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INDONESIAN AGRICULTURAL RESEARCH ABSTRACTS

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INDONESIAN AGRICULTURAL RESEARCH ABSTRACTS

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PREFACE

Abstracts of Indonesian Agricultural Research contain the compilation of author abstracts which are synthesizes 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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Agricultural land conversion as a threat to food security and environmental quality. ***Konversi lahan pertanian sebagai suatu ancaman terhadap ketahanan pangan dan kualitas lingkungan***/ Agus, F.; Irawan (Balai Penelitian Tanah, Bogor (Indonesia)). [Proceedings of the seminar on multifunctionality and revitalization of agriculture], Bogor, 27-28 Jun 2006/ Dariah, A.; Nurida, N.L.; Irawan; Husen, E.; Agus, F. (eds.) Badan Penelitian dan Pengembangan Pertanian, Jakarta (Indonesia). Jakarta: Badan Litbang Pertanian, 2006; p.101-121, 3 ill., 6 tables; 22 ref. 63(594)/SEM/p

RICE FIELDS; FOOD SECURITY; ENVIRONMENT; QUALITY; FARMLAND; LAND USE; PLANNING.

Land use changes in Indonesia have been biased towards the economic merits of industrial and urban developments at the expense of highly productive agricultural lands. Agriculture provides various functions including environmental, food security, socio-cultural, and employment functions which collectively called multifunctionality of agriculture (MFA). Total economic value of flood mitigation, water resource conservation, erosion reduction, organic waste disposal, heat mitigation, and rural amenity functions of the 156,000 ha paddy fields in Citarum Watershed, analyzed using the replacement cost method, was about 51% ($ 92.67 million/year) of the total price of rice of $ 181.34 million/year produced in the watershed. This amount could be regarded as free services provided by the farmers to the society. However, because of society's negligence of the importance of MFA, conversion of agricultural lands has been accelerating. In the last few years, the rate of conversion of paddy field, for example, has been far exceeding the development of new paddy areas. Morever, the recent spatial land use plan showing that approximately 42% (3.10 million ha) of the 7.30 million ha irrigated paddy fields which are allocated for non-agricultural purposes, is an indication of negligence among the local governments of the importance of agriculture. If this conversion trend continues, there will be a dramatic escalation of the country's dependence on imported rice. To maintain rice self-sufficiency for the next twenty years, Indonesia has to curb the current paddy field conversion rate of above 100,000 ha/year to less than 29,000 ha/year. For each ha of converted paddy field, 2.20 ha new paddy field has to be developed to compensate for the yield loss, because of high productivity of the current paddy fields. Low and fluctuating price of agricultural products, unavailability, uncontrolled quality, or non-affordability to purchase agricultural supplies, insecure land tenure and low accessibility to markets are among the major disincentives faced by farmers. Meanwhile, effective regulatory measures are not in place to control the conversion of highly productive agricultural lands. Highly productive agriculture lands need to be safeguarded against uncontrolled conversion using improved regulatory and incentive measures.

002 HADI, P.U.

Current position and outlook of Indonesia's estate crop plantation. ***Posisi dan masa depan pembangunan perkebunan Indonesia***/ Hadi, P.U.; Supriyati; Zakaria, A.K. (Pusat Analisis Sosial Ekonomi dan Kebijakan Pertanian, Bogor (Indonesia)). [Proceedings of performance and prospect of Indonesia's agriculture sector development], Jakarta, 20 Dec 2006/ Suradisastra, K.; Yusdja, Y.; Hadi, P.U. (eds.). Bogor: PSEKP, 2007; p. 23-43, 9 tables; 23 ref. 631.001.6(594)/SEM/p

PLANTATIONS; CROPS PERFORMANCE; PRODUCT DEVELOPMENT; INDONESIA.

