; Sumanto; Budiarsana, I G.M.; Praharani, L. (Balai Penelitian Ternak, Bogor (Indonesia)). [Proceedings of the national seminar and workshop on buffaloes] Samarinda (Indonesia), 21-22 Jun 2011 / Talib, C.; Herawati, T.; Praharani, L.; Sumantri, C.; Hidayati, N. (eds.). Bogor (Indonesia): Puslitbangnak, 2012: p. 100-106, 1 ill., 3 tables; 7 ref. 636.293.082/SEM/p

WATER BUFFALOES; LAND SUITABILITY; INTEGRATED PLANT PRODUCTION; RICE FIELDS; FARMLAND; AGROECOSYSTEMS; REARING SYSTEMS; JAVA.

Buffaloes rearing systems are still rely on the availability of grass land, so that the integration pattern with the land area of food (rice fields and farmlands) and the plantation was deadly important. Maintenance of buffaloes on agroecosystem of palm plantation show that the productivity and performance of farmer's revenue better than on the beaches and rice fields, because of the influence of the availability of forage feed source. Herd rearing system, forage grass and cover crop is a model that can be developed and suitable for buffaloes development. Agroecosystem of palm plantation where forage widely available, is very suitable to be used as center of breeding of buffaloes. A study on land suitability and recommendation for buffalo development was conducted in September 2010 in Lebak

District. Results mapping of development areas of buffaloes showed that broad ecological suitability of land for buffalo in Lebak Districts reached 179,529 ha or about 50% of the total land area of 356,390 ha composed of S1 (very suitable) = 127,775 ha, S2 (suitable) = 48,059 ha and S3 (marginally suitable) = 3,434 ha. Land recommendation for developing of buffaloes is in diversification of more than: 81,529 ha of dry land 52,767 ha of rice field, 29,553 ha diversification of farm plantation and 12,873 ha of forest extensification.

156 SYAFRUDDIN

Potency and land suitability for durio development at Parigi Moutong Regency, Central Sulawesi [Indonesia]. ***Potensi dan kesesuaian lahan untuk pengembangan tanaman durian di Kabupaten Parigi Moutong Sulawesi Tengah*** / Syafruddin; Saidah (Balai Pengkajian Teknologi Pertanian Sulawesi Tengah, Palu (Indonesia)). [Proceedings of the national seminar on Indonesia fruits] Bogor (Indonesia), 28-29 Oct 2009 / Taher, R.; Dwiastuti, M.E.; Devy, N.F.; Prabawati, S.; Harlion, L.L. (eds.). Jakarta (Indonesia): Puslitbanghorti, 2009: p. 598-612, 4 ill., 3 tables; 11 ref. 634.1/.7(594)/SEM/p

DURIO ZIBETHINUS; LAND SUITABILITY; LAND EVALUATION; LAND CLASSIFICATION; SOIL CHEMICOPHYSICAL PROPERTIES; LAND USE; FARMING SYSTEMS; PRODUCTION POSSIBILITIES; SULAWESI.

Land as a growing media for plant must be utilized optimally to obtain good and sustainable yield. For that purpose, its utilization has to be synchronized with agro-climate conditions and the level of suitability. Research was conducted in two stages: 1. preparation, 2. field and laboratory studies consisting of: inventory and characterization of bio-physical condition, preparation of base maps, terrain analysis, arrangement of land unit map, soil samples analysis, preparation of land resources data base and land evaluation with computerized systems. This study aimed at determining the potential and land suitability classes for durio plants in Parigi Moutong. The results showed that the clasess of land suitability for durio plant in Parigi Moutong consisted of very suitable class (S1), just suitable (S2), marginally suitable (S3), and not suitable (N); with the most dominant inhibiting factors were the root condition (RC), and slope (ER).

E14 DEVELOPMENT ECONOMICS AND POLICIES

157 MUDIARTA, K.G.

Perspective and role of economic sociology in economic development. ***Perspektif dan peran sosiologi ekonomi dalam pembangunan ekonomi masyarakat*** / Mudiarta, K.G. (Balai Besar Pengkajian dan Pengembangan Teknologi Pertanian, Bogor (Indonesia)). *Forum Penelitian Agro Ekonomi* (Indonesia). ISSN 0216-4361 (2011) v. 29(1) p. 55-66, 39 ref.

INDONESIA; ECONOMIC SOCIOLOGY; ECONOMIC DEVELOPMENT; ECONOMIC POLICIES; ECONOMIC INDICATORS; ECONOMIC SYSTEMS; SOCIAL WELFARE; POVERTY.

Economic sociology is a sociological perspective that explains economic phenomena, mainly related to aspects of production, distribution, exchange, consumption of goods, services, and resources, aiming at improving people's welfare. Contribution of the sub-discipline of economic sociology improves along with the various socio-economic problems in the society both in developed and developing countries where they try to improve people's welfare through its development programs. Progress of economic sociology can not be separated

from the ideas of classical sociology and new thinking in economic sociology since 1980s. Economic sociology studies in Indonesia showed that most of the studies are directed toward on how the community alleviates poverty. Currently, economic sociology studies social capital, as well as structural problems, institutional and national economic systems associated with welfare. The national economic system is in accordance with the country's constitution. On the other hand, the impacts of national development are also the focus of the studies since the development policies have not been able to realize a welfare society and inclusiveness in national development. It is based on the construction of the welfare state model with the main indicator of relatively equal development.

158 PANGESTUTI, R.

GAP-SOP implementation and fresh fruits certification at Central Java [Indonesia]. ***Penerapan GAP-SOP dan sertifikasi buah segar di Jawa Tengah*** / Pangestuti, R. (Balai Pengkajian Teknologi Pertanian Jawa Tengah, Ungaran (Indonesia)). [Proceedings of the national seminar on Indonesian fruits] Bogor (Indonesia), 28-29 Oct 2009 / Taher, R.; Dwiastuti, M.E.; Devy, N.F.; Prabawati, S.; Harlion, L.L. (eds.). Jakarta (Indonesia): Puslitbanghorti, 2009: p. 231-241, 3 tables; 11 ref. 634.1/.7(594)/SEM/p

FRUITS; ALTERNATIVE AGRICULTURE; ORGANIC AGRICULTURE; STANDARDIZING; REGISTRATION; CERTIFICATION; AGRICULTURAL PRODUCTS; FARMERS; PARTICIPATION; TECHNOLOGY TRANSFER; JAVA.

Consumer demand for quality agricultural products and safe products for consumption including fresh fruit, was responded positively by the producers of fruit in Central Java which guided by related institutions. Series of activities starting from socialization of GAP-SOP programme; preparation of SOP, registration and certification of fresh fruit has been done. This study aimed at knowing the progress of GAP-SOP implementation which has been carried out by producers of fresh fruit in Central Java, and also the constraints and obstacles faced in the implementation of fresh fruit certification. The primary data obtained through direct interview with farmers whose grown Nglumut Salak fruit at Magelang and Banjarnegara Regency, melon farmers at Pekalongan Regency, watermelon farmers at Kebumen District and mango farmers at Pemalang District which have been in the certification process of the orchard. Secondary data obtained from the relevant agencies at the Provincial Agricultural Office, National Food Security and Regional Food Safety Competency Authority (RFSCA) Central Java. Data were analyzed descriptively using tabulation method and literature study. The results of the study showed that farmers/farmer groups have realized the importance of GAP-cultivation according to standard operating procedures, and have strong desire to get a Certificate Prima 3 for the fruit products they produced. The obstacle faced were mixed varieties of fruits cultivated in one area, disorderliness administration/records as a document of the orchard, the implementations of grading, sorting and packaging were still simple and switching system of land cultivation in melon and watermelon commodities. High interest for the fruit certification constrained by limited budget of the government's platform so the government imposed rationing system and the queue. Up to now, there has been available 27 of SOP fruit, 5 registered farmer groups with 3 local prime fruit commodities (Pekalongan Red melon, Pemalang mango, Magelang Nglumut salak) which also have received Certificates Prima 3.

159 RIVAI, R.S.

Concept and implementation of sustainable agricultural development in Indonesia. ***Konsep dan implementasi pembangunan pertanian berkelanjutan di Indonesia*** / Rivai, R.S.; Anugrah, I.S. (Pusat Sosial Ekonomi dan Kebijakan Pertanian, Bogor (Indonesia)).

Forum Penelitian Agro Ekonomi (Indonesia). ISSN 0216-4361 (2011) v. 29(1) p. 13-25, 1 ill., 1 table; 24 ref.

INDONESIA; AGRICULTURAL DEVELOPMENT; SUSTAINABILITY; SOCIOECONOMIC ENVIRONMENT; ECONOMIC GROWTH; ECOSYSTEMS; LAND PRODUCTIVITY; DIVERSIFICATION; APPROPRIATE TECHNOLOGY.

Sustainable development including on agricultural aspect all of the countries' commitment to be implement. Previous development implementation focused on economic progress resulting in environmental degradation and social problems. Sustainable development approach is basically development activities integrating economic, social, and environmental aspects. However, this concept is not fully implemented by all of the countries as depicted in the agreement. It is indicated by many problems related with environmental degradation and natural resources deprivation. Implementation of sustainable agricultural development deals with some constraints especially in developing countries including in Indonesia. One of the main constraints in Indonesia is interest conflict among sectors leading to separated implementation. Sustainable development concept is a multidimensional approach implemented through integrated program among sectors both at central and regional levels.

E20 ORGANIZATION, ADMINISTRATION AND MANAGEMENT OF AGRICULTURAL ENTERPRISES OR FARMS

160 BURHANSYAH, R.

[Analysis of pineapple farming feasibility at Kubu Raya [West Kalimantan (Indonesia)]. ***Analisis kelayakan usaha tani nanas di Kabupaten Kubu Raya*** / Burhansyah, R.; Supriyanto, A.; Melia P.; Tietyk K. (Balai Pengkajian Teknologi Pertanian Kalimantan Barat, Pontianak (Indonesia)). [Proceedings of the national seminar on Indonesian fruits] Bogor (Indonesia), 28-29 Oct 2009 / Taher, R.; Dwiastuti, M.E.; Devy, N.F.; Prabawati, S.; Harlion, L.L. (eds.). Jakarta (Indonesia): Puslitbanghorti, 2009: p. 292-303, 1 table; 8 ref. Appendices. 634.1/.7(594)/SEM/p

PINEAPPLES; FARMING SYSTEMS; COST BENEFIT ANALYSIS; FARM INPUTS; TRADITIONAL TECHNOLOGY; PRICE POLICIES; PRODUCTION COSTS; MARKET PRICES; KALIMANTAN.

Pineapple development prospects in West Kalimantan are good enough because it is supported by the availability of land pineapple processing plant. One of the problems in the development of pineapple Kubu Raya was that the farmers wanted to raise the price in accordance with the market price of Rp 400.00 to Rp 600.00. The response to the problems will require a feasibility study of pineapple farming in Kubu Raya. The purpose of this study was to determine the feasibility of pineapple farming in Kubu Raya. This research was conducted in May to July 2009 and used survey research methodology to the pineapple farmers. The analysis used project evaluation criteria, which were Economic Benefits, Net Present Value (NPV), Internal Rate Return (IRRI), B/C ratio, Payback period. The results showed that both the pattern of 10,000 plant population/ha and population of 40.000/ha were feasible based on project feasibility. Sensitivity analysis indicated a change in the price of labor, the price of production facilities, production cuts and decreased selling prices could affect the feasibility of pineapple farming.

161 GALIB, R.

Contribution of buffaloes farm in household income: case of Sungai Buluh Village, Labuan Amas Subdistrict, Hulu Sungai Tengah District [Indonesia]. ***Kontribusi usaha ternak kerbau dalam pendapatan rumah tangga peternak: kasus di Desa Sungai Buluh, Kecamatan Labuan Amas Utara, Kabupaten Hulu Sungai Tengah*** / Galib, R.; Hamdan, A. (Balai Pengkajian Teknologi Pertanian Kalimantan Selatan, Banjarbaru (Indonesia)) [Proceedings of the national seminar and workshop on buffaloes] Samarinda (Indonesia), 21-22 Jun 2011 / Talib, C.; Herawati, T.; Praharani, L.; Sumantri, C.; Hidayati, N. (eds.). Bogor (Indonesia): Puslitbangnak, 2012: p. 159-164, 2 tables; 4 ref. 636.293.082/SEM/p

WATER BUFFALOES; FARM INCOME; HOUSEHOLDS; MEAT PRODUCTION; KALIMANTAN.

Development of swamp buffalo (*Bubalus bubalus*) in South Kalimantan has great opportunities and good prospects. It is in terms of natural resources in the form of potential wetlands agroecosystem that once the provider of the palatable forage feed for the buffalo. Human resources such as raising experience that is long enough, from generation to generation and never stopped. For residents of South Kalimantan, buffalo meat is preferred and the price is not different in compared to the price of beef meat, so it can meet the needs of the community. To find out the contribution of buffaloes in the household income of farmers in the Sungai Buluh Village, Labuan Amas Subdistrict, Hulu Sungai Tengah District, in 2008, primary data was collected through unstructured interviews with participatory approaches (Participatory Rural Appraisal) through focus group discussions and is equipped with the results of interviews with key informants, field officers, and the data from the relevant secondary offices. Assessment results show that the main source of household income are buffaloes (mainly for the expenditure of non consumption needs), in spite of other commodities. Although swamp buffaloes contribute to the total meat production in South Kalimantan, it has only reached 15%. Even so the buffalo ranchers do not reduced interest and since 2002 the business development program area of the swamp buffalo has been carried out by local government.

162 RUSDIANA, S.

Farm income on buffalo business in the District of Gunung Sindur Bogor [Indonesia]. ***Pendapatan usaha ternak kerbau di Kecamatan Gunung Sindur Kabupaten Bogor*** / Rusdiana, S.; Mahendri, I G.A.P.; Talib, C. (Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia)). [Proceedings of the national seminar and workshop on buffaloes] Samarinda (Indonesia), 21-22 Jun 2011 / Talib, C.; Herawati, T.; Praharani, L.; Sumantri, C.; Hidayati, N. (eds.). Bogor (Indonesia): Puslitbangnak, 2012: p. 152-158, 3 tables; 9 ref. 636.293.082/SEM/p

WATER BUFFALOES; FARM INCOME; SURVEYS; FARM MANAGEMENT; JAVA.

The purpose of this research is to analyze the magnitude of the maintenance costs of the buffalo herds for one year, gross revenue and net income as well as find out the influence of the cost, the outpouring of manpower and the number of livestock ownership. Research carried out in Gunung Sindur Bogor Regency, West Java Province. Prediction of socioeconomic value household and cultural of the area very well. The method used is survey method. Primary data obtained from observations and interviews is from the fields by using the 30 respondents buffalo breeders which sampled by using proportional stratified random sampling method. Secondary data obtained from a breeder and the primary data of Bogor Regency, West Java. Data analyzed using descriptive statistical analysis and t-test comparing gross income and net income. T test results obtained 10.13 which indicates that

the relationship between gross income and net income is significantly different (P<0.05), with income acquires for Rp 2.7 million/head/year.

E21 AGRO-INDUSTRY

163 BURHANSYAH, R.

Partnership pattern of sustainable pineapple agrobusiness at Kubu Raya District, West Kalimantan [Indonesia]. ***Pola kemitraan agribisnis nanas yang berkelanjutan di Kabupaten Kubu Raya*** / Burhansyah, R.; Supriyanto, A. (Balai Pengkajian Teknologi Pertanian Kalimantan Barat, Pontianak (Indonesia)). [Proceedings of the national seminar on Indonesian fruits] Bogor (Indonesia), 28-29 Oct 2009 / Taher, R.; Dwiastuti, M.E.; Devy, N.F.; Prabawati, S.; Harlion, L.L. (eds.). Jakarta (Indonesia): Puslitbanghorti, 2009: p. 217-230 , 3 ill., 12 ref. 634.1/.7(594)/SEM/p

PINEAPPLES; MARKETING CHANNELS; PARTNERSHIP; FARMERS; ENTERPRISES; COOPERATIVE FARMING; AGROINDUSTRIAL SECTOR; EXPORTS; SUSTAINABILITY; KALIMANTAN.

Pineapple development in West Kalimantan is prospective and is supported by the availability of land and the pineapple processing industry of PT Agro Industry Saribumi Kalbar. On the other hand, the company still have limited raw materials to meet the factory capacity. Raw materials are mostly from the farmers. Until now, there has been no clear pattern of partnership. It required a study of partnership that sustainable for pineapple agribusiness at Kubu Raya District. The study was carried out in April to May 2009. Studies located in the pineapple development area of Kubu Raya Districs. This study used institutional analysis. Sustainable pineapple farmer partnership with enterprise can be done with 2 (two) scenarios. First: OAC (Operational Agribusiness Cooperation) pattern between farmers or groups partnering with exporter companies; second: farm cooperative partnership with the exporters company. Sustainable partnership between the farmer and the company should be characterized, including, farmers who owned the entire agribusiness network, horizontal and vertical network partnership, a partnership of economic rationality and specialization in the organic division of work.

164 PASARIBU, S.M.

Developing agroindustry in rural areas using one village one product (OVOP) approach. ***Pengembangan agroindustri perdesaan dengan pendekatan one village one product (OVOP)*** / Pasaribu, S.M. (Pusat Sosial Ekonomi dan Kebijakan Pertanian, Bogor (Indonesia)). *Forum Penelitian Agro Ekonomi* (Indonesia). ISSN 0216-4361 (2011) v. 29(1) p. 1-11, 1 ill., 15 ref.

AGROINDUSTRIAL SECTOR; INTEGRATED RURAL DEVELOPMENT; PRODUCT DEVELOPMENT; QUALITY; ECONOMIC COMPETITION; POSTHARVEST TECHNOLOGY; FARM INCOME; RURAL AREAS.

Agro-industry development in rural areas could be implemented using an OVOP approach. As a people movement, this agroindustry needs active participation of all related institutions. The inter-related elements under the agribusiness system on this approach requests willingness of all related parties, from the upstream to the downstream of agricultural system cycle. The working steps for its application cover the selection of local specific product, identification of product strengths and associated constraints for development for higher quality and for global market, application of product development (processing and

marketing) for added value and income improvement, and implementation of evaluation for better future product and business performances. The OVOP approach could be applied in rural areas of Indonesia if all stakeholders along with their respective institutions are in favor of the rural people's interest.

165 RINA D.Y.
Study of kepok banana agribusiness on wet climate upland area South Kalimantan [Indonesia]. ***Kajian agribisnis pisang kepok di lahan kering beriklim basah Kalimantan Selatan*** / Rina D.Y. (Balai Penelitian Pertanian Lahan Rawa, Banjarbaru (Indonesia)); Antarlina, S.S.; Amali, N. [Proceedings of the national seminar on Indonesian fruits]. Bogor (Indonesia), 28-29 Oct 2009 / Taher, R.; Dwiastuti, M.E.; Devy, N.F.; Prabawati, S.; Harlion, L.L. (eds.). Jakarta (Indonesia): Puslitbanghorti, 2009: p. 257-272, 2 ill., 6 tables; 15 ref. 634.1/.7(594)/SEM/p

MUSA PARADISIACA; CULTURAL METHODS; LAND VARIETIES; POSTHARVEST TECHNOLOGY; MARKETING CHANNELS; AGROINDUSTRIAL SECTOR; DIFFERENTIAL PRICING; DRY FARMING; HUMID CLIMATE; KALIMANTAN.

The main factor of agribusiness can be grouped into production system, processing, and marketing system. Those systems are related to each other, hence those functions can be increased together. The upland area in South Kalimantan is potential for banana's Kepok development. This paper aimed at obtaining information of the kepok banana agribusiness on South Kalimantan's dry land. The banana cultivation contribution toward farmer's income was 38.74% banana production improvement could be conducted through implementation of specific location banana cultivation technology: using local varieties with 2-3 month old seed, 4 m x 5 m planting size, 10 kg manure as basal fertilizer and 0.5 kg lime/pH, fertilizer dose was 0.5 kg Urea, 0.33 kg SP36 and 0.25 kg KCl/tree/year, which produced 20.8 t/ha (twice harvesting). Banana marketing was not only in South Kalimantan area but also from outside South Kalimantan area. The efficient fresh banana marketing channel for Surabaya destination was started from farmer to Surabaya's collector merchant then to retailer and to consumers, while for marketing channel for South Kalimantan was producers to village's collector traders then to the last province's collector traders to consumers. Generally, central area of kepok banana production was far from consumer's market so for expanding marketing's capacity, the fresh banana manufacturing to banana flour was required. Banana flour manufacturing technology could be conducted by 3 manners especially fresh banana slicing technique, viz. (1) sulada, (2) manual slight chops hand tools and tools and (3) manual slight chops tools with electricity. The three manners have good quality flour and water content was <10%. Economically manual slight chops tools with electricity gave better profit Rp 1,603,296.7/800 stems. The problems that had been faced by the farmer on cultivating kepok banana were unstable banana's price, diseases and definite capital.

E70 TRADE, MARKETING AND DISTRIBUTION

166 HASIBUAN, A.M.
[Market integration of white pepper in Bangka Belitung (Indonesia)]. ***Integrasi pasar lada putih di Bangka Belitung*** / Hasibuan, A.M.; Sudjarmoko, B. (Balai Penelitian Tanaman Rempah dan Aneka Tanaman Industri, Sukabumi (Indonesia)) [Innovation to support the development of pepper in Bangka Belitung Province (Indonesia)]. / Syafaruddin; Daras, U.; Ajijah, N.; Ferry, Y.; Indriati, G.; Taher, S.; Supriadi, H.; Towaha, J.; Herman, M.; Hasibuan, A.M.; Wicaksono, I.N.A.; Rivai, A.M. (eds.). Sukabumi (Indonesia): Balittri, 2009: p. 23-30, 2 ill., 4 tables; 10 ref. 633.841/INO

PEPPER; MARKETING; MARKETS; ECONOMIC INTEGRATION; BANGKA.

Bangka Belitung Province has long known as the white pepper producer, in the world of trade it is known as Munthok white pepper. However, nowadays, the production and area of pepper show continuously a significant decline. Therefore, efforts are needed to restore the glory of pepper in this area. This paper discusses the integration of the market of white pepper in Bangka Belitung as one of agribusiness aspect. The result analysis of white pepper market showed that farmers have shares almost 80%, and a largest profit margin was obtained by exporter. Market structures tended to oligopolistic. Integration of the farmers price and exporters, (MTT of 21.7) was very weak because the selling price at the farmer level was determined by the price level in the previous month. While the integration between the market price of the exporter and the world price was quite strong (MTT of 0.68).

F01 CROP HUSBANDRY

167 BUDIYATI, E.

[Application of auxin on grape (Vitis vinifera) var. Kediri kuning cuttings]. ***Pemberian auksin pada bibit setek tanaman anggur (Vitis vinifera) varietas Kediri kuning*** / Budiyati, E.; Basuki J.S. (Balai Penelitian Tanaman Jeruk dan Buah Subtropika, Tlekung, Malang (Indonesia)). [Proceedings of the national seminar on Indonesian fruits] Bogor (Indonesia), 28-29 Oct 2009 / Taher, R.; Dwiastuti, M.E.; Devy, N.F.; Prabawati, S.; Harlion, L.L. (eds.). Jakarta (Indonesia): Puslitbanghorti, 2009: p. 388-401, 5 ill., 5 tables; 19 ref. 634.1/.7 (594)/SEM/p

VITIS VINIFERA; VARIETIES; AUXINS; PROPAGATION BY CUTTINGS; SEEDLINGS; GROWTH; PLANT GROWTH SUBSTANCES; SHOOTS.

Grapevine multiplication can be produced either generatively by seedling or vegetatively by both cutting and grafting. In Indonesia, most grapevines are from vegetative one. Application of growth controller hormone functions as stimulator of plants growth. This research was aimed at observing the effect of auxin application to seedling growth from grapevine cutting. The research was conducted on December 2007 until March 2008 at Indonesian Citrus and Subtropical Fruits Research Institute (950 m above sea level). It used completely randomized design with 2 treatments and 3 replications, they were: (1) auxin application of 50 ppm (P1) and non auxin application (P0); (2) cultivation activities which were comprised of fertilizer application, clearing weeds, and pest and diseases controlling. The result showed that the percentage of cutting growth of P1 treatment was 60% at two weeks after application, while the percentage of cutting growth of P0 treatment was 63.3% at one week after application. Average number of leaves at P1 treatment was 3.38 leaves, and that of control was 3.53 leaves. Average length of shoot at P0 was 1.85 cm, and that of P1 treatment was 3.43 cm. Average length of leaf at P0 was 1.66 cm, while that of P1 treatment was 1.7 cm. Width of leaf at P0 treatment was 2.02 cm. According to T test result, the auxin application had significant effects to the length of shoot, length of leaf and width of leaf. On the contrary, it did not have any significant effect to the leaves number.

168 DARAS, U.

Increasing pepper productivity through live post height and branches volume optimization. ***Peningkatan produktivitas lada melalui optimalisasi tinggi tajar dan volume percabangan tanaman*** / Daras, U.; Rusli (Balai Penelitian Tanaman Rempah dan Aneka Tanaman Industri, Sukabumi (Indonesia)). [Innovation to support the development of pepper in Bangka Belitung Province (Indonesia)] / Syafaruddin; Daras, U.; Ajijah, N.; Ferry, Y.;

Indriati, G.; Taher, S.; Supriadi, H.; Towaha, J.; Herman, M.; Hasibuan, A.M.; Wicaksono, I.N.A.; Rivai, A.M. (eds.). Sukabumi (Indonesia): Balittri, 2009: p. 127-130, 1 ill., 9 ref. 633.841/INO

PIPER NIGRUM; PRODUCTIVITY; HEIGHT; BRANCHES; PRUNING.

Black pepper belongs to dimorphic plants which has two kinds of branches (orthotrop and plagiotrop), functioning differently. A number of the plagiotrop branches per vine may extent at some limit yields produced. Pruning practices of black pepper are mainly aimed to generate more branches that may be gained, in turn, increase in yields. Furthermore, by using live posts mean yield of the crops may also be higher than those of traditional methods. Therefore, the use of lengthen live post (5-6 m long) combined with more intensity of pruning (5-6 times/year) that may be applied is expected to give more yields.

169 ERDIANSYAH, N.P.

Relationship between caffeine content and flavor with light intensity of several coffee Robusta clones. ***Hubungan intensitas cahaya di kebun dengan profil cita rasa dan kadar kafein beberapa klon kopi Robusta*** / Erdiansyah, N.P.; Yusianto (Pusat Penelitian Kopi dan Kakao Indonesia, Jember (Indonesia)). Pelita Perkebunan (Indonesia). ISSN 0215-0212 (2012) v. 28(1) p. 14-22, 4 ill., 3 tables; 12 ref.

COFFEA CANEPHORA; CLONES; LIGHTING; SHADE; FLAVOUR; CAFFEINE; QUALITY.

Coffee is a refreshing beverage product and its price is determined by physical quality and flavor. An excellent coffee flavor is resulted only from qualified coffee beans, produced by well managed plantation. The objective of this experiment was to study the effect of sunlight intensity entering coffee farm on flavor profiles and caffeine content of Robusta coffee. The experiment was conducted at the Field Experimental Kaliwining Estate of Indonesian Coffee and Cocoa Research Institute (ICCRI) during 2009-2011. Treatments were Robusta coffee clones and sunlight intensity. Experimental design was split plot design with three replications. Robusta clones used were BP 409, BP 534, BP 936 and BP 939, planted in 2002. The sunligt intensity treatments were 100% (without shade tree), 50-60% (*Leucaena leucocephala shade*), and 20-30% (*Hibiscus macrophyllus* and *Melia azedarach* L. shades). Only red coffee cherries were harvested for flavor and caffeine analysis. Coffee cherries were washed, depulped and sundried until moisture content of less than 12%. The green coffee bean samples were roasted at medium level (Agtron Scale at 65#) for cupping test which involved five expert panelists by using ICCRI protocol. Caffeine content was determined by spectrophotometric method. The experiment result indicated that high sunlight intensity resulted in strong aroma of Robusta coffee, while good flavor coffee need medium light intensity. Cafein content had positive correlation with light intensity entering the coffee farm, whereas cafein content had no direct effect on Robusta coffee flavor.

170 FANINDI, A.

Effect of shade levels and cutting interval on Arachis glabrata production. ***Pengaruh naungan dan interval pemotongan terhadap produksi hijauan Arachis glabrata*** / Fanindi, A.; Yuhaeni, S.; Sutedi, E.; Oyo (Balai Penelitian Ternak Ciawi, Bogor (Indonesia)). [Proceedings of the national seminar on animal husbandry and veterinary technology 2011]. Bogor (Indonesia), 7-8 Jun 2011 / Prasetyo, L.H.; Damayanti, R.; Iskandar, S.; Herawati, T.; Priyanto, D.; Puastuti, W.; Anggraeni, A.; Tarigan, S.; Wardhana, A.H.; Darmayanti,

N.L.P.I. (eds.). Bogor (Indonesia): Puslitbangnak, 2012: p. 849-856, 6 ill., 2 tables; 13 ref. 636:619/SEM/p

ARACHIS GLABRATA; FORAGE; HARVESTING; PRODUCTION; PLANT PRODUCTION; SHADING; FELLING CYCLE.

A study was done to determine the effect of shade on forage production of *Arachis glabrata*. The study was conducted at Indonesian Research Institute for Animal Production for one year. Shade is made from paranet. Plants were grown using seeds and planted in pots with a diameter of 36 cm. Pots were placed on the artificial shade 2.5 m x 2.5 m which side was covered using paranet, according to treatment. Research was done based on randomized block design factorial with 5 treatments and 3 replications. The first factor is intensity level of shade that consists of N0: control without shade, N1: Shade using 1 layer paranet (50% shade), N2: Shade use 2 layers paranet (70% shade), N3: Shade uses 3 layers paranet (80% shade), N4: Shade uses 4 layers paranet (90% shade). The second factor is the cutting interval that consist of 1 month intervals, 2 months and 3 months. The results showed that the weight of fresh and dried forage was influenced by the level of shade, while cutting interval had no effect on fresh and dry matter production of *Arachis glabrata*. The highest production achieved in the 1 layer paranet (50%), whereas until layers 2 paranet (70%) fresh and dry matter production did not differ from control. This result showed that *Arachis glabrata* in this research, are shade tolerant plant, because the plant still can produce at the 2-layer shade paranet (70%), and even increased in the medium shade (50%).

171 PRISDIMINGGO

Production and quality of moringa planted from seed in research field of Assessment Institute for Agricultural Technology West Nusa Tenggara [Indonesia]. ***Keragaan, produksi dan kualitas kelor (Moringa oleifera L.) yang ditanam dengan biji di Kebun Balai Pengkajian Teknologi Pertanian Nusa Tenggara Barat*** / Prisdiminggo; Panjaitan, T.; Astiti, L.G.S. (Balai Pengkajian Teknologi Pertanian Nusa Tenggara Barat, Mataram (Indonesia)). [Proceedings of the national seminar on animal husbandry and veterinary technology 2011]. Bogor (Indonesia), 7-8 Jun 2011 / Prasetyo, L.H.; Damayanti, R.; Iskandar, S.; Herawati, T.; Priyanto, D.; Puastuti, W.; Anggraeni, A.; Tarigan, S.; Wardhana, A.H.; Darmayanti, N.L.P.I. (eds.). Bogor (Indonesia): Puslitbangnak, 2012: p. 825-828, 1 ill., 2 tables; 8 ref. 636:619/SEM/p

MORINGA OLEIFERA; PRODUCTION; QUALITY; SEED; NUSA TENGGARA.

An evaluation on production and quality of moringa was conducted between January and April 2011 at AIAT-West Nusa Tenggara. The seeds were sown following overnight soaking with one seed per hole in a two plot of 1.7 m x 7.5 m with plant spacing of 10 cm x 10 cm. Urea were provided at 250 kg/ha and applied 30 days after sowing (DAS). On the 10 days after planting (DAP), the seed emergence rate was 43% and reached 85% by 20 DAP. On the 90 DAP, mortality rate of total emerged was 14%, plant height was 168.3 cm, fresh weight was 210 g/plant, dry matter weight was 26 g/plant, crude protein content was 14.6%, organic matter content was 95.0% and total dry matter yield was 8.7 ton/hectare. Moringa is promising roughage to be used as Cl feed supplement for cattle in cattle production area such as West Nusa Tenggara.

172 SANTOSO, B.B.

Pattern on the yield improvement of *Jatropha curcas* L. of West Lombok ecotype during four years production cycle. ***Pola peningkatan hasil tanaman jarak pagar***

(Jatropha curcas L.) ekotipe Lombok Barat selama empat tahun siklus produksi / Santoso, B.B. (Universitas Mataram (Indonesia). Fakultas Pertanian); Hariyadi; Purwoko, B.S. *Jurnal Agronomi Indonesia* (Indonesia). ISSN 2085-2916 (2011) v. 39(2) p. 137-143, 7 tables; 27 ref.

JATROPHA CURCAS; YIELD INCREASES; YIELD COMPONENTS; YIELDS; SEEDS; LIPID CONTENT; DRY FARMING.

The aim of this experiment was to evaluate the pattern of yield improvement of *Jatropha curcas* L. of West Lombok ecotype at dry land of North Lombok, West Nusa Tenggara during four years production cycle. The experiment was conducted in randomized completely block design (RCBD) using three types of propagules (stem cutting, seed, and seed followed by pruning after transplanting) and three replications from November 2006 to November 2010. The results showed that yield increased as plant age increased. Plants cultivated during rainy season had higher yield compared to those cultivated during dry season. However, the oil content of nuts was slightly higher when harvested in dry season than in rainy season. Yield was also affected by plant material used. In the first year, plants propagated by stem cutting had the highest yield. In the second, third, and fourth year, plants propagated from seed followed by pruning produced the highest nut dry weight. During four years production cycle, annual yield improvement was about 2-3 times than the previous year and did not follow the geometrical progression based on dichotomy branching pattern of jatropha.

173 SRIWATI, R.

Response of cocoa seedling planted in different media as affected by application of Trichoderma application. ***Respon pertumbuhan bibit kakao akibat pemberian dua isolat Trichoderma pada beberapa campuran media tanam*** / Sriwati, R.; Khamzurni, T. (Universitas Syiah Kuala, Banda Aceh (Indonesia)); Ardiansyah; Yusmaini. *Pelita Perkebunan* (Indonesia). ISSN 0215-0212 (2012) v. 28(1) p. 45-53, 4 ill., 23 ref.

THEOBROMA CACAO; SEEDLINGS; TRICHODERMA HARZIANUM; RICE; PLANTING; BRAN; PLANT NURSERIES; BIOPESTICIDES; GROWING MEDIA.

Trichoderma is an antagonist fungal which is potential to be used as a biopesticide, however its application in cocoa propagation medium has not been studied. The study aimed at determining the effect of two types of Trichoderma isolates application on several media on the growth response of cocoa seedling. Research was conducted at Department of Agrotechnology Laboratory, Faculty of Agriculture Syiah Kuala University in completely randomized design (CRD) non factorial with three replication. The treatments included of soil as control, soil with suspension of *T. harzianum*, soil with *T. virens*, soil with suspension of *T. harzianum* and rice bran, soil with suspension of *T. virens*, soil with *T. harzianum* suspension and rice, soil with suspension of *T. virens* and rice. Results of the study showed that soil treatment with both suspension of *T. harzianum* and *T. virens* without media and rice bran showed a positive effect on the percentage of seed germination, plant height and number of leaf formation compared with control and the media of rice and rice bran. However, soil treatment with Trichoderma suspension, rice bran and rice showed the occurrence of inhibition in germination percentage, plant height and leaf number compared with the control and soil treatment without additional media.

174 WIRNAS, D.
Analysis of RAPD marker linked to shading stress tolerance of soybean. ***Analisis marka RAPD yang terpaut dengan toleransi terhadap naungan pada kedelai*** / Wirnas, D.; Sopandie, D.; Trikoesoemaningtyas; Sobir (Institut Pertanian Bogor (Indonesia). Fakultas Pertanian). *Jurnal Agronomi Indonesia* (Indonesia). ISSN 2085-2916 (2011) v. 39(2) p. 73-78, 6 tables; 20 ref.

GLYCINE MAX; RAPD; QUANTITATIVE TRAIT LOCI; SHADE TOLERANCE; AGRONOMIC CHARACTERS.

The objective of the research was to identify RAPD markers linked to QTL related to agronomic traits of soybean under low-light intensity condition. The genetic material used in the QTL analysis based on RAPD markers were Ceneng, Godek, and F6 RILs derived from hybridization between Ceneng (tolerant parent) and Godek (sensitive parent). The result of molecular analysis showed that 9 primers were polymorphic and linked to the tolerant parent. Primers produced 14 RAPD markers which were polymorphic and linked to the tolerant parent. The markers were distributed into a linkage group that containing seven markers. RAPD markers (OPE15-800, OPM20-800) were linked to two QTL controlling number of productive node and seed weight, respectively. The marker linked to the tolerant parent could be used as a marker assisted selection for high-yielding soybean lines under low-light intensity.