Estate crop subsector shares significant contributions to the Indonesian economy; thus, it needs further development in the future. In this sense, the government always constructs annual development plans for each commodities. For 2007, there are three prioritized

programs, namely: (a) Revitalization of three export commodities including oil palm, rubber and cocoa; (b) Acceleration of production and yield growth for import in commodity of sugar cane; and (c) Development of bio-energy source commodity of *Jatropha curcas*. In this connection, the present paper aims at describing achievements of the past development of the commodities by 2005-2006 and analyzing the future prospect of the commodities by 2007. The results showed that (a) the government policies are directed to promote growth of the commodities; (b) better development achievements indicated by increase in production of the four commodities, increase in the export the three export commodities, decrease in the import and production deficit of the one import substitution commodity; and (c) by 2007, the four commodities would have better prospect due to increase in output price, and especially for oil palm, there will be new generated demand for biodiesel raw material. It is suggested, that (a) promotion and protection policies to develop estate crop subsector need to be continued; (b) the revitalization programs for oil palm, rubber and cocoa as well as the accerelation program for sugar cane by 2007 need to be facilitated with sufficient financial supports; and (c) the needs for development of farm diversification on estate crop lands.

003 NAINGGOLAN, K.
[Food security and stability of supply, demand and prices of food commodity]. ***Ketahanan dan stabilitas pasokan, permintaan, dan harga komoditas pangan*** / Nainggolan, K. (Badan Ketahanan Pangan, Jakarta (Indonesia)). *Analisis Kebijakan Pertanian* (Indonesia) ISSN 1693-2021 (2008) v. 6(2) p. 114-139, 7 tables; 28 ref.

FOOD SECURITY; PRICE STABILIZATION; POVERTY; COMMODITY MARKETS.

Global food problem today is triggered by soaring international food prices. The factors underpinning the rising prices include high oil prices and energy costs, which lead to higher input costs such as fertilizer and freight costs; increasing demand for rice in India due to substitution of rice for wheat; disaster in Vietnam and Myanmar; panic buying in the Philippines; and possible influence of speculators. Additional pressure has been put on food prices because of demand from the biofuels. Future food security of any nation must be the focus of attention. National food security is a basic foundation for high quality of human resources. Food resilience at the household level must get more attention in the future, in order to build a strong foundation of regional and national food resilience. Up to now, the state of our food security, based on food availability, distribution, price stability, and consumption is good. Food production during the past five years was also good except for soybean. First round forecast by BPS in 2008 also shows a more optimistic picture. Similarly, with regard to consumption, the index of desired consumption pattern in 2007 reaching 82.8 is better compared with that in previous year. The national food security policy has been established, covering important dimensions such as food availability, distribution and food price stability, food access, and supporting policies. Resources and local wisdom based on food security development should be consistently developed. This has been started and will continue in the future with our action program called Development of Food Resilience Village in 825 villages covering 201 regencies in 32 provinces. The phylosophy adopted in this program is people empowerment, that is help people in order to enable them to help themselves.

004 PRIBADI, E.R.
Economic analysis of organic and conventional cultivation of three promising lines of javanese turmeric (*Curcuma xanthorrhiza* Roxb.). ***Kajian ekonomi budi daya organik dan konvensional pada 3 nomor harapan temulawak (Curcuma xanthorrhiza Roxb)***/ Pribadi, E.R.; Rahardjo, M. (Balai Penelitian Tanaman Obat dan Aromatik, Bogor

(Indonesia)). *Buletin Penelitian Tanaman Rempah dan Obat* ISSN 0251-0824 (2007) v.17(1) p.73-85, 4 tables; 19 ref.

CURCUMA XANTHORRHIZA; VARIETIES; CULTIVATION; ECONOMIC ANALYSIS; FARMING SYSTEMS; EXTRACTS; PRODUCTION COSTS; FARM INCOME; COST BENEFIT ANALYSIS.