F02 PLANT PROPAGATION

175 DINARTI, D.
Micropropagation on several bulb storage periods and shallot micro bulb induction on two different temperatures. ***Perbanyakan tunas mikro pada beberapa umur simpan umbi dan pembentukan umbi mikro bawang merah pada dua suhu ruang kultur*** / Dinarti, D.; Purwoko, B.S.; Purwito, A.; Susila, A.D. (Institut Pertanian Bogor (Indonesia). Fakultas Pertanian). *Jurnal Agronomi Indonesia* (Indonesia). ISSN 2085-2916 (2011) v. 39(2) p. 97-102, 3 tables; 16 ref.

ALLIUM ASCALONICUM; SEED; MICROPROPAGATION; STORAGE; TEMPERATURE; IN VITRO CULTURE; GROWTH.

Shallot bulb generally stored for several month before planted in the field. Since explant age is one of important factors in tissue culture development, storage period of shallot bulb might alter the explant growth *in vitro*. Shoots of shallot formed in the *in vitro* culture can be use as seedling, and temperature may affect micro bulb induction. Two experiments had been conducted to evaluate 1) the effect of storage period in the field on the growth of shallot explant *in vitro* and 2) the effect of culture room temperature in microbulbs induction of shallot. In the first experiment, shallot bulb had been stored for 1, 2, 3 and 4 months before used as explants. Storage period significantly influenced the explant growth *in vitro*. Bulb with 2 months storage gave the best performance on number of micro shoot, number of leaves and roots, and less of vitrification. Micro shoots on three weeks after planting (WAP) was feasible to be used as propagule for shallot micro bulb induction. In the second experiment, shoots from propagation medium was transplanted to bulb induction medium and grown in growth chamber with different temperatures (day/night) 20/17°C and 30/27°C, respectively. Micro bulb induction was influenced by temperature. Lower temperature showed good results for number of leaves, length of leaves, number of roots, and length of roots. However, temperature of 30/27°C gave the best result on number of micro bulb, diameter of bulb and bulb width: bulb disk diameter ratio.

176 MARIANA, B.D.

Callus induction of lowland longan (*Dimocarpus longan*, Lour.). *Induksi kalus lengkeng dataran rendah (Dimocarpus longan, Lour.)* / Mariana, B.D.; Sugiyanto, A. (Balai Penelitian Tanaman Jeruk dan Buah Subtropika, Tlekung, Malang (Indonesia)). [Proceedings of the national seminar on Indonesian fruits] Bogor (Indonesia), 28-29 Oct 2009 / Taher, R.; Dwiastuti, M.E.; Devy, N.F.; Prabawati, S.; Harlion, L.L. (eds.). Jakarta (Indonesia): Puslitbanghorti, 2009: p. 347-354 , 2 ill., 2 tables; 11 ref. 634.1/.7(594)/SEM/p

DIMOCARPUS LONGAN; CALLUS; PLANT GROWTH SUBSTANCES; 2,4-D; LEAVES; EXPLANTS; GROWTH; LOWLAND

Longan propagation via *in vitro* technique was initiated in ICSFRI Integrated Laboratories from May to August 2008. There were two steps in the research: determination of explant material and callus induction from two lowland longan accessions (Diamond River and Pingpong). Explant materials were taken from the first to the fifth leave and node from above. MS was used as the basic media for the treatment. CRD factorial 2 x 5 was used in the research. The first factor was longan accessions (Diamond River and Pingpong); while the second factor was plant growth regulator: 0; 2,4-D 1 mg/l; BAP 1 mg/l; 2,4-D 1 mg/l + 0.5 mg/l BAP; 0.5 mg/l 2,4-D + 1 mg/l BAP. Observations were made on time of initiation and%age of explants forming callus. The result showed that part of the leave that suitable to use as explants is the second to fourth leaf segment after shoots. On callus initiation stage, the treatment of varieties showed significant differences in the parameters of time of callus initiation and plant growth regulator 2,4 D 1 mg/l gave the best results. This reseach is expected to be the first step in developing alternative methods for propagation lowland longan.

177 PANCANINGTYAS, S.

Effectiveness of calcium chloride in reduction of shoot necrosis on cocoa (*Theobroma cacao* L.) *in vitro* propagation. *Keefektifan penambahan kalsium klorida untuk mengurangi nekrosis pada perbanyakan kakao (Theobroma cacao L.) secara in vitro* / Pancaningtyas, S. (Pusat Penelitian Kopi dan Kakao Indonesia, Jember (Indonesia)). *Pelita Perkebunan* (Indonesia). ISSN 0215-0212 (2012) v. 28(1) p. 23-31, 2 ill., 2 tables; 24 ref.

THEOBROMA CACAO; NECROSIS; CALCIUM CHLORIDE; SOMATIC EMBRYOGENESIS; PLANT EMBRYOS; PLANTING EQUIPMENT; IN VITRO; VITROPLANTS; PLANT PROPAGATION.

Various efforts have been developed for the optimization of the various stages *in vitro* micropropagation. The maturation stage and pre-acclimatization plantlets is an important stages that must be considered to produce vigorous plants and ready to be planted in the field. The purpose of this study was to reduced shoot tip necrosis in cocoa plantlets to obtain vigorous plantlets from *in vitro* propagation through the addition of *calcium chloride* ($CaCl_2$). The study used two stages of embryogenic development. The first was embryo maturation stage and the second was the shoot growth development stage. The study was arranged factorially in experiment design of completely randomized design consisting of two factors i.e. concentration of $CaCl_2$ consisted of 0, 50, 100, 150, and 200 mg/l and clones consisted of Sulawesi 1 and Sea 6. Each experiment was repeated three times, so the number of combination trials were 5 x 2 x 3 = 30 experimental units. The parameters observed included shoot growth percentage and vigorous plantlets percentage. The results showed that the addition of $CaCl_2$ at a concentration of 150 mg/l during maturation stage increased the embryos performance and percentage of shoot tip. However, it could not prevent the shoot tip necrosis. Whereas, the addition at a concentration of 50 mg/l during the shoot growth

development stage could reduced necrosis, suggested to increase the quality of *in vitro* planlets.

178 SUGIYANTO, A.

Effect of scion position and stem diameter size on the success of cleft grafting of longan (*Dimocarpus longan*). *Pengaruh posisi batang atas dan perbedaan ukuran diameter batang terhadap keberhasilan sambung celah lengkeng* / Sugiyanto, A.; Sukadi (Balai Penelitian Tanaman Jeruk dan Buah Subtropika, Tlekung, Malang (Indonesia)); Ayuningtyas, V.D. [Proceedings of the national seminar on Indonesian fruits] Bogor (Indonesia), 28-29 Oct 2009 / Taher, R.; Dwiastuti, M.E.; Devy, N.F.; Prabawati, S.; Harlion, L.L. (eds.). Jakarta (Indonesia): Puslitbanghorti, 2009: p. 363-380, 5 ill., 2 tables; 33 ref. 634.1/.7(594)/SEM/p

DIMOCARPUS LONGAN; SCIONS; STEMS; DIAMETER; DIMENSIONS; GRAFTING; ROOTSTOKS.

Longan (*Dimocarpus longan*) is a fruit that is favored by the people, because it tastes sweet with a distinctive aroma. Longan fruit prices high enough so the plants can be used for sources of income in order to increase farmers' income. This plant originated from South China region with subtropic climates and can grow on tropic climate as well as Indonesia. Longan grows well in areas with altitude between 300 to 950 m above sea level. Among farmers, litchi propagation is generally done by grafting, wet nursing, bud grafting and grafting. Propagation by grafting was more practising because of the well bearing fruit of the seed during fews months, but the constraint lies on the limitations of the parent tree and the risk of damage due to too many parent trees transplanted. Similarly, on feeding techniques, just limited seeds which can be obtained by this multiplications. Propagation by gap grafting is the most frequent among farmer or seeder, but the yields were are not satisfactory yet. Previously research showed that the percentage of successfull in continued crack propagation of litchi at 38.3% while by grafting at 6.7%. The purpose of this study was to investigate and to obtain information about the selection of stem length and stem diameter of the most appropriate of continued crack propagation in litchi plants. The experiment was conducted at Research Institute of Citrus and Subtropical Fruit with altitute 950 m above sea level from March to August 2008. Experiment was using a randomized block design (RBD) with the combined treatment were: First: the length of the stem above, namely A (stems above 10 cm from top); B (upper trunk 11-20 cm from top), and C (upper 21-30 cm of stem shoots); Second: the stem diameter, namely (a) size + stem diameter of rootstock on (0.64 to 0.70 cm), (b) lower stem diameter less than scions (0.58 to 0.62 cm), and (c) stem diameter below the more than top bar (0.72 to 0.84 cm). The experiment design consisted of 9 combinations of treatment with 4 replicates and three plants of each treatment unit in order to obtain 108 plants. The results showed that Ca treatment (position on the stem at the base, 21-30 cm from top to bottom bar of the same size with the bar above) produced the highest percentage of connections so that is 44.44% and produced the highest number of leaves at the age of observation 21 days after grafting. At the time of observation bud emergence, Ba treatment (upper trunk position in the middle, 11-20 cm from top to bottom stem + stem above) produced the fastest growth of shoots is 16.33 the day after grafting. Selection of rootstock diameter less than stem diameter increment would result in the highest compared with other treatments. Rootsock affected scion growth and vice versa scions was also influenced by rootsctok.

179 WINARTO, B.

Application of 2,4-D and TDZ on callus formation and its regeneration of Anthurium anther culture. ***Aplikasi 2,4-D dan TDZ dalam pembentukan dan regenerasi kalus pada kultur anther Anthurium*** / Winarto, B. (Balai Penelitian Tanaman Hias, Cianjur (Indonesia)); Mattjik, N.A.; Purwito, A.; Marwoto, B. *Jurnal Hortikultura* (Indonesia). ISSN 0853-7097 (2010) v. 20(1) p. 1-9, 2 ill., 4 tables; 33 ref.

ANTHURIUM; PLANT GROWTH SUBSTANCES; ANTHERS; GROWTH; CALLUS; REGENERATION; SHOOTS

Study of 2,4-D and TDZ concentration combination in callus formation and its regeneration on anther culture of Anthurium was conducted at Tissue Culture Laboratory of Indonesian Ornamental Crops Research Institute from November 2007 to August 2008. This study was aimed at determinating the effect of concentration combination of 2,4-D and TDZ on callus formation, growth, and its regeneration. Spadix of *Anthurium andraeanum* cv. Tropical which 50% of its stigma was in optimum receptive, MWR-3 medium containing BAP 0.75 mg/l, NAA 0.02 mg/l, sucrose 30 g/l, and gelrite 2.0 g/l and callus derived from the anthers were used in the experiments. Concentrations of 2,4-D and TDZ tested in the experiment for callus formation and its regeneration were 0, 0.5, 1.0, and 2.0 mg/l. Factorial experiment with four replications was arranged in a completely randomized design. The results of the study indicated that combination of 2,4-D and TDZ gave significant effect on callus induction and its regeneration. In callus formation, 2,4-D 0.5 mg/l combined with TDZ 2.0 mg/l was the most suitable treatment with potential anther growth up to 58%; and 38% of anther regenerated with average 2.3 of anthers produced callus per treatment. The 2,4-D 1.0 mg/l combined with TDZ 0.5 mg/l was the most appropriate treatment for callus regeneration into shoots with 5.3 shoots/explant.

180 YULIANTI, F.

Production of strawberry (*Fragaria x ananassa* Dutch) plantlet via meristem culture. ***Produksi planlet strowberi (Fragaria x ananassa Dutch) melalui kultur meristem*** / Yulianti, F.; Devy, N.F. (Balai Penelitian Tanaman Jeruk dan Buah Subtropika, Tlekung, Malang (Indonesia)). [Proceedings of the national seminar on Indonesian fruits]. Bogor (Indonesia), 28-29 Oct 2009 / Taher, R.; Dwiastuti, M.E.; Devy, N.F.; Prabawati, S.; Harlion, L.L. (eds.). Jakarta (Indonesia): Puslitbanghorti, 2009: p. 402-409, 2 ill., 4 tables; 11 ref. 634.1/.7(594)/SEM/p

FRAGARIA ANANASSA; TISSUE CULTURE; MERISTEM CULTURE; VITROPLANTS; TISSUE PROLIFERATION; SEEDLINGS.

The conventional method of strawberry cultivation in Indonesia is by rooted runners and splitting the mother plants. Disadvantageous of this methods are degeneration after third generation and their vulnerability and susceptibility to pathological agents from the mother plants. Tissue culture technique through meristem tip culture offers new method for strawberry mass propagation and production of diseases free plantlets. The research was conducted at Tissue Culture Laboratory, Indonesian Citrus and Subtropical Fruits Research Institute, from February to September 2009. The aim of the research was at obtaining production protocol of diseases free strawberry plantlets through meristem tip culture. The strawberry plantlets production were investigated through meristem tip culture of three strawberry cultivar, i.e. local ('Batu'), dorit and california. The result of the experiment showed that meristem tip which was submerged in antibiotic and cultured on MS 0 medium + 1 g/l active charcoal showed the best growth response. Growth capacity of local cultivar was the highest (90%), followed by dorit (60%) and california (30%). At the proliferation

phase, optimal growth of each cultivar was establish on medium MS macro-micro + 1/2 MS vitamin + 1/2 B5 vitamin + 4 micron M BAP + 0.5 micron M NAA. Better proliferation established on local, dorit and california cultivar, respectively.

F04 FERTILIZING

181 ABDULRACHMAN, S.

[Influence of silicate on stem hardness, paddy productivity, grain quality and rice produced]. ***Pengaruh silikat terhadap kekerasan batang, produktivitas padi, mutu gabah, dan beras yang dihasilkan*** / Abdulrachman, S. (Balai Besar Penelitian Tanaman Padi Sukamandi, Subang (Indonesia)). *Pangan* (Indonesia) ISSN 0852-0607 (2011) v. 19(3) p. 257-264, 8 tables; 11 ref.

RICE; GRAIN; SILICATES; FERTILIZER APPLICATION; PRODUCTIVITY; QUALITY; FIRMNESS; PEST RESISTANCE.

The objective of this research is to find out the effect of silicate application on increasing stem hardness, productivity and quality of rice. These trials were carried out using split plot design with three replications. Variety treatments (inbred, hybrid, and NPT) was placed as main plot, while silicate fertilizer was as subplot, e.i. (1) without silicate fertilizer as a control, (2) +50 ppm SiO_2, (3) +100 ppm SiO_2, (4) +200 ppm SiO_2, and (5) +400 ppm SiO_2. Silicate was applied as a basal fertilizer, while another fertilizers were applied according to those technical recommendations. The results indicated that: (1) Stem hardness depend on crops age and variety. The more crop age, the stem was more harder, inbred Impair 10 variety had less stem hardness compared to hybrid Hipa 6 variety and NPT B.105.33F-KN-11-1. The stem hardness could be increased by applying silicate fertilizer. Under low Si content like in the Alluvial soil of Subang (74.46%), this soil required 200 ppm SiO_2. While medium content of SiO_2 like in Andosols soil of Kuningan (82.66%) up to high content of SiO_2 like in Latosols soil of Bogor (87.24%), those soil required 50 ppm Si, (2) Average rice yield that was achieved by applying cilicate fertilizer were 6.24 t/ha at Alluvial soil, 6.71 t/ha at Andosols soil, and 7.23 t/ha of dry paddy at Latosols soil. Therefore, the yield increase was 6.45% on alluvial soil, 6.67% on Andosols soil, and 7.05% on Latosols soil compared to control, and (3) Application of silicate fertilizer increased rice quality, but not to all soil types. On Alluvial soil, transparency as a component of rice quality increased from 1.4% to 1.6%. While on Latosols soil, milling yield rice, whiteness and milling degree increased from 68.9% to 69.1%; 48.8% to 50.3%; and from 129.9 to 136.4, respectively.

182 HARLION, L.L.

Evaluation of potassium deficiency and excessive symptom on mangosteen (*Garcinia mangostana* L.) plants. ***Evaluasi gejala kekurangan dan kelebihan kalium pada tanaman manggis (Garcinia mangostana L.)*** / Harlion, L.L.; Hendri (Balai Penelitian Tanaman Buah Tropika, Solok (Indonesia)). [Proceedings of the national seminar on Indonesian fruits] Bogor (Indonesia), 28-29 Oct 2009 / Taher, R.; Dwiastuti, M.E.; Devy, N.F.; Prabawati, S.; Harlion, L.L. (eds.). Jakarta (Indonesia): Puslitbanghorti, 2009: p. 483-496 , 7 ill., 1 table; 10 ref. 634.1/.7(594)/SEM/p

GARCINIA MANGOSTANA; POTASSIUM; SOIL DEFICIENCIES; NUTRIENT UPTAKE; NUTRIENT EXCESS; NUTRIENT DEFICIENCIES; GROWTH; LEAF FALL; CROP PERFORMANCE.

Potassium (P) is often called as catalyst in living process due to its influence in plant physiological processes. Some functions of P related to the ionic strength of solutions within plant cell, such as enzyme activation, water relations, energy relations, translocation assimilates, N uptake and protein synthesis. Therefore, deficiency or excessive potassium will influence growth and plant production. To prevent the deficiency or excessive potassium in mangosteen plant, the symposiums in leaves for each condition must be known. An experiment was arranged in randomized completely block design, using one factor, with six replications. The treatment consisted of six levels of potassium dosage: 0; 25; 50; 100; 200; and 400 ppm P/plant. All treatments were applied on 17 months mangosteen seedling old. The results showed that mangosteen seedling which deficient of potassium exhibited symptoms like dullness green leaf color, slow growth, concentration of P in leaf <0.52%. On the order hand, the seedlings that had excessive potassium showed symptoms such as reddish brown leaf color, necrotic and finally drop; root was dark brown, cracking and broken easily, finally rotten, and concentration of P in leaf was >1.93%.

183 HUTASOIT, R.

Effect of rock phosphate and biofertilizers (biophosphate and rhizobium) on the productivity of *Stylosanthes guianensis*. *Pengaruh pemberian batuan fosfat dan mikroba pelarut fosfat (biofosfat) plus rhizobium terhadap produktivitas hijauan Stylosanthes guianensis* / Hutasoit, R. (Loka Penelitian Kambing Potong Sei Putih, Medan (Indonesia)). [Proceedings of the national seminar on animal husbandry and veterinary technology 2011]. Bogor (Indonesia), 7-8 Jun 2011 / Prasetyo, L.H.; Damayanti, R.; Iskandar, S.; Herawati, T.; Priyanto, D.; Puastuti, W.; Anggraeni, A.; Tarigan, S.; Wardhana, A.H.; Darmayanti, N.L.P.I. (eds.). Bogor (Indonesia): Puslitbangnak, 2012: p. 857-862, 4 tables; 13 ref. 636:619/SEM/p

STYLOSANTHES GUIANENSIS; GREEN FEED; PRODUCTIVITY; ROCK PHOSPHATE; BIOFERTILIZERS; RHIZOBIUM; DRY MATTER; CRUDE PROTEIN CONTENT; CRUDE FIBRE CONTENT.

The experiment was done to study the effect of rock phosphate and biofertilizers (biophosphate and rhizobium) on the forage productivity of *Stylosanthes guianensis*. It was done following a strip plot design with two factors and three replications for each treatment. Four levels of biofertilizers as a horizontal factor were applied, namely M0 = without biofertilizer, M1 = plus biophosphate, M2 = plus rhizobium, and M3 = combination of biophosphate and rhizobium. Three levels of rock phosphate fertilizer as a vertical factor, namely P0 = without rock phosphate, P1 = 250 kg/ha rock phosphate and P2 = 500 kg/ha rock phosphate. The parameter observed were dry matter yield, crude protein, crude fiber and phosphorus contents. All data were analyzed using variance analysis and followed by Duncan Multiple Range Test. Resul of the experiment showed that rock phosphate increased the dry matter yield of *Stylosanthes guianensis*. However, there were no significant effect of treatment on the content of crude protein, crude fiber and phosphorus. The efficiency rate of phosphate fertilizer to increase productivity of *Stylosanthes guianensis* was found at 250 kg/ha of rock phosphate.

184 KASNO, A.

Effect of P fertilizer application on soil phosphate form and corn yield on Typic Plintudults and Placic Petraquepts. *Pengaruh pemupukan P terhadap bentuk fosfat tanah dan hasil jagung pada Typic Plintudults dan Placic Petraquepts* / Kasno, A.; Subiksa, I G.M.; Dwiningsih, S. (Balai Penelitian Tanah, Bogor (Indonesia)). *Jurnal Tanah dan Iklim* (Indonesia). ISSN 1410-7244 (2009) (no. 23) p. 15-22, 4 ill., 2 tables; 13 ref.

ZEA MAYS; PHOSPHATE FERTILIZERS; PHOSPHATES; SOIL TYPES; YIELDS.

Phosphorus is one of macro nutrient for crops, but on the acid soils it becomes a main limiting factor for increasing plant growth and yield. Phosphorus availability and forms in the soil are influenced by the level of soil acidity, Fe and Al oxide content, and the kind of P fertilizer added on the soil. The objective of this research was to study the effect of three sources of P fertilizer application on weight of dry corn and on forms of phosphorus on the soil. The experiment had been conducted on Typic Plintudults in Jagang, North Lampung and on Placic Petraquepts in Cicadas, Bogor. The treatments consisted of three sources of P fertilizer, i.e. SP-36, DAP, and TSP, and control treatment (without P). The P fertilizer rate was 40 kg/ha. The results of the study showed that P fertilizer application can increase the dry corn weight from 2 t/ha to 6 t/ha, Al-P from 13 ppm to 41-48 ppm, Fe-P from 176 ppm to 263-300 ppm, Rs-P from 27 ppm to 64-73 ppm, and Ca-P from 14 ppm to 18-34 ppm. The increasing of dry corn weight was influenced by the increasing of Al-P, Rs-P, and Ca-P content on the soils. The increasing weight of dry corn was mostly influenced by the increasing of Ca-P, phosphate fertilizer on the Placic Petraquepts Cicadas, Bogor was not able to increase weight of dry corn. SP-36 and DAP fertilizer could increase Al-P and Rs-P, whereas TSP fertilizer decreased Rs-P and Ca-P. TSP fertilizer was suitable for annual crops, increased Ca-P and yield of corn.

185 MUHAKKAI

Swamp grass (*Ischaemum rugosum*) response in sulphur fertilization in the upland. *Respon pertumbuhan rumput rawa (Ischaemum rugosum) dengan pemberian sulfur di lahan kering* / Muhakkai; Muchlison, H.; Indra, A.; Ali, M.; Muslim, G. (Universitas Sriwijaya, Palembang (Indonesia). Fakultas Pertanian). [Proceedings of the national seminar on animal husbandry and veterinary technology 2011]. Bogor (Indonesia), 7-8 Jun 2011 / Prasetyo, L.H.; Damayanti, R.; Iskandar, S.; Herawati, T.; Priyanto, D.; Puastuti, W.; Anggraeni, A.; Tarigan, S.; Wardhana, A.H.; Darmayanti, N.L.P.I. (eds.). Bogor (Indonesia): Puslitbangnak, 2012: p. 829-834, 2 tables; 18 ref. 636:619/SEM/p

ISCHAEMUM; SULPHUR FERTILIZERS; DOSAGE; GROWTH; UPLAND SOILS.

The objective of research was to determine the optimal sulphur dosage of swamp grass (*Ischaemum rugosum*) in upland. Research results showed that the dose of sulphur did not affect plant height, number of tillers and number of leaves. However there was a tendency that a dose of 105 kg S/ha can increase the number of tillers and leaves. Sulphur fertilization until 105 kg S/ha can increase the growth of swamp grass.

186 NAPITUPULU, D.

Effect of N and K fertilizer on growth and yields of shallots. *Pengaruh pemberian pupuk N dan K terhadap pertumbuhan dan produksi bawang merah* / Napitupulu, D.; Winarto, I. (Balai Pengkajian Teknologi Pertanian Sumatera Utara, Medan (Indonesia)). *Jurnal Hortikultura* (Indonesia). ISSN 0853-7097 (2010) v. 20(1) p. 27-35, 2 ill., 6 tables; 25 ref.

ALLIUM ASCALONICUM; NITROGEN FERTILIZERS; POTASSIUM FERTILIZERS; APPLICATION RATES; GROWTH; YIELDS.

Shallots is one of the vegetables that has wide adaptation. One of shallots varieties that well adapted in the lowland is Kuning. Total shallots production in North Sumatra was still quite low and has not yet been able to meet the local needs. The low productivity of shallots in North Sumatra meanwhile, was due to inappropriate fertilizers application and no suitable

recommendation of fertilizer application package technology for spesific location. Good recommendation of fertilizer application was expected to increase productivity which economically profitable. The objective of this study was to find out the effect of N and K fertilizers on the growth and yield of shallots. The study was conducted in the Experimental Garden, Assessment Institute of Agriculture Technology North Sumatra, Medan, at 30 m asl, from April to June 2008. Shallot variety used was Kuning. The treatments were four levels of N (0, 150, 200, 250 kg/ha) and four levels of K (0, 75, 100, 125 kg/ha). The experiment was arranged in a factorial randomized block design with four replications. Basic fertilizers used were manure (15 t/ha) and SP-36 (300 kg/ha), applied at one week before planting. N and K were given at the age of 3, 21, and 35 days after planting respectively with the dose of 1/3. The plot size was 1.5 m x 1.5 m, and 0.3 m row spacing and distance between block 0.4 m, and 0.3 m, respectively. Planting distance was 25 cm x 25 cm. Pest and disease observation were done using integrated pest control methods. The research results indicated that there was interaction between nitrogen and potassium fertilizers application to the fresh weight and dry bulb per plant. Application of fertilizer could increase shallots dry bulb yield up to 64.69 g/plant that was obtained by the application of 250 kg N/ha and 100 kg K/ha. The fertilizer application of N (250 kg/ha) and K (100 kg/ha) was recommended to increase the productivity of shallots in the area.

187 SAJIMIN

Effect of type and dosage of organic fertilizer on production of alfalfa (*Medicago saliva* L.) in Bogor West Java [Indonesia]. ***Pengaruh jenis dan taraf pemberian pupuk organik pada produktivitas tanaman alfalfa (Medicago sativa L.) di Bogor Jawa Barat*** / Sajimin; Purwantari, N.D.; Mujiastuti, R. (Balai Penelitian Ternak, Bogor (Indonesia)). [Proceedings of the national seminar on animal husbandry and veterinary technology 2011] Bogor (Indonesia), 7-8 Jun 2011 / Prasetyo, L.H.; Damayanti, R.; Iskandar, S.; Herawati, T.; Priyanto, D.; Puastuti, W.; Anggraeni, A.; Tarigan, S.; Wardhana, A.H.; Darmayanti, N.L.P.I. (eds.). Bogor (Indonesia): Puslitbangnak, 2012: p. 842-848, 1 ill., 5 tables; 12 ref. 636:619/SEM/p

MEDICAGO SATIVA; FORAGE; ORGANIC FERTILIZERS; DOSAGE EFFECTS; GROWTH; PRODUCTIVITY; PLANT NUTRITION; JAVA.

Alfalfa (*Medicago sativa* L.) has been grown as a forage crop and can now be found almost anywhere in the world. Alfalfa has spread and become popular because of its productivity and high feed value. However, the development of alfalfa in Indonesia is hardly reported. This research was conducted in order to investigate the effect of type and dosage of organic fertilizer on forage production of alfalfa. The treatments were arranged in randomized completely block (RCB) design with 5 replications. The treatment were: P1 (rabbit manure), P2 (chicken manure), P3 (sheep manure) and dosage of fertilizer were: 0 ton/ha (D1); 10 ton/ha (D2); 15 ton/ha (D3) and 20 ton/ha (D4). Data collected were plant height, fresh and dry weight of shoot every 6 weeks. The result showed that the type of organic fertilizer of 20 ton/ha significantly affected plant growth and total fresh and dry weight. The highest forage production was from alfalfa fertilized with chicken manure, 9.53 g/plant and followed by rabbit manure 8.33 g/plant and sheep manure 7.25 g/plant. This result was higher than control by 86.56, 63.01 and 41.94%, respectively. It is concluded that the type and dosage of fertilizer significantly improved growth and forage production.

188 SANTOSA, E.

Nitrogen and potassium applications on the growth of *Amorphophallus muelleri* Blume. [*Aplikasi nitrogen dan kalium terhadap pertumbuhan Amorphophallus muelleri Blume*.] /

Santosa, E. (Institut Pertanian Bogor (Indonesia). Fakultas Pertanian); Setiasih, I.; Mine, Y.; Sugiyama, N. *Jurnal Agronomi Indonesia* (Indonesia). ISSN 2085-2916 (2011) v. 39(2) p. 124-130, 6 tables; 21 ref.

AMORPHOPHALLUS; NITROGEN FERTILIZERS; POTASH FERTILIZERS; DOSAGE; APPLICATION RATES; GROWTH.

Productivity of *Amorphophallus muelleri* is considered low. Thus, pot experiment was conducted at the Cikabayan Experimental Farm, Bogor Indonesia during rainy season November 2007 to July 2008, in order to determine the optimum fertilizer dose for *A. muelleri* under 50% shading net. Treatments consisted of four doses of nitrogen (0, 50, 100 and 150 kg/ha N) and three doses of potassium (0, 50 and 100 kg/ha K_2O). The results showed that application of N and K fertilizers significantly increased vegetative growth, i.e., number of leaves, number of leaflets and second leaf size, but did not affect harvesting time. Fresh weight and dry matter content of daughter corm were significantly affected by N and K applications. Combination of 50 kg/ha N and 100 kg/ha K_2O resulted in higher corm weight than other treatments. It is evident that the application of nitrogen and potassium is important in *A. muelleri*.

189 SUSANTI, H.

Protein and anthocyanin production of water leaf shoots (*Talinum triangulare* (Jacq.) Willd) at different levels of nitrogen + potassium and harvest intervals. [*Pengaruh berbagai dosis pupuk nitrogen + kalium dan interval panen terhadap produksi protein dan antosianin pucuk kolesom (Talinum triangulare (Jacq.) Willd)*] / Susanti, H. (Institut Pertanian Bogor (Indonesia). Fakultas Pertanian); Aziz, S.A.; Melati, M.; Susanto, S. *Jurnal Agronomi Indonesia* (Indonesia). ISSN 2085-2916 (2011) v. 39(2) p. 119-123, 4 tables; 24 ref.

DRUG PLANTS; NITROGEN FERTILIZERS; POTASH FERTILIZERS; FERTILIZER APPLICATION; APPLICATION RATES; HARVESTING FREQUENCY; PROTEIN CONTENT; ANTHOCYANINS.

The experiment was conducted at IPB Experimental Station, Leuwikopo, Dramaga, Bogor, from November 2009 until February 2010 to study the effect of different nitrogen + potassium rates and harvest intervals on protein and anthocyanin production of waterleaf shoot (*Talinum triangulare* (Jacq.) Willd). A randomized completely block design was used with three replications of two factors, which were four N + K dosages (50 kg urea + 50 kg/ha KCl, 50 kg urea + 100 kg/ha KCl, 100 kg urea + 50 kg/ha KC, 100 kg urea + 100 kg/ha KCl) and three harvest intervals (30, 15, and 10 days). The results showed that interaction of 100 kg urea + 100 kg/ha KCl and 15 days harvest interval produced the highest content (8.29 mg/g fresh weight) and production (4.72 g/plant) of protein. The interaction of N + K dosages and harvest intervals were not significant in affecting the anthocyanin content. The highest production of anthocyanin was produced by single treatment of 100 kg urea + 100 kg/ha KCl (152.23 µmol/plant) and 10 days harvest interval (165.47 µmol/plant), respectively. Leaf protein levels negatively correlated with anthocyanin content.

F06 IRRIGATION

190 KURNIAWAN, J.

Determination of the degradation rate of irrigation infrastructures using statistical method. *Penentuan laju degradasi prasarana irigasi menggunakan metode statistik* /

Kurniawan, J. (The Environmental Services Program (ESP) United States Agency for International Development (USAID), Regional Jawa Tengah dan Yogyakarta (Indonesia)); Sudira, P.; Arif, S.S. *Agritech* (Indonesia). ISSN 0216-0455 (2008) v. 28(3) p. 130-136, 5 ill., 3 tables; 6 ref.

IRRIGATION; INFRASTRUCTURE; DEGRADATION; STATISTICAL METHODS; JAVA.

Degradation process of irrigation infrastructures is one of the most important things and determines the last result of Asset Management Planning (AMP). Degradation process will determine irrigation infrastructure's lifetime, hence, it will influence the whole process of AMP, and finally influence the management of irrigation infrastructures. The objective of this research aims at developing a model of the degradation rate of irrigation infrastructures, as one input for AMP, to support decision making in irrigation infrastructure management. This research was conducted at Sidandang, Pengasih, Jering and Mejing irrigation schemes located at Magelang, Kulonprogo, Sleman, and Bantul Districts, respectively. Statistical model was used to analysis the rate of degradation of irrigation infrastructures. The model requires the relation between time for degradation and the number of degradations. The data used for analysis was secondary data of asset condition in several years. The result shows that linear model that has been regularly used before is not valid to predict the rate of degradation of irrigation infrastructures based on irrigation facet age. The exponential model was developed in order to find out the more suitable procedure to predict the rate of degradation process based on irrigation facet age, and effective for all types of facet at all types of asset. The rate of degradation process of irrigation asseet condition is highly influenced by the rock composition factor and soil physical characteristics of asset construction.

191 SURYADI, E.

Irrigation sceduling of maize (*Zea mays* L.) hybrids UNPAD DR with application of inorganic fertilizer and biofertilizer. ***Penjadwalan irigasi pada tanaman jagung (Zea mays L.) hibrida DR-UNPAD yang diberi pupuk anorganik dan pupuk hayati*** / Suryadi, E.; Bafdal, N.; Ruswendi, D. Universitas Padjadjaran, Bandung (Indonesia). Fakultas Teknologi Industri Pertanian. Bandung (Indonesia): UNPAD, 2010: 41 p. 9 tables; 28 ref. Appendices. 633.15:631.675/SUR/p

ZEA MAYS; HYBRYDS; IRRIGATION SCHEDULING; NPK FERTILIZERS; ORGANIC FERTILIZERS; WATER MANAGEMENT; GROWTH; YIELDS.

Irrigation interval is basicly same as water availability in the root zone of plants which can meet the needs of plants or evapotranspiration. The main purpose of determining the time interval of irrigation water is to meet crop water requirements in the context of irrigation efficiency. Meanwhile, irrigation efficiency can be improved by scheduling irrigation. Scheduling irrigation means of planning time and amount of irrigation water according to crop water requirements. Technically, corn plants need water as much as 350-400 mm/season. Thus, the corn crop will grow and give much products when obtaining water supply between 3.5 to 4.0 mm/day or 35-40 m^3/ha/day. But unfortunately maize cultivation activities in Indonesia are mostly still dependent on rain water. According on diverse agroecosystem area in West Java such as: soil moisture content, altitude, fertility/soil type; it is necessary to study the scheduling of irrigation on corn in some corn production centers in West Java in order to obtain superior hybrid corn varieties that potentially high yield and suitable for the conditions of each regions. The research aimed at evaluating the influence of water and irrigation intervals on the maize hybrid DR-UNPAD in order to obtained the best

irrigation interval and at evaluating the responses of maize hybrid DR-trending UNPAD against fertilizer N, P, K, and biofertilizer. This research was carried out in 3 locations: Majalengka, Subang, and Ciamis from April to November 2010. The research was arranged in Split-Plot Design (RPT). Conclusion obtained from this study were: 1. Three days irrigation interval with provision of 100% NPK without EMAS biofertilizer provided the highest water use efficiency of 6.45 g/l (Majalengka); 5.39 g/l (Subang); and 6.29 g/l (Ciamis); 2. Three days irrigation interval, 50% application of NPK fertilizer and EMAS-bio-FERTILIZER 100 kg/ha gave an average height of corn plants height in three locations: 220.58 cm (Majalengka); 213.02 cm (Subang) and 216 cm (Ciamis). It also gave the average number of leaves was 14.36 strand (Majalengka); 12.34 strand (Subang); and 14.58 strand (Ciamis); 3. Interval irrigation, application of NPK fertilizer and EMAS biofertilizer gave varied effect with several parameters such as total yield of maize rows seed per cob, shelled seed weight per plant, weight of 1,000 grain and shelled seed weight per plot; 4. Protein content in maize hybrids DR-A, DR-B, DR-F, and Bisi-2 varied between 1.2 to 17.62%. For tryptopan content ranged from 0.42 to 0.55%. While the lysine content of maize hybrids DR-A, DR-B, DR-F and Bisi-2 ranged from 0.82 to 1.21%.