All of plant have specific character in adaptation to environment and input of production that will be expressed to production and income of farming system. The objective of the research was to find out economic aspect of effect of organic and conventional cultivation of three promising lines of javanese turmeric (*Curcuma xanthorrhiza* Roxb.). The research was conducted in Sukamulya Experimental Station from August 2005 to October 2006. The size of experimental plot was 30 m^2 and the line spacing was 75 cm x 50 cm and every experimental plot consisted of 80 plants. The experiment was arranged in split plot design with 4 replications. The main plot was two treatments of organic and conventional cultivation. In organic cultivation, fertilizer application was 10 t bokashi + 90 kg biofertilizer + 300 kg zeolit + 300 kg rock phosphate/ha and the treatment of conventional cultivation was 20 t dung manure + 200 kg urea + 200 kg SP-36 + 200 kg/ha. The data collected were input-output of farming system. Farming efficiency was analyzed using descriptive analysis and B/C ratio. The results showed that: (1) javanese turmeric with conventional cultivation produced rhizome and simplisia higher than production of rhizome and simplisia in organic cultivation, the production were 15.20 - 17.83 t/ha and 3.04 3.57 t/ha, the highest production was promising line of Balittro 3 (17.83 t/ha and 3.57 t/ha), (2) the production of rhizome and simplisia in conventional cultivation were 19.64 - 22.31 t/ha and 3.93 - 4.46 t/ha, the highest production was obtained by promising line Balittro 2, (3) If price of the rhizome was Rp 1,500/kg, the organic cultivation was not promising to be develop for all promising lines of Balittro 1, 2 and 3 because net income was negative and B/C ratio was lower than 1, (4) Floor price of java turmeric in organic cultivation was Rp 1,726/kg for rhizome, Rp 19,805/kg for simplisia, and Rp 163,179/kg for extract. Then, in conventional cultivation, floor price was Rp 1,471/kg for rhizome, Rp 18,531/kg for simplisia, and Rp 155,046/kg for extract, (5) If price of rhizome Rp 1,500/kg, conventional cultivation of promising lines Balittro 2 and 3 gave net income per 1,000 m^2 were Rp 228,750 and Rp. 78,750, the B/C ratio 1.073 and 1.026, (6) If javanese turmeric was produced in kind of simplisia and extract with price of Rp 20,000/kg and Rp 174,000/kg, organic cultivation of promising lines Balittro 1 and 2, and conventional cultivation of promising lines Balittro 1, 2, and 3 were feasible developed. The highest net income was gained by conventional cultivation of promising line Balittro 2, the net income was Rp 819,965 and Rp 2,747,516, while B/C ratio was 1.101 and 1.226/1,000 m2 area for rhizome and simplisia, respectively.

005 RACHMAN, H.P.S.

[Diversification of food consumption in Indonesia: problem and implication on policy and program]. ***Penganekaragaman konsumsi pangan di Indonesia: permasalahan dan implikasi untuk kebijakan dan program/*** Rachman, H.P.S.; Ariani, M. (Pusat Analisis Sosial Ekonomi dan Kebijakan Pertanian, Bogor (Indonesia)). *Analisis Kebijakan Pertanian* ISSN 1693-2021 (2008) v.6(2) p.140-154, 4 tables; 16 ref.

FOOD CONSUMPTION; AGRICULTURAL POLICIES; DIVERSIFICATION; INDONESIA.

This paper aims to analyze the performance of the diversification of food consumption in Indonesia, its problems and implications on policy and program formulation. Secondary data from relevant institutions were used in the analysis. The result showed that the diversification of food consumption in Indonesia is far from what is expected. Rice and noodles are becoming more popular than local food staples. On average, the quality of food

consumption in Indonesia is still low and less diversified, mainly comprising of carbohydrates, especially rice. As a result, a breakdown of the main strategy or pertinent factors that relate to food security policy is required. Strategies for diversifying food consumption includes: (1) Diversification of home business in order to increase producers (especially small-scale farmers and fishermen) earnings through integrated farming development; (2) Diversification of business or food production and food consumption which are carried out through farm diversification in the areas of food, estate crops, livestock farm and fisheries; (3) Development of local wisdom in line with specific local foods; and (4) More comprehensive human resource development in the fields of food and nutrition through education and training.

006 SIMATUPANG, P.
Critical review on paradigm and framework of national food security policy. ***Analisis kritis terhadap paradigma dan kerangka dasar kebijakan ketahanan pangan nasional***/ Simatupang, P. (Pusat Analisis Sosial Ekonomi dan Kebijakan Pertanian, Bogor (Indonesia)). *Forum Penelitian Agro Ekonomi* ISSN 0216-4361 (2007) v. 25(1) p. 1-18, 4 ill., 2 tables; 28 ref.

INDONESIA; FOOD SECURITY; AGRICULTURAL POLICIES; DEVELOPMENT POLICIES; ECONOMIC ANALYSIS.