F08 CROPPING PATTERNS AND SYSTEMS

192 FERRY, Y.

Harvest time acceleration and production enhancement through plantation patterns of climb pepper and clump pepper. ***Percepatan umur panen dan peningkatan produksi lada melalui pola tanam lada perdu dan lada panjat*** / Ferry, Y.; Pronowo, D. (Balai Penelitian Tanaman Rempah dan Aneka Tanaman Industri, Sukabumi (Indonesia)). [Innovation to support the development of pepper in Bangka Belitung Province (Indonesia)] / Syafaruddin; Daras, U.; Ajijah, N.; Ferry, Y.; Indriati, G.; Taher, S.; Supriadi, H.; Towaha, J.; Herman, M.; Hasibuan, A.M.; Wicaksono, I.N.A.; Rivai, A.M. (eds.). Sukabumi (Indonesia): Balittri, 2009: p. 105-110, 5 ill., 8 ref. 633.841/INO

PIPER NIGRUM; CROP MANAGEMENT; PRODUCTION INCREASE; HARVESTING DATE.

Productivity of Muntok white pepper is decreasing caused by illegal tin mining which is damaging for pepper plantation, and farmer switched from pepper to palm oil plantation. Tin mining is more profitable, but only temporary. Palm oil plantation has not been evaluated, while Muntok white pepper has been already known in the world. Therefore, Muntok white pepper must be maintained. Cropping system of climb pepper and clump pepper could accelerate harvesting and increase pepper production. At first year of cultivation, the plant has been able to produce and continually increasing up until four years, the production has surpassed the production of climbing pepper and clump pepper monoculture. This system could increase pepper farmers revenue about 50%.

F30 PLANT GENETICS AND BREEDING

193 ARYANTI

Yield potential and starch content of Sari cultivar sweet potato mutant lines at different locations. ***Potensi hasil dan kandungan pati galur mutan ubi jalar Sari pada lokasi berbeda*** / Aryanti; Yuniawati, M.; Jusuf, M. (Pusat Aplikasi Teknologi Isotop dan Radiasi (PATIR) BATAN, Jakarta (Indonesia)). *Jurnal Ilmiah Aplikasi Isotop dan Radiasi* (Indonesia). ISSN 1907-0322 (2010) v. 6(2) p. 132-138, 5 tables; 11 ref.

IPOMOEA BATATAS; SWEET POTATOES; STARCH; CARBOHYDRATE CONTENT; INDUCED MUTATION; MUTANTS; AGRONOMIC CHARACTERS; YIELDS.

Research on mutation induction for agronomic traits improvement of Sari cultivar sweet potato have been conducted at PATIR - BATAN. Four mutant lines of M1V5 generation (D15.7.5; D15.7.7; D15.7.8; and D15.7.9) derived from irradiated bud by the dose of 40 Gy have been obtained. These mutant lines were planted at 4 different locations namely West Jawa Province (Bogor and Kuningan), and East Java Province (Malang and Mojokerto). The mutant lines, Sari cultivar and local cultivar were cultivated at 0.25 m x 1 m distance in the field with a plot size of 4 m x 5 m. The harvesting were done when the plants were 4 months of age and sugar and starch contents were analyzed using Spectrophotometer. The result showed that the highest yield production obtained was 44.11 t/ha by D15.7.5 mutant line from Mojokerto. This mutant line was stable at all four locations with average production of 30.04 ton/ha. Mojokerto was the best location compared to the others 3 locations. The dried starch was 96.47% obtained by D15.7.9 mutant line, meanwhile sugar content was 8.80% by D15.7.5 mutant line. The production, starch and sugar content of the mutant lines were all higher than that of the original mother plant.

194 DEVY, N.F.

[Rootstock growth of four citrus varieties on *in vitro* culture by using three explant types]. ***Pertumbuhan empat varietas batang bawah jeruk (Citrus sp.) secara in vitro dengan menggunakan 3 macam eksplan*** / Devy, N.F. (Balai Penelitian Tanaman Jeruk dan Buah Subtropika, Tlekung, Malang (Indonesia)); Ariniasari, L. [Proceedings of the national seminar on Indonesian fruits]. Bogor (Indonesia), 28-29 Oct 2009 / Taher, R.; Dwiastuti, M.E.; Devy, N.F.; Prabawati, S.; Harlion, L.L. (eds.). Jakarta (Indonesia): Puslitbanghorti, 2009: p. 319-332, 5 ill., 5 tables; 13 ref. 634.1/.7(594)/SEM/p

CITRUS; VARIETY TRIALS; ROOTSTOCKS; IN VITRO CULTURE; EXPLANTS; CROP PERFORMANCE; PLANT RESPONSE; GROWTH.

Citrus rootstock plants are usually propagated by seeds. However, some varieties are not optimal in producing seeds and have seed polyembryo a little too low so that needs to be done through vegetative propagation. One way that can be used is the technique of *in vitro* propagation using stem as explant material. In this technique, material used in mini size, so it does not require too many explant material. Explant material position in the parent plant will affect the growth of shoots and roots of new plants produced. The selection of appropriate explant material would give a better effect on plant growth. This research was conducted with the aim at observing explant growth of *in vitro* stem culture of four varieties whereas the explants were taken from different position on the parents plants. The study was conducted in December 2007-June 2008 at the Central Research Laboratory of Indonesian Citrus and Subtropical Fruits Research Institute, Tlekung, Batu. This study was designed using a simple completely randomized design with 12 treatments which were peak stem of Japanche Citroen (A), middle stem of Japanche Citroen (JC) (B), stem base of Japanche Citroen (C), the peak stem of Rough Lemon (D), middle stem of Rough Lemon (E), stem base of Rough Lemon (RL) (F), peak of Volkameriana (G), middle stem of Volkmeriana (H), stem base of Volkameriana (I), peak stem of AA23 (J), middle stem of AA23 (K), stem base of AA23 (L). Each treatment was repeated 3 times so that there were 36 experimental units, each unit consisting of 5 explants. From the result of research, it can be concluded that in general the shoot multiplication phase (proliferation) of Volkameriana and Rough Lemon provided a better response than other varieties. In rooting phase, Japanche Citroen, Rough Lemon and Volkameriana gave better growth and but not significantly different in parameters emerging root time, number of root, length and percentage of rooted explant.

Explant different positions from each variety did not provide significant influence on the parameters number of roots, root length and percentage of rooted explant.

195 INDRAYANTI, R.

Radiosensitivity of banana cv. ampyang and potential application of gamma irradiation for variant induction. ***Radiosensitivitas pisang cv. ampyang dan potensi penggunaan iradiasi gamma untuk induksi varian*** / Indrayanti, R. (Universitas Negeri Jakarta (Indonesia). Fakultas Matematika dan Ilmu Pengetahuan Alam); Mattjik, N.A.; Setiawan, A.; Sudarsono. *Jurnal Agronomi Indonesia* (Indonesia). ISSN 2085-2916 (2011) v. 39(2) p. 112-118, 3 ill., 3 tables; 28 ref.

MUSA ACUMINATA; IN VITRO CULTURE; GAMMA IRRADIATION; DOSAGE; SEEDLINGS; GROWTH.

Banana is commonly propagated vegetatively by suckers since most of edible banana are triploid, male sterile and parthenocarpic. Therefore use of conventional breeding for banana improvement is difficult. Mutation induction and *in vitro* technique are alternative tools for banana improvement. The objectives of this research were (1) to determine radiosensitivity of banana cv. ampyang against gamma irradiation, and (2) to evaluate performance of plantlets regenerated from gamma irradiated explants of banana cv. ampyang. Explants of *in vitro* shoots were exposed to gamma irradiation at 0, 20, 25, 30, 35, 40, 45, and 50 Gy to determine their radiosensitivity. Growth and development of regenerated plantlets were recorded after 10 months of proliferation and regeneration periods. The CurveExpert ver. 1.4 analysis results indicated that lethal doses of irradiation reducing 20% to 50% of shoot growth (LD20-50) were 51.07-64.54 Gy. All regenerated plantlets from irradiated explants produced less numbers of roots, and some of regenerated plantlets, showed significantly less plantlet fresh weight and height than the control one. Plantlets regenerated from explants irradiated with 25, 40, 50 Gy had longer leaves than the control. The regenerated plantlets from gamma irradiation treatments were successfully transferred into soil and they would be used to evaluate existence of variants among regenerated banana plantlets.

196 IRIANY, R.N.

Evaluation of combining ability and heterosis of five sweet corn lines (*Zea mays* var. saccharata) through diallel crossing. ***Evaluasi daya gabung dan heterosis lima galur jagung manis (Zea mays var. saccharata) hasil persilangan dialel*** / Iriany, R.N. (Balai Penelitian Tanaman Serealia, Maros (Indonesia)); Sujiprihati, S.; Syukur, M.; Koswara, J.; Yunus, M. *Jurnal Agronomi Indonesia* (Indonesia). ISSN 2085-2916 (2011) v. 39(2) p. 103-111, 6 tables; 30 ref.

ZEA MAYS; CROSSBREEDING; COMBINING ABILITY; HETEROSIS; HYBRIDS; YIELDS.

The objective of this research was to estimate general combining ability (GCA), specific combining ability (SCA), and heterosis of five sweet corn inbreds in order to be selected to develop hybrid varieties. Five inbred lines as parent were Mr12/SC/BC4-6-1B-1, Mr14/SC/BC4-6-1B-1, Mr4/SC/BC4-2-1B-1, Mr11/SC/BC4-2-IB-1, and Mr12/SC/BC3-3-1B-1. The experiment was conducted from April to June 2010 using a randomized completely block design with two replications at Indonesian Cereal Research Institute (ICERI) experimental station, Maros, South Sulawesi. Analyses of GCA and SCA were based on the Griffing's fixed model of Diallel Design Method I. Heterosis values were predicted based on the average values of their parents whereas heterobeltiosis were predicted

based on the average values of the highest parents. B x D (Mr14/SC/BC4-6-1B-1 x Mr11/SC/BC4-2-1B-1) crossing had the highest SCA for yield 990.67. A x B (Mr12/SC/BC4-6-1B-1 x Mr14/SC/BC4-6-1B-1)crossing had the highest SCA for ear diameter 0.36. Crossing of A x D (Mr 12/SC/BC4-6-1B-1 x Mr 11/SC/BC4-2-1B-1) had the highest heterosis and heterobeltiosis for yield, while crossing of A x D (Mr12/SC/BC4-6-1B-1 x Mr11/SC/BC4-2-1B-1) had the highest heterosis and heterobeltiosis for ear length. A x B (Mr12/SC/BC4-6-1B-1 x Mr14/SC/BC4-6-1B-1) and E x A (Mr12/SC/BC3-3-1B-1 x Mr12/SC/BC4-6-1B-1) crossings had the highest heterosis and heterobeltiosis for ear diameter.

197 ISMAIL, A.

[Evaluation, characterization, and analysis of genetic variation of 30 local banana (*Musa paradisiaca*) germplasm based on morphological and agronomical characters]. ***Evaluasi, karakterisasi, dan analisis keragaman genetik 30 plasma nutfah pisang lokal (Musa paradisiaca) berdasarkan karakter morfologi dan agronomi*** / Ismail, A.; Bakti, C. Universitas Padjadjaran, Bandung (Indonesia), Fakultas Pertanian. Bandung (Indonesia): UNPAD, 2010: 29 p. 2 ill., 6 tables; Bibliography: p. 20-22. Appendices. 634.773-152.4/ISM/e

MUSA PARADISIACA; GERMPLASM; GENETIC VARIATION; GENETIC CORRELATION; GENETIC DISTANCE; GENETIC INHERITANCE; AGRONOMIC CHARACTERS; PLANT ANATOMY.

Information about genetic variability and relationship of banana population based on morphology and agronomic characters are needed to arrange genetic diversity database and banana germplasm relationship connection. Thirty banana acessions were obtained from West Java. Experiment was executed in Experimental Field of Agriculture Faculty, University Padjadjaran, Ciparanje Village, Jatinangor, Sumedang Regency, West Java during March-October 2010. The analysis methods on this experiment were cluster analysis and principle component analysis (PCA) by software NTSYSpc program 2.10 q version. The result of relationship from thirty banana accession were far and divided into two groups, there were group I which consisted of cluster I and cluster II. Cluster I was divided by two subcluster that were: I1 consisted of 5 acessions and subcluster I2 consisted of 19 acessions. Acessions of sub cluster I1 were included: SJ4, SJ2, SJ5, SJ3, and SJ1. Sub-cluster I2 consisted of: TJ3, TJ2, TJ5, TJ4, JT5, CP1, CP4, JT4, CP3, JT3, PL3, PL4, CP5, PL5, CP2, JT2, PL2, JT1 and PL1. Euclidean distances of 2.81 scale on subcluster I1 consisted of 6 acessions that were: TJ1, JK2, JK5, JK3, JK4, and JK1.

198 NUGROHO, D.

Characterization of physical quality and flavour profile of Arabica coffee bean of Maragogype variety (*Coffea arabica* L., var. Maragogype Hort. ex Froehner) and mother plant selection in East Java [Indonesia]. ***Karakterisasi mutu fisik dan cita rasa biji kopi Arabika varietas Maragogip (Coffea arabica L. var Maraogype Hort. ex Froehner) dan seleksi pohon induk di Jawa Timur*** / Nugroho, D.; Mawardi, S.; Yusianto; Arimarsetiowati, R. (Pusat Penelitian Kopi dan Kakao Indonesia, Jember (Indonesia)). *Pelita Perkebunan* (Indonesia). ISSN 0215-0212 (2012) v. 28(1) p. 1-13, 3 ill., 4 tables; 35 ref.

COFFEA ARABICA; VARIETIES; SELECTION; MOTHER PLANTS; QUALITY; FLAVOUR; JAVA.

Development of specialty coffee product needs to be done by producing a product that has a good flavor, unique, and different from the existing specialty coffee products. One of the varieties of Arabica coffee that has good potential to be developed into a specialty coffee is Maragogype coffee. This paper discusses the results of selection and characterization of physical and flavor quality of Arabica coffee varieties Maragogype in East Java. Selection was done in PTPN XII at Pancur/Angkrek and Kayumas Estate. It was obtained two superior genotypes those have high productivity and good taste, they were MP3 and MP4 with of productivity of 7,985.3 and 5,985.3 g cherries/tree, respectively. Maragogype varieties showed good physical quality, in which 99% of bean belong to the large been category, whiches the highest of 1,000 beens, and good bulk density and apparent swelling. MP3 genotype had a floral, citrus acidity, mild, and very good sweetness characteristics. MP mix had the showed same characteristics, but its intensity was not as high as MP3. MP4 has herbal and flora characteristics with bitter after taste.

199 PRIYONO

Transferability of simple sequence repeats and single nucleotide polymorphisms marker for genetic map development in *Coffea canephora* Pierre. *Kemampuan transfer marka simple sequence repeats dan single nucleotide polymorphisms pada pengembangan peta genetik Coffea canephora Pierre* / Priyono (Pusat Penelitian Kopi dan Kakao Indonesia, Jember (Indonesia)); Rigoreau, M.; Crouzillat, D. *Pelita Perkebunan* (Indonesia). ISSN 0215-0212 (2010) v. 26(3) p. 126-141, 4 ill., 2 tables; 29 ref.

COFFEA CANEPHORA; GENETIC MAPS; GENE TRANSFER; GENETIC POLYMORPHISM; GENETIC MARKERS; NUCLEOTIDES.

Simple sequence repeats (SSR) and single nucleotide polymorphisms (SNP) have been developed for some crops. However, the studies of transferability of this marker for coffee are very limited. These researches were aimed at describing the heterozygosity level of parental clones in Robusta coffee (*Coffea canephora*) and evaluating the transferability of SSR and SNP markers for development of genetic maps in Robusta coffee. Three parental clones, namely BP 409, BP 961 and Q 121 clones were used for evaluation of heterozygosity level. Three populations, namely CPA (BP 961 x Q 121), CPB (BP 409 x Q 121), and CPC (BP 409 x BP 961) were used for genetic mapping. SSR and SNP markers selected from reference genetic map were used as molecular markers in this study. The result showed that the screening of BP 409, BP 961 and Q 121 clones using SSR led to, respectively, 52%, 53% and 40%, heterozygosity. A selection of SSR and SNP linkage information in reference map of Robusta coffee allowed the homology linkage groups among three cross pollinated (CP) maps, three backcross (BC) maps, and consensus map can be established. Most of the markers mapped for seven maps showed a very good collinear to reference maps. These results confirm that SSR and SNP markers have high transferability and mapping information for Robusta coffee. This work will allow faster and more detailed investigations of quantitative trait loci (QTLs) and positioning of a growing number of candidate genes co-localized with QTLs.

200 PURNAMANINGSIH, R.

Evaluation of artemisia mutant lines conducted from gamma irradiation treatment. *Evaluasi keragaman galur mutan artemisia hasil iradiasi gamma* / Purnamaningsih, R.; Lestari, E.G.; Yunita, R. (Balai Besar Penelitian dan Pengembangan Bioteknologi dan Sumberdaya Genetik Pertanian, Bogor (Indonesia)); Syukur, M. *Jurnal Ilmiah Aplikasi Isotop dan Radiasi* (Indonesia). ISSN 1907-0322 (2010) v. 6(2) p. 139-146 , 4 tables; 17 ref.

ARTEMISIA ANNUA; ARTEMISININ; INDUCED MUTATION; MUTANTS; GENETIC VARIATION; GAMMA IRRADIATION.

Cases of malaria diseases attack in Indonesia has been increasing. Plasmodium falciparum the cause of malaria disease is now resistant to the usual medicine. One of malaria medicine which recommended by WHO is artimisinine compound extracted from *Artemisia annua* L. plant. Low artemisinine content is one problem of Artemisia development in Indonesia. Increasing genetic variation using gamma irradiation is one alternative method to improve artemisinin content. In 2007, induce mutation had been done to artemisia seeds using gamma irradiation at dosage of 10-100 Gy. The good rooting plantlet was regenerated and acclimatized in the greenhouse, and then the seedling (MO generation) was planted in the field at 1545 m asl. Plants generated from seeds without gamma irradiation treatment and cultured *in vitro* (*in vitro* control) were used as control. The result showed there were some morphological variations between the mutant lines in term of plant height, shape of the leaves and time of flowering. Ten mutant lines were selected based on biomass yield and analyzed for the artemisinine content. Artemisinine content of the mutant lines ranged from 0.44-1.41%, were significantly higher than that of *in vitro* control (0.43%).

201 ROSTINI, N.

[Evaluation genetic and morphology seed selection (*Paraserianthes falcataria* (L) Nielsen)]. ***Evaluasi genetik dan morfologi keturunan populasi hasil seleksi sumber benih sengon (Paraserianthes falcataria (L) Nielsen) tahan boktor (Xystrocera vestipa) dan produktivitas tinggi*** / Rostini, N.; Damayanti, F.; Sunarya, S. Universitas Padjadjaran, Bandung (Indonesia), Fakultas Pertanian. Bandung (Indonesia): UNPAD, 2010: 124 p. 39 ill., 74 tables; 41 ref. 630*232/ROS/e

PARASERIANTHES FALCATARIA; PROVENANCE TRIALS; SELECTION; POPULATION GENETICS; PHENOTYPES; AGRONOMIC CHARACTERS; GENETIC RESISTANCE; STEM EATING INSECTS; RAPD.

P. falcataria plant have more developed at community forest caused could growth in broad climate condition appear, not required high site and have more benefits. Although, that developing no balanced by tree improvement efforts thus productivity never optimal. This is caused by limited seed source with high genetic quality. In which, this research is focused to genetic evaluating provenance test seed source that established 10 years ago. This research aim at knowing characters that corelate with *P. falcataria* quality from population level until seedling level. This research hope to know a provenance that have quality at growth stage or all growth stage. Research method were done by using 5 stage as morphology characterization (population, fruit and seed, germination and seedling) and RAPD marker. Data were analysis statistically and for RAPD data by using NTSys 2.1 programme. Result of this research showed that Kuningan provenance is more better than at all characters compared with another provenances (Subang, Kediri, Banjarnegara and Solomon). Specifically, each provenance have superiority for a certain character. Character differences among provenances for each *P. falcataria* growth stage were inconsistence. Over all, it show that high different character occured between Subang provenance with Banjarnegara provenance.

202 SETIADI, D.

Preliminary evaluation provenance and progeny test of *Araucaria cunninghamii* up to 12 months old in field. ***Evaluasi awal uji sumber benih dan uji keturunan Araucaria cunninghamii sampai dengan umur 12 bulan di lapangan*** / Setiadi, D. (Balai Besar

Penelitian Bioteknologi dan Pemuliaan Tanaman Hutan, Yogyakarta (Indonesia)). *Wana Benih* (Indonesia). ISSN 1410-1173 (2009) v. 10(2) p. 27-36, 5 tables; 7 ref.

ARAUCARIA CUNNINGHAMII; PROVENANCE TRIALS; PROGENY TESTING; GROWTH; HERITABILITY.

Araucaria cunninghamii seedling seed orchard was established in 2008 located in Bondowoso, East Java. The aim of this research was at evaluating the initial growth performance of the seedling at nursery level and plantation trial up to 12 months old. The survival of family was 100%. At the nursery level at the age of 6 months old, the seedling from Queensland provenances gave the best result. At the 12 months old in the plantation trial, the best provenance was from Manokwari. The result showed that different provenances or families were highly significant for height and diameter at age of up to 12 months old. The family and individu heritability were classified as moderate (h2f = 0.58; h2f = 0.55) and (h2i = 0.28; h2i; = 0.33) for the traits of heights and diameters of 12 months old plantation.

203 SYAFARUDDIN

Optimalization of isolation and purification of DNA technique on pepper (*Piper nigrum* L.). *Optimalisasi teknik isolasi dan purifikasi DNA pada lada (Piper nigrum L.)* / Syafaruddin; Randriani, E.; Hadad, M. (Balai Penelitian Tanaman Rempah dan Aneka Tanaman Industri, Sukabumi (Indonesia)). [Innovation to support the development of pepper in Bangka Belitung Province (Indonesia)] / Syafaruddin; Daras, U.; Ajijah, N.; Ferry, Y.; Indriati, G.; Taher, S.; Supriadi, H.; Towaha, J.; Herman, M.; Hasibuan, A.M.; Wicaksono, I.N.A.; Rivai, A.M. (eds.). Sukabumi (Indonesia): Balittri, 2009: p. 55-60, 2 ill., 16 ref. 633.841/INO

PIPER NIGRUM; DNA; ISOLATION TECHNIQUES; PURIFICATION.

Many techniques to conduct DNA isolation depend on kind of plants, plant organ or plant tissue that will be used. Basically, there are three important factors on extraction and purification of DNA: 1). Homogenity of plant tissue, 2). Composition of buffer solution which is added during grinding of leaf/plant tissue sample, and 3). Deletion of resistor enzyme-polysaccharide, especially for perennial plant. Effective and efficient DNA isolation and purification are desirable, to reduce cost and time consuming while working in the laboratory. Conscientiousness of DNA isolation and purification denotes an important step to obtain clean and contaminant free of DNA, so banding pattern will be clear. In this technique, polyvinilpolypirolidone (PVPP) and mercapto-ethanol such as antioxidant were not used, neither over night storage of leaf extraction before used for purification which is often used for perennial plant. In addition, the technique focused carefully on leaf sample grinding, vortex and controlling of temperature on each step.

204 TRIATMININGSIH, R.

Phenotypic performance of papaya inbreed lines I (*Carica papaya* L.). *Penampilan fenotipik galur inbreed I pepaya (Carica papaya L.)* / Triatminingsih, R.; Indriyani, N.L.P.; Purnomo, S. (Balai Penelitian Tanaman Buah Tropika, Solok (Indonesia)). [Proceedings of the national seminar on Indonesian fruits]. Bogor (Indonesia), 28-29 Oct 2009 / Taher, R.; Dwiastuti, M.E.; Devy, N.F.; Prabawati, S.; Harlion, L.L. (eds.). Jakarta (Indonesia): Puslitbanghorti, 2009: p. 448-456, 1 ill., 4 tables; 10 ref. Appendices. 634.1/.7(594)/SEM/p

CARICA PAPAYA; INBREED LINES; GENETIC VARIATION; PHENOTYPES; HERITABILITY; AGRONOMIC CHARACTERS.

The purposes of this research were to get the information of phenotypic of papaya inbreed lines I-3, variability of genetic, variability phenotypic and heritability. Research was conducted at Aripan Experimental Field of Indonesian Tropical Fruit Research Institute (ITRFI), using a randomized completely block design with three treatments and three replications. The sample unit consisted of 11 trees. F-test and BNJ were performed to test the difference among treatment means. The result showed that almost all of characters observed among the inbreed lines I-3 had low genetic variability, and phenotypic variability. Heritability estimates were high for fruit weight, firmness, fruit circumference, length of fruit stal, and fruit length. Heritability estimates were low for flesh thickness, total soluble solid, and fruit elongata shape. Inbreed line I-3-205 had homogeny in fruit shape elongate, high firmness and total soluble solid, and had orange-red flesh and fruit weight of 372.5 g.

205 WIDIANINGSIH, S.

[Stomata characters of five varieties of grapes grown in different altitude and its effect on the intensity of downy mildew]. ***Karakter stomata pada lima varietas anggur yang ditanam pada ketinggian tempat yang berbeda dan pengaruhnya pada intensitas penyakit downy mildew*** / Widianingsih, S.; Budiyati, E.; Andrini, A. (Balai Penelitian Tanaman Jeruk dan Buah Subtropika, Tlekung, Malang (Indonesia)). [Proceedings of the national seminar on Indonesian fruits]. Bogor (Indonesia), 28-29 Oct 2009 / Taher, R.; Dwiastuti, M.E.; Devy, N.F.; Prabawati, S.; Harlion, L.L. (eds.). Jakarta (Indonesia): Puslitbanghorti, 2009: p. 473-482, 1 ill., 4 tables; 12 ref. 634.1/.7(594)/SEM/p

VITIS VINIFERA; VARIETY TRIALS; ALTITUDE; PLASMOPARA VITICOLA; STOMATA; LEAVES; DISEASE TRANSMISSION; PATHOGENICITY; ENVIRONMENTAL FACTORS.

Downy mildew disease is the major diseases that attack grapevines in many vineyards in Indonesia. The number of leaf stomata may affect grape varieties resistance to downy mildew. Place to grow can affect plant morphology characters. This study aimed at determining stomata character of five varieties of grapes grown in different altitude and its effect on the intensity of downy mildew. The research was conducted at the Integrated Laboratory, Indonesian Citrus and Subtropical Fruits Research Institute, Batu, East Java, in March 2008. Varieties observed were BS 85 (Cardinal/Probolinggo super), BS 45 (Caroline black rose), BS 88 (Belgi/Kediri yellow), BS 86 (Muscato D'Adda), and BS 60 (MS 23-7). Leaves for stomata observations were taken from KP Banjarsari which has altitude 1 m above sea level and KP Tlekung, which has 950 m altitute above sea level. Character leaves and stomata observed were stomata length, width of stomata, the number stomata/square cm, leaf area and the number of stomata/leave on each variety. In addition, observation was done also on the intensity of downy mildew disease. Results showed that the varieties grown on KP Banjarsari and KP Tlekung were different in stomata characters. BS 85 varieties grown on KP Banjarsari has the smallest stomata length (25.88 µm), while the BS 45 has the least number of stomata (15.70/cm^2) and were significantly different from other varieties. BS 85 varieties grown on KP Tlekung have the most stomata length (30.16 µm), BS 88 has the widest stomata (16.85 µm), BS 86 has the most number of stomata (44.35/cm^2) and significantly different from other varieties. Comparison of varieties planted in KP Banjarsari and KP Tlekung indicated that BS 85, BS 45 and BS 60 have significant difference in stomata length parameter and all varieties were different significantly on width of stomata. According to the number stomata/square centimeter, BS 45 and BS 86 showed a significant difference. BS 85 showed siginificant differences in leaf area compared with other varieties.

Downy mildew disease intensity was different for each variety, but in a more extensive scale, it was more affected by the disease control than by the stomata character.

F40 PLANT ECOLOGY

206 SUDARMONO
Langir fruits (*Lepisanthes amoena* (Haask.) Leenh.; Sapindaceae) and its phenology. ***Buah langir (Lepisanthes amoena (Haask.) Leenh.; Sapindaceae) dan fenologi bunganya*** / Sudarmono; Sumanto (Pusat Konservasi Tumbuhan Kebun Raya Bogor (Indonesia)) [Proceedings of the national seminar on Indonesian fruits]. Bogor (Indonesia), 28-29 Oct 2009 / Taher, R.; Dwiastuti, M.E.; Devy, N.F.; Prabawati, S.; Harlion, L.L. (eds.). Jakarta (Indonesia): Puslitbanghorti, 2009: p. 355-362 , 4 ill., 10 ref. 634.1/.7(594)/SEM/p

SAPINDACEAE; SPECIES; PHENOLOGY; FLOWERING; HERMAPHRODITISM; SELF COMPATIBILITY; WET SEASON; CLIMATIC FACTORS; PLANT COLLECTIONS; BOTANICAL GARDENS.

Langir (*Lepisanthes amoena* (Haask.) Leenh.) is a minor edible fruits species but similar to member of Family Sapindaceae which has sweet on arillode. Observations of phenology were analyzed from the view points of flowering time, floral behavior and micro climate change. Observations on floral behavior of *L. amoena* clearly showed that this species performed protandry and almost self-compatible. In the beginning of flowering is hermaphrodite flower system and gradually change into monoecious flower in rainy season. Temperature and rainfall are probably a main factors in change of flowering system on *L. amoena*.

F50 PLANT STRUCTURE

207 MARTASARI, C.
Cytology characters of Mandarin citrus (*Citrus reticulata* Blanco) M1V2 generation from Gamma irradiation treatment. ***Karakter sitologi jeruk keprok (Citrus reticulata Blanco) generasi M1V2 hasil radiasi sinar Gamma*** / Martasari, C.; Yusuf, H.M. (Balai Penelitian Tanaman Jeruk dan Buah Subtropika, Tlekung, Malang (Indonesia); Karsinah. [Proceedings of the national seminar on Indonesian fruits]. Bogor (Indonesia), 28-29 Oct 2009 / Taher, R.; Dwiastuti, M.E.; Devy, N.F.; Prabawati, S.; Harlion, L.L. (eds.). Jakarta (Indonesia): Puslitbanghorti, 2009: p. 381-387, 2 ill., 2 tables; 10 ref. 634.1/.7(594)/SEM/p

CITRUS RETICULATA; GAMMA RADIATION; CYTOLOGY; MUTANTS; STOMATA; CHLOROPLASTS; CHROMOSOME NUMBER; GENETIC CORRELATION.

Gamma irradiation treatment on several mandarin citrus varieties resulted in change on morphology character, especially in number of seed on the first generation (M1V1) and second generation (M1V2). The change has to be supported by cytology information to ensure the heritability of the seedless character. The research aimed at knowing the cytology characters of M1V2 through measurement of stomata, number of chloroplast, and number of chromosome. The result showed that there were variation in stomata (width, length and density) for each variety observed compared to its control. There were also differences in number of chloroplast and chromosome, either addition of deletion. There was positive correlation between number of chloroplast and chromosome which showed that number of chloroplast could be an alternative way to observe plant ploidy. The result showed additional

chromosome indicated that polyploidy had occured, however, it could not be directly associated with seedless character.

F60 PLANT PHYSIOLOGY AND BOCHEMISTRY

208 ASIKIN, S.

Effication of several swampy wild plant on fruit borer (*Diaphania indica*). *Efikasi beberapa jenis tumbuhan liar rawa terhadap ulat buah (Diaphania indica)* / Asikin, S.; Willis, M.; Thamrin, M. (Balai Penelitian Pertanian Lahan Rawa, Banjarbaru (Indonesia)). [Proceedings of the national seminar on Indonesian fruits]. Bogor (Indonesia), 28-29 Oct 2009 / Taher, R.; Dwiastuti, M.E.; Devy, N.F.; Prabawati, S.; Harlion, L.L. (eds.). Jakarta (Indonesia): Puslitbanghorti, 2009: p. 509-516 , 2 ill., 16 ref. 634.1/.7(594)/SEM/p

AMORPHOPHALLUS CAMPANULATUS; FICUS; WILD PLANTS; PLANT EXTRACTS; DIAPHANIA INDICA; BOTANICAL INSECTICIDES; BIOLOGICAL CONTROL; PESTICIDAL PROPERTIES; FRUIT DAMAGING INSECTS; SWAMP SOILS.

The main pests of horticultural crops in the swamp land (tidal and lowland) had never been reported in detail, therefore it is necessary to do exploratory research of pests and diseases as the first step in determining control strategies. Field observations showed that one of the major pest of horticulture (fruits and vegetables) are fruit flies and fruit borers. Fruit caterpillars caused by pests *Diaphania indica* (Lepidoptera), was an important pest in melon. According to Asikin (2006), this fruit borer attack melon and caused 50-80% loss. The use of synthetic insecticides are generally less secure because of adverse side effect on health and the environment. Therefore, alternatives for the synthetic insecticides have to be developd, for example, biological natural products (secondary metabolite) which is generally a narrow spectrum of chemical compounds against the target organism. It has been reported safe for the environment. In the tidal area of South and Central Kalimantan, common plant species found as potential material for making botanical pesticides. So far, as many as 180 plant species which were assumed to have such toxic to kill insects have been collected. Botanical insecticides are derived from plant materials that are extracted and processed into concentrate in such technique, so that do not changing on the chemical structures. It is degradable and not persistent in nature or in food. Thus, those insecticides are very safe for humans and the environment. The insecticides have specific characteristic that is safe for natural enemies of pests. Residue was easily broken down so safe for the environment. Raw materials can be gained easily and inexpensively. Research results indicated that some plant species found to be potential as insecticide against caterpillars fruit (*Diaphania indica*), those were Kapayang (*Pangium edule*), Lukut (*Platycerium bifurcatum*), Maya (*Amorphophallus campanulatus*), Kumandra, Kalalayu (*Eriogiosum rubiginosum*), Lua (*Ficus glomerata*) and other plants with the percentage of mortality ranged from 65-85%.

209 GHOLIB, D.

Antifungal effect of kencur tuber (*Kaempferia galanga* L.) ethanol extract on mold Trichophyton verrucosum by in vitro test. *Uji daya antifungi ekstrak etanol rimpang kencur (Kaempferia galanga L.) terhadap pertumbuhan jamur Trichophyton verrucosum secara in vitro* / Gholib, D. (Balai Besar Penelitian Veteriner, Bogor (Indonesia)). [Proceedings of the national seminar on animal husbandry and veterinary technology 2011] Bogor (Indonesia), 7-8 Jun 2011 / Prasetyo, L.H.; Damayanti, R.; Iskandar, S.; Herawati, T.; Priyanto, D.; Puastuti, W.; Anggraeni, A.; Tarigan, S.; Wardhana, A.H.; Darmayanti,

N.L.P.I. (eds.). Bogor (Indonesia): Puslitbangnak, 2012: p. 865-869, 1 ill., 1 table; 19 ref. 636:619/SEM/p

KAEMPFERIA; TRICHOPHYTON; ETHANOL; PLANT EXTRACTS; IN VITRO; ANTIFUNGAL PROPERTIES.

Kencur tuber (*Kaempfera galanga* L.) extract was extracted by mean of maceration using 96% ethanol as solution, was studied on its antifungal effect on dermatophyte mold Trichophyton verrucosum using dilution method. The extract for this study was diluted into 0.25, 0.5, 1, and 2%. The result revealed that minimal inhibition concentration (MIC) was 1%. Phytochemical analysis of the extract showed that it contains the compound of alkaloid group, saponin, tannin, flavonoid, phenolic and glicocider.

210 SURYANTO, E.

Isolation and singlet oxigen quenching activities of phenolic fractions from andaliman extract (*Zanthoxylum acanthopodium* DC.). *Isolasi dan aktivitas penstabil oksigen singlet fraksi fenolik dari ekstrak andaliman (Zanthoxylum acanthopodium DC.)* / Suryanto, E. (Universitas Sam Ratulangi, Manado (Indonesia). Fakultas Matematika dan Ilmu Pengetahuan Alam); Raharjo, S.; Sastrohamidjojo, H.; Tranggono. *Agritech* (Indonesia). ISSN 0216-0455 (2008) v. 28(3) p. 102-108, 4 ill., 2 tables; 35 ref.

ZANTHOXYLUM; PHENOLIC COMPOUNDS; PLANT EXTRACTS; ISOLATION.

The objectives of this study were to isolate the different phenolic fractions present in andaliman extract and to determine their singlet oxygen quenching activities. Andaliman fruit was sequentially extracted with hexane, acetone and ethanol (1:5) for 24 hours, respectively. The extracts of andaliman fruit were further separated by gradient elution methods with column chromatography, using ethyl acetate-methanol as mobile phase and silica gel G-60 as stationary phase. Singlet oxygen quenching activities was examined using linoleic acid as substrates each containing 100 ppm erythrosine as α-photosensitizer. The active fractions were characterized by 1R and UV spectrometry techniques. Fraction II was discovered having properties as quencher of singlet oxygen effectively as well as fraction III. The quenching effect of fractions II and III were much higher than that of α-tocopherol ($P<0.05$). The fraction II was identified by 1R spectrometry, and the sample showed that strongest absorption at 3,356/cm indicating hydroxyl group from the phenolic compounds and the UV spectra showed that data of active fractions indicated an absorption maximum were 204, 221 and 272 nm, respectively. The conclusion was that fractions component of andaliman extract showing singlet oxygen quenching activity was a component having phenolic group.

F62 PLANT PHYSIOLOGY - GROWTH AND DEVELOPMENT

211 HADIYAN, Y.

Early growth of some seed sources of sengon (*Falcataria moluccana*) at Cikampek, West Java [Indonesia]. *Pertumbuhan awal beberapa sumber benih sengon (Falcataria moluccana) di Cikampek, Jawa Barat* / Hadiyan, Y. (Balai Besar Penelitian Bioteknologi dan Pemuliaan Tanaman Hutan, Yogyakarta (Indonesia)). *Wana Benih* (Indonesia). ISSN 1410-1173 (2009) v. 10(1) p. 19-25, 4 tables; 8 ref.

PARASERIANTHES FALCATARIA; GROWTH; JAVA.

Sengon (*Falcataria moluccana*) collected from 5 seed sources in Indonesia has planted at Cikampek, West Java in a progeny test by the year 2008. The orchard consisted of 80 open-pollinated families. This plot was arranged in a randomized completely block design, 4 tree line plots and 6 blocks. Tree growth will be an important economic parameter for this trial. The growth analysis at 6 months old was aimed at knowing early performance of 5 seed sources tested. The analysis result showed that average survival of the growth was 77.42% ranged from 69.44% to 84.07%. It was significantly differences between two variables measured (diameter and height). In general, the average stem diameter growth was 1.98 cm and the height was 1.68 m. Seed source of Kediri has a highest rank on survival (84.07%), diameter (2.10 cm) and height (1.87 m) characters.

212 KURNIAWAN, L.A.

Variation of growth from several populations of teak (*Tectona grandis*) on progeny trial in Gunung Kidul [Indonesia]. ***Variasi pertumbuhan beberapa populasi jati (Tectona grandis) pada plot uji keturunan di Gunung Kidu***l / Kurniawan, L.A. (Institut Pertanian STIPER, Yogyakarta (Indonesia). Fakultas Kehutanan); Mahfudz. *Wana Benih* (Indonesia) ISSN 1410-1173 (2009) v. 10(2) p. 37-45, 3 ill., 3 tables; 5 ref.

TECTONA GRANDIS; POPULATION GROWTH; PROGENY TESTING; JAVA.

Teak is one of the species that can give significant contribution to provide wood materials. To support high quality seed of teak, progeny trial was established with genetic materials from several populations of teak in Indonesia. The research was done on Petak 93, RPH Kepek, BDH Playen, Gunung Kidul Regency, Yogyakarta Province, to determine survival rate and adaptability, and to estimate genetic variation of height and diameter growing between teak provenances. Randomized completely block design was used with 6 blocks, 120 families, and 3 tree plots and spacing 6 m x 2 m. The result evaluation in 3 months ages showed that most of teak have highest survival rate and adaptability of 95.52%. Based on the height growth parameter, several populations tested have less significant variation, whereas on diameter growth of parameter, the populations have highly significant genetic variation at 0.05 probability level. Teak provenances showed the same growth if it is viewed from height variable, so it can not determine the best provenances. Than if it is viewed from diameter variable, Randu Blatung provenances showed the best diameter growth.

213 QIROM, M.A.

Growth characteristic of teak clone on different location in South Kalimantan [Indonesia]. ***Karakteristik pertumbuhan klon jati pada dua lokasi berbeda di Kalimantan Selatan*** / Qirom, M.A. (Balai Penelitian Kehutanan Banjarbaru, (Indonesia)); Mahfudz. *Wana Benih* (Indonesia) ISSN 1410-1173 (2009) v. 10(2) p. 47-58, 4 ill., 2 tables; 8 ref. Appendices.

TECTONA GRANDIS; LAND SUITABILITY; GROWTH; VIABILITY; CANOPY; DIAMETER; HEIGHT; KALIMANTAN.

Land suitability is main factor to support plant establishment. The effect of land suitability on teak growth can be detected with clone test at different locations. Clone test was conducted in Tapin and Kotabaru Regencies. The research used 42 teak clones with randomized completely block design (RCBD), single tree plot, 5 replications with spacing 3 m x 3 m. The result after 17 months, showed that most of teak have highest survival rate and adaptability of 78.6-83.0% (Tapin) and 89.5-92.5% (Kotabaru). Teak diameter in Tapin was 4.01-4.36 cm and height 2.1-2.3 m. Teak diameter in Kotabaru was 7.45-7.86 cm and height

was 5.3-5.6 m. From 3 parameters (survival, diameter, and height), Kotabaru location was better than Tapin at early growth.

H01 PROTECTION OF PLANTS - GENERAL ASPECTS

214 TRESNIAWATI, C.
Preliminary study on BUSS test for plant variety protection on pepper (*Piper nigrum*). *Studi pendahuluan uji BUSS untuk mendukung perlindungan varietas lada (Piper nigrum)* / Tresniawati, C.; Wicaksono, I.N.A. (Balai Penelitian Tanaman Rempah dan Aneka Tanaman Industri, Sukabumi (Indonesia)). [Innovation to support the development of pepper in Bangka Belitung Province (Indonesia)] / Syafaruddin; Daras, U.; Ajijah, N.; Ferry, Y.; Indriati, G.; Taher, S.; Supriadi, H.; Towaha, J.; Herman, M.; Hasibuan, A.M.; Wicaksono, I.N.A.; Rivai, A.M. (eds.). Sukabumi (Indonesia): Balittri, 2009: p. 49-54, 2 tables; 6 ref. 633.841/INO

PIPER NIGRUM; PLANT PROTECTION; VARIETIES; AGRONOMIC CHARACTERS; TESTING.

It is necessary to give appropriate rights and law protection to plant breeders and plant variety protection rights holders. The country gives Plant Variety Protection rights, represented by the government and carry out by Center of Plant Variety Protection. Distinctness, uniformity and stability test (DUS test) is an important key in conjunction with plant variety protection. Operationally, clear and applicative standard guideline, especially in classification of quantitative, qualitative, and pseudo-qualitative characters were a prerequisite aspect needed for each country. This paper is preliminary study of pepper DUS test to support plant variety protection in pepper in order to support development of national seed industry. There are several characters in table of characteristics that can be used as a distinguishing character in pepper DUS test, such as leaf shape, seed shape, spike shape, lateral branch pattern, length of lateral branch, leaf base, leaf margin, length of spike, length of leaf, shoot tip color, and width of leaf.

215 ASIKIN, S.
Plant materials with benefit as attractant of fruit flies (*Bactrocera dorsalis*). *Bahan nabati yang berfungsi sebagai atraktan bagi lalat buah (Bactrocera dorsalis)* / Asikin, S.; Thamrin, M. (Balai Penelitian Pertanian Lahan Rawa, Banjarbaru (Indonesia)). [Proceedings of the national seminar on Indonesian fruits] Bogor (Indonesia), 28-29 Oct 2009 / Taher, R.; Dwiastuti, M.E.; Devy, N.F.; Prabawati, S.; Harlion, L.L. (eds.). Jakarta (Indonesia): Puslitbanghorti, 2009: p. 517-524, 5 tables; 10 ref. 634.1/.7(594)/SEM/p

FRUIT CROPS; VEGETABLE CROPS; BACTROCERA DORSALIS; ATTRACTANTS; FERMENTED FOODS; CASSAVA; SOYBEANS; FERMENTATION; FLAVOURINGS; BIOLOGICAL CONTROL.

Bactrocera dorsalis is one type of fruit flies that often cause damage to vegetables, ridged luffa and bitter melon. In addition, these fruit flies can also attack the fruits such as starfruit, jackfruit, cempedak, banana, guava and avocado. The damage or loss caused by the fruit fly attack is ranged between 80-95% if not controlled. In general, for controlling fruit fly *Bactrocera dorsalis*, farmers generally rely on toxic chemicals or using fruit cover. The use of toxic chemicals or synthetic insecticides may adversely affect consumers because of the residues on the fruit, while packing the fruit is less practical and time-consuming and labor, especially in large orchard. The use of synthetic methyl eugenol as male fruit flies attractant

trap has been studied for periods. Attractant is already sold but they were very expensive and less safe for human because it may cause skin irritation if exposed. Effective and efficient control can be obtained by using attractant or decoy from plant materials. Sources for fruit flies attractant from plant materials have been derived from fermented cassava, fermented soy added with food flavorings and sugar cane juice supplemented with food flavorings. They are environmental friendly, inexpensive and easy to apply. The results showed that level of fruit damage in the treatment which used those artificial attractant substances could be decrease by 5-10% compared to the control treatment that showed fruit damage between 80-100%. In addition, by using artificial substances for attractant control, insecticides used to control the flies could be reduced or even without no insecticides.

216 MURYATI

Early warning system of mango main pests. ***Pendugaan dini pengendalian beberapa hama penting mangga*** / Muryati (Balai Penelitian Tanaman Buah Tropika, Solok (Indonesia)). [Proceedings of the national seminar on Indonesian fruits]. Bogor (Indonesia), 28-29 Oct 2009 / Taher, R.; Dwiastuti, M.E.; Devy, N.F.; Prabawati, S.; Harlion, L.L. (eds.) Jakarta (Indonesia): Puslitbanghorti, 2009: p. 497-508, 12 ill., 1 table; 8 ref. 634.1/.7 (594)/SEM/p

MANGIFERA INDICA; CURCULIONIDAE; LEAF EATING INSECTS; STEM EATING INSECTS; FULGOROIDEA; DOMINANT SPECIES; PEST SURVEYS; CONTROL METHODS.

The objective of the research was to find out the model of early warning system for the control of mango main pest. This activity was conducted at the Cukurgondang Research Station, Pasuruan, East Java that is characterized as dry low land agro ecology with amount of rainfall <1,000 mm/year, and located at 50 m above sea level and at the Aripan Research Station Solok, West Sumatra that is characterized as wet low land. Samples used in this activity were 20 mango trees cv. Arumanis 143 from each location that were randomly selected. The result showed that there were differences on dominant mango pest between wet low land and dry low land agro climate. The shoot borer and stem borer were main pests on the wet-low land, while the mango hopper, shoot bug and mango webber were main pests on the dry-low land agro climate. Early warning system for mango pests control could be decided based on critical phase of plant and climatic factors that influence their population. The early warning for the mango shoot borer could not decided yet, because critical phase of plant is always present through a year, while the climatic data were insufficient, so routine monitoring program must be done. The early warning system for controlling mango hopper, mango shoot bug and mango webber can be decided by calendar system based on critical phase of host and climatic factor.

217 SUSANTI, E.

The use of climate information for developing early warning system to brown plant hopper attack on rice plants. ***Pemanfaatan informasi iklim untuk pengembangan sistem peringatan dini luas serangan WBC pada pertanaman padi*** / Susanti, E.; Ramadhani, F.; June, T.; Amien, L.I. (Balai Penelitian Agroklimat dan Hidrologi, Bogor (Indonesia)). *Jurnal Tanah dan Iklim* (Indonesia). ISSN 1410-7244 (2009) (no. 30) p. 47-58, 8 ill., 3 tables; 5 ref.

ORYZA SATIVA; NILAPARVATA LUGENS; AGRICULTURAL WARNING SERVICES; INFORMATION SYSTEMS; PLANT PROTECTION; CLIMATIC DATA; JAVA.

Crop pests and diseases are limiting factors in determining crop production. Brown Plant Hopper/BPH (*Nilaparvata lugens*) is the major crop pests and diseases for rice in Asia since 1970's. The presence of BPH is depending upon several conditions covering pathogenic characteristics, carriers, physical environment (rainfall, temperature, and humidity) and biotic environment (natural enemy and competitor organisms). BPH growth is very fast delivering huge amount of eggs, has a short life cycle (28 days) with fast dispersive power and incredible attack power. The presence of BPH is very dynamic and its presences is assumed related to the climatic condition of their habitat. This is the reason why climate can be used as an indicator for early warning to anticipate the attack of BPH. The relationship between pest and diseases attack and climate parameters such as rainfall, mean temperature, maximum temperature, minimum temperature, mean humidity, maximum humidity, and minimum humidity can be analyzed using multiple regression. A dynamic and interactive early warning system is developed using software of MS Access, Arc View, Map Object, and Visual Basic. The results of analysis showed that climate parameter has a correlation with the BPH attack area only during the La Nina years. Those parameters include rainfall, maximum temperature, maximum temperature at two weeks before attack, minimum temperature, and minimum temperature at two weeks before attack. The early warning system is started by entering the climate prediction for the next cropping season where the time is subject to be predicted, at a certain subdistrict. After inputting data of climate prediction the system will provide information of potential area attack of BPH at that location. By performing information of potential area attack the anticipative action can be designed earlier to reduce the crop harvest failure.

218 THAMRIN, M.

Botanical insecticides as control for leaf pest of melon at tidal swamp land. ***Kemanjuran insektisida nabati terhadap hama perusakan daun melon di lahan rawa pasang surut*** / Thamrin, M.; Asikin, S. (Balai Penelitian Pertanian Lahan Rawa, Banjarbaru (Indonesia)). [Proceedings of the national seminar on Indoneian fruits]. Bogor (Indonesia), 28-29 Oct 2009 / Taher, R.; Dwiastuti, M.E.; Devy, N.F.; Prabawati, S.; Harlion, L.L. (eds.). Jakarta (Indonesia): Puslitbanghorti, 2009: p. 525-531 , 1 table; 11 ref. 634.1/.7(594)/SEM/p

CUCUMIS MELO; PLUSIA; LEAF EATING INSECTS; BOTANICAL INSECTICIDES; PLANT EXTRACTS; MELALEUCA; CHROMOLAENA ODORATA; BIOLOGICAL CONTROL; PESTICIDAL PROPERTIES; SWAMP SOILS; TIDES.

Swamp land is rich in various types of plants that contain bioactive substances which are potential to be pest control agents especially as an insecticides. The use of the plant materials as sources of bioactive compounds will not cause adverse effects such as environmental pollution and so on, because in general the plant material is easily broken down or degraded in nature and could be expected to not persistent in nature or in food material, so that it will not pollute the environment. In addition, in supporting organic farming as well as to reduce the use of synthetic insecticides, an environmental friendly and inexpensive price alternative control is required. One of them is to use insecticides derived from plants. This botanical insecticides have specific properties that are safe for natural enemies of pests. Residue was easily broken down so that it is safe for the environment. Raw materials can be obtained easily with economical price. The results showed that the swamp plants that are potential to be used as insecticides and toxic to Plusia sp. are galam, mercon, sungkai, kedundung, kumandrah, jalatang, rumput minjangan, and cambai with larval mortality percentage ranged between 63.3-70%.

219 WIRYADIPUTRA, S.

Effect of seed extract of soursop fruit (*Annona muricata*) on the development of *Pratylenchus coffeae* on arabica coffee. ***Pengaruh ekstrak biji sirsak (Annona muricata) terhadap perkembangan nematoda Pratylenchus coffeae pada tanaman kopi arabika*** / Wiryadiputra, S. (Pusat Penelitian Kopi dan Kakao Indonesia, Jember (Indonesia)); Anggraini, W.; Waluyo, J.; Pujiastuti. *Pelita Perkebunan* (Indonesia). ISSN 0215-0212 (2010) v. 26(3) p. 156-168, 2 ill., 3 tables; 28 ref.

COFFEA ARABICA; BOTANICAL PESTICIDES; PRATYLENCHUS COFFEAE; SEED EXTRACTS; ANNONA MURICATA; IN VITRO; IN VIVO.

In the recent years, world coffee consumers are highly concern on the jeopardous of chemical pesticides in controlling coffee pests and diseases. To overcome these problems, integrated pest control must be practiced using non-pesticides component methods which are safer and more sustainable, such as the use of botanical pesticides. Research on bioactivities of water extract of soursop (*Annona muricata* L.) seed against a main coffee parasitic nematode, Pratylenchus coffeae has been conducted in Nematology Laboratory and a greenhouse of Indonesian Coffee and Cocoa Research Institute, in Jember, East Java. The research consisted of *in vitro* and *in vivo* trials of the effect of soursop seed extract on mortality of *P. coffeae*. As a comparison, carbofuran nematicide was included in the trials. Research results revealed that water extract of soursop seed was very effective for killing *P. coffeae* both on *in vitro* and *in vivo* trials. On the *in vitro* trial, with the range of seed extract concentration of 3.0-24.0 ml/l of water (stock solution based) caused efficacy level of 32.3%-87.2%. Efficacy level at concentration of 24.0 ml/l of water was significantly higher than that of carbofuran treatment at the dose of 1.0 g formulation per liter of water. On the in vivo trial using arabica coffee seedling S 795 variety, soursop seed extract was also higly effective in killing *P. coffeae* and suppressing the infestation on the form of root lesion caused by the nematode. At concentration level of 10.0 ml/l of water, mortality levels reached 100% and similar with the carbofuran treatment at the dose 1.0 g formulation per seedling. Seed extract treatments had also caused the increase of arabica coffee seedling growth compared with carbofuran and untreated treatments.

H10 PESTS OF PLANTS

220 YULIASMARA, F.

Effectiveness of several phytocoater formula to protect cocoa pods from the attack of cocoa pod borer. ***Keefektifan beberapa formula pelapis nabati untuk melindungi buah kakao dari serangan hama penggerek buah kakao*** / Yuliasmara, F. (Pusat Penelitian Kopi dan Kakao Indonesia, Jember (Indonesia)); Firdaus, F.; Sulistyowati, S.; Prawoto, A.A. *Pelita Perkebunan* (Indonesia). ISSN 0215-0212 (2010) v. 26(3) p. 142-155, 2 ill., 6 tables; 22 ref.

THEOBROMA CACAO; PESTS OF PLANTS; BEAUVERIA BASSIANA; PREHARVEST TREATMENT; PROTECTIVE COATINGS; FRUIT; GROWTH.

Pod sleeving using polyethylene bag is an effective method to control cocoa pod borer (CPB), but it still remains problem in practicality and waste. Phytocoater is another alternative which is formulated from basic ingredients of polylactic acid (PLA). This formula is expected to be effective to suppress pest especially CPB. The aim of the research was at studying physical and mechanical characteristic of phytocoater and its effectiveness in protecting cocoa pod from CPB attack. The physical and mechanical characteristics of phytocoater was tested using lab-Tenso MEY, and its degradability was also observed.

Effect of phytocoater application on pod development and physiology was observed in Kaliwining Experimental Station using randomized completely block design with three replications. The observed variables were length and diameter of pods, and rate of pod transpiration. Effectiveness of phytocoater on CPB infestation was observed in Kendeng Lembu Estate using randomized completely block design with 3 replications in factorial arrangement. The first factor was phytocoater formulation, i.e. F1 (50 ml PLA + 25 ml glycerol + chitosan 10 ml + lemon grass extract), F2 (50 ml PLA + 25 ml glycerol + chitosan 10 ml + neem extract), F3 (50 ml PLA + 25 m glycerol + chitosan 10 ml + *Melia azedarach* extract), F4 (10 ml glycerol + 10 ml PLA + 10 ml chitosan + lemon grass extract), F5 (10 ml glycerol + 10 ml PLA + 10 ml chitosan + neem extract), dan F6 (10 ml glycerol + 10 ml PLA + 10 ml chitosan + *Melia azedarach* extract). The second factor was application interval, i.e., two weeks, four weeks and control (without application). The results were also compared to insecticide and pod sleeving methods. The results showed that the formulated phytocoater had physical and mechanical characters similar with polyethylene. Application of phytocoater on cocoa pod did not interfere growth of cocoa pod, but F3 and F4 decreased pod transpiration. F6 with a two-weeks interval application reduced percentage of yield loss up to 14.1% while control 84.3%. F6 showed significant difference from the control to reduce yield loss, but its effectiveness was still lower than pod sleeving and insecticide treatments. Formula 6 is potential to be used to protect cocoa pods from CPB attack.

H20 PLANT DISEASES

221 INDRIATI, G.

Potential of neem and tobacco for control *Planococcus* sp. as insect vector of stunted growth disease on black pepper. *Potensi serbuk mimba dan tembakau untuk pengendalian Planococcus sp. sebagai vektor penyakit kerdil pada tanaman lada* / Indriati, G.; Khaerati; Towaha, J. (Balai Penelitian Tanaman Rempah dan Aneka Tanaman Industri, Sukabumi (Indonesia)). [Innovation to support the development of pepper in Bangka Belitung Province (Indonesia)] / Syafaruddin; Daras, U.; Ajijah, N.; Ferry, Y.; Indriati, G.; Taher, S.; Supriadi, H.; Towaha, J.; Herman, M.; Hasibuan, A.M.; Wicaksono, I.N.A.; Rivai, A.M. (eds.). Sukabumi (Indonesia): Balittri, 2009: p. 181-186, 1 table; 24 ref. 633.841/INO

PIPER NIGRUM; NEEM EXTRACTS; TOBACCO; PLANOCOCCUS; PLANT DISEASE; BOTANICAL PESTICIDES.

Stunted growth disease is the most important diseases on black pepper. The disease is transmitted through the plant material and insects. *Planococcus* sp. is one of the insects vectors that can attack plants and pepper seedling in the field. To cope the stunted disease at the pepper plant, among others, the control of insects vector is done. Mortality level of *Planococcus* sp. is adequately high in 5 days after application (DAA) which ranged 87.3 - 92.0%. Bioinsecticide of neem and tobacco produced in a simple method were potential to control *Planococcus* sp. as vectors of stunted growth disease on black pepper. Thus, neem and tobacco extracts as biopesticide are effective to control insect vectors *Planococcus* sp.

222 ISTIFADAH, N.

Use of spent mushroom substrate for environmentally friendly control measures of potato diseases. *Pemanfaatan limbah bekas media jamur konsumsi untuk pengendalian penyakit pada tanaman kentang yang ramah lingkungan* / Istifadah, N.; Hartati, S.; Herdiyantoro, D. Universitas Padjadjaran, Bandung (Indonesia). Fakultas Pertanian. Bandung (Indonesia): UNPAD, 2010: 37 p. 3 ill., 7 tables; 21 ref. Appendices. 633.491-293.7/IST/p

SOLANUM TUBEROSUM; WASTE UTILIZATION; EDIBLE FUNGI; DISEASE CONTROL; ALTERNARIA SOLANI; PHYTOPHTHORA INFESTANS; PLEUROTUS; LENTINUS EDODES; AURICULARIA; MICROBIAL PESTICITIDES.

Potato is one of food crops that are usually cultivated in highland areas. One of limiting factors in potato production is potato diseases. The most common control measures used is pesticide application. The increase of awareness on environment issues and pesticide residues has encouraged the development of environmental-friendly control measures including the use of organic matters for plant disease control. Spent mushroom substrates are potential to be used for plant disease control. The purpose of this study were to examine the abilities of spent substrate of *Pleurotus* spp., *Lentinus edodes*, and *Auricularia auriculaceae* for controlling bacterial diseases (*Ralstonia solanacearum*), early blight (*Alternaria solani*), and late blight (*Phytophthora infestans*) in potato. The results showed that spent substrates of *Pleurotus* spp., *L. edodes*, and *A. auriculaceae* applied in the planting site and their water extract spray every 3 or 7 days suppressed the development of early blight disease (*A. solani*) by 59-85% in greenhouse potato and late blight disease (*P. infestans*) in the field experiment by 26.9-35.6%. The abilities of the spent mushroom substrates in inhibiting pathogen were mostly due to the presence of various microorganisms in the extracts which were antagonistic to the pathogen than the presence of toxic compounds.

223 ZAINAL, A.

Inoculation test and response of 38 tomato genotypes to Indonesian isolates of *Clavibacter michiganensis* subsp. *michiganensis*. *Uji inokulasi dan respon ketahanan 38 genotipe tomat terhadap Clavibacter michiganensis subsp. michiganensis* / Zainal, A.; Anwar, A. (Universitas Andalas, Padang (Indonesia)); Ilyas, S.; Sudarsono; Giyanto. *Jurnal Agronomi Indonesia* (Indonesia). ISSN 2085-2916 (2011) v. 39(2) p. 85-91, 1 ill., 7 tables; 20 ref.

LYCOPERSICON ESCULENTUM; CLAVIBACTER MICHIGANENSIS; INOCULATION; GENOTYPES; DISEASE RESISTANCE.

Identification of resistant genotypes is the first step in the development of cultivars resistant to pathogenic Cmm. The objectives of the study were (i) to obtain an effective way of inoculation and the optimal concentration of Cmm suspension for evaluating their resistance against Cmm tomatoes in a greenhouse, and (ii) testing the resistancy of 38 genotypes of tomato after inoculation with Cmm. The experiment used 38 genotypes of tomato consisting of 7 local tomato varieties, 15 commercial tomato varieties, and 16 tomato lines of Plant Breeding Study Center, Bogor Agricultural University (PSPT/IPB) collection. Bacterial agents causing cancer used were six Cmm isolates. The method of effective inoculation Cmm to tomato plant by using cv. Marta (highly susceptible), and the testing of the resistance reaction of 38 genotypes tomato to Cmm have been conducted at screen net. The result showed that inoculation by injecting Cmm suspension at several sites of leaves axil (first leaves, middle leaves, and shoots) with 5 µl concentration of 10^6 cfu/ml was the most effective inoculation method for evaluating the resistance of tomato against Cmm. From the 38 tomato genotypes tested, there were no resistant genotypes to Cmm infection, while local tomato genotypes have a rather susceptible and some were moderately resistant.

H50 MISCELLANEOUS PLANT DISORDERS

224 INONU, I.

Response of rubber clones to frequency of watering in sand tailings media derived from tin post-mining. *Respon klon karet terhadap frekuensi penyiraman di media tailing pasir pasca penambangan timah* / Inonu, I. (Universitas Bangka Belitung, Bangka (Indonesia). Program Studi *Agroteknologi); Budianta, D.; Umar, M.; Yakup; Wiralaga, A.Y.A. Jurnal* Agronomi Indonesia (Indonesia). ISSN 2085-2916 (2011) v. 39(2) p. 131-136, 4 tables; 20 ref.

HEVEA BRASILIENSIS; DROUGHT TOLERANCE; WATERING; DISTRIBUTION OF FREQUENCY; SANDY SOILS.

Sand tailings derived from tin post-minings activities have high porosity, low water holding capacity, and low organic matter content. These conditions cause soil water deficit, especially in dry season. To increase the successful of sand tailings revegetation with rubber tree, it is important to select some rubber tree clones based on their adaptability on the sand tailings conditions, especially drought stress. This research aimed to study the response of several rubber tree clones to the frequency of watering on sand tailings. The experiment was conducted in a plastic house at the Experimental Station of Agrotechnology Study Program of Bangka Belitung University, Sungailiat for 4 months. The experimental design used was a factorial randomized block design with two factors and three replications. The first factor was the frequency of watering (every day, every 3 days, and every 5 days), the second factor was a combination of recommended rootstock clones and recommended latex clones (clone GT 1 + PB 260, GT 1 + IRR 118, and PB 260 + BPM 24). The results showed that watering every 5 days caused drought stress resulted in impaired growth of rubber in sand tailings media derived from tin post-mining. The combination of rootstocks and scions PB 260 + BPM 24 and PB 260 + IRR 118 were categorized as moderately tolerant clones, while GT 1 + PB 260 was categorized as sensitive clones to drought stress in the sand tailings media.

225 KARTI, P.D.M.H.

Aluminum tolerance mechanism in *Setaria splendida*. *Mekanisme toleransi aluminium pada rumput pakan Setaria splendida* / Karti, P.D.M.H. (Institut Pertanian Bogor (Indonesia). Fakultas Peternakan). *Jurnal Agronomi Indonesia* (Indonesia). ISSN 2085-2916 (2011) v. 39(2) p. 144-148, 1 ill., 2 tables; 13 ref.

SETARIA; CHLORIS GAYANA; ALUMINIUM; TOLERANCE; CHEMICAL COMPOSITION; OXALIC ACID; MALEIC ACID; CITRIC ACID; GROWTH.

Plant tolerance mechanism to aluminum (Al) toxicity can be studied by comparing the Al-tolerant and Al-sensitive species. *Setaria splendid*a is an Al-tolerant forage, while Chloris gayana is a Al sensitive one. This research was aimed to reveal the main Al-tolerant mechanism in *S. splendida*. The first experiment was arranged in completely randomized design with two factors and two replications to study the organic acid and Al accumulation in *S. splendida* and *C. gayana*. The first factor was Al concentration (0 and 2 mM Al), while the second factor was Al tolerant (*S. splendida*) and Al sensitive (*C. gayana*) species. The second experiment was arranged in completely randomized design with two factors and three replications to study the effect of Al stress on plant growth. The first factor was Al tolerant (*S. splendida*) and Al sensitive (*C. gayana*) species, while the second factor was four levels of Al concentration in the growing medium (28.19, 27.37, 13.74, and 0.13 me Al^{3+}). The results showed that Al accumulation in the root tissue of *S. splendida* was similar to *C. gayana*. Although *S. splendida* accumulated higher Al in the shoots in comparison to *C.*

gayana, they were more tolerant to Al. *S. splendida* tolerated Al-toxicity by secreting oxalic acids and citric acid from roots to the external solution, and by accumulating oxalic acid and mallic acid in their roots and shoots.

226 SUPRIADI, H.
Potency of drought resistant pepper for pepper agribusiness development in Bangka Belitung Islands [Indonesia]. ***Potensi lada tahan kekeringan untuk pengembangan agribisnis lada di Kepulauan Bangka Belitung*** / Supriadi, H.; Heryana, N. (Balai Penelitian Tanaman Rempah dan Aneka Tanaman Industri, Sukabumi (Indonesia)). [Innovation to support the development of pepper in Bangka Belitung Province (Indonesia)] / Syafaruddin; Daras, U.; Ajijah, N.; Ferry, Y.; Indriati, G.; Taher, S.; Supriadi, H.; Towaha, J.; Herman, M.; Hasibuan, A.M.; Wicaksono, I.N.A.; Rivai, A.M. (eds.). Sukabumi (Indonesia): Balittri, 2009: p. 69-74, 3 tables; 14 ref. 633.841/INO

PIPER NIGRUM; DROUGHT RESISTANCE; AGROINDUSTRIAL SECTOR; RAIN; BANGKA.

Cultivation of pepper plant (*Piper nigrum* L.) in Bangka Belitung Islands have a serious problem, which is often due to the occurrence of long dry months (rainfall <100 mm) for >3 months, causing a lot of death in pepper plants. One effort to overcome this problem is using resistant or tolerant plants to drought. Some accessions and superior varieties of pepper resistant or tolerant to drought have been generated by ISICRI namely: Petaling 2 varieties, and 7 accessions LDL (Lampung Daun Lebar), No. T, LH 6-2, LH 22-1, LH N2xBxl, LH 36-31 and LH 63-5. These varieties and accessions are potential to be developed in pepper agribusiness in Bangka Belitung Islands.

J11 HANDLING, TRANSPORT, STORAGE AND PROTECTION OF PLANT PRODUCTS

227 DARMAWATI, E.
[Efforts to reduce the level of beans damage in the transportation]. ***Upaya mengurangi tingkat kerusakan buncis pada proses transportasi*** / Darmawati, E. (Institut Pertaian Bogor (Indonesia)). *Pangan* (Indonesia). ISSN 0852-0607 (2010) v. 19(3) p. 275-281, 8 ill., 1 table; 7 ref.

BEANS; MECHANICAL DAMAGE; WEIGHT REDUCTION; TRANSPORTATION; FIRMNESS; ORGANOLEPTIC TESTING; COST ANALYSIS; PACKAGING.

Green bean is one of vegetables that much consumed to accomplish community nutrition. Green beans are fresh products that can be easily damaged during transportation process, thus proper handling during and post transportation are needed. The objective of this study was to determine the influence of packaging types to the quality of fresh beans after transportation. During the transportation from farming area, the beans were packaged in two forms: bulky and retail packaging. In the bulky form, the beans were subsequently package in the form of retail packaging and directly displayed to end user. The results showed that in term of quality and quantity, suitable packaging for transport of the fresh green beans were in retail form (a combination of styrofoam packaging + plastic container). In the economic point of view, bulky form (plastic container and plastic bags), could be considered to be continually used for short-distance transport, whereas for long-distance transport, the beans were packed in the retail form would be more advantageous. On the basis of cost-benefit analysis, on the selling price beans of Rp 2,500/kg, suitable packaging was the combination

of PE + plastic container, while plastic container, plastic bag, and combination of styrofoam + plastic film would be reasonably apply when the level of the selling price was Rp 4,900/kg.

228 FARAH, D.M.H.

Optimization of cocoa nib roasting based on sensory properties and colour using response surface methodology. ***Penentuan kondisi optimum penyangraian keping biji kakao berdasarkan sifat organoleptik dan warna menggunakan response surface methodology*** / Farah, D.M.H.; Zaibunnisa, A.H. (Universiti Teknologi MARA, Selangor (Malaysia)); Misnawi (Pusat Penelitian Kopi dan Kakao Indonesia, Jember (Indonesia)). *Pelita Perkebunan* (Indonesia). ISSN 0215-0212 (2012) v. 28(1) p. 54-61, 3 ill., 2 tables; 16 ref.

COCOA BEANS; FLAVOUR; ROASTING; COLOUR; ORGANOLEPTIC ANALYSIS; METHODS; QUALITY.

Roasting of cocoa beans is a critical stage for development of its desirable flavour, aroma and colour. Prior to roasting, cocoa bean may taste astringent, bitter, acidy, musty, unclean, nutty or even chocolate-like, depends on the bean sources and their preparations. After roasting, the bean possesses a typical intense cocoa flavour. The Maillard or non-enzymatic browning reactions is a very important process for the development of cocoa flavor, which occurs primarily during the roasting process and it has generally been agreed that the main flavor components, pyrazines formation is associated within this reaction involving amino acids and reducing sugars. The effect of cocoa nib roasting conditions on sensory properties and colour of cocoa beans were investigated in this study. Roasting conditions in terms of temperature ranged from 110 to 160°C and time ranged from 15 to 40 min. were optimized by using Response Surface Methodology based on the cocoa sensory characteristics including chocolate aroma, acidity, astringency, burnt taste and overall acceptability. The analyses used 9 point hedonic scale with twelve trained panelist. The changes in colour due to the roasting condition were also monitored using chromameter. Result of this study showed that sensory quality of cocoa liquor increased with the increase in roasting time and temperature up to 160°C and up to 40 min., respectively. Based on the Response Surface Methodology, the optimised operating condition for the roaster was at temperature of 127°C and time of 25 min. The proposed roasting conditions were able to produce superior quality cocoa beans that will be very useful for cocoa manufactures.

229 MASITHOH, R.E.

Image analysis to observe changes of visual appearance of dehydrated red onion (*Allium ascalonicum* L.). ***Analisis citra untuk mengamati perubahan kenampakan visual bawang merah (Allium ascalonicum L.) karena pengeringan*** / Masithoh, R.E.; Kusuma, S.A. (Universitas Gadjah Mada, Yogyakarta (Indonesia). Fakultas Teknologi Pertanian). *Agritech* (Indonesia). ISSN 0216-0455 (2008) v. 28(3) p. 113-119, 5 ill., 19 ref.

ALLIUM ASCALONICUM; MOISTURE CONTENT; IMAGE PROCESSING; IMAGE ANALYSIS; TEXTURE; FELLING AREAS.

This research aimed at observing changes of visual appearance of dehydrated sliced red onion (*Allium ascalonicum* L.) and its image parameters, i.e. area and textures (entropy, energy, contrast, and homogenecity) using image processing and analysis. Images analysis was conducted using the image processing system consisted of a webcam, illuminations, computer hardware, and image processing software. Entropy and contrast increased as

moisture contents decreased, whereas energy, homogenecity and area decreased as the moisture contents decreased. Statistical analysis resulted in the relationship between red onion moisture content and its textural image parameters, i.e. entropy, energy, homogenecity and area; while contrast did not contribute significantly to the moisture content. Using the developed machine vision system it is expected to determine the moisture content of sliced red onion based on image parameters, i.e. texture and area.

230 PANGARIBUAN, D.H.

Application of 1-MCP to intact tomatoes differing in maturity delays quality changes in the stored slices. ***Aplikasi 1-MCP pada tomat berbagai kematangan menunda perubahan kualitas pada penyimpanan irisan tomat*** / Pangaribuan, D.H. (Universitas Lampung, Bandar Lampung (Indonesia). Fakultas Pertanian); Irving, D. *Jurnal Agronomi Indonesia* (Indonesia). ISSN 2085-2916 (2011) v. 39(2) p. 92-96, 2 ill., 2 tables; 27 ref.

TOMATOES; MCPA; APPLICATION RATES; MATURITY; QUALITY; COLD STORAGE; CHEMICOPHYSICAL PROPERTIES.