An effective and efficient national food security strategy and policy can only be formulated using an appropriate paradigm. Food security paradigm evolves as food security context changes and in line with development of scientific understanding of the issue. This paper discusses evaluation of the food security paradigm and their application in designing strategy and framework of food security policy in Indonesia. It is shown that the national food sufficiency-oriented policy belongs to the food availability approach which has been empirically proven can not assure household or individual food security. The more appropriate paradigm is the food entitlement approach. Based on this paradigm, national food security strategy and policy should be designed comprehensively that includes food availability, access and utilization dimensions, and risk mitigation related to the three dimensions in an integrated macro-micro scale.

007 SWASTIKA, D.K.S.
[Policy of production and distribution of agricultural products generated from genetically modified organism (GMO) in Indonesia]. ***Kebijakan produksi dan peredaran produk pertanian hasil rekayasa genetika (PRG) di Indonesia*** / Swastika, D.K.S. (Pusat Analisis Sosial Ekonomi dan Kebijakan Pertanian, Bogor (Indonesia)); Hardinsyah. *Analisis Kebijakan Pertanian* (Indonesia) ISSN 1693-2021 (2008) v. 6(2) p. 103-113, 2 ill., 14 ref.

FOODS; IMPORTS; ECONOMIC THEORIES; INDONESIA.

Providing sufficient food at an affordable price is an important problem for the developing countries, including Indonesia. Lack of food could result into social, economic and political instability of the country, and finally causes the fall of the government. That is the main reason why increasing food production is given the highest priority in the overall development. However, food production in Indonesia is almost always below its consumption, and therefore, Indonesia still depends upon import. The problems are not only the availability of foreign exchange and the decreasing in world supply, but also the imported foods which come from the countries where genetically modified organism (GMO)technology is intensively applied. Some people are worry about the negative effects of GMO for human health. Thus there is a need of strategic policy to control the entrance,

production, and distribution of food produced using GMO technology. The government of Indonesia has highly considered the entrance, production, and distribution of GMO foods. This was shown by some regulations included in the Government Decrees and Laws. Unfortunately, the implementation of these rules and regulations were quite poorly applied in the field, particularly due to lack of control and law enforcement. To anticipate the long term negative effects of GMO food and feed, a proper safety test of GMO together with law enforcement is highly recommended.

008 SYAFRUDDIN

[Management strategy and analysis of sustainable status of food security in Central Halmahera Regency (Indonesia)]. ***Strategi pengelolaan dan analisis status keberlanjutan ketahanan pangan di Kabupaten Halmahera Tengah***/ Syafruddin (Dinas Pertanian dan Peternakan Halmahera Tengah, Indonesia); Sutjahjo, S.H.; Baliwati, Y.F.; Nurmalina, R. *Jurnal Pengkajian dan Pengembangan Teknologi Pertanian* ISSN-1410-959X (2007) v.10(1) p.30-38, 8 ill., 8 tables; 7 ref.

FOOD SECURITY; SUSTAINABILITY; MANAGEMENT; MALUKU.

The aim of the research was to construct the planning of the desirable dietary based on potential area in frame of sustainable food security development. This research was done on a survey research basis. The types of data consisted of primary and secondary data. The rapfish method was used for sustainability analysis, whereas the analysis of hierarchy process (AHP) method was used to determine the strategy for food security management. The results of this research were (1) the sustainability index or scale value of ecology dimension was in "good" category, the sociocultural dimension was in "fine" category and the economic dimension was in "less" category, and (2) Management strategy in achieving the sustainable food security in Central Halmahera was 'low food price' as the first priority followed by the increases of food production, farming incentive, environmental friendly agriculture, poverty alleviation and the improvement of human resource quality.

E11 LAND ECONOMICS AND POLICIES

009 BAHARSJAH, S.

Multifunctionality of agriculture: the Indonesian case. ***Multifungsi pertanian, kasus di Indonesia/*** Baharsjah, S. (Yayasan Padi Indonesia, Jakarta). [Proceedings of the seminar on multifunctionality and revitalization of agriculture], Bogor, 27-28 Jun 2006/ Dariah, A.; Nurida, N.L.; Irawan; Husen, E.; Agus, F. (eds.) Badan Penelitian dan Pengembangan Pertanian, Jakarta (Indonesia). Jakarta: Badan Litbang Pertanian, 2006; p.17-22, 7 ref. 63(594)/SEM/p

AGRICULTURE; MULTIPLE USE; FOOD SECURITY; INTERNATIONAL TRADE; INDONESIA.