A study was carried out to determine the effect of 1-MCP applied to intact tomatoes differing in maturity stage on quality of stored tomato slices. 1-MCP (1 micro l/l, 20°C, 12 h) was applied directly to intact tomatoes from 'turning', 'pink', and 'light-red' stages of maturity. After slicing, slices were stored for up to 10 days at 5°C. 1-MCP maintained slice quality during storage following treatment of intact 'turning' and 'pink' maturity fruit as indicated by higher titratable acidity, higher ascorbic acid concentration, and lower lycopene content. 1-MCP treatment did not significantly affect soluble solids and electrolyte leakage. Slices from 'light-red' maturity stage fruit did not respond to 1-MCP. The results showed that application of 1-MCP to intact tomatoes was effective in maintaining tomato slice quality if 1-MCP is applied to fruit at early ('turning' and 'pink') stages of maturity.

231 SUDARYANTO

Effect of storage and packaging on the quality of patchouli oil. ***Pengaruh lama penyimpanan dan jenis kemasan terhadap mutu minyak nilam (Patchouli oil)*** / Sudaryanto; Nurjanah, S.; Rosalinda, S. Universitas Padjadjaran, Bandung (Indonesia), Fakultas Teknologi Industri Pertanian. Bandung (Indonesia): UNPAD, 2010: 76 p. 11 ill., 8 tables; 33 ref. Appendices. 633.812:665.53/SUD/p

POGOSTEMON CABLIN; OILS; STORAGE; PACKAGING; BOTTLES; PLASTICS; CANS; KEEPING QUALITY; DURATION; CHEMICAL COMPOSITION; CHEMICOPHYSICAL PROPERTIES.

Packaging of patchouli oil is a storage technique that most applicable in transportation and storage of export fluid (oil) aromatherapy commodities. This research was done at the Postharvest Engineering and Process Technology Laboratory, Department of Agricultural Engineering, Padjadjaran University. This research is expected to become research method base in developing of storage technique of patchouli oil with used description method with three replications, which included treatment, trial, analysis and response planning. Treatment planning consisted of grey glass bottle, transparent glass bottle, white plastic bottle, transparent plastic bottle, and metal can. The responses observed were the content of patchouli alcohol (PA), change of pachouli oil color, weight specific, value of acid, value of ester, soluble of alcohol 90%, and bias index. The result showed that there was influence of quality of patchouli oil with physical aspect or chemical component of patchouli oil. The duration storage (9 weeks) was influence on patchouli alcohol (PA), change of patchouli oil

color, weight specific, value of acid, value of ester; soluble of alcohol 90%, and bias index, which was suitable with SNI 06-2385-2006, and grey glass bottle was the best treatment for quality of patchouli oil storage.

L01 ANIMAL HUSBANDRY

232 PRIYANTO, D.

Study of adaptation of composite breed at sheep farming system condition in village. ***Uji adaptasi domba komposit pada kondisi usaha peternakan rakyat di pedesaan*** / Priyanto, D.; Subandriyo (Balai Penelitian Ternak, Bogor (Indonesia)). [Proceedings of the national seminar on animal husbandry and veterinary technology] Bogor (Indonesia), 7-8 Jun 2011 / Prasetyo, L.H.; Damayanti, R.; Iskandar, S.; Herawati, T.; Priyanto, D.; Puastuti, W.; Anggraeni, A.; Tarigan, S.; Wardhana, A.H.; Darmayanti, N.L.P.I. (eds.). Bogor (Indonesia): Puslitbangnak, 2012: p. 577-585, 1 ill., 5 tables; 10 ref. 636:619/SEM/p

SHEEP; COMPOSITE POPULATION; ADAPTATION; ANIMAL PRODUCTION; SMALL FARMS; PRODUCTIVITY; LITTER SIZE; SURVIVAL; WEANING WEIGHT; GROWTH RATE; ECONOMIC ANALYSIS.

Indonesian Research Institute for Animal Production (RIAP) has established three composite sheep, which have superiority of giving birth along the year, a large body condition, resistant to certain diseases and other superiorities. A test was done in sheep farming to study genotype and environment interaction. The research conducted in Juhut Village, Pandeglang Regency with introduction of 3 genotypes i.e. Barbados Cross (BC), Garut composite (KG), and Sumatra composite (KS), which was compared to local breed as a control. Production and economic parameters were recorded then analyzed to study feasibility of sheep farming system in village. Result showed that total weaning weight - that was related to litter size and survival rate - of composite breed was higher compared to local breed, and showed significantly different among genotype ($P<0.001$). Meanwhile body weight at 8 weeks and weaning weight (3 months) among genotype were significantly different ($P<0.001$). Body weight at different sexes were not significantly different ($P>0.05$), but body weight at single litter size were higher than twin ($P<0.001$). Post weaning weight at 6 months until 11 months showed competition growth significantly ($P<0.01$), although in general composite breed were higher than local breed, except at KS breed at 11 months age. Economic analysis done based on ewes productivity showed that composite breed has higher marginal economic value (MNE) compared to local breed i.e. 247, 207 and 179% for KG, BC, and KS respectively. Efficiency of economic value (NEE) growth at weaning until the age 11 months: lokal (LL) sheep was very superior (Rp 286,000), followed by KG (Rp 180,000), BC (Rp 179,600), and the lowest was KS (Rp 1 46,900). This finding should become a consideration in pattern of lamb rearing management.

L02 ANIMAL FEEDING

233 FIRSONI

Effect of *Tithonia diversifolia* (Hemsley) A. Gray and *Moringa oleifera* Lamk leaves in complete feed on gas production *in-vitro*. *Efek daun paitan Tithonia diversifolia (Hemsley) A. Gray dan kelor (Moringa oleifera Lamk) di dalam pakan komplit terhadap produksi gas in-vitro* / Firsoni (Badan Tenaga Nuklir Nasional, Jakarta (Indonesia)); Puspitasari, L.; Andini, L. [Proceedings of the national seminar on animal husbandry and veterinary technology]. Bogor (Indonesia), 7-8 Jun 2011 / Prasetyo, L.H.; Damayanti, R.; Iskandar, S.; Herawati, T.; Priyanto, D.; Puastuti, W.; Anggraeni, A.; Tarigan, S.; Wardhana,

A.H.; Darmayanti, N.L.P.I. (eds.). Bogor (Indonesia): Puslitbangnak, 2012: p. 522-528, 4 tables; 24 ref. 636:619/SEM/p

MAIZE; STRAW; TITHONIA DIVERSIFOLIA; MORINGA OLEIFERA; COMPLETE FEEDS; IN VITRO; CELL CULTURE; DURATION; DEGRADATION.

This research was done to determine the advantages of *Tithonia diversifolia* (Hernsl.) A. Gray and *Moringa oleifera* Lamk leaves as a protein source in complete feed for ruminants. Randomized block design was applied in this study with five treatments: A. Rice straw (JJ) 100%; B. JJ 60% + T. diversifolia (TD) 40%; C. JJ 60 % + TD 30% + ricebrand (DD) 10%; D, JJ 60% + TD 22.5% + M. oleifera (MO) 7.5 % + DD 10 % dan E. JJ 60 % + TD 15 % + MO 15 % + DD 10 %) in 4 blocks. Samples were weighted 375 ± 5 mg, placed into 100 ml syringe glass, added with 30 ml rumen liquor with bicarbonat buffer media and incubated in 39°C for 48 hours. Parameters observed were: gas production after 0, 2, 4, 6, 10, 12, 24, and 48 hours incubation; degradability of dry matter (DBK) and organic matter (DBO); NH3, total VFA concentration; and microbe biomass production after 48 hours incubation. Results showed that T. diversifolia and *M. oleifera* significantly increased NH3, microbes, DBK and DBO (P<0.05). The highest gas production was obtained from treatment D (60.30 ml/375 mg DM) and the lowest was from treatment B (50.06 ml/375 mg DM). The highest DBK was obtained from treatment D (62.45%) and the highest DBO from treatment E (61.12%), whereas the lowest were from treatment A (57.19%) and (55.12%), respectively. Treatment C contributed the highest NH3 (32.11 mg/100 ml) on the other hand the lowest NH3 was from A (28.06 mg/100 ml), while the highest microbial biomass was obtained from treatment E (165.6 mg) and the lowest was from A (148.5 mg).

234 KIROH, H.J.

Domesticating process of tarsius (*Tarsius spectrum*) by gradually optimal feeding system in wire netting pen. *Upaya domestikasi tangkasi (Tarsius spectrum) melalui optimalisasi pemberian pakan secara gradual dalam penangkaran* / Kiroh, H.J. (Universitas Sam Ratulangi, Manado (Indonesia). Fakultas Peternakan). *Berita Biologi* (Indonesia). ISSN 0126-1754 (2009) v. 9(6) p. 649-655, 1 ill., 3 tables; 14 ref.

DOMESTIC ANIMALS; ANIMAL FEEDING; FEED COMPOSITION; FEED CONSUMPTION; FEEDING HABITS.

This research was conducted to change natural feeding behavior of tarsius (*Tarsius spectrum*) using fresh life insect into fresh meal material as new introducing feeding material by gradually optimal feeding system in wire netting pen. This research was focused on preference of tarsius into fresh meal as new introducing feeding material and nutrient consumption. Result showed that Tarsius was able to be interested in different fresh meal as new introducing feeding material within relatively short time and to be adaptable on different nutrient consumption. Therefore, it can be concluded that (1) domesticating process of tarsius was able to change their natural feeding behavior using fresh life insects into fresh meal material as new introducing feeding within 27 day; (2) Average nutrient consumption of tarsius for new introducing feeding varied one to each other in wire netting pen.

235 RACHMAWATI, S.

Immunoreagent production for development of ELISA Ochratoxin-A technique in monitoring livestock feed security. *Produksi pereaksi imunokimia untuk pengembangan teknik* ELISA Okratoksin A (OTA) dalam rangka monitoring keamanan pakan ternak / Rachmawati, S. (Balai Besar Penelitian Veteriner, Bogor (Indonesia). [Proceedings of the

national seminar on animal husbandry and veterinary technology 2011]. Bogor (Indonesia), 7-8 Jun 2011 / Prasetyo, L.H.; Damayanti, R.; Iskandar, S.; Herawati, T.; Priyanto, D.; Puastuti, W.; Anggraeni, A.; Tarigan, S.; Wardhana, A.H.; Darmayanti, N.L.P.I. (eds.). Bogor (Indonesia): Puslitbangnak, 2012: p. 732-740, 5 ill., 2 tables; 15 ref. 636:619/SEM/p

LIVESTOCK FEED; IMMUNOCHEMISTRY; PRODUCTION; ELISA; OCHRATOXINS; MONITORING.

Ochratoxin A (OTA) contaminates feed material such as corn, starting from pre to post harvest. For monitoring purpose of OTA contamination and quality control, there is a need to provide a tool capable of analyzing contaminant rapidly with high accuracy. Currently, there are only limited number of laboratories in Indonesia capable of analizing OTA, and mostly using the instrument such as HPLC which need big investation, skilled operator, long preparation, and expensive cost. So, immunodetection for quantifying OTA is necessary to be developed in Indonesia. The objective of this research was to produce the immunoreagent for development of OTA ELISA kit. The research activities involved: (a) Polyclonal antibody anti OTA production in rabbit serum; (b) preparation of OTA-HRP (horseraddish peroxidase) conjugate for development of direct competitive ELISA and (c) development and characterization of indirect and direct competitive ELISA to find out the sensitivity of reagents produced. Blood serum was collected from 1st, 2nd, 3rd, and 4th bleeding, the serum was purified using protein A sepharose column, the IgG content were in the range of 1 - 6 mg/ml for 1st - 4th bleeding antibody. Indirect ELISA test using 3rd bleed antibody with IgG content of 1.7 mg/ml indicated that antibody anti OTA had the activity given the high different of OD value (0.9) with the OD of control serum (pre-immunization serum) on dilution factor of 50. The diluted antibody of 1/400 (dilution factor of 400) still gave good response. Increasing activity of antibody of 3rd bleed also found by an increase of coating antigen OTA-BSA 0.4; 2 and 10 µg/ml, Liniearity testing of 3rd bleed antibody gave a linier curve in the range of 1 up to 100 ppb of OTA standard. However the response seemed not too sensitive as the percentage inhibition given of 100 ppb OTA standard only 43%. Combination of coated antigen OTA-BSA and antibody still have to be studied to find out the optimum condition of indirect ELISA test. Immunoreagent of conjugate OTA-HRPO was also prepared for the direct ELISA test. Titration of conjugate gave value of 0.7 OD for 1/300 and 0.4 for 1/900. The conjugate test did not give a satisfied result. Further synthesizing and testing of conjugate still needed to find sensitive results.

236 ROHAENI, E.S.

Response of male buffalo on fattening by rice bran feed in buffalo center-south Kalimantan [Indonesia]. ***Respon kerbau jantan pada penggemukan dengan pakan dedak padi di sentra kerbau Kalimantan Selatan*** / Rohaeni, E.S.; Hamdan, A.; Subhan, A.; Qomariah, R. (Balai Pengkajian Teknologi Pertanian Kalimantan Selatan, Banjarbaru (Indonesia)). [Proceedings of the national seminar and workshop on buffaloes]. Samarinda (Indonesia), 21-22 Jun 2011 / Talib, C.; Herawati, T.; Praharani, L.; Sumantri, C.; Hidayati, N. (eds.). Bogor (Indonesia): Puslitbangnak, 2012: p. 86-90, 2 tables; 10 ref. 636.293. 082/SEM/p

WATER BUFFALOES; ANIMAL FEEDING; FATTENING; FEEDS; RICE POLISHINGS; EICHHORNIA CRASSIPES; CONCENTRATES; RICE; MAIZE; BEANS; ECONOMIC ANALYSIS; KALIMANTAN.

Swamp buffalo is one of large ruminants in South Kalimantan Province which ought to be kept their sustainability and productivity. Swamp buffalo is developed in remote area and

moving from one to other areas, keeping traditionally by grazing in herds along year. Buffaloes are known to have better ability to utilize low-quality feed with high roughage such as straw of rice/maize/beans ground to be converted into meat. The purpose of this study was to find out the response of male buffalo in fattening with rice bran as concentrate in buffalo center of South Kalimantan. The assessment was carried out in the Tabat Village, Hulu Sungai Tengah District. There were 2 treatments, i.e. called A: 1 kg rice bran + 5 kg of water hyacinth grasses; and B: control (ad libitum local grass). Animals used were 16 male swamp buffaloes with 2 to 3 years old, and each treatment used 8 heads. Daily body weight gain (PBBH) as one of parameters were observed which represents the difference between final and initial body weight divided by 90 days of activities, weighing every 4 weeks. Data of body weight and PBBH generated were analyzed by T test and continuing analysis by R/C and MBCR for cost and revenues. Treatment A gave PBBH with the average of kg/head/day 0.61 in comparing to the treatment B as control that only PBBH of 0.21 kg/head/day. Fattening buffalo gave a profit of Rp 7.25 million per three months with a scale of 8 male buffaloes per harvest period, the value of R/C 1.13 and MBCR 2.02.

237 SARIUBANG, M.

Buffalo fattening with concentrate in "Soma" system at Tana Toraja [Indonesia]. ***Kajian penggemukan kerbau melalui pemberian pakan konsentrat dengan sistem "Soma" di Kabupaten Tana To*raja** / Sariubang, M.; Kallo, R. (Balai Pengkajian Teknologi Pertanian Sulawesi Selatan, Makassar (Indonesia)); Kristanto, L. [Proceedings of the national seminar and workshop on buffaloes]. Samarinda (Indonesia), 21-22 Jun 2011 / Talib, C.; Herawati, T.; Praharani, L.; Sumantri, C.; Hidayati, N. (eds.). Bogor (Indonesia): Puslitbangnak, 2012: p. 82-85, 1 table; 6 ref. 636.293.082/SEM/p

WATER BUFFALOES; ANIMAL FEEDING; FATTENING; FEEDS; CONCENTRATES; UNRESTRICTED FEEDING; SULAWESI.

The study was conducted in Tana Toraja to study the effect of concentrate on fattened buffalo "Soma" of the daily weight gain (PBBH) for 3 months. Ten male buffaloes aged 4 years old with body weight of ± 350 kg, were divided randomly into two feeding treatments, i.e. T0 = ad libitum natural grass (control), T1 = ad libitum natural grass + concentrates 1.5 % of body weight. Parameters measured were dry matter intake (DM) of feed per day and average daily weight gain (PBBH). The study results showed that daily feed DM intake of each T0 = 11.2 kg/head/day and T1 = 10.9 kg/head/day showed no significant difference (P>0.05), whereas PBBH for T0 was 0.41 kg/head/day and T1 was 0.59 kg/head/day. From the results of the study could, it be concluded that 50% of concentrate (1.5% of body weight) contained in total DM intake of feed could increase and improve the PBBH buffalo by "Soma" system for 3 months as well as accelerate the time of fattening compared to the control. So, it can provide a significant advantage for the user.

238 SUPRIADI

Increasing crossbred beef production through feeding concentrate. ***Peningkatan produksi daging sapi hasil silangan melalui pemberian pakan konsentrat*** / Supriadi (Balai Pengkajian Teknologi Pertanian Yogyakarta (Indonesia)). [Proceedings of the national seminar on animal husbandry and veterinary technology]. Bogor (Indonesia), 7-8 Jun 2011 / Prasetyo, L.H.; Damayanti, R.; Iskandar, S.; Herawati, T.; Priyanto, D.; Puastuti, W.; Anggraeni, A.; Tarigan, S.; Wardhana, A.H.; Darmayanti, N.L.P.I. (eds.). Bogor (Indonesia): Puslitbangnak, 2012: p. 347-352, 4 tables; 10 ref. 636:619/SEM/p

BEEF CATTLE; FEED; PROXIMATE COMPOSITION; CONCENTRATES; FEED CONSUMPTION; BODY WEIGHT; GROWTH RATE; ECONOMIC ANALYSIS.

This research was conducted during May until August 2010, in three districts namely Bantul, Sleman and Gunung Kidul Regency. Forage feed used on the existing technology is any type of forage used by farmers as animal feed, while for the treatment group, fermented hay and concentrate were given ad libitum. Diet was provided as follows: P1 = 50% concentrate and 50% forage; P2 = 60% concentrate and 40% forage; P3 = 70 % concentrate and 30% forage; and Control = usual feeding done by farmer. Concentrate given was produced by PMT Nutrifeed, with BC's production code 133. Result showed that all cattle could not finish the concentrate that has been provided in accordance with the treatment. Daily weight gain (ADG) in cattle consuming concentrate treatment P1 with as much as 2 % of body weight reached 0.85 kg/head/day with FCR 25, whereas the P2 treatment, ADG reached 0.91 kg/head/day with concentrate consumed as much as 3% of body weight and FCR values 22.8. At P3, ADG reach 0.73 kg/head/day, with consumption of concentrate as much as 8.5 kg/head/day or 3.7 % of body weight or 41% of the diet consumed, FCR value of 28. Results of analysis of beef cattle farming on assessments site indicated that value of R/C ranged from 1.02 to 1.15.

239 WIBOWO, B.

Feasibility study of native chicken fattening at the farm level: a case study on "Barokah" farmer group in Ciamis. ***Analisis kelayakan usaha penggemukan ayam kampung (lokal) di tingkat petani: studi kasus kelompok peternakan ayam kampung "Barokah" di Ciamis*** / Wibowo, B.; Sartika, T. (Balai Penelitian Ternak, Bogor (Indonesia)). [Proceedings of the national seminar on animal husbandry and veterinary technology]. Bogor (Indonesia), 7-8 Jun 2011 / Prasetyo, L.H.; Damayanti, R.; Iskandar, S.; Herawati, T.; Priyanto, D.; Puastuti, W.; Anggraeni, A.; Tarigan, S.; Wardhana, A.H.; Darmayanti, N.L.P.I. (eds.). Bogor (Indonesia): Puslitbangnak, 2012: p. 699-704, 3 tables; 4 ref. 636:619/SEM/p

CHICKENS; FATTENING; COST BENEFIT ANALYSIS; SMALL FARMS.

Native chicken is an alternative of local source for Indonesian egg and meat production. This study was done in 2009 to the group of native chicken farmer "Barokah" located in Ciamis District. This group was chosen since it has made pioneering effort of intensive chicken rearing for the purpose of meat production. There were 2,400 native chickens reared every period (3 months) and were sold for meat. Economic feasibility analysis of "Barokah" local chicken intensive rearing was carried out. Result showed that benefit from local chicken farming was Rp 6,685,950/period (3 months). Break-even point of production was 1,911 birds and break even point price was Rp 20,038/head. Based on IRR calculation rate for 5 years of farm activity was 66,56% and business activities could be continued up to 5 years a head.

240 WIRADIPUTRA, B.R.

Buffaloes forage composition in and outside of oil palm estate in Lebak District, Banten [Indonesia]. Komposisi jenis hijauan pakan kerbau di luar dan di dalam perkebunan kelapa sawit, Kabupaten Lebak, Banten / Wiradiputra, B.R. (Balai Penelitian Ternak, Bogor (Indonesia)). [Proceedings of the national seminar and workshop on buffaloes]. Samarinda (Indonesia), 21-22 Jun 2011 / Talib, C.; Herawati, T.; Praharani, L.; Sumantri, C.; Hidayati, N. (eds.). Bogor (Indonesia): Puslitbangnak, 2012: p. 92-99, 5 tables; 20 ref. 636.293.082/SEM/p

WATER BUFFALOES; ANIMAL FEEDING; FEEDS; PROXIMATE COMPOSITION; PALM OILS; FORAGE; IMPERATA CYLINDRICA; CHROMOLAENA ODORATA; PASPALUM CONJUGATUM; DIGITARIA SANGUINALIS; ELEUSINE INDICA; MUSA; PARASERIANTHES FALCATARIA; AGERATUM CONYZOIDES.

Observation on water buffalo forages composition in and outside of oil palm estate in Kampung Solear, Sindang Mulya Village, Maja Subdistrict, Lebak District, Banten has been done in June and September 2011. The results showed that there was a great variation between forages taken from outside of oilpalm estate and from the undergrowth. The forages from outside were more varied consisted of alang-alang (*Imperata cylindrica*), kirinyuh (*Eupatorium palescens*), rumput pahit (*Paspalum conjugatum*), rumput jariji (*Digitaria sanguinalis*), jampang munding (*Eleusine indica*) and some others roughages of nongramineae such as banana leaf (*Musa* spp.), sengon (*Albizia falcata*), babadotan (*Ageratum conyzoides*), kacapituheur (*Mikania cordata*), and harendong (*Melastoma* spp.). While under the oil palm trees there were mostly *Paspalum conjugatum* with SDR more than 90%. This is showed that although the animal was grazing in the oil palm estate, they should fed with forages from outside (roadside, rice dike, etc), so the feed is rich of varieties and the quality is also better.

L10 ANIMAL GENETICS AND BREEDING

241 ANGGRAENI, A.

Genetic evaluation on birth weight of the kids of progeny tested young bucks of PE goat. ***Evaluasi genetik sifat pertumbuhan anak dari jantan muda uji progeni pada kambing PE*** / Anggraeni, A.; Sutama, K.; Komaruddin (Balai Penelitian Ternak, Bogor (Indonesia)); Setiyorini; Jakaria [Proceedings of the national seminar on animal husbandry and veterinary technology]. Bogor (Indonesia), 7-8 Jun 2011 / Prasetyo, L.H.; Damayanti, R.; Iskandar, S.; Herawati, T.; Priyanto, D.; Puastuti, W.; Anggraeni, A.; Tarigan, S.; Wardhana, A.H.; Darmayanti, N.L.P.I. (eds.) . Bogor (Indonesia): Puslitbangnak, 2012: p. 465-471, 1 ill., 4 tables; 10 ref. 636:619/SEM/p

GOATS; PROGENY; TESTING; BIRTH RATE; BIRTH WEIGHT; LITTER SIZE; ENVIRONMENTAL FACTORS.

Progeny test on milk transmitting ability in young bucks should consider growth traits of their kids due to the existence of positive genetic correlation between growth and milk traits. This study was aimed to estimate breeding values of young PE bucks as participants of progeny test based on birth weight of their kids. Effects of kidding year, kidding season, sex, and litter size on birth weight were analyzed by General Linear Model. Breeding values of young PE bucks was evaluated based on birth weight of their kids, and analyzed by contemporary comparison (CC) method. There were six young PE bucks included in the progeny test for birth weight trait, with number of their kids within the range of 14 - 33 hds. The highest average of birth weight was obtained from young buck no.179 for 3.01 kg (2.00 to 4.60 kg), whereas the lowest one was from that of no. 178 for 2.36 kg (1.40 to 3.80 kg). Litter size, kidding season, and kidding year were dominant factors ($P<0.05$) in affecting birth weight. Sex ($P>0.05$) was not, dominant factor although male kids in reality had heavier birth weight than female kid (2.94 kg vs. 2.80 kg). Heritability of birth weight of PE kids was relatively high for $h2 = 0.26$. Although the regression coefficients (2b) differed widely among young bucks, but they did not change the rank of the progeny test results based on the estimated values of CC or breeding value (BV). Young PE buck no. 19 was proved at the highest rank, followed by Cariu at the second and no. 2031 at the third in transmitting birth weight ability.

242 BRAHMANTIYO, B.

Morphometric evaluation of Merawang chicken: a case study at BPTU sapi dwiguna dan ayam, Sembawa, and Bangka Island, South Sumatera [Indonesia]. ***Pendugaan jarak genetik ayam Merawang: studi kasus di BPTU sapi dwiguna dan ayam, Sembawa dan Pulau Bangka, Sumatera Selatan*** / Brahmantiyo, B.; Sartika, T.; Sopiyana, S. (Balai Penelitian Ternak, Bogor (Indonesia)). [Proceedings of the national seminar on animal husbandry and veterinary technology]. Bogor (Indonesia), 7-8 Jun 2011 / Prasetyo, L.H.; Damayanti, R.; Iskandar, S.; Herawati, T.; Priyanto, D.; Puastuti, W.; Anggraeni, A.; Tarigan, S.; Wardhana, A.H.; Darmayanti, N.L.P.I. (eds.). Bogor (Indonesia): Puslitbangnak, 2012: p. 632-640, 2 ill., 4 tables; 4 ref. 636:619/SEM/p

CHICKENS; CROSSBREEDING; SELECTION; PRODUCTIVITY; WEANING WEIGHT; HERITABILITY.

Morphometric evaluation on body size of Merawang chicken using Mahalanobis distance test have been conducted to determine the progress and changes in characteristics due to adaptation to the environment. BPTU sapi dwiguna dan ayam, Sembawa, South Sumatra has developed Merawang chicken originating from the island of Bangka. Observation of the character of body weight (g), chest circumference (cm), length of back (cm), wing length (cm), neck length (cm), beak length (mm), width of beak (mm), beak thickness (mm), head width (mm), head length (mm), femur length (cm), tibia length (cm), shank length (cm), shank circumference (cm), width of pubis (mm), height of comb (mm), length of comb (mm), and width of comb (mm) were conducted to evaluate morphometric merawang chickens originating from Sembawa and the island of Bangka. Merawang chicken obtained from Bangka island (Air Pelempang, Baturusa and Ketapang) was different from that obtained from Sembawa with discriminant variables of body size on length of back, beak length, femur length, shank length and shank circumference. This difference explains the difference breeding purposes of Merawang chicken in the two areas, namely as a broiler on the island of Bangka and as laying hens in Sembawa.

243 DOLOKSARIBU, M.

Effect of intrauterine artificial insemination with frozen semen on pregnancy of goats. ***Inovasi teknologi inseminasi*** **buatan secara intrauteri dengan menggunakan semen beku terhadap kebuntingan kambing** / Doloksaribu, M.; Pamungkas, F.A.; Nasution, S.; Mahmilia, F. (Loka Penelitian Kambing Potong, Sei putih, Sumatera Utara (Indonesia)) [Proceedings of the national seminar on animal husbandry and veterinary technology]. Bogor (Indonesia), 7-8 Jun 2011 / Prasetyo, L.H.; Damayanti, R.; Iskandar, S.; Herawati, T.; Priyanto, D.; Puastuti, W.; Anggraeni, A.; Tarigan, S.; Wardhana, A.H.; Darmayanti, N.L.P.I. (eds.). Bogor (Indonesia): Puslitbangnak, 2012: p. 479-484, 4 tables; 14 ref. 636:619/SEM/p

GOATS; ARTIFICIAL INSEMINATION; INNOVATION; TECHNOLOGY; SEMEN; PREGNANCY; REPRODUCTIVE PERFORMANCE.

Acceleration of Boerawa-Boerka meat-type goat production has been done through intrauterine artificial insemination (AI). This activity was done at Indonesian Goat Research Center, Sei Putih, to determine pregnancy rate of local Kacang goat, Boerka and peranakan Etawah (P-E) that were artificial inseminated with the help of laparoscope directly into uterine cornua. Frozen semen of Boer stud kind was used in the AI. Ninety three dams consist of 3 main genotypes: P-E, Boerka and Kacang were prepared. However only 83 dams were ready to be inseminated-based on their body condition. This dams were prepared into two groups: 63 dams were synchronized by injecting Glandin-N hormone and 18 dams that

performed estrus naturally. Detection of estrus was done by vasectomized ram. Any dam showed after AI, would be inseminated again until it got pregnant. Result showed that the conception rate resulted from dam with estrus was higher (77.78%) compared to dams with hormone injection (13.84%). The overall service per conception was 2.13 until the dam got pregnant and kidding afterward. Intrauterine artificial insemination plays an important role in increasing goat productivity and increase efficiency on the use of superior rams.

244 INOUNU, I.

Establishment of composite sheep through cross-breeding technology in efforts to improve genetic quality of local sheep. ***Pembentukan domba komposit melalui teknologi persilangan dalam upaya peningkatan mutu genetik domba lokal*** / Inounu, I. (Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia)). *Pengembangan Inovasi Pertanian* (Indonesia) ISSN 1979-5378 (2011) v. 4(3) p. 218-230, 44 ref

SHEEP; BREEDS (ANIMALS); LAND RACES; CROSSBREEDING; SELECTION; GENETIC CORRELATION; HERITABILITY; BREEDING METHODS.

A research to improve the genetic quality of local sheep has been done using cross-breeding followed by selection to form a composite breed. From the results of regular cross-breeding between sheep of St. croix rams (HH) with garut ewes (GG) was obtained HG sheep (50% H, 50% G) in 1995-1996. In the following year (1996), MG sheep (50% M, 50% G) was obtained from cross-breeding between *M. charolais* rams (MM) with garut ewes (GG) using artificial insemination. Then the two hybrid sheep breeds of HG and MG were selected and mated to generate composite breed (HMG and MHG sheep). HMG sheep (25% H, 25% M, 50% G) was resulted from the mating between HG rams and MG ewes and MHG sheep (25% M, 25% H, 50% G) from the mating between MG rams and HG ewes. Performance test for production traits of economic importance value such as the number of lambs born, the total weight of birth, dam's milk production, the age when they reach 35 kg, and genetic parameters was done. It is recommended that this composite sheep (HMG) could be developed as a commercial sheep breed. Multiplication of sheep resulted from breeding is constrained by limited land, funds, and policy support. It required support from investment policy, research and development policy as well as cooperation with farmer associations or with other private parties.

245 SAPUTRA, F.

Identification of β-casein gene variability (CSN2) in Etawah grade, Saanen and PESA goats by PCR-SSCP method. ***Identifikasi keragaman gen β-kasein (CSN2) pada kambing peranakan Etawah, saanen dan persilangannya dengan metode PCR-SSCP*** / Saputra, F.; Darwati, S.; Maheswari, R.R.A.; Sumantri, C. (Institut Pertanian Bogor (Indonesia). Fakultas Peternakan). [Proceedings of the national seminar on animal husbandry and veterinary technology]. Bogor (Indonesia), 7-8 Jun 2011 / Prasetyo, L.H.; Damayanti, R.; Iskandar, S.; Herawati, T.; Priyanto, D.; Puastuti, W.; Anggraeni, A.; Tarigan, S.; Wardhana, A.H.; Darmayanti, N.L.P.I. (eds.). Bogor (Indonesia): Puslitbangnak, 2012: p. 458-464, 2 ill., 3 tables; 13 ref. 636:619/SEM/p

GOATS; IDENTIFICATION; CASEIN; GENETIC VARIATION; PCR; HETEROZYGOTES; GENOTYPES.

β-casein gene is directly related to the quality and properties of milk. A protocol for rapid and simultaneous genotyping of β-casein alleles in goat was conducted by single strain conformational polymorphism polymerase chain reaction (SSCP-PCR) method. Screening of

β-casein gene variability in 3 dairy goat breeds: namely Etawah grade (77 samples), Saanen (67 samples) and PESA (Crossbreed Etawah grade with Saanen) (29 samples) was conducted in Bogor and Sukabumi. The objective of this research was to identify polymorphism of the β-casein (CSN2) gene in dairy goat. The result showed that three alleles of the β-casein gene were CSN2*A, CSN2*C, and CSN2*O, In most breeds, CSN2*O occurred in the lowest frequency. The identification of the CSN2 gene variability in the goat breeds indicated the predominance of the A allele. The CSN2*A allele had a high frequency in Saanen in Cijeruk (0.66); Etawah grade in Cariu (0,62); and PESA in Cariu (0.54). While the CSN2*C allele had a high frequency in PESA in IRIAP (0,83); Etawah grade in Ciapus (0.48); and Saanen in Taurus (0.38). Based on the result of χ^2 analysis, it was found that Saanen in Cariu and Taurus was not in Hardy-Weinberg equilibrium.

246 SUPRIYANTONO, A.

Potency of naked neck chicken as a source of local chicken meat. *Potensi ayam leher gundul sebagai sumber daging ayam buras* / Supriyantono, A.; Killian, A.L.; Wajo, M.J. (Universitas Negeri Papua Manokwari, Papua Barat (Indonesia). Fakultas Peternakan Perikanan dan Ilmu Kelautan). [Proceedings of the national seminar on animal husbandry and veterinary technology]. Bogor (Indonesia), 7-8 Jun 2011 / Prasetyo, L.H.; Damayanti, R.; Iskandar, S.; Herawati, T.; Priyanto, D.; Puastuti, W.; Anggraeni, A.; Tarigan, S.; Wardhana, A.H.; Darmayanti, N.L.P.I. (eds.). Bogor (Indonesia): Puslitbangnak, 2012: p. 685-690, 3 tables; 18 ref. 636+619/SEM/p

CHICKENS; CROSSBREEDING; GROWTH RATE; BODY WEIGHT; PHENOTYPES.

Naked neck chicken is one of local chicken varieties that have the potential to be developed as a meat producer. The aim of this research was to identify potency of naked neck chicken by obseving its progeny phenotype. The materials used were 40 birds consisted of 20 naked neck chickens and 20 normal chicken. The ratio of male: female for each group was 1:1. Completely randomized design (CRD) was applied in this study using four treatments of crossing namely naked neck male X naked neck female; naked neck male X normal female; normal male X naked neck female; and normal male X normal female. Each treatment of crossing was repeated five times. Results showed that F1 of normal chicken and naked neck chicken has the proportion of 33.33% - 100% and 0% - 66.67%, respectively. Based on χ^2 test, the naked neck chickens genotypes used as parental (male and female) were heterozygous (Na/na). Body weight of offspring at 20 weeks old in all the crosses were in accordance with the results of other studies, but not significantly different for each treatment. There is a tendency of better body weight of progeny from the crossing of normal male X normal female than those of the other crosses. In conclusion, cumulative body weight gain of progeny from the crossing of naked neck male X normal female is better than those of the other crosses.

247 TRIWULANNINGSIH, E.

Response of some methods of estrus synchronization and artificial insemination on buffalo (*Bubalus bubalis*) in Kampar District [Indonesia]. *Respon beberapa metode sinkronisasi estrus dan inseminasi buatan pada kerbau Bubalus bubalis di Kabupaten Kampar* / Triwulanningsih, E.; Haryanto, B. (Balai Penelitian Ternak, Bogor (Indonesia)); Yendraliza. [Proceedings of the national seminar and workshop on buffaloes]. Samarinda (Indonesia), 21-22 Jun 2011 / Talib, C.; Herawati, T.; Praharani, L.; Sumantri, C.; Hidayati, N. (eds.). Bogor (Indonesia): Puslitbangnak, 2012: p. 60-69, 4 ill., 3 tables; 13 ref. 636.293.082/SEM/p

WATER BUFFALOES; OESTRUS SYNCHRONIZATION; ARTIFICIAL INSEMINATION; INJECTION; PREGNANCY; SUMATRA.

Population of swamp buffalo (*Bubalus bubalis*) in Indonesia has declined steadily every year, due to decrease of good quality bull in some group of buffalo population, because a lot of the higher grade of bulls have been slaughtered during various traditional ceremonies, so that in some population there was even no bull. This study was conducted with the objectives for increasing buffalo population through artificial insemination (AI) using frozen semen of buffalo from Baluran (East Java), and for reducing the existing inbreeding effect. Three methods of estrus synchronization were designed as treatments: twice injection of PGF2α with 11 days interval and artificial inseminated on day 13th (A), twice injection of PGF2α with 11 days interval and injection of hCG on day 12th afternoon and inseminated on day 13th (B), and injection of GnRH and followed by injection of PGF2α on day 8th, then inseminated on day 13th (C). Frozen semen was prepared in the Reproductive Physiology Laboratory of IRIAP (Indonesian Research Institute for Animal Production). Rectal palpations for pregnancy tests were carried out two months after insemination. Results of this study showed that percentage of pregnancy was 62.07; 83.33 and 44.44% for treatment A, B and C respectively. It can be concluded that twice injection of PGF2α with 11 days interval and injection of hCG on day 12th afternoon and insemination on day 13th (B) is more effective for estrus synchronization followed by artificial insemination on swamp buffalo in Kampar Regency.

L20 ANIMAL ECOLOGY

248 PRAHARANI, L.

Population dynamics (herd survival) of buffalo: a case in Lebak District of Banten [Indonesia]. ***Dinamika kelestarian populasi (herd survival) kerbau: kasus di Kabupaten Lebak, Banten [Indonesia]*** / Praharani, L.; Ashari (Balai Penelitian Ternak, Bogor (Indonesia)). [Proceedings of the national seminar and workshop on buffaloes]. Samarinda (Indonesia), 21-22 Jun 2011 / Talib, C.; Herawati, T.; Praharani, L.; Sumantri, C.; Hidayati, N. (eds.). Bogor (Indonesia): Puslitbangnak, 2012: p. 76-81, 2 ill., 2 tables; 7 ref. 636.293. 082/SEM/p

WATER BUFFALOES; ANIMAL POPULATIONS; PRODUCTIVITY; REPRODUCTION; JAVA.

Nationally depleting buffalo population has been lasting for years. In fact buffalo production of Lebak District contributes to fulfill the demand of local and the surrounding districts (Serang, Pandeglang) and other regions (out of Java). Therefore there is a need to understand and to promote and establish strategic programmes on population growth accelleration. An explorative study was carried out in 4 villages of 4 subdistricts: Malimping, Maja, East Rangkasbitung and Siraja of Lebak District of Banten Province. Interview method was used to gather the primary data on production, reproduction and postharvest parameters from respondents of 4 buffalo farmer's groups, 1 official of slaughtering house, 1 wholesale and 1 meatball restorant owner to calculate the status of herd survival of buffalo of that Lebak District. Results showed Lebak District as one of the 15 Buffalo Breeding Center Districts, from this study showed that this district had a slow growth of 1.90% buffalo finisher suplly to the total buffalo district population, due to low productivity and land ecological disturbance as land use changes. Recommended that to accelerate population growth have to improve productivity and spatial land allocation planning and also supporting regulation (law) particularly for palm oil-buffalo integrated systems, with the care of animal health, by establishing strategic disease free zones as part of national prioritized programme.

L50 ANIMAL PHYSIOLOGY AND BIOCHEMISTRY

249 MUNAWAR, H.
Comparison of multi and single element standards used to analyze zinc (Zn) in chicken and beef. ***Perbandingan standar multi elemen dan elemen tunggal untuk analisis kadar seng (Zn) pada daging ayam dan sapi*** / Munawar, H. (Balai Besar Penelitian Veteriner, Bogor (Indonesia)) [Proceedings of the national seminar on animal husbandry and veterinary technology 2011] Bogor (Indonesia), 7-8 Jun 2011 / Prasetyo, L.H.; Damayanti, R.; Iskandar, S.; Herawati, T.; Priyanto, D.; Puastuti, W.; Anggraeni, A.; Tarigan, S.; Wardhana, A.H.; Darmayanti, N.L.P.I. (eds.). Bogor (Indonesia): Puslitbangnak, 2012: p. 765-771, 4 ill., 4 tables; 15 ref. 636:619/SEM/p

CHICKEN MEAT; BEEF; ZINC; ELEMENTS; ANALYSIS.

Zinc (Zn) is an essential metal in animal feed because it affects physiological function and metabolism process. The purpose of this study was to test the accuracy of multi element standard with atomic absorption spectrophotometer (AAS), and compare it with the single element standard based on linearity, precision, and recovery test. Absorbance and concentration of single and multi element standards.were measured, and then were made line regression equation and linearity regression. For digestion process, sample (chicken and beef) were dissolved in HNO_3 65%, and heated to get clear solution. The digestion solution was then measured with AAS at wavelength of 213.9 nm. Precision and recovery were performed on a standard that had the best linearity by taking data from measured sample. The result of line equation of the standard multi element y = 0.1795x + 0.0129 was obtained with linear regression 0.9982. Precision calculated by determining coefficient of variance was 0.0015, and the recovery was 90.09. Based on these data, multi element standard could be determined using AAS including as a standard for the sample because the linearity resulted from multi element was better than that of single element.

L52 ANIMAL PHYSIOLOGY – GROWTH AND DEVELOPMENT

250 YUNIARSIH, P.
Exon 3 growth hormone gene exploration in Etawah grade, Saanen and PESA by PCR-SSCP method. ***Eksplorasi gen "growth hormone" exon 3 pada kambing Peranakan Etawah (PE), Saanen dan PESA melalui teknik PCR-SSCP*** / Yuniarsih, P.; Jakaria; Muladno (Institut Pertanian Bogor (Indonesia). Fakultas Peternakan). [Proceedings of the national seminar on animal husbandry and veterinary technology]. Bogor (Indonesia), 7-8 Jun 2011 / Kelonowati, E.; Pulungan, R.E.; Yunia, L. (eds.). Bogor (Indonesia): Puslitbangnak, 2012: p. 451-457, 4 ill., 3 tables; 9 ref. 636:619/SEM/p

GOATS; SOMATOTROPIN; IDENTIFICATION; PCR; GENES; HETEROZYGOTES.

This research was conducted to identify genetic polymorphism growth hormone gene of the exon 3 in three goat breeds. Polymorphisms at exon 3 growth hormone gene was identified by single strand conformational polymorphism polymerase chain reaction (SSCP-PCR) method. The DNA of 234 goat used were from Etawah Grade (98 samples), Saanen (92 samples) and their crossbred (44 samples) in Cariu, Ciapus, Sukajaya, Cijeruk, Balitnak and Sukabumi. The PCR-SSCP method was performed at 250 V for 8 hours using 12% of acrylamide concentration. The result showed that the annealing temperature was 60°C. The PCR product was 157 bp (base pair). The result of SSCP method found four conformational patterns resulting 4 gene types of AA, AB, BC, dan AC. The genotype frequency in exon 3 were AA (0.205), AB (0.856), AC (0,163) and BC (0.045). Further, three alleles were found.

The highest frequencies were allele A (0.602) and B (0.443) at Saanen, Etawah Grade and their crossbred goat. The highest genotype frequency was AB at three goat breeds. The highest heterozygosity was found in Etawah Grade, Saanen and their crossbred goat (0.938).

L53 ANIMAL PHYSIOLOGY - REPRODUCTION

251 ANDRIYANTO

Hematological condition of superovulated sheep prior to mating and administration of temulawak during pregnancy. ***Kondisi hematologis induk domba bunting yang disuperovulasi sebelum perkawinan dan diberikan ekstrak temulawak plus selama periode kebuntingan*** / Andriyanto; Arif, R.; Ganjar; Darjat, M.; Manalu, W. (Institut Pertanian Bogor (Indonesia). Fakultas Kedokteran Hewan). [Proceedings of the national seminar on animal husbandry and veterinary technology]. Bogor (Indonesia), 7-8 Jun 2011 / Prasetyo, L.H.; Damayanti, R.; Iskandar, S.; Herawati, T.; Priyanto, D.; Puastuti, W.; Anggraeni, A.; Tarigan, S.; Wardhana, A.H.; Darmayanti, N.L.P.I. (eds.). Bogor (Indonesia): Puslitbangnak, 2012: p. 500-507, 3 tables; 31 ref. 636:619/SEM/p

SHEEP; CURCUMA XANTHORRHIZA; EXTRACTS; SUPEROVULATION; APPLICATION RATES; GESTATION PERIOD; BLOOD; BIRTH WEIGHT; LITTER SIZE.

This experiment was designed to study the combination effects of temulawak (*Curcuma xanthorrhiza*) extract plus and superovulation (to improve endogenous secretion of pregnancy hormones) on hematological parameters of sheep during pregnancy and lamb birthweight. Sixteen adult dams were groupped into 4 treatments i.e, the sheep without temulawak extract plus and without superovulation administration (control), sheep without temulawak extract plus administration with superovulation given (treatment 1), sheep with temulawak extract plus administration without superovulation (treatment 2), and sheep with temulawak extract plus and superovulation administration (treatment 3). Temulawak extract plus was administered every week during pregnancy with a dosage of 1 mg/bw. Result showed that superovulated sheep with and without administration of temulawak extract plus had higher number of red blood cells, hemoglobin value, hematocrit percentage, and lamb birth weight compared to control. Neutrophil and neutrophil to lymphocyte ratio increased in superovulated sheep with or without temulawak extract plus administration. It was concluded that the increasing litter size in superovulated sheep did not decrease red blood cells parameters but increased stress indicators (N/L) during pregnancy.

252 TALIB, C.

Determining factors of twinning beef cattle. ***Faktor-faktor penentu kelahiran kembar pada sapi potong*** / Talib, C.; Matondang, R.H.; Herawati, T. (Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia)). [Proceedings of the national seminar on animal husbandry and veterinary technology]. Bogor (Indonesia), 7-8 Jun 2011 / Prasetyo, L.H.; Damayanti, R.; Iskandar, S.; Herawati, T.; Priyanto, D.; Puastuti, W.; Anggraeni, A.; Tarigan, S.; Wardhana, A.H.; Darmayanti, N.L.P.I. (eds.). Bogor (Indonesia): Puslitbangnak, 2012: p. 367-375, 1 ill., 4 tables; 19 ref. 636:619/SEM/p

BEEF CATTLE; SIBLINGS; SITE FACTORS; BREEDS (ANIMAL); SEX; GREEN FEED; PROXIMATE COMPOSITION.

Meat production in Indonesia could only meets 65% of the demand, while the rest is supplied by importing meat and feeder cattle from Australia and New Zealand. The rate of

importation is about 8%/year. To achieve meat self sufficiency in 2014, a breakthrough program should be done. This program should have direct impact on improving population as well as productivity, such as twinning. This study was done to identify the determining factor in twinning beef cattle. Results showed that twinning is affected by: location, cow breed and sex of calf. Parity has quadratic effect on twinning that reach the peak at second up to third parity. Out of 64 born twin calves, 56 % were female and 28 % were male. Feed and its nutrition could not trigger twinning without interaction with location and certain physiological status of beef cow. It is suspected that PO cattle has twin genetic in a larger rate compared to other breed of beef cattle in general. Therefore PO cattle should become priority choice in developing twinning cattle breeding herd in Indonesia.

253 YENDRALIZA

Level of progesterone in blood and feces of swamp buffaloes (*Bubalus bubalis*) in Kampar District [Indonesia]. ***Kadar hormon progesteron kerbau lumpur (Bubalus bubalis) melalui darah dan feses di Kabupaten Kampar*** / Yendraliza (Universitas Islam Negeri Riau, Pekanbaru (Indonesia). Fakultas Pertanian). [Proceedings of the national seminar and workshop on buffaloes]. Samarinda (Indonesia), 21-22 Jun 2011 / Talib, C.; Herawati, T.; Praharani, L.; Sumantri, C.; Hidayati, N. (eds.). Bogor (Indonesia): Puslitbangnak, 2012: p. 70-75, 2 ill., 1 table; 19 ref. 636.293.082/SEM/p

WATER BUFFALOES; PROGESTERONE; FAECES; BLOOD; ELISA; SUMATRA.

This study was carried out to know ovary physiology of caraheifer and caracow. There were 40 faecal samples weight of 0.25 g and 6 of blood samples taken from 3 caraheifer and 3 caracow through the profiles of progesterone in the stool. The samples were analysed by ELlSA (enzyme linked immunosorbent assay) and shown descriptively by displaying the average and percentage of progesterone level. Level of progesterone of in caracow was 790.62 approx. 296.21 ng/g of dry weight faecal and 4.3 ng/ml in blood and the lowest level of progesterone of caraheifer was 766.67 ± 225.09 ng/g of dry weight faecal and 2,667 ng/ml in blood. The mean levels of progesterone caracow with caraheifer were not significantly different at P>0.05. It could be concluded that the ovary activity could be detected by faecal analysis.

L73 ANIMAL DISEASES

254 GRANDIOSA, R.

Efficacy of *Nigella sativa* extracts in curing motile *Aeromonas septicemia* on Cyprinus carpio juveniles. ***Pengaruh perendaman ekstrak jintan hitam (Nigella sativa) terhadap pengobatan penyakit M.A.S. pada ikan mas*** / Grandiosa, R.; Rosidah; Rustikawati, I. Universitas Padjadjaran, Bandung (Indonesia), Fakultas Perikanan dan Kelautan. Bandung (Indonesia): UNPAD, 2010: 46 p. 7 ill., 6 tables; Bibliography: p. 32-36. 639.215.3.09/ GRA/p

CYPRINUS CARPIO; AEROMONAS HYDROPHILA; NIGELLA SATIVA; SEED EXTRACTS; HEAT TREATMENT; ANTIMICROBIAL PROPERTIES; METHANOL; MORTALITY; MEDICINAL PROPERTIES; SURVIVAL.

Treatment of bacterial disease in carp juvenile by local farmers in Indonesia is limited to antibiotics, but the indiscriminate use of antibiotics for veterinary purposes has increasingly become matter of public concern. Alternative methods, such as phytotherapy, can be additional tools in disease management. The use of *Nigella sativa* can be a great importance

in aquaculture as important herbal for phytotherapy. *Nigella sativa* is a herbaceous plant found in the Middle East, Europe and Western and Middle Asia. The seeds of *Nigella sativa* have a great medicinal importance and have reported to exhibit many pharmacological effects that include antiparasitic, antibacterial, antifungal. antiviral, antioxidant and anti-inflammatory activities. The objective of this research was to study the efficacy of *Nigella sativa* preliminary study were done to observe antibacterial properties of *Nigella sativa* seed extract by using disc diffusion method and showed that *Nigella sativa* had antimicrobial properties. Research showed that the lowest concentration of hot water extracts to inhibit bacterial growth was t 500 ppm with clear zone diameter of 9.29 ± 0.21 mm and the lowest concentration of methanol extract to inhibit growth was at 10 ppm with clear zone diameter of 7.86 ± 0.1 mm. The main goal of this experiment was to find the effective dosage of *Nigella sativa* in curing *Aeromonas septicaemia* on carp juveniles using filtrated hot water extract and methanol extract of *Nigella sativa*. The concentration range used lethal concentration analysis. Six different treatments of *Nigella sativa* extract was applied as a bath medication treatment of infected carps through 24 hours bath immersion. Carp juveniles were previously infected intramuscularly with *Aeromonas hydrophila* as much as 10^8 cfu/fish. Survival rate was recorded and analyzed statistically using ANOVA and post-hoc used was Duncan test. The survival rate from the dosage of 1000 ppm filtrates of hot water extract resulted the highest survival rate (62.22%) of juvenile carp from bacterial disease caused by *Aeromonas hydrophila* and differed significantly from the other treatments, while the highest survival rate from methanol extract was 72.33% using 20 ppm concentration.

255 HARYUNINGTYAS, D.

Effectivity of *Pachyrhizus erosus* seeds extracted by water and acetone against Sarcoptes scabiei mites *in vitro*. *Efektivitas ekstrak biji bengkuang (Pachyrhizus erosus) dengan pelarut air dan aseton terhadap tungau Sarcoptes scabiei secara in vitro* / Haryuningtyas, D.; Yuningsih; Estuningsih, S.E. (Balai Besar Penelitian Veteriner, Bogor (Indonesia)). [Proceedings of the national seminar on animal husbandry and veterinary technology]. Bogor (Indonesia), 7-8 Jun 2011 / Prasetyo, L.H.; Damayanti, R.; Iskandar, S.; Herawati, T.; Priyanto, D.; Puastuti, W.; Anggraeni, A.; Tarigan, S.; Wardhana, A.H.; Darmayanti, N.L.P.I. (eds.). Bogor (Indonesia): Puslitbangnak, 2012: p. 598-605, 1 ill., 4 tables; 27 ref. 636:619/SEM/p

GOATS; MANGE; SARCOPTES SCABIEI; DISEASE CONTROL; PACHYRHIZUS; EXTRACTS; ACETON; IN VITRO EXPERIMENTATION; MORTALITY.

Scabies is a zoonotic parasitic disease caused by *Sarcoptes scabiei* mite. The mite commonly infests skin of goat. Control scabies using synthetic drugs have limitation because of the expensive price, negative effect to environment, emerging problem of drug resistance and also unavailability in the rural area. Therefore, it is needed to develop a botanical acariside as an alternative drug which are cheap and accescible for farmer. The aim of the *in-vitro* study was to investigate the potency of bengkuang (*Pachyrhizus erosus*) seeds against *S. scabiei* collected from goat skin. The extraction was performed using acetone and water. Two hundred and seventy mites were used in this study and divided into two groups e.g. water (1, 2.5, and 5% concentration), and acetone extracts group (2.5, 5 and 10%). Cypermetrin 25% was used as positive control. Six extract solutions were tested to mite mortality (LT50 and LT95) in incubation chamber and observed every hour for 6 hours. The mortality data analysed using probit analisis with 95% significant level. The result demonstrated that active coumpound of bengkuang (*P. erosus*) seeds (rotenone) had effectively contact toxic property for *S. scabiei* at 5% concentration both in water and acetone extract. Water extracts have LC50 and LC95 for 8.5 and 0.8 and acetone extract for 2,3 and 11.3 respectively on 5 hours. The lethal concentration of acetone extract were lower than water extract on 5%

concentration e.g. 1.8 hours (LT50); 4.8 hours (L T95) and 2.5 hours (LT50); 5 hours (LT95) respectively. Five percentage of water extracts *P. erosus* seed concentration was applicable for farmer in the rural area since it was cheap and practical and also effective to kill mite.

256 SAEPULLOHI, M.

Effect of toxin binder and aflatoxin B1 against immune response of newcastle disease in broiler. ***Pengaruh toksin binder dan aflatoksin B1 terhadap respon tanggap kebal newcastle disease pada ayam pedaging*** / Saepullohi, M.; Rahmawati, S.; Darmayanti, N.L.P.I. (Balai Besar Penelitian Veteriner, Bogor (Indonesia)); Bahri, S. [Proceedings of the national seminar on animal husbandry and veterinary technology 2011]. Bogor (Indonesia), 7-8 Jun 2011 / Prasetyo, L.H.; Damayanti, R.; Iskandar, S.; Herawati, T.; Priyanto, D.; Puastuti, W.; Anggraeni, A.; Tarigan, S.; Wardhana, A.H.; Darmayanti, N.L.P.I. (eds.). Bogor (Indonesia): Puslitbangnak, 2012: p. 753-764, 3 ill., 5 tables; 25 ref. 636:619/SEM/p

BROILER CHICKENS; NEWCASTLE DISEASE; TOXINS; AFLATOXINS; FEEDS; CONTAMINATION; IMMUNE RESPONSE.

The aim of this research was to study the effectiveness of toxin binder to aflatoxin B1 (AFB1) in chicken feed and also its influence to antibody response against Newcastle Disease (ND) in broiler. Three commercial product of toxin binder (A, B, and C) that contain propionate acid and calcium propionate were used to absorb the aflatoxin in chicken feed. Each of toxin binder with a dosage 0.2% was mixed with chicken feed that contain aflatoxin 100 ppb and 5000 ppb which was given to experimental chicken for 3 and 4 week, respectively. The result showed that the used of binder A, B, and C was still effective as toxin binder when the chicken feed only contained 100 ppb AFB1. However, all of the binders were not effective when chicken feed contained 5000 ppb AFB1. Based on the challenged test against ND, death was not found in treatment groups, except in the control group without vaccination and one chicken death in treatment group IX (5000 ppb of AFB1 and binder B). The result demonstrated that the binder A, B and C will be more effective if the aflatoxin content in chicken feed was relatively lower (100 - 200 ppb) for prolonged effect as the case with layer. Therefore, further research in layer was needed to find out the antibody response against ND.

257 SUWITO, W.

Antibiotic susceptibility test of verotoxigenic *E. coli* (VTEC) isolated from some dairy farm in West Java [Indonesia]. ***Uji kepekaan antibiotika verotoksigenik E. coli (VTEC) yang di isolasi dari beberapa peternakan sapi perah di Jawa Barat*** / Suwito, W. (Balai Pengkajian Teknologi Pertanian Yogyakarta (Indonesia)); Setyadji, R. [Proceedings of the national seminar on animal husbandry and veterinary technology]. Bogor (Indonesia), 7-8 Jun 2011 / Kelonowati, E.; Pulungan, R.E.; Yunia, L. (eds.). Bogor (Indonesia): Puslitbangnak, 2012: p. 376-383, 4 tables; 19 ref. 636:619/SEM/p

DAIRY CATTLE; ESCHERICHIA COLI; ANTIBIOTICS; ISOLATION; RESISTANCE TO CHEMICALS.

Verotoxigenic Escherichia coli (VTEC) is one of the strains that are responsible for serious human illnesses. This strain is one of bacteria contaminants in milk. Recently, many antibiotics are used freely in dairy cattle and impact of the use of antibiotic causing resistance. The aim of study is to investigate effectiveness of some antibiotics against VTEC collected from dairy farm in Bogor, Sukabumi dan Cianjur West Java using standard national committee for clinical laboratory (NCCLS) disk diffusion. Antibiotic susceptibility

test was determined for 2 isolates VTEC O157:H7, 11 isolates VTEC non O157:H7 and 4 isolates hemolytic *E. coli.* The results demonstrated that one isolate of VTEC O157:H7 from Sukabumi was resistant to Chloramphenicol, Sulfamethoxazole and Tetracycline, while from Bogor only Tetracycline. Three isolates of VTEC non O157:H7 from Sukabumi were resistant to Tetracycline and six isolates VTEC non O157:H7 consisted of 2 from Bogor, 3 from Sukabumi, and 1 from Cianjur were resistant to Erythromycin. All of isolates were resistant to Bacitracin.

258 WAHYUWARDANI, S.

Description of gumboro virus pathological infection and antigen detection to the bursae of fabricius with immunohistochemical technique. ***Gambaran patologik infeksi virus gumboro dan deteksi antigen pada bursa fabricius dengan teknik imunohistokimia*** / Wahyuwardani, S. (Balai Besar Penelitian Veteriner, Bogor (Indonesia)). [Proceedings of the national seminar on animal husbandry and veterinary technology 2011]. Bogor (Indonesia), 7-8 Jun 2011 / Prasetyo, L.H.; Damayanti, R.; Iskandar, S.; Herawati, T.; Priyanto, D.; Puastuti, W.; Anggraeni, A.; Tarigan, S.; Wardhana, A.H.; Darmayanti, N.L.P.I. (eds.). Bogor (Indonesia): Puslitbangnak, 2012: p. 772-778, 4 ill., 1 table; 11 ref. 636:619/SEM/p

BROILER CHICKENS; GUMBORO DISEASE; PATHOLOGICAL ANATOMY; INFECTION; ANTIGENS; IMMUNOLOGICAL TECHNIQUES.

Gumboro virus infection trial using isolates of vvIBD-indo5 was conducted in broilers at the age of 15 days. Pathological changes observation and Gumboro viral antigen detection to the bursae of Fabricius was performed at various stages post infection. Pathological changes found was in accordance with Gumboro disease symptoms in general. There were hypheremic of thigh muscle and atrophy of the bursae Fabricius found from 7 to 14 days post infection. The results of scoring histopathologic changes in the bursae of Fabricius showed that the highest score achieved at 14 days post infection. Detection of antigens by immunohistochemical technique using primary antibody that was raised in rabbit provides an optimal result at dilution of 1:600. Gumboro virus antigens could be detected in bursae Fabricius, from 1 to 14 days post infection. The antigens in bursae of Fabricius was found at the greatest number at 3 and 7 days post infection. However, the number of the antigen decreased at 14 days post infection. This might be due to the lost of number lymphoid cells in the lymphoid follicle of the bursa Fabricius because of necrosis or apoptosis.

259 WARDHANA, A.H.

Field assay of Bezzilure in catching flies causing myasis to livestock. ***Uji lapangan pemikat Bezzilure untuk menangkap lalat penyebab myasis pada ternak*** / Wardhana, A.H.; Muharsini, S.; Maryam, R. (Balai Besar Penelitian Veteriner, Bogor (Indonesia)). [Proceedings of the national seminar on animal husbandry and veterinary technology] Bogor (Indonesia), 7-8 Jun 2011 / Prasetyo, L.H.; Damayanti, R.; Iskandar, S.; Herawati, T.; Priyanto, D.; Puastuti, W.; Anggraeni, A.; Tarigan, S.; Wardhana, A.H.; Darmayanti, N.L.P.I. (eds.). Bogor (Indonesia): Puslitbangnak, 2012: p. 606-612, 1 ill., 2 tables; 22 ref. 636:619/SEM/p

LIVESTOCK; CHRYSOMYA; ATTRACTANTS; TRAPS; EFFICIENCY.

One of efforts in controlling myasis cases in livestock can be performed by setting traps over a farm. Research on improvement of attractant for myasis flies was started in 2000 and completed in 2006 - 2008. Bezzilure is one of attractant candidates in catching more Chrysomya bezziana for both cage and room assays. The aim of study was to investigate

effectivity of Bezzilure in the field. Lampung and South Kalimantan were chosen to test the attractant candidate. A sticky trap was set outside cattle pen surrounded by plantation and shady vegetations. After three days, all flies caught were collected and sent to the Indonesian Research Centre for Veterinary Science for identification. The result demonstrated that Bezzilure caught 70.5% and 75.2% of secondary myasis flies (*C. megacephala, C. rufifacies, emypyrellia*) for Lampung and South Kalimantan, respectively. The attractant was also able to catch tertiary myasis flies (*Sarcophaga* sp. and *Musca* sp.) in Lampung and South Kalimantan for 29.5% and 24.7%, respectively. However, none of primary fly (*C. bezziana*) was caught. Factors influencing low response of *C. bezziana* are discussed in this paper.

260 WARDHANA, A.H.

Myasis treatment using essential oil cream of green *Piper betle* L. on sheep infestated with *Chrysomyia bezziana* larvae. *Pengobatan myasis dengan sediaan krim minyak atsiri daun sirih hijau (Piper betle L.) pada domba yang diinfestasi dengan larva Chrysomyia bezziana* / Wardhana, A.H.; Muharsini, S. (Balai Besar Penelitian Veteriner, Bogor (Indonesia)); Santosa, S.; Arambewela, L.S.R.; Kumarasinghe, S.P.W. [Proceedings of the national seminar on animal husbandry and veterinary technology]. Bogor (Indonesia), 7-8 Jun 2011 / Prasetyo, L.H.; Damayanti, R.; Iskandar, S.; Herawati, T.; Priyanto, D.; Puastuti, W.; Anggraeni, A.; Tarigan, S.; Wardhana, A.H.; Darmayanti, N.L.P.I. (eds.). Bogor (Indonesia): Puslitbangnak, 2012: p. 586-597, 3 ill., 2 tables; 34 ref. 636:619/SEM/p

SHEEP; CHRYSOMYA; MYASIS; DISEASE CONTROL; ESSENTIAL OILS; PIPER BETLE; IN VITRO EXPERIMENTATION; SYMPTOMS; LARVAE; GRANULOCYTES.

Researches on usage of *Piper betle* L. as herbal medicine have been done for years. *In vitro* assessment revealed that the essential oil of *P. betle* L. leaf was effective to kill *Chrysomyia bezziana* larvae which is known as primary agent of myiasis in livestock, wild and pet animals including human in Indonesia. The aim of this study was to examine efficacy of the essential oil of *Piper betle* L. leaf and haematological value in sheep infested by *C. bezziana* larvae. Four incision wounds were made on sheep's back (two in the left side and two in right side) and then 25 larvae were introduced to each wound. Four treatments tested were: sheep without any treatment (negative control/KN), sheep treated with 2% asuntol (positive control/KP), 2% and 4% essential oil cream of *P. betle* L leaf for MA 2% and MA 4%, respectively. The clinical symptomps, weight and number of the larvae collected from myiasis wounds including number of eosinophil and neutrophil were observed. The result demonstrated that all of the sheep suffered from inflammation reaction marked by increased body temperature and number of eosinophil and neutrophil counts. There was no significant difference between sheep treated neither with MA 2% nor with MA 4% on observed variables. Myiasis treatment using the essential oil cream of *P. betle* L leaf was significantly able to reduce the growth of *C. bezziana* larvae due to contact and digestive effect of the active compounds contained in the essential oil of *Piper betle* L. leaf.

N20 AGRICULTURAL MACHINERY AND EQUIPMENT

261 PURBA, T.

Effectiveness examination of citrus production estimation tool at West Kalimantan (Indonesia). *Uji efektivitas alat estimasi produksi jeruk di Kalimantan Barat* / Purba, T.; Supriyanto, A.; Zuhran, M. (Balai Pengkajian Teknologi Pertanian Kalimantan Barat, Pontianak (Indonesia)). [Proceedings of the national seminar on Indonesian fruits]. Bogor (Indonesia), 28-29 Oct 2009 / Taher, R.; Dwiastuti, M.E.; Devy, N.F.; Prabawati, S.;

Harlion, L.L. (eds.). Jakarta (Indonesia): Puslitbanghorti, 2009: p. 286-291 , 3 ill., 2 tables; 2 ref. 634.1/.7 (594)/SEM/p

CITRUS; PRODUCTION POSSIBILITIES; EQUIPMENT TESTING; FRUITS; DENSITY; MEASURING INSTRUMENTS; METHODS; KALIMANTAN.

Citrus industrialization in West Kalimantan requires more accurate production estimation on siam (tangerine) yield to determine the marketing strategy that is more efficient. One of them is the Production Estimation Tool (PET). This study aimed at determining the highest effectiveness of PET. This research was a field experiment conducted in June 2009 in the area of citrus production centers in West Kalimantan, which is Sambas Regency. Examination was conducted on the effectiveness of two modified models of PET, which have size 40 cm x 40 cm and 50 cm x 50 cm, respectively. The examination used two ways of measuring, the first was 4 points of measurement (4 quadrants plant canopy) and the second was 6 points of measurement (6 quadrants plant canopy). Sample as many as 30 productive citrus trees were observed on the fruit density in the PET and then were correlated with the number of fruit per tree. The result showed that the most effective PET was the one that sized 50 cm x 50 cm with 4 quadrant measurement point. It was based on the Standard Error Estimation of the lowest coefficient of 38.85 and the highest correlation of 0.732 with a linear regression model Y = 14.69 + 13.31 X.

P01 NATURE CONSERVATION AND LAND RESOURCES

262 KURNIATI, H.
Negative impact of forest degradation to herpetofauna species richness in Kerinci Seblat National Park, Sumatra [Indonesia]. ***Dampak negatif dari degradasi hutan terhadap kekayaan jenis herpetofauna di Taman Nasional Kerinci Seblat, Sumatera*** / Kurniati, H. (Pusat Penelitian Biologi-LIPI, Cibinong (Indonesia)). *Berita Biologi* (Indonesia). ISSN 0126-1754 (2009) v. 9(6) p. 699-713, 6 ill., 1 table; 9 ref. Appendices

SUMATRA; NATIONAL PARK; DEGRADATION; HERPETOLOGY; BIODIVERSITY; SPECIES.

Habitat loss and fragmentation are among the largest threats to herpetofauna diversity in tropical rain forest areas, including the rain forest in Kerinci Seblat National Park (KSNP). To measure the rate of negative impact to the herpetofauna population, fifteen survey sites with several degree of habitat disturbance were selected. Based on cluster analysis, 15 survey sites were grouped into five distinct clusters, included low elevation forest group, high elevation group, swamp group, disturbed forest group and cultivated land group. Calculation of linier regression for major (low elevation forest group, high elevation group, disturbed forest group and cultivated land group) showed that the rate of locally biodiversity losses were high (R^2 >0.7).

P10 WATER RESOURCES AND MANAGEMENT

263 NASRULLAH.
Hydrological model of upstream Aih Tripe Watershed for drought and flood prediction. ***Model hidrologi DAS Aih Tripe Hulu untuk prediksi banjir dan kekeringan*** / Nasrullah; Kartiwa, B. (Balai Penelitian Agroklimat dan Hidrologi, Bogor (Indonesia)). *Jurnal Tanah dan Iklim* (Indonesia). ISSN 1410-7244 (2009) (no. 23) p. 35-52, 11 ill., 6 tables; 16 ref.

WATERSHEDS; HYDROLOGY; DROUGHT; FLOODING; LAND USE.

The objectives of this research were to analyze biophysic characteristics of upstream Aih Tripe Watershed and to predict discharge characteristic of Aih Tripe River based on hydrological models application. Modified H2U model was applied to predict instantaneous discharge, meanwhile GR4J model was applied to predict daily discharge. Upstream Aih Tripe characteristics, 1,115.2 km^2 wide, stretch watershed type (Gravelius index 4.31), equivalent length (L) 252.40 and equivalent width (I) 4.42, parallel drainage pattern, maximum river order was 5 and drainage density 1.37 mm^{-2}, global slope index (lg) 2.0 and specific high different (Hg) 0.06. Instantaneous discharge simulation results at dry season were: instantaneous maximum discharge was 364.8 m^3/s and time to peak 4 hours, rainfall maximum intensity was 29 mm/hour, rainfall was 45.9 mm with duration 5 hours. In rainy season, maximum discharge was 605.2 m^3/s and time to peak 2 hours, rainfall maximum intensity was 40.8 mm/hour, rainfall was 73.2 mm with duration 7 hours. Maximum discharge during El Nino condition was 131.4 m^3/s (30 September) and minimum discharge was 8.2 m^3/s (31 March). Discharge simulation during La Nina, maximum dischange was 328.3 m^3/s (11 December) and minimum dischange was 8.5 m^3/s (5 October).

P30 SOIL SCIENCE AND MANAGEMENT

264 PRASETYO, B.H.

Characteristic of soils with andic properties derived from acid pyroclastic materials in Toba highlands [Indonesia]. ***Karakteristik tanah-tanah bersifat andik dari bahan piroklastis masam di dataran tinggi Toba*** / Prasetyo, B.H.; Suharta, N.; Yatno, E. (Balai Besar Penelitian dan Pengembangan Sumberdaya Lahan Pertanian, Bogor (Indonesia)). *Jurnal Tanah dan Iklim* (Indonesia). ISSN 1410-7244 (2009) (no. 23) p. 1-14, 5 ill., 8 tables; 34 ref.

SUMATRA; ANDOSOLS; HIGHLANDS; MINERALS; SOIL CHEMICOPHYSICAL PROPERTIES; SOIL CLASSIFICATION; TILLAGE.

Soil with andic properties are generally found in Indonesian volcanic highlands. To characterize the andic soils, six pedons derived from pyroclastic rock from Toba highlands were studied. Properties of the andic soils from Toba highlands were somewhat different from others andic soils in Indonesia. Results of chemical and mineralogical data interpretation showed that the andic soils from Toba were derived from acid pyroclastic rock. This indicates that andic soils in Indonesia are not only derived from intermediate to basic volcanic rock, but also from acid rock. The main problem of andic soils is high P retention. In the study area the P retention ranged between 34-95%, the soils are acid to very acid (pH 5.5-4.1), poor of nutrients, and some of them have very high Al saturation (>60%). Increasing exchangeable Al occur at pH 4 to 5, while the high Al saturation occur at concentration of exchangeable Al between 0.5 to 3 cmolc/kg. High value of P retention was caused by high content of amorphous materials, indicated by positive relationships between P retention and Al + Fe extracted by ammonium oxalate (R^2 = 0.88). Clay mineral identification is needed to distinguish between amorphous and crystallin minerals that can be used as a basic of better soil management.

P31 SOIL SURVEYS AND MAPPING

265 SUHARIYONO

Mapping of apple areas in East Java [Indonesia]. ***Pewilayahan tanaman apel di Jawa Timur*** / Suhariyono; Sutopo (Balai Penelitian Tanaman Jeruk dan Buah Subtropika, Tlekung (Indonesia)); Suratman. [Proceedings of the national seminar on Indonesian fruits]. Bogor (Indonesia), 28-29 Oct 2009 / Taher, R.; Dwiastuti, M.E.; Devy, N.F.; Prabawati, S.; Harlion, L.L. (eds.). Jakarta (Indonesia): Puslitbanghorti, 2009: p. 555-564, 2 tables; 8 ref. Appendix 634.1/.7(594)/SEM/p

MALUS; LAND SUITABILITY; SOIL CHEMICOPHYSICAL PROPERTIES; ALTITUDE; SOIL FERTILITY; VARIETIES; GROWTH; CLIMATIC FACTORS; SOIL SURVEYS; CARTOGRAPHY; JAVA.

To study optimal requirement of apple crop and development of apple crop were done through activities of farm characterization and climate in East Java production center and overlapping with other area in Indonesia by using approach of literature study and survey in Batu, Poncokusumo, Malang, Nongkojajar, Pasuruan. Pursuant to result of characterization according to climate and farm of show that height of place (elevation) was apple crop residing at altitude between 800 till 1,500 m asl, with rainfall 1,000 till 3,000 mm/year, effective deepness of soil 30 till 50 cm and also soil consistency of "gembur" till "teguh", while appropriate area for the crop of apple in Java only 0.57%. Best growth and the highest production at 1,000 m asl till 1,200 m asl or 1,300 m asl. Rome beauty variety of apple was better at 700 m asl till 1,000 m asl, and Manalagi variety was better at 1000 m till 1,200 m asl., while at above 1.200 m asl, apple of Anna variety was growth better. At 100 m until 1500 asl, the crop had good growth level. This matter was possible influenced by soil condition where at progressively upper area was enriched by volkan materials with better fertility such as its physical condition and thick soil layer.

P33 SOIL CHEMISTRY AND PHYSICS

266 NURSYAMSI, D.

Soil P availability in neutral and alkaline soils. ***Ketersediaan P tanah-tanah netral dan alkalin*** / Nursyamsi, D.; Setyorini, D. (Balai Penelitian Tanah, Bogor (Indonesia)). *Jurnal Tanah dan Iklim* (Indonesia) ISSN 1410-7244 (2009) (no. 30) p. 25-36, 3 ill., 7 tables; 27 ref.

PHOSPHORUS; FRACTIONATION; TOP SOIL; SOIL CHEMICHOPHYSICAL PROPERTIES; ALKALINE SOILS; NUTRITIONAL STATUS; SOIL TYPES.

The availability of soil P for plant growth depends on equilibrium reaction between several P forms in the soils, such as soil soluble, labile, non-labile, as well as organic P. The research that aimed to study soil P availability, form, and sorption, as well as soil properties that affect on P availability in neutral and alkaline soils was conducted in Soil Testing Laboratory, Indonesian Soil Research Institute using 91 topsoil samples (0-20 cm) which have pH neutral-alkaline taken from Java. The samples consisted of Inceptisols (13 samples), Vertisols (47 samples), and Alfisols (31 samples), Soil properties analyzed were soil pH H2O (1:5), clay content (pipette), organic-C (Kjeldahl), exch. Ca and Mg (NH_4OAc 1 N pH=7), exch. AI (KCl 1 M, and P (HCl 25%, Olsen, and Bray I). Soil P fractionation and sorption were determined using Kuo (1996) and Fox and Kamprath (1970) procedures respectively. The result showed that according to HCl 25%, Olsen, and Bray I extractions, the availability of soil P among the soils was in order of Inceptisols > Vertisols > Alfisols.

Whereas the soil P forms in tested soils was in order of residual-P > Ca-P > (Fe+Al)-P > orqanic-P. Buffering capacity, maximum sorption, as well as bonding energy constant of soil P was in order of Inceptisols > Vertisols > Alfisols. Furthermore, soil properties that effected significantly on the variables of soil P availability were soil clay content, organic-C, and exch. Mg in Inceptisols; clay content and organic-C in Vertisols; as well as pH, clay content, and exch. Ca in Alfisols.

267 SATRIO

Methoxyethylamine as CO_2 absorber alternative for analysis of 14C content in soil and groundwater samples. ***Metoksietilamin sebagai alternatif absorber CO_2 untuk analisis 14C. dalam tanah dan air tanah*** / Satrio; Sidauruk, P. (Pusat Aplikasi Teknologi Isotop dan Radiasi, Jakarta (PATIR) - BATAN (Indonesia)). *Jurnal Ilmiah Aplikasi Isotop dan Radiasi* (Indonesia). ISSN 1907-0322 (2010) v. 6(2) p. 117-124, 3 ill., 2 tables; 8 ref.

CARBON DIOXIDE; SOIL; GROUNDWATER; SOIL ANALYSIS; SUSPENSION SYSTEM.

At the Hydrology Laboratory of PATIR-BATAN, 14C analysis using carbosorb as an absorber of CO_2 has been developed and applied to several research activities especially researches related to soil and groundwater. However, at the present time, Packard Co. as a producer of carbosorb is no longer producing carbosorb hence it is hardly found in the market. Therefore, the alternatives of CO_2 absorber should be found. 2-Methoxyethylamine is considered to be a good alternative and it is commercially available. The study was intended to elaborate the potential of 2-Methoxyethylamine as an alternative absorber to analyze 14C content. Several times of analysis showed that the solution of 2-Methoxyethylamine/Sintilator at 21 ml was able to absorb 2.61-3.08 g CO_2 or equivalent to 0.713-0.810 g of 14C at saturated temperature of 53°C. At this time, the density of the solutions increased from 0.866 g/ml to around 0.974 g/ml. By three times test, the results of background and standard counting were relatively stable with values 20.36 ± 0.10 cpm and 3.2.74 ± 0.06 cpm, respectively. Whereas, the results of several samples analysis showed that all the 14C count of soil and groundwater during this study were in between the count of background and standard. This result shows that 2-Methoxyethylamine can serve as an alternative of CO_2 absorber to determine the age of soil and groundwater samples through their 14C contents.

268 SUBIKSA, I G.M.

Potassium soil test calibration for corn on Typic Hapludox Cigudeg [Indonesia]. ***Kalibrasi nilai uji tanah kalium untuk tanaman jagung pada Typic Hapludox Cigudeg*** / Subiksa, I G.M.; Sabiham, S. (Balai Penelitian Tanah, Bogor (Indonesia)). *Jurnal Tanah dan Iklim* (Indonesia). ISSN 1410-7244 (2009) (no. 30) p. 17-24, 1 ill., 8 tables; 13 ref.

ZEA MAYS; STANDARDIZING; POTASSIUM; SOIL ANALYSIS; SOIL CHEMICOPHYSICAL PROPERTIES; NUTRITIONAL STATUS; YIELDS; JAVA.

Soil testing calibration is a process to provide meaning of soil test value in term of crops response. Research on soil testing calibration for corn has been carried out on Typic Hapludox Cigudeg. The objectives were: 1) to determine critical point of soil test value of K and 2) to determine the application rate of K fertilizer recommendation. The split plot design was used with five rate of K fertilization on three K soil status as the main plots. There were four K soil test methods assessed to determine the critical point value for corn. K availability was classified into three categories namely low, medium, and high class. The results

revealed that critical value of four soil testing methods for low, medium, and high respectively were: HCl 25% (<14, 14-29, and >29 mg 100/g), NH4OAc pH 7 (<84 ppm, 84-220 ppm and >220 ppm), Morgan (<70 ppm, 70-180 ppm, and >180 ppm), and Mechlich 1 (<54 ppm, 54-135 ppm, and >135 ppm). K fertilization significantly affected to corn plant height in the low soil K status until the rate of 60 kg K/ha (116 kg KCl/ha). Dry biomass significantly increased due to K fertilization on low, medium as well as high soil K status. K fertilization also improved corn grain production. The ears of corn could not develop without K fertilization. This was an evidence that K nutrient has an important role in enzyme activity and assimilate translocation. Even with low rate of K fertilization, corn has succeeded to form ears and kernels. In the low soil K status, K fertilization sharply increased dry grain, but in the medium soil K status the curve was gentler. Whereas in the high soil K status, K fertilization did not significantly affect the dry grain yield. The recommended application rate of K fertilization for corn on Typic Hapludox Cigudeg with low K status was 89 kg K/ha and in the medium status was 53 kg K/ha. Whereas in the high soil K status, no K fertilization was needed.

269 WIGENA, I G.P.

Soil and climate characterization and its suitability for nucleus smallholder oil palm at Sei Pagar, Kampar District, Riau Province [Indonesia]. ***Karakterisasi tanah dan iklim serta kesesuaiannya untuk kebun kelapa sawit plasma di Sei Pagar, Kabupaten Kampar, Provinsi Riau*** / Wigena, I G.P.; Sudrajat; Sitorus, S.R.P.; Siregar, H. (Balai Penelitian Tanah, Bogor (Indonesia)). *Jurnal Tanah dan Iklim* (Indonesia) ISSN 1410-7244 (2009) (no. 30) p. 1-16, 1 ill., 7 tables; 19 ref. Appendices.

ELAEIS GUINENSIS; CLIMATE; SOIL CHEMICOPHYSICAL PROPERTIES; LAND SUITABILITY; SMALL FARMS; YIELDS; SUMATRA.

The management of nucleus smallholder oil palm after conversion is mostly improper with the promoted management practice, consequently oil palm yield decreases due to decreasing of land quality. For this reason, the study has been done to characterize land condition, to assess land suitability for oil palm and to correlate soil properties against oil palm yield. The study was conducted at Sei Pagar, Kampar District, Riau Province from January 2007 to March 2008. Soil erosion was estimated using Universal Soil Loss Equation, while land suitability was processed using Land Evaluation Technical Guidance for Agriculture Commodities, and correlation of soil properties to oil palm yield was calculated using Multiple Regression Analysis on SPSS version 12.0. The study showed that climate conditions was favorable for oil palm growth and production, with anual rainfall 2,339 mm/yr, air temperature 26.04°C, and relative humidity 81.2%. Soil erosion varied from 1.322-3.423 t/ha/yr. The soils were dominated by Typic Haplosaprist and Terric Haplosaprist covering 8,641 ha with land suitability of S2-f (moderately suitable with nutrients retention as limitng factor). The other soil are Humic Dystrudepts and Typic Dystrudepts covering 587 ha with land suitability of S2-f,n (moderately suitable with nutrients retention and nutrient supply as limiting factors). The soil properties of Typic Haplosaprist and Terric Haplosaprist affected to oil palm yield were organic-C, nitrogen content, P_2O_5 content, and available-S. Meanwhile, on Humic Dystrudepts and Typic Dystrudepts, oil palm yield was affected by organic-C, nitrogen content, available-S, and aluminum content.

P34 SOIL BIOLOGY

270 MUSFAL

Potential of vesicular arbuscular mycorrhiza in increasing maize yield. *Potensi cendawan mikoriza arbuskula untuk meningkatkan hasil tanaman jagung* / Musfal (Balai Pengkajian Teknologi Pertanian Sumatera Utara, Medan (Indonesia)). *Jurnal Penelitian dan Pengembangan Pertanian* (Indonesia). ISSN 0216-4418 (2010) v. 29(4) p. 154-158, 4 ill., 22 ref.

ZEA MAYS; VESICULAR ARBUSCULAR MYCORRHIZAE; SOIL IMPROVEMENT; SOIL CHEMICOPHYSICAL PROPERTIES; NUTRIENT UPTAKE; DROUGHT RESISTANCE; YIELD INCREASE; SOIL BIOLOGY.

Vesicular arbuscular mycorrhizae (VAM) can associate and symbiose with 97% high level plant family. VAM is included in ordo Glomales, and based on the body structure and infection way can be grouped into endomycorrhizae and ectomycorrhizae. VAM is able to improve the physical and chemical properties of soil, increase nutrient absorption, improve plant resistance to drought, protect roots from pathogens, increase plant yield, and release the P fixation. Ectomycorrhizae fungi can be consumed and as medicine. Application of VAM up to 20 g/plant and 100% NPK dosage in Inceptisols affected root infection, P absorption, biomass weight, and increased maize yield. P absorption was positively correlated with the maize yield. VAM reduced the rate of NPK fertilizer up to 50%. Application of 50% NPK fertilizer added with VAM 15 g/plant produced maize yield that was not significantly different with application of 100% NPK fertilizer. The highest maize yield was produced with application of 100% NPK fertilizer added with VAM 20 g/plant.

P35 SOIL FERTILITY

271 PURWONO

Application of filter cake on growth of upland sugarcanes. [*Aplikasi kompos blotong terhadap pertumbuhan tebu di lahan kering*] / Purwono; Sopandie, D.; Harjadi, S.S.; Mulyanto, B. (Institut Pertanian Bogor (Indonesia). Fakultas Pertanian). *Jurnal Agronomi Indonesia* (Indonesia). ISSN 2085-2916 (2011) v. 39(2) p. 79-84, 3 ill., 4 tables; 26 ref.

SACCHARUM OFFICINARUM; VARIETIES; COMPOST; FILTRATION; WASTES; ORGANIC FERTILIZERS; DOSAGE; APPLICATION RATES; WATERING; DISTRIBUTION OF FREQUENCY; RAIN; SOIL WATER CONTENT; GROWTH; YIELDS; DRY FARMING.

Recently planting site of sugar cane was shifted from lowland to upland area. Sugar cane cultivation in upland has many constraints, especially limited water supply and low nutrients availability. The objectives of this research were to study the influence of application of composted filter cake on growth and water use efficiency of upland sugar cane. The research was conducted in Jengkol, Kediri. Treatments consisted of three factors: frequency of irrigation (once every 1 week, once every 2 weeks, and once every 3 weeks); sugar cane varieties (PS-862 and PS-864); and compost doses (0, 2.5, 5, and 7.5 ton/ha). Split plot design with three replications was used in each irrigation treatment, using composted filter cake as main plots and sugar cane varieties as subplots. The results showed that the highest sugar content was reached at application of 5 ton/ha compost and the greatest crystal sugar was reached at 3.09 ton/ha compost. Compost application at 5 ton/ha on each planted row can reduce frequency of irrigation from once a week to once every 2 weeks.

P36 SOIL EROSION, CONSERVATION AND RECLAMATON

272 WIDIRIANI, R.
Sustainability analysis of existing agriculture on high risk erosion area: case studies in Lembang, West Bandung District and in Dongko, Trenggalek District [Indonesia]. ***Analisis keberlanjutan usaha tani di kawasan rawan erosi: studi kasus di Kecamatan*** **Lembang, Kabupaten Bandung Barat dan Kecamatan Dongko, Kabupaten Trenggalek** / Widiriani, R. (Badan Ketahanan Pangan, Jakarta (Indonesia)); Sabiham, S.; Sutjahjo, S.H.; Las, I. *Jurnal Tanah dan Iklim* (Indonesia). ISSN 1410-7244 (2009) (no. 23) p. 65-80, 14 ill., 5 tables; 14 ref.

FARMING SYSTEMS; SLOPING LAND; SUSTAINABILITY; ANALYSIS; EROSION; JAVA.

There are three main constraints for the upland agriculture development, namely (1) steep slopes that limit the suitable farm land, (2) soil erosion rate tends to be higher than the rate of soil losses, and (3) high average annual rainfall. This research focused on sustainability analysis at high risk erosion area in Lembang Subdistrict and Dongko Subdistrict. The aim of this research was to analyze index and sustainability status of the border area, existing farming on high risk erosion. Multi dimension scalling-rapid appraisal for farming (MDS-Rapfarm) technique was used for evaluating the sustainability of existing farming based on five sustainable indicators, i.e. ecology, economy, social, local organization, and technology. Soil analysis and USLE method were used to predict erosion rate and soil fertility. The result of the MDS analysis showed that sustainable multi-dimension index (ecology, economy, social, local organization, technology) of Lembang Subdistrict was 35.47; 38.15; 56.42; 34.49; 17.30; and Dongko Subdistrict was 24.16; 47.13; 63.78; 64.78; 41.55 (on scale 0-100). The average soil loss in Lembang was predicted 147.29 t/ha/year and in Dongko was 245.95 t/ha/year on average. Attributes being sensitive in increasing index and sustainability status were source of organic matter, perennial proportion, farmer oriented on agriculture extension, social conflict intensity, annual rainfall, land solum, land conversion, and number of agriculture household.

P40 METEOROLGY AND CLIMATOLOGY

273 APRIYANA, Y.
Analysis of climate and soil variables as determinant factors for internal quality of tawangmangu citrus. ***Analisis peubah iklim dan tanah sebagai faktor penentu mutu internal jeruk keprok tawangmangu*** / Apriyana, Y. (Balai Penelitian Agroklimat dan Hidrologi, Bogor (Indonesia)); Haryono; Suciantini. *Jurnal Tanah dan Iklim* (Indonesia). ISSN 1410-7244 (2009) (no. 23) p. 81-100, 4 ill., 16 tables; 18 ref.

CITRUS; BIOPHYSICS; CLIMATE; SOIL CHEMISTRY; CULTIVATION; QUALITY; ANALYSIS; JAVA.

In Tawangmangu, citrus (*Citrus nobilis* L.) has a specific taste which may be affected by biophysical characteristics such as soil and climate. Yet, the nature of this citrus in relation with biophysical characteristics is rarely studied. The purposes of this present study were to (1) identify variables of soil and climate that affect the quality of citrus, and (2) characterize the quality of citrus spatially and temporally. The study was conducted covering desk study, field survey and laboratory analysis. Climate and soil parameters were ascertained by identifying citrus and its production, characterizing the farmer practices, observing selected climate and soil parameters, and formulating the selected climate and soil parameters in

every stage of citrus growth. The quality of citrus product was ascertained through laboratory and organoleptic analysis. The results showed that citrus has better internal quality under the topography of more than 1,000 m above sea level (asl) and the average rainfall of 3,166 mm/year on Acrudoxin Hapludands soils compared with that growing in area of lower than 1,000 m asl and the average rainfall of 2,715 mm/year on Typic Dystrudepts soils. Citrus of Tawangmangu with good quality of yield needed low temperature about 19°C and radiation about 320 kal/cm^2 in flowering season while high and stable temperature of 22-23°C and radiation about 400 kal/cm^2 were needed during maturing period until fruiting period. Total dissolved solid and acid values significantly affected by macro nutrient i.e. N, P, K and micro nutrient, i.e. Fe, B, and Cu, and also sand mineral i.e. opaque, volcanic glass and labradorit under the topography of more than 1,000 m asl. Meanwhile in area of lower than 1,000 m asl, total soluble solidity significantly affected by CEC, Al, organic matter, micro nutrient and also opaque, volcanic glass and labradorit. Acid value significantly affected by macro nutrient. Sweets content significantly affected by Hornblende, Augit, and Hiperstin. Therefore, citrus of Tawangmangu can be more adaptable if planted in Typic Dystrudepts on area of more than 1,000 m asl.

Q02 FOOD PROCESSING AND PRESERVATION

274 FILIANTY, F.

[Preservation engineering technique of sugarcane juice using kawao root (*Millettia* sp.) for supporting policy towards sugar self-sufficiency in Garut, Sukabumi, Cirebon (Indonesia)]. ***Teknik rekayasa pengawetan nira menggunakan akar kawao (Millettia sp.) untuk mendukung kebijakan menuju swasembada gula (Jawa Barat: Garut, Sukabumi, Cirebon)*** / Filianty, F.; Sumiati, D.M.; Subroto, E. Universitas Padjadjaran, Bandung (Indonesia). Fakultas Teknologi Industri Pertanian. Bandung (Indonesia): UNPAD, 2010: 61 p. 13 ill., 5 tables; Bibliography: p.50-54. Appendices. 633.17:633.61/FIL/t

MILLETTIA; ROOTS; PLANT EXTRACTS; BIOLOGICAL PRESERVATION; ANTIMICROBIALS; ENZYME INHIBITORS; ALKALOIDS; CLOSTRIDIUM BOTULINUM; SACCHAROMYCES CEREVISIAE; SUGARCANE JUICE; JAVA.

Kawao root (*Millettia sericea*) can be used as preservatives that are often used by traditionally palm farmers for palm juice. Its applications in the juice require specific process conditions for optimal preservation to resulting performance and can be applied more broadly in society. The goals of this research were: (1) to know types of alkaloids contained in the kawao root (*Millettia* sp.), (2) to find out the best solvent for extracting alkaloids in the kawao root, (3) to know the effect of solvent extracts from the kawao root (*Milletia* sp.) on changing the quality of palm juice, coconut juice, and sugar cane juice and, (4) to obtain juice pickling method using the roots to be applied in the sugar industry. This research was conducted in several stages of the experiment, i.e.: (1) phytochemical screening of kawao root; (2) isolation and identification of alkaloids in the kawao root; (3) testing the effect of solvent on the extraction of kawao root; (4) toxicity testing of kawao root; (5) identification and testing of kawao root inhibition of natural microorganisms in the sap; (6) testing the ability of kawao root preservation of palm juice, coconut juice, and sugar cane juice; (7) implementation of the focus group discussion (FGD) in sugar production center of Garut, Sukabumi, and Cirebon. The results of this study revealed the existence of 38 species of alkaloids. Toxicity of kawao root extract in mice was 2.115 mg per body weight of mice and 1,000 ppm in shrimp larvae. Local inhibition of kawao root extract was identified in the natural microorganisms in the sap, especially *Saccharomices* sp. Application of kawao root on palm juice, coconut juice, and sugarcane juice showed a marked decline in the influence of preservation rate of sucrose degradation. Based on interviews and discussions with sugar

farmers in each sugar producing centers showed that the kawao root starting rarely used and was replaced by the use of synthetic preservatives such as sodium metabisulphite. In the field observation, it was also found the use of synthetic preservatives that exceeds the threshold of food security.

275 HAJRAWATI

Interior quality of chicken eggs by soaking using betel leaf (*Piper betle* L.) as preservative. ***Kualitas interior telur ayam ras dengan penggunaan larutan daun sirih (Piper betle L.) sebagai bahan pengawet*** / Hajrawati; Aswar, M. (Universitas Hasanuddin, Makassar (Indonesia). Fakultas Peternakan). [Proceedings of the national seminar on animal husbandry and veterinary technology 2011]. Bogor (Indonesia), 7-8 Jun 2011 / Prasetyo, L.H.; Damayanti, R.; Iskandar, S.; Herawati, T.; Priyanto, D.; Puastuti, W.; Anggraeni, A.; Tarigan, S.; Wardhana, A.H.; Darmayanti, N.L.P.I. (eds.). Bogor (Indonesia): Puslitbangnak, 2012: p. 800-805, 3 tables; 12 ref. 636:619/SEM/p

EGGS; LAYER CHICKENS; SOAKING; BETEL; QUALITY; PRESERVATIVES; STORAGE.

This study was aimed to determine the effect of green betel concentration of soaking solution to maintain interior egg quality during storage at room temperature. Parameters in this study were interior egg quality including shrinkage weight, pH and albumen quality (HU = Haugh Unit). The use of betel leaf with different concentrations and time of immersion affected interior quality that includes egg weight shrinkage, pH, and albumen quality (HU). The best values occurred on the betel leaf concentration of 30% and 28 days storage time. Interactions between concentration of soaking solution betel leaf with different storage time did not significantly affect egg weight shrinkage, pH value and, albumen quality (HU).

276 PURNAMASARI, E.

Color and chemical characteristics of cemani chicken meat soaked in citric acid solution. ***Sifat warna dan kimia daging ayam cemani yang direndam dalam larutan asam sitrat*** / Purnamasari, E. (Universitas Islam Negeri Sultan Syarif Kasim Riau, Pekanbaru (Indonesia)); Legowo, A.M.; Bintoro, V.P. [Proceedings of the national seminar on animal husbandry and veterinary technology 2011]. Bogor (Indonesia), 7-8 Jun 2011 / Prasetyo, L.H.; Damayanti, R.; Iskandar, S.; Herawati, T.; Priyanto, D.; Puastuti, W.; Anggraeni, A.; Tarigan, S.; Wardhana, A.H.; Darmayanti, N.L.P.I. (eds.). Bogor (Indonesia): Puslitbangnak, 2012: p. 806-814, 4 ill., 1 table; 21 ref. 636:619/SEM/p

CHICKEN MEAT; SOAKING; CITRIC ACID; COLOUR; CHEMICOPHYSICAL PROPERTIES.

This research was done to measure the characteristic of the color, i.e. value CIE L*a*b* (International Commission on Illumination) lightness (L*), redness (a*), and yellowness (b*) and the chemical characteristic, i.e. pH value, total heme content, melanin and iron content (Fe). Research was conducted on meat of cemani chicken soaked in citric acid with a different level of concentration (0; 1; 1.5 and 2%), with four replications. The result showed that the meat soaked in citric acid solution significantly affected ($P<0.5$) value of L*, pH, iron, and the total heme content. Using 2% of citric acid for five minutes resulted in the best color and chemical characteristics.

277 RACHMAT, R.

[Prospects of nutritious rice production technology through iodine fortification]. ***Prospek teknologi pembuatan beras bergizi melalui fortifikasi iodium*** / Rachmat, R.; Lubis, S. (Balai Besar Penelitian dan Pengembangan Pascapanen Pertanian, Bogor (Indonesia)). Pangan (Indonesia). ISSN 0852-0607 (2010) v. 19(3) p. 265-274, 4 ill., 5 tables; 19 ref.

RICE; PRODUCTION TECHNOLOGY; IODINE; FOOD FORTIFICATION; CONCENTRATES; QUALITY; ORGANOLEPTIC PROPERTIES.

In an effort to overcome iodine deficiency disorders problems, increasing nutrient quality of rice is one of the breakthroughs that can be achieved primarily to improve the nutritive quality of the community in areas of iodine endemic. Implementation of iodine fortification technology is highly prospective for development of rice, because rice is the staple food consumed by more than 90% of Indonesian population. Iodine fortification implementation of rice technology by utilizing the principle of the easy nature of iodine bound with amylose as the main element in rice. Iodine as fortificants in the form of a solution with the addition of a binder in mist sprayer which coupled with rice polisher. The results showed that iodine fortification in rice by using a binder dextrose and sodium bicarbonate did not affect the quality of rice. The organoleptic test showed that iodine fortification of 1 ppm in rice showed that the rice with iodate and iodide fortificants or without a binder was not significantly different from the control and preferred by >2 or 60% of consumers (respondents). The flavor was not significantly different from the control and showed clean and bright surface appearance. From the physical quality of rice, generally iodided rice can be classified as the quality standard II because over the head rice yield was 80% and the highest broken rice should be 19.41%.

278 ROSIDA

Study of lactic acid bacteria concentration and fermentation time on sour cassava starch flour production. ***Kajian konsentrasi bakteri asam laktat dan lama fermentasi pada pembuatan tepung pati singkong asam*** / Rosida; Nurasih, A.S. (Universitas Pembangunan Nasional Veteran Jawa Timur, Surabaya (Indonesia). Jurusan Teknologi Pangan). *Agritech* (Indonesia). ISSN 0216-0455 (2008) v. 28(3) p. 97-101, 5 tables; 14 ref.

CASSAVA; FLOURS; LACTID ACID BACTERIA; FERMENTATION; LACTOBACILLUS PLANTARUM.

The aim of this research was at studying the influence of lactic acid bacteria (*Lactobacillus plantarum*) concentration and fermentation time on physical and chemical properties of sour cassava starch flour. This research used a completely randomized design with factorial pattern (two factors). The first factor was the concentration of lactic acid bacteria (0 %, 1%, 2%, and 3%), and the second factor was the fermentation time (0, 3, 6 and 9 days). The best treatment was the combination of concentration of lactic acid bacteria 9% and 9 days of fermentation. This sour cassava starch flour had 19.6% flour yield, 0.44% total acid, 1,984 cps viscosity, 3.88 sour smell score and 276.3% developing volume of bread. The addition of lactic acid bacteria could shorten fermentation time and produce sour cassava starch flour that had similar properties with the natural one.

279 SUKARTI, T.

[Assessment of iodine content in processing of *Clarias gariepinus* nugget added by seaweed (*Euchema cotonii*)]. ***Kajian kandungan iodium pada proses pembuatan nugget***

ikan patin (Clarias gariepinus) yang ditambahkan rumput laut (Encheuma cotonii) / Sukarti, T.; Purnomo, D.; Cahyana, Y. Ban Universitas Padjadjaran, Bandung (Indonesia), Fakultas Teknologi Industri Pertanian. Bandung (Indonesia): UNPAD, 2010: 50 p. 10 ill., 17 tables; Bibliography: p. 39-41. Appendices. 639.217:664.95/SUK/k.

CLARIAS GARIEPINUS; PROCESSING; FISH PRODUCTS; MILLING; FLOURS; FLAVOURINGS; SEAWEEDS; IODINE; ORGANOLEPTIC PROPERTIES; PROXIMATE COMPOSITION

King catfish nuggets are the processed food products which was made from grinding fish, by adding flavors, binding agent, covering with bread flour then was frozen. To produce a nugget which has the best hedonic characteristics and enrich of iodine, pulp seaweed (iodine = 3.75 ppm) was made from seaweed (iodine = 4.68 ppm) to put in soak for 2 days. The experimental treatments were seaweed additional of 10%, 20%, 30% and 40% of fish meat weight. Based on result of hedonic test, the treatment of 30% seaweed additional was the most interested. It was evaluated iodine concentration from the raw material until the final products which ready consumpted. The iodine content at the mixture dough step was increase of 4.06 ppm because there was salt additional in dough. The iodine content after steaming step was decrease of 3.44 ppm and after frying step decreased of 3.27 ppm, so the iodine decreased during in the processing on nugget making were 30.13%. The result evaluation of iodine content since nugget storage (-18°C) also caused iodine decrease 0.141 ppm day, so storage time of king catfish nugget which iodine enriches from seaweed are 23 days.

280 USMIATI, S.

Inhibitory activity of bacteriocin extract from *Lactobacillus* sp. strain SCG 1223. *Aktivitas hambat bubuk ekstrak bakteriosin dari Lactobacillus sp. galur SCG 1223* / Usmiati, S. (Balai Besar Penelitian dan Pengembangan Pascapanen Pertanian, Bogor (Indonesia)); Rahayu, W.P. [Proceedings of the national seminar on animal husbandry and veterinary technology]. Bogor (Indonesia), 7-8 Jun 2011 / Prasetyo, L.H.; Damayanti, R.; Iskandar, S.; Herawati, T.; Priyanto, D.; Puastuti, W.; Anggraeni, A.; Tarigan, S.; Wardhana, A.H.; Darmayanti, N.L.P.I. (eds.). Bogor (Indonesia): Puslitbangnak, 2012: p. 388-397, 2 ill., 1 table; 41 ref. 636:619/SEM/p

LACTOBACILLUS; EXTRACTS; BACTERIOCINS; ANTAGONISM; ESCHERICHIA COLI; PEDIOCOCCUS ACIDILACTICI; STORAGE; TEMPERATURE; PH; DURATION.

Bacteriocin is antibacterial agent that has been widely used as bio-preservative of food based on plant and animal sources. It is unstable to changes in temperature and pH. Encapsulation was part of efforts to stabilize the bacteriocin extract produced by *Lactobacillus* sp. strain SCG 1223. Inhibitory activity of bacteriocin extract powder after stored and rehydrated was done to test its inhibitory activity against *Escherichia coli* and *Pediococcus acidilactici*. The study aimed to determine shelf life bacteriocin extract powder of *Lactobacillus* sp. strain SCG 1223 based on inhibitory activity against *E. coli* (representing Gram negative) and *P. acidilactici* (representing Gram positive). The results showed that the optimum inhibitory activity of bacteriocin extract powder of *Lactobacillus* sp strain SCG 1223 against *E. coli* was 1862.5 AU/ml and towards to *P. acidilactici* was 1303.5 AU/ml on the dissolution condition of pH 10 and temperature degree of 55°C. Storage of bacteriocin extract powder effectively inhibited *E. coli* was at 4°C after 6 weeks on dissolution condition of pH 10 and temperature degree of 55°C with an increased inhibitory activity of 58.2 %. Inhibitory

activity of bacteriocin extract powder stored at 4°C for 12 weeks to 984 AU/ml against E. coli (down 24.5 %) and 736 AU/ml against *P. acidilactici* (down 44.4 %).

Q03 FOOD CONTAMINATION AND TOXICOLOGY

281 HARSOJO

Analysis of number and species of bacteria in buffalo meat and bowel in the market. ***Analisis bakteri pada daging dan jeroan kerbau yang dijual di pasar*** / Harsojo (Pusat Aplikasi Teknologi Isotop dan Radiasi, BATAN, Jakarta (Indonesia)). [Proceedings of the national seminar and workshop on buffaloes]. Samarinda (Indonesia), 21-22 Jun 2011 / Talib, C.; Herawati, T.; Praharani, L.; Sumantri, C.; Hidayati, N. (eds.) .Bogor (Indonesia): Puslitbangnak, 2012: p. 165-169, 4 tables; 11 ref. 636.293.082/SEM/p

WATER BUFFALOES; BUFFALO MEAT; FOOD CONTAMINATION; BACTERIA; COLIFORM BACTERIA; ESCHERICHIA COLI; STAPHYLOCOCCUS.

Buffalo have an important role in the development of Indonesia economic especially for their meat, bowel, skin and animal power. Investigation has been carried out to analyse the initial bacterial contamination on buffalo meats and bowels which are sold in markets. The parameters were total aerob bacterias, coliforms, *Escherichia coli*, *Staphylococcus* spp., and detection of Salmonella. The samples were buffalo meat and bowel such as liver and intestine. The initial contamination of aerob bacteria were varied from 1.2 x 10^6 up to 2.3 x 10^6 cfu/g, while coliforms were varied from 2.3 x 10^5 up to 7.7 x 10^5 cfu/g. The total *E. coli* were varied from 2.0 x 10^4 up to 4.0 x 10^5 cfu/g, while the total *Staphylococcus* spp. were varied from 1.9 x 10^4 up to 2.0 x 10^4 cfu/g. No Salmonella was detected in all samples observed. The initial bacterial contamination is on top of the permissible concentration threshold of Indonesia National Standard (SNI).

282 WIDIASTUTI, R.

Spiramycin residue in muscle and liver of chicken received spiramycin antibiotic administered orally. ***Residu antibiotika spiramisin pada hati dan daging ayam pedaging yang dicekok antibiotika spiramisin*** / Widiastuti, R.; Murdiati, T.B. (Balai Besar Penelitian Veteriner, Bogor (Indonesia)). [Proceedings of the national seminar on animal husbandry and veterinary technology 2011]. Bogor (Indonesia), 7-8 Jun 2011 / Prasetyo, L.H.; Damayanti, R.; Iskandar, S.; Herawati, T.; Priyanto, D.; Puastuti, W.; Anggraeni, A.; Tarigan, S.; Wardhana, A.H.; Darmayanti, N.L.P.I. (eds.). Bogor (Indonesia): Puslitbangnak, 2012: p. 741-745, 1 table; 10 ref. 636:619/SEM/p

BROILER CHICKENS; SPIRAMYCIN; ANTIBIOTIC RESIDUES; LIVER; MEAT.

Spiramycin, one of macrolides antibiotic is widely used in veterinary medicine to treat respiratory diseases or as feed additives to promote growth. However uncontrolled usage and/or slaughtered the animal before the recommended withdrawal period may cause the presence of residue in animal products. The aim of this research was to study the distribution of spiramycin residue in meat and liver of 6 weeks chickens that were orally treated with 1 g/l spiramycin for 7 consecutive days. The spiramycin residue in meat and liver samples were extracted chemically and analysed by a high performance liquid chromatography (HPLC). Spiramycin residue in meat disappeared rapidly and remained only for one day post withdrawn. On the other hand the occurrence of spiramycin residue in liver tissue was higher than in meat and remained more than 7 days post withdrawn.

Q04 FOOD COMPOSITION

283 ARITONANG, S.N.

Effect of white Oyster mushroom powder (*Pleurotus ostreatus*) addition on goat milk yoghurt quality. *Pengaruh penambahan bubuk jamur tiram putih (Pleurotus ostreatus) terhadap kualitas yoghurt susu kambing* / Aritonang, S.N.; Purwati, E.; Fitri, Y. (Universitas Andalas, Padang (Indonesia). Fakultas Peternakan). [Proceedings of the national seminar on animal husbandry and veterinary technology]. Bogor (Indonesia), 7-8 Jun 2011 / Prasetyo, L.H.; Damayanti, R.; Iskandar, S.; Herawati, T.; Priyanto, D.; Puastuti, W.; Anggraeni, A.; Tarigan, S.; Wardhana, A.H.; Darmayanti, N.L.P.I. (eds.). Bogor (Indonesia): Puslitbangnak, 2012: p. 620-625, 1 table; 16 ref. 636:619/SEM/p

GOAT MILK; YOGHURT; PLEUROTUS OSTREATUS; QUALITY; PROTEIN CONTENT; LIPID CONTENT; VISCOSITY; FLAVOUR.

A research on effect of white oyster mushroom powder addition on goat milk yoghurt quality was done by using randomized block design (RBD) with 5 treatments and 4 replications. In this research, 4080 ml of Peranakan Ettawa goat milk was used. The treatment was the addition of white oyster mushroom powder as much as: A (0%), B (0.1%), C (0.2%), D (0.3%) and E (0.4%). Variables measured were protein content, fat content, viscosity and flavour of goat milk yoghurt. Results showed that addition of powdered white oyster mushroom significantly ($P<0.05$) increased protein content, viscosity and flavour of goat milk and reduced fat content. The addition of white oyster mushroom powder as much as 0.3% was the best to produce goat milk yoghurt.

284 CHOLIQ, A.

β-galactosidase activity as milk lactose hydrolyzer of selected main bacteria from *Carica papaya* fruits. *Aktivitas* β-*galaktosidase penghidrolisa laktosa susu pada bakteri unggul terseleksi dari buah Carica papaya* / Choliq, A.; Khusniati, T. (Pusat Penelitian Biologi LIPI, Cibinong-Bogor (Indonesia)). [Proceedings of the national seminar on animal husbandry and veterinary technology]. Bogor (Indonesia), 7-8 Jun 2011 / Prasetyo, L.H.; Damayanti, R.; Iskandar, S.; Herawati, T.; Priyanto, D.; Puastuti, W.; Anggraeni, A.; Tarigan, S.; Wardhana, A.H.; Darmayanti, N.L.P.I. (eds.). Bogor (Indonesia): Puslitbangnak, 2012: p. 398-402, 5 tables; 9 ref. 636:619/SEM/p

CARICA PAPAYA; ISOLATION; ENZYMATIC HYDROLYSIS; ISOLATES; BETA GALACTOSIDASE; TEMPERATURE; PH; DURATION.

The β-galactosidase enzyme is enzyme hydrolyzing milk lactose which can be used for production of low/free lactose milk, these milk can be consumed by human who are having "lactose intolerance". Characteristic of β-galactosidase as hydrolyzing milk lactose from various bacteria species haven't been known yet. The research was done to study beta-galactosidase characteristics of various bacteria species, the activity of β-galactosidase as hydrolyzing lactose milk of selected main bacteria from *Carica papaya* planted in Dieng, Wonosobo. The growth media for bacteria isolated from fruits used MRS media. The activity of β-galactosidase, was measured by modified Marteau et al. (1990) method. The protein concentration for counting specific activity was measured by Bradford method. The results showed that 6 out of 21 bacterial isolates from *C. papaya* (raw and mature in half) fruits, were the main bacterial isolates producing β-galactosidase. From various growth times of selected main isolates, the highest activity of β-galactosidase as milk lactose hydrolyzer was reached on the growth time for 48 hours, with β-galactosidase activity of 6,258 U/ml, and specific activity of 8,300 U/mg. From various pH and temperature, the highest activity of β-

galactosidase as milk lactose hydrolyzer reached on pH 6.5 was 11,550 U/ml, and on temperature 45°C, was 15,661 U/ml, respectively.

285 MISKIYAH

Physicochemical properties of cow milk dadih: effect of storage temperature and packaging material. ***Sifat fisikokimia dadih susu sapi: pengaruh suhu penyimpanan dan bahan pengemas*** / Miskiyah; Usmiati, S. (Balai Besar Penelitian dan Pengembangan Pascapanen Pertanian, Bogor (Indonesia)). [Proceedings of the national seminar on animal husbandry and veterinary technology] Bogor (Indonesia), 7-8 Jun 2011 / Prasetyo, L.H.; Damayanti, R.; Iskandar, S.; Herawati, T.; Priyanto, D.; Puastuti, W.; Anggraeni, A.; Tarigan, S.; Wardhana, A.H.; Darmayanti, N.L.P.I. (eds.). Bogor (Indonesia): Puslitbangnak, 2012: p. 432-441, 4 ill., 1 table; 23 ref. 636:619/SEM/p

MILK PRODUCTS; FERMENTATION; DURATION; PACKAGING MATERIAL; CHEMICOPHYSICAL PROPERTIES; PH; STORAGE; TEMPERATURE; VISCOSITY.

Dadih is a product of spontaneous fermented buffalo milk in bamboo container at room temperature. Traditionally processed dadih has short storage life. There improvement of processing and better handling of dadih was needed. One of the improvement factors was packaging and storage handling. This research was aimed to study the effect of storage temperature and packaging material on physicochemical characteristic of dadih from cow milk. Research was done based on randomized block design with factorial pattern (4 x 2) with treatment: packaging type (A): A1: bamboo to flex pack; A2: bamboo to clay pot; A3: bamboo to plastic cup pp; A4: bamboo; A5: flexypack; A6: clay pot; A7: plastic cup pp. Temperature treatment (B): B1: room temperature (25 - 30°C); B: cold temperature (4 - 10°C). Result showed that early time fermentation before moved into packaging treatment was 15 hour after fermentation in bamboo. Cold temperature was more effective in extending storage life of dadih compared to storage at room temperature. The use of pp plastic cup packaging and also flexypack packaging maintain physicochemical characteristic of dadih, compared to other packaging type. Nevertheless, economically, pp plastic cup packaging was cheaper than the others.

286 SURYANINGSIH, L.

Effect of breadfruit flour on chemical and physical quality of horse sausage. ***Potensi penggunaan tepung buah sukun terhadap kualitas kimia dan fisik sosis kuda*** / Suryaningsih, L. (Universitas Padjadjaran, Jatinangor, Sumedang (Indonesia). Fakultas Peternakan). [Proceedings of the national seminar on animal husbandry and veterinary technology] Bogor (Indonesia), 7-8 Jun 2011 / Kelonowati, E.; Pulungan, R.E.; Yunia, L. (eds.). Bogor (Indonesia): Puslitbangnak, 2012: p. 442-447, 3 tables; 15 ref. 636:619/SEM/p

HORSE MEAT; SAUSAGES; BREADFRUITS; FLOURS; PROTEIN CONTENT; MOISTURE CONTENT; CHEMICOPHYSICAL PROPERTIES; QUALITY.

The objective of this study was to observe the effect of breadfruit flour %age on the chemical (protein and moisture content) and physical (the value of tenderness) quality of horse sausage. This research was carried out using experimentally based on completely randomized design with four treatments (10% of tapioca flour as control and breadfruit flour 10, 15, and 20%) in five replications. Anova test was applied to find out the effect and Tukey test was applied to find out the differences between each treatment. Results showed that the average protein content of horse sausage with the addition of breadfruit flour 10, 15 and 20 % respectively were 16.5, 15,8 and 14.7%, meaning that the protein content of horse sausage

produced was higher than the Indonesian National Standard (SNI) 1995, i.e. 13% protein content. Moisture content of horse sausage with the use of 10% tapioca flour, did not differ significantly from the use of 10 to 15% breadfruit flour but significantly different from the addition of 20% breadtruit flour. The use of breadfruit flour of 10,15, and 20% resulted in moisture content of: 60.1, 58.1 and 56.1% respectively. Value of horse sausage tenderness with the use of starch of 10%, used as control was significantly different from the use of breadfruit flour at 10 to 20%. The use of breadfruit flour at 10, 15 and 20% resulted in tenderness respectively was 68.5, 62.9 and 55.1 mm/g/10 sec.

287 ZURIATI, Y.

Quality characteristic of fresh milk safety and yoghurt from three dairy goat breeds to support food savety and food diversification program. ***Karakteristik kualitas susu segar dan yoghurt dari tiga bangsa kambing perah dalam mendukung program ketahanan dan diversifikasi pangan*** / Zuriati, Y. (Balai Pengkajian Teknologi Pertanian Riau, Pekanbaru (Indonesia)); Maheswari, R.R.A.; Susanty, H. [Proceedings of the national seminar on animal husbandry and veterinary technology]. Bogor (Indonesia), 7-8 Jun 2011 / Prasetyo, L.H.; Damayanti, R.; Iskandar, S.; Herawati, T.; Priyanto, D.; Puastuti, W.; Anggraeni, A.; Tarigan, S.; Wardhana, A.H.; Darmayanti, N.L.P.I. (eds.). Bogor (Indonesia): Puslitbangnak, 2012: p. 613-619, 1 ill., 3 tables; 11 ref. 636:619/SEM/p

GOAT MILK; FRESH PRODUCTS; QUALITY; YOGHURT; FOOD TECHNOLOGY; CHEMICOPHYSICAL PROPERTIES.

This study was aimed to identify quality characteristic of milk and dairy products such as yoghurt from Etawah grade (PE), Saanen and their crossbred with the approach of physic and chemical quality. Milk sample were used from 23 PE, 29 Saanen and 23 their crossbred (PE-SA). Stage activities include: (a) analysis quality of fresh milk; (b) making of yoghurt and (c) analysis quality of yoghurt. Data was analized with General Linear Model (GLM) to find differences milk and yoghurt quality between goat breeds. Observation on goat milk quality showed that Etawah grade milk had highest derisity value (1.033 ± 0.002) and solid non fat (9.577 ± 0.704%). Quality of yoghurt made from Etawah grade milk had highest protein content (6.380 ± 0.03%), solid non fat (11.980 ± 0.03%), ash content (1.23 ± 0.01%) and viscosity (42.5 ± 3.54 dpa.s) compared to those made from Saanen and PE-SA milk. The highest water content was found in yoghurt from Saanen milk (90.775 ± 0.02%).

Q05 FOOD ADDITIVES

288 ABUBAKAR

Physical, chemical and palatability characteristic of local duck (*Anas platyrynchos*) meat nugget with the addition of carrageenan. ***Pengaruh penambahan karagenan terhadap sifat fisik, kimia dan palatabilitas nugget daging itik lokal (Anas platyrynchos)*** / Abubakar (Balai Besar Penelitian dan Pengembangan Pascapanen Pertanian, Bogor (Indonesia)); Suryati, T.; Aziz, A. [Proceedings of the national seminar on animal husbandry and veterinary technology 2011]. Bogor (Indonesia), 7-8 Jun 2011 / Prasetyo, L.H.; Damayanti, R.; Iskandar, S.; Herawati, T.; Priyanto, D.; Puastuti, W.; Anggraeni, A.; Tarigan, S.; Wardhana, A.H.; Darmayanti, N.L.P.I. (eds.). Bogor (Indonesia): Puslitbangnak, 2012: p. 787-800, 3 ill., 5 tables; 37 ref. 636:619/SEM/p

DUCK MEAT; PROCESSED PRODUCTS; CARRAGEENANS; CHEMICOPHYSICAL PROPERTIES; PALATABILITY; CONSUMER BEHAVIOUR.

Problems occurred in the processing of emulsion products, such as meat nugget is the breaking up of the emulsion system. Use of carrageenan as stabilizing agent was studied in this research. The research was done to observe the effect of carrageenan concentration levels (0, 0.5, 1.0, 1.5, 2.0%) on physical characteristic (cooking yield, water holding capacity, hardness and emulsion stability), chemical characteristic (moisture, ash, fat, protein, carbohydrate and dietary fibre content) and palatability characteristic (taste, smell, colour, hardness and texture) of the duck meat nugget. The result showed that the addition of carrageenan was not significantly different in cooking yield, water holding capacity, and hardness. The treatments significantly affected emulsion stability. The increase the addition of carrageenan the increase the emulsion stability. The chemical content of the duck meat nugget met the SNI chicken nugget requirements which are 47.53% moisture, 2.05% ash, 17.10% fat, 13.22% protein and 20.51% carbohydrate content. The result showed that as the addition of carrageenan increased, the dietary content increased as well. Use of 2% carrageenan did resulted in product with the highest dietary fibre content (12.23%). The addition of carrageenan DID not significantly affect taste, smell, hardness, and texture, except colour. The duck meat nugget with the addition of 2% carrageenan was significantly different from the one without carrageenan addition and it was less desirable than the other treatments. In conclusion, the panelist can accept the duck meat nugget of research result.

Q53 FEED CONTAMINATION AND TOXICOLOGY

289 AHMAD, R.Z.

Population dynamics of fungi in poultry feed against some antifungal. *Dinamika populasi cendawan dalam pakan unggas menghadapi anticendawan* / Ahmad, R.Z. (Balai Besar Penelitian Veteriner, Bogor (Indonesia)). [Proceedings of the national seminar on animal husbandry and veterinary technology 2011]. Bogor (Indonesia), 7-8 Jun 2011 / Prasetyo, L.H.; Damayanti, R.; Iskandar, S.; Herawati, T.; Priyanto, D.; Puastuti, W.; Anggraeni, A.; Tarigan, S.; Wardhana, A.H.; Darmayanti, N.L.P.I. (eds.). Bogor (Indonesia): Puslitbangnak, 2012: p. 746-752, 2 ill., 1 table; 17 ref. 636:619/SEM/p

POULTRY; FEEDS; CONTAMINATION; FUNGI; POPULATION DYNAMICS; ANTIFUNGAL PROPERTIES.

A good quality poultry feed composed by carbohydrate, protein, vitamine; and mineral is a fundamental nutrition source in achieving optimal growth and productivity. However, the feed also potentially serve as a carrier for microorganisms, particularly fungi contamination including their toxic metabolism products. The aim of this study is to investigate the dynamic population of fungus in poultry feed after being treated by some antifungal. Two different stocks of poultry feeds (200 g in a plastic container (S200) and 50 kg in a sack (S50) were used in this study and three anti fungal addition into those poultry feed stocks (0.1% of AFI; 0.1% of AF2 and 0.05% of AF3) were tested. A control group was stocks without any anti fungal. They were incubated for 16 weeks at 25 - 30°C. Observation of the dynamic population was conducted at week 0, 2, 4, 8, 12 and 16. Results demonstrated that there was a fluctuating number of mold, yeast and *Mycelia sterile* for both S200 and S50 during 16 weeks of observation. For S200, number of mold, yeast and M. sterile was significantly different from control ($P<0.0001$). Number of mold declined at week 8 and week 2 for AF1 and AF3 groups, respectively. Anti fungal effect of AF2 on mold was found at week 2 and 4. For S50, although number of mold in the control group was significantly different from AF1, AF2 and AF3 ($P<0.0001$), but those three anti fungal significantly revealed the same effect ($P>0.05$). Significant difference of *M. sterile* number was occurred on AF1 and AF2 ($P<0.03$). Interestingly, there was no significant difference between the control group and all anti fungal on number of yeast ($P>0.1$) but AF3 significantly reduced

more number of yeast than AF2 (P<0.02). Anti fungal AF1 and AF2 acted to inhibit the fungi growth starting at week 8-16 and at week 2 for AF3. For S50, AF1 and AF2 were more effective than AF3 especially at week 12-16. This study also demonstrated that *M. sterile* contamination in the poultry feed was more dominant than both mold and yeast.

290 KUSUMANINGTYAS, E.

Feed contamination by *Aspergillus flavus* producing aflatoxin in region of Cianjur, Depok and Bekasi [Indonesia] in 2009. *Pencemaran bahan pakan oleh Aspergillus flavus yang mampu memproduksi aflatoksin di wilayah Cianjur, Depok dan Bekasi tahun 2009* / Kusumaningtyas, E.; Maryam, R. (Balai Besar Penelitian Veteriner, Bogor (Indonesia)). [Proceedings of the national seminar on animal husbandry and veterinary technology 2011] Bogor (Indonesia), 7-8 Jun 2011 / Prasetyo, L.H.; Damayanti, R.; Iskandar, S.; Herawati, T.; Priyanto, D.; Puastuti, W.; Anggraeni, A.; Tarigan, S.; Wardhana, A.H.; Darmayanti, N.L.P.I. (eds.). Bogor (Indonesia): Puslitbangnak, 2012: p. 870-875, 2 tables; 20 ref. 636:619/ SEM/p

ASPERGILLUS FLAVUS; AFLATOXINS; FEEDS; CONTAMINATION; ANIMAL HEALTH; JAVA.

Aspergillus flavus and aflatoxin, as its secondary metabolite, are often found in feed. Aflatoxin production of each isolate was different, therefore in this research aflatoxin produced by *A. flavus* isolate contaminating feed was measured. Samples were taken from three regions of Jabodetabek, i.e. Cianjur, Depok, and Bekasi. Assay of ability to produce aflatoxin was conducted by growing *A. flavus* isolates from samples on to potato dextrose broth and were incubated at 28°C for 9 days, and then their aflatoxin production were measured. *Aspergillus flavus* contaminations in feed were 10^1 to 10^5 cfu/g. The ability to produce aflatoxin varied from not detected to 1212,28 µg/ml. *Aspergillus flavus* isolated from corn sample from Bekasi produced the highest aflatoxin (1212,28 µg/ml). It was higher than aflatoxin produced by *A. flavus* from BBalitvet Culture Collection (BCC) or Japan Collection of Microorganisms (JCM) for 84.48 and 809.43 µg/ml, respectively. Based on the result, it was concluded that *A. flavus* isolated from feed samples potentially produced high level of aflatoxin, therefore it might become a threat for animal health.

291 WINUGROHO, M.

Activity of bacteria Bacteroides clostridiformis isolate in detoxification of toxic compound in *Chromolaena odorata*. *Daya kerja isolat mikroba Bacteroides clostridiformis dalam menghilangkan racun daun Chromolaena odorata* / Winugroho, M.; Widiawati, Y. (Balai Penelitian Ternak, Bogor (Indonesia)). [Proceedings of the national seminar on animal husbandry and veterinary technology 2011]. Bogor (Indonesia), 7-8 Jun 2011 / Prasetyo, L.H.; Damayanti, R.; Iskandar, S.; Herawati, T.; Priyanto, D.; Puastuti, W.; Anggraeni, A.; Tarigan, S.; Wardhana, A.H.; Darmayanti, N.L.P.I. (eds.). Bogor (Indonesia): Puslitbangnak, 2012: p. 887-893, 4 tables; 16 ref. 636:619/SEM/p

CHROMOLAENA ODORATA; BACTEROIDES; DETOXIFICATION; IN VITRO; NITRATES; NITRITES.

As a weed, *Chromolaena odorata* L. (Ki rinyuh) grows very fast in pasture, thus reduce the productivity of pasture. More than 70% of pasture in East Nusa Tenggara are covered by this weed. The weed contains some toxic compounds, namely nitrate and nitrite. Animal consuming the weed is reported to have diarrhoea, toxicity or death. Preliminary study indicated that bacteria Bacteroides c1ostridiformis isolated from rumen of buffalo might

reduce the nitrate and nitrite content in Chromolaena leaves in *in vitro* experiment. Further experiment was undertaken to investigate the activity of this bacteria in reducing the nitrate and nitrite content in Chromolaena leaves. *In vitro* technique was used to investigate the activity of isolate bacteria Bacteroides clostridiformis on three types of substrates, namely fresh leaves, sun dried and freeze dried of *Chromolaena odorata*. There were three bacteria inoculums used in the experiment. They were fresh rumen bacteria, isolate of Bacteroides c1ostridiformis and combination between the fresh rumen bacteria and isolated Bacteroides c1ostridiformis (50:50). Measurement was taken on total gas produced during substrate fermentation, bacteria population and residue of nitrate and nitrite in the substrates after 96 hours of incubation. Results showed that isolated bacteria of Bacteroides clostridiformis reduced nitrate and nitrite content in Chromolaena leaves by 90 and 75% respectively. The isolated bacteria increased bacteria population by 62% and total gas produced by 6.1% on Chromolaena substrate treated by freeze drying. It is concluded that the isolated Bacteroides c1ostridiformis might be used to reduce nitrate and nitrite content in Chromolaena odorata leaves.

292 YUNINGSIH

Easy and effective method (kit method) for paraquat (gramoxone) herbicide residue detection in drinking water. ***Metode mudah dan efektif (metode kit) deteksi, residu herbisida parakuat (gramoxone) dalam air minum*** / Yuningsih (Balai Besar Penelitian Veteriner, Bogor (Indonesia)). [Proceedings of the national seminar on animal husbandry and veterinary technology 2011]. Bogor (Indonesia), 7-8 Jun 2011 / Prasetyo, L.H.; Damayanti, R.; Iskandar, S.; Herawati, T.; Priyanto, D.; Puastuti, W.; Anggraeni, A.; Tarigan, S.; Wardhana, A.H.; Darmayanti, N.L.P.I. (eds.). Bogor (Indonesia): Puslitbangnak, 2012: p. 882-886, 1 ill., 2 tables; 19 ref. 636:619/SEM/p

DRINKING WATER; PARAQUAT; HERBICIDES; RESIDUES; SPECTROPHOTOMETRY; METHODS.

An easy and effective method have been improved for determination of paraquat herbicide residue in drinking water. Paraquat was reduced with glucose in an alkaline medium, and blue radical ion obtained was measured at 600 nm by using spectrophotometer. Validation of improved method was conducted by recovery, linearity, repeatability (precision) of 6 type concentration (5, 10, 20, 30, 40 and 50 ppm paraquat) and limit of detection (LOD). The result of recoveries after adding 0.5, 1.0 dan 2.0 µg paraquat standard solution (in duplo) in water sample were mean of recoveries are 106; 79 and 72% which its in range 70 - 110%. Linearity (correlation coefficient) r at the power of 2 : 0.9942 is nearly good result (0.999). All of validation result is in range of Validation Acceptance Criteria for Analysis Pesticide Residues, so this improved that the method is quite significant with LOD 0.25 ± 0.015 microgram/ml, Blue color intensity from 10 to 50 ppm paraquat standard solution can be applied as paraquat kit color chart (Kit Method) for paraquat residue analysis in water sample without using spectrophotometer.

293 YUNINGSIH

Quick and easy method for pentachlorophenol (PCP) pesticide residue detection in rice straw and bran. ***Metode cepat dan mudah deteksi residu pestisida pentachlorophenol (PCP) dalam jerami dan dedak padi*** / Yuningsih (Balai Besar Penelitian Veteriner, Bogor (Indonesia)). [Proceedings of the national seminar on animal husbandry and veterinary technology 2011]. Bogor (Indonesia), 7-8 Jun 2011 / Prasetyo, L.H.; Damayanti, R.; Iskandar, S.; Herawati, T.; Priyanto, D.; Puastuti, W.; Anggraeni, A.; Tarigan, S.; Wardhana,

A.H.; Darmayanti, N.L.P.I. (eds.). Bogor (Indonesia): Puslitbangnak, 2012: p. 876-881, 3 tables; 20 ref. 636:619/SEM/p

RICE STRAW; BRAN; PENTACHLOROPHENOL; PESTICIDE RESIDUES; METHODS.

Quick and easy method has been improved for detection of pentachlorophenol (PCP) residue in rice straw and bran. The extraction of straw sample was performed with acetone and ethyl acetate-cyclohexane (1+1, v/v). Rice bran sample was extracted using acetonitrile, anhydrous magnesium sulfate and sodium chloride, then extraction result were purified using florisil column. Both extracts were spotted on plate thin layer chromatography (TLC silica gel 60 F254) by developing solvent hexane-acetone (4+1, v/v). The spot result was detected by UV lamp on 254 nm wave length. Validation could be assesed by recovery test by adding 5, 10 and 20 micro g, PCP standard solution (in triplicates), 1 replication of blanko and determination of limit of detection (LOD). Result of recovery test was 100.0; 112.5; 100.0; and 100.0; 100.0; 100.0%; for rice straw and bran respectively. They were in the range of Validation Acceptance Criteria for Analysis Pesticide Residues (70-110%). In conclusion, the improved method is suitable to detect PCP residue with LOD: 0.02 micro g PCP.

Q60 PROCESSING OF NON-FOOD OR NON-FEED AGRICULTURAL PRODUCTS

294 AHMADI, N.R.

Processing technology improvement of white pepper. ***Perbaikan teknologi pengolahan lada putih*** / Ahmadi, N.R. (Balai Pengkajian Teknologi Pertanian Kalimantan Timur, Samarinda (Indonesia)); Hidayat, T. [Innovation to support the development of pepper in Bangka Belitung Province (Indonesia)] / Syafaruddin; Daras, U.; Ajijah, N.; Ferry, Y.; Indriati, G.; Taher, S.; Supriadi, H.; Towaha, J.; Herman, M.; Hasibuan, A.M.; Wicaksono, I.N.A.; Rivai, A.M. (eds.). Sukabumi (Indonesia): Balittri, 2009: p. 195-206, 10 tables; 18 ref. 633.841/INO

PIPER NIGRUM; EXPORTS; PROCESSING; TECHNOLOGY; COLOUR; CHEMICOPHYSICAL PROPERTIES; MICROBIOLOGY.

During the last five years there is a tendency of decreasing export, volume and quality of Indonesian pepper productivity. The market is more competitive due to higher quality standard submitted by the customer countries and the emergence of new pepper producer countries. To increase the economic value and competitiveness of Indonesian pepper in the world market, improvements of processing and implementation of quality management system in the pepper are required, so that the farmers produced pepper with appropriate quality standards and consistent export. Research was conducted in Batuah Village Loa Janan, Subdistrict Kutai Kartanegara District, East Kalimantan Province. The recommended processing of white pepper can produce white pepper with a better quality of white pepper produced traditionally and can meet the quality requirements of the IPC. The recommended white pepper processing consists of separation of the fruit stalk with perontok tool, followed by soaking pepper fruit in water with the replacement of water every two days (the duration depending on of soaking the nature of pepper rind), separation of fruit rind with shelling tool and sun drying (improved drying method) or with a mechanical drier at a temperature of 60-70°C.

295 AINURI, M.

Performance of improver additive in rolling oil production using crude palm oil as raw material. ***Kinerja aditif improver dalam produksi rolling oil menggunakan bahan baku minyak sawit*** / Ainuri, M. (Universitas Gadjah Mada, Yogyakarta (Indonesia). Fakultas Teknologi Pertanian); Irawadi, T.T.; Suryani, A.; Gumbira-Sa'id, E.; Mas'ud, Z.A.; Hardono, E. *Agritech* (Indonesia). ISSN 0216-0455 (2008) v. 28(3) p. 120-129, 6 ill., 1 table; 26 ref.

PALM OILS; LUBRICANTS; ROLLING; ADDITIVES; OILS; PETROLEUM.

Rolling oil (RO) is a process lubricant that used in metal working industries, especially in cold rolling mill (CRM) process as roll coolants, roll oil and pickler oil. Rolling oil is the mixture of basic lubricant and additives. Basic lubricant of RO usually from mineral or synthetic oil which have problems on process performance as well as in environment. Crude palm oil (CPO) is a potential commodity, but its utilities are still very limited. CPO is better than mineral or synthetic oil, especially on environmental conservation and process performance. Therefore, CPO is very potential to replace mineral oil as a base lubricant of RO. To determine the best base lubricant and additives based on characteristic analysis and performance uses two approaches, the statistical approach used to know whether the treatment is effective or not and zero one method used to get the best decision from more alternatives and criteria. In general, CPO characteristics generally is similar with commercial RO characteristics. Yet, deviation of the acid value, peroxside value, iodine value, moisture and Fe content can be minimized by purification and mixture of olein fraction. Performance of improver additive, emulsifier (EM), viscocity index improver (VII) and extrime pressure (EP) produces three kinds of the best additive namely emulfluid A (Ed) as a emulsifier additive, AP 5315 (Va) as a viscosity index improver and AP2337 (Pb) as a extreme pressure. Interaction phenomena distinguish the more purify of CPO purification process the more interactive for additive, and interaction between additives distinguishes that additives of VII affect to emulsion performance and EP additives have negative effects on emulsion and viscosity performance. Selection of the best concentration of the best improver additives results were: Ed 2.0% (w/w) with alternative value of 35%, Va 2.0% (w/w) with alternative value 42.9% and Pb 2.0% with alternative value 46.25%.

296 SUHARTINI, M.

Characteristic of natural rubber latex - methyl methacrylate copolymer in mineral lubricant base oil. ***Karakteristik kopolimer lateks karet alam - metil metakrilat dalam minyak lumas dasar mineral*** / Suhartini, M.; Rahmawati (Pusat Aplikasi Teknologi Isotop dan Radiasi (PATIR) - BATAN, Jakarta (Indonesia)). *Jurnal Ilmiah Aplikasi Isotop dan Radiasi* (Indonesia). ISSN 1907-0322 (2010) v. 6(2) p. 147-156 , 2 ill., 11 tables; 12 ref.

RUBBER; POLYMERS; LATEX; LUBRICANTS; PROCESSING; MINERAL OILS; VISCOSITY.

Natural rubber latex - methyl methacrylate copolymer was diluted in xylene, then diluted in four types of lubricant base oil with concentrations of 0.25%, 1% 5%, and 10%. The mixed solutions were analyzed to obtain kinematics viscosity, viscosity index, density, ash content, metal content, flash point, shear stability and total alkali number. The viscosity index of sample, increased by adding the copolymer solution. The results showed that lubricant base oil of high viscosity index (HVI) 60 and mixed HVI 60: HVI 650 gave optimum viscosity index. The higher concentration of polymer added into base lubricant oil, the higher viscosity index obtained. The shear stability test showed that the kinematics viscosity of sample decreased 6.5% after 60 minutes of treatment test.

Q70 PROCESSING OF AGRICULTURAL WASTES

297 MUNIER, F.F.

Characteristic evaluation of silage of corn husk and leucaena (*Leucaena leucochepala*) mixture with or without molasses. *Evaluasi karakteristik silase campuran kulit jagung dan daun lamtoro (Leucaena leucochepala) tanpa dan dengan molases* / Munier, F.F. (Universitas Gadjah Mada, Yogyakarta (Indonesia). Pascasarjana Program studi Peternakan). [Proceedings of the national seminar on animal husbandry and veterinary technology]. Bogor (Indonesia), 7-8 Jun 2011 / Prasetyo, L.H.; Damayanti, R.; Iskandar, S.; Herawati, T.; Priyanto, D.; Puastuti, W.; Anggraeni, A.; Tarigan, S.; Wardhana, A.H.; Darmayanti, N.L.P.I. (eds.). Bogor (Indonesia): Puslitbangnak, 2012: p. 515-521, 4 tables; 24 ref. 636:619/SEM/p

MAIZE; HUSKS; LEUCAENA LEUCOCEPHALA; MOLASES; SILAGE; CHEMICOPHYSICAL PROPERTIES; PH; FEEDS.

Research was done in Feed Animal Science Laboratory, Faculty of Animal Science, Gadjah Mada University, Yogyakarta during January - March 2011. Corn husks and leucaena leaves were mixed in ratio of 75:25. The mixture were ensiled in 900 g bottles, with three replications for each treatment (T1: corn husk, T2: corn husk + 4 % molasses, T3: corn husk + leucaena, T4: corn husk + leucaena + 4% molasses). Fermentation process was done for one month. The silages were evaluated physically. The samples were analyzed for dry matter (DM), crude protein (CP), ash contents, NDF and ADF contents. Research was done based on complete randomize design (CRD). T1 had a brown pale colour, T2, T3 and T4 had colour from light brown to reddish. Result showed that pH of T1 3.6 was not different significantly (P>0.05) from T2 (3.7), but these were significantly (P<0.05) lower than that of T1 (4.5) and T4 (4.2). DM content of T1 was 34.64% which was significantly higher (P<0.05) than that of the other treatments. CP content of T4 was 8.27 % significantly higher (P<0.05) than T1 (3.53%) and T2 (4.26), whereas T4 was not different (P>0.05) from T3 (6.62%). Ash content of T1 was 5.58%, significantly higher (P<0.05) than T1 (4.35%), while T4 was not different (P>0.05) from T2 (5.20%). NDF and ADF contents in T4 (69.81%, 47.82%) was lower (P<0.05) than T1 (78.34%, 56.62%) T2 (77.53%, 56.88%) and T3 (76.81%, 55.98%).

298 MUNIER, F.F.

Growth activity of *Aspergillus ficuum* in fermentation of chopped cocoa pod husk (*Theobroma cacao* L.). *Aktivitas pertumbuhan Aspergillus ficuum dalam proses fermentasi pada media cacahan kulit buah kakao (Theobroma cacao L.)* / Munier, F.F. (Universitas Gadjah Mada, Yogyakarta (Indonesia). Pascasarjana Program studi Peternakan) [Proceedings of the national seminar on animal husbandry and veterinary technology]. Bogor (Indonesia), 7-8 Jun 2011 / Prasetyo, L.H.; Damayanti, R.; Iskandar, S.; Herawati, T.; Priyanto, D.; Puastuti, W.; Anggraeni, A.; Tarigan, S.; Wardhana, A.H.; Darmayanti, N.L.P.I. (eds.). Bogor (Indonesia): Puslitbangnak, 2012: p. 508-514, 1 ill., 3 tables; 23 ref. 636:619/SEM/p

COCOA HUSKS; FERMENTATION; ASPERGILLUS; DURATION; MYCELLIUM; SPORES; MOISTURE CONTENT; PH; TEMPERATURE; FEEDS.

Cocoa pod husk (CPH) is one of estate plantation by-product which is potential to be utilized as feed alternative. This research was aimed to study *Aspergillus ficuum* (*A. ficuum*) growth activity in some chop sizes of CPH. Research was done in Feed Animal Science Laboratory, Animal Science Faculty, Gadjah Mada University, Yogyakarta from July until August 2009.

Fresh CPH was chopped into: A1 (irregular size), A2 (1 cm x 5 cm), A3 (3 cm x 5 cm), and A4 (5 cm x 5 cm), every chop size had three replications. *A. ficuum* BPT as decomposer was used 1.0 % from CPH on dry matter (DM) base. Fermentation process was done 7 days. Mycelium growth, spora and measure CPH media temperature were observed everyday. Research design applied was complete randomize design (CRD). The result showed that CPH chop sizes affected *A. ficuum* growth, optimum growth (mycelium 100% covered CPH media) in A2 on fourth day, and A3 on fifth day. A1 and A4 did not grow optimally (mycelium 75% covered CPH media) on fifth day. CPH chop sizes did not significantly affect (P>0.05) moisture content lost and pH in CPH. The highest CPH media temperature was reached on third day in A2.

T01 POLLUTION

299 HARYONO

Rehabilitation of soils polluted by mercury (Hg) due to gold mining using leaching and organic matter in greenhouse. *Rehabilitasi tanah tercemar merkuri (Hg) akibat penambangan emas dengan pencucian dan bahan organik di rumah kaca* / Haryono (Balai Besar Penelitian dan Pengembangan Sumberdaya Lahan Pertanian, Bogor (Indonesia)); Soemono, S. *Jurnal Tanah dan Iklim* (Indonesia). ISSN 1410-7244 (2009) (no. 23) p. 53-64, 4 ill., 5 tables; 30 ref.

LAND REHABILITATION; SOIL POLLUTION; MERCURY; LEACHING; ORGANIC MATTER; GREENHOUSES.

The industrial waste, especially without wastewater management installations caused soil resources degradation. The waste type that has potential to degrade the soil is toxic material, including heavy metals. Mercury (Hg) is one of the toxic and dangerous heavy metal, which threaten crops, animals, and human health. All types of mercury compound are toxic for human. The mercury is one of the most toxic metal ion to soil biota. Generally, mercury availability in soil for crop is low, and it tends to accumulate in rootzone. This indicated that the rootzone is a barrier to mercury uptake. The organic materials can be used to adsorp the heavy metals. The material have functional array that is active to adsorp the heavy metal if it is ionized. The research was conducted in green house of Soil Research Institute using factorial randomized block design 3 x 4, with three replications. The first factor was leaching (without leaching, leached with 1-2 l/pot each three days). The second factor was organic matter (control; cow manure 1,181.47 g/pot; chicken manure 741.62 g/pot; straw compost 1,102.29 g/pot). The research showed that the heavy metal pollutions did not affect rice (IR-64) growth and yield. Organic matter and leaching affected the mercury contents in produced rice. The Hg content from analysis of percolated water was not significantly different. The most effective treatment to lower the mercury content in rice to the level of "Dirjen POM" (0.05 ppm or 50 ppb) was leaching with 1-2 litre water that reached 14 ppb and 23 ppb; without leaching reached 25 ppb. Chicken manure with 1 litre water gained 34 ppb and 37 ppb. Organic matter addition with combination of leaching can decrease the Hg content to less the level.

300 SA'AD, N.S.

Phytoremediation for the rehabilitation of agricultural land contaminated by cadmium and copper. *Fitoremediasi untuk rehabilitasi lahan pertanian tercemar kadmium (Cd) dan tembaga (Cu)* / Sa'ad, N.S.; Artanti, R.; Dewi, T. (Balai Penelitian Lingkungan Pertanian, Pati (Indonesia)). *Jurnal Tanah dan Iklim* (Indonesia). ISSN 1410-7244 (2009) (no. 30) p. 59-66, 3 ill., 5 tables; 13 ref.

FARMLAND; RECLAMATION; ENVIRONMENT; POLLUTION CONTROL; CADMIUM; COPPER; HEAVY METALS.

There are many agricultural land using irrigation water from polluted industrial waste of heavy metals. Improvement of agricultural land quality using phytoremediation is needed to overcome heavy metal pollution. The research aims to make remedies for paddy field polluted by cadmium (Cd) and copper (Cu) using plants that have the ability to absorb heavy metals in order to increase land. This research was conducted at the screen house of Indonesian Aqricultural Enviroment Research Institute, using a randomized block design (RBD). Hyperaccumulator treatment plant, consisting of T1: mendong (*Fimbristylis globulosa*), T2: grass types tekian (*Cyperus platystylis*), T3: jugul (*Borreria laevis*), T4: spinach (*Amaranthus* spp.), T5: mustard (*Brassica juncea*), T6: bundung ganal (*Scleria poaeformis*), T7: purun tikus (*Eleocharis dulcis*), T8: karapiting (*Polygonum hydropipen*), T9: hiring-hiring (*Rhynchosphora corynbosa*), and T10: purun kudung (*Leperonia mucrunata*). The results showed that the content of heavy metals Cd and Cu in Vertisols (Sambung Macan and Sragen) are 1.18 and 31.38 ppm respectively. All hyperaccumulator plants on Vertisols polluted by cadmium (Cd) reduced the levels of soil cadmium after two months planted (Duncan test level of 5%). The content of copper (Cu) in soil indicated an increase and significantly different (Duncan test level of 5%). Purun kudung was significantly different compared with mustard in term of Cu adsorption from soil. The Cu content on two months old spinach was higher than other treatments, but the highest Cu content occured on stems and leaves of jugul plant. The content of cadmium (Cd) on roots of jugul plant was the highest and significantly different, while the content of Cd on hiring-hiring plant was also the highest content but not significantly different.

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