The term of "multifunctionality of agriculture" is still debated among national and international community. Some countries still resist the ideas to internalize multifunctionality of agriculture in trade of agricultural products. As an exporter as well as importer of agricultural products, Indonesia needs to reconsider its position in negotiation of multifunctionality of agriculture. Indonesia has a responsibility to protect its agriculture because of its roles in food security, environmental protection, and cultural heritage preservation. The existence of local wisdom that perceives agricultural land as a social capital is important to foster agricultural development. Application of the principles of multifunctionality of agriculture can reposition the importance of agriculture among sectors in national economy.

E14 DEVELOPMENT ECONOMICS AND POLICIES

010 BAHTIAR

[Identification and analysis of composite maize development in North Sumatra (Indonesia)]. ***Identifikasi dan analisis pengembangan jagung komposit di Sumatera Utara/*** Bahtiar (Balai Penelitian Tanaman Serealia, Maros (Indonesia)); Akmal. [Proceedings of the national seminar on the socialization of agricultural research and assessment. Book 1], Medan, 21-22 Nov 2005/ Yufdi, M.P.; Danil, M.; Nainggolan, P.; Nazir, D.; Suryani, S.; Napitupulu, B.; Ginting, S.P.; Rusastra, I W. (eds.) Bogor: PSEKP, 2006; p.49-59, 4 ill., 4 tables; 18 ref. 631.17.001.5/SEM/p

ZEA MAYS; CULTIVATION; CONSUMERS; FEEDS; FISHES; ECONOMIC DEVELOPMENT; FARMERS; SALES; ECONOMIC ANALYSIS; SUMATRA.

Analysis and identification on composite corn development in North Sumatra was conducted in June to July 2005 at Subdistrict Bandar Huluan and Dolok Batu Nanggar District of Simalungun, North Sumatra. The objective of this study was to gather some information on farming system of composite corn in order to promote agribusinees in North Sumatra. Questionnaire was applied and distributed to the respondent consisted of farmers, stakeholder and private sectors. The result showed that dominant varieties applied in the field was late Bisi-2 (repitation seed or selection, high application of nutrient 250-700 kg urea/ha and 50 kg SP-36/ha. Otherwise application of urea 50-100 kg/ha was applied by farmer for composite corn. There was found of 6 (six) poultry shops as consumer of corn to support feed industry in Sumatra. More than 6000 t/year was needed as artificial feed for fish culture in two villages in subdistrict of Dolok Batu Nanggar Huluan in Simalungun. It mean that there is an opportunity on agribusiness development of corn in North Sumatra.

011 PARHUSIP, D.

[Analysis of some superior industrial crops in South Nias Regency (Indonesia)]. ***Analisis beberapa komoditas unggulan perkebunan di Kabupaten Nias Selatan***/ Parhusip, D.; Sebayang, L. (Balai Pengkajian Teknologi Pertanian Sumatera Utara, Medan (Indonesia)). [Proceedings of the national seminar on innovation and specific location technology transfer supporting agriculture revitalization. Book 2], Medan, 5 Jun 2007/ Sudana, W.; Moudar, D.; Jamil, A.; Yufdy, P.; Napitupulu, B.; Daniel, M.; Simatupang, S.; Nainggolan, P.; Hayani; Haloho, L.; Darmawati; Suryani, S. (eds.) Balai Besar Pengkajian dan Pengembangan Teknologi Pertanian, Bogor (Indonesia). Bogor: BBP2TP, 2007; p. 880-886, 2 tables; 5 ref. 631/152/SEM/p bk2

COCONUTS; RUBBER; THEOBROMA CACAO; POGOSTEMON CABLIN; COFFEA; SYZYGIUM AROMATICUM; PRIMARY SECTOR; AGRICULTURAL DEVELOPMENT; FARMERS ASSOCIATIONS; PARTNERSHIPS; SUMATRA.

South Nias Regency represents producer of some plantation commodities such as coconut, rubber, cacao, patchouli, coffee and clove which plays important role in estate crops sector in improving household economy. Cultivation of estate crops in South Nias is generally done well. Analysis of determining superior commodities was conducted by using Location Quotien (LQ) analysis, where agricutural production of South Nias was compared to that of North Sumatra Province. Superior commodity is commodity owning value of LQ > 1, which also added with production and harvesting area indicators. At the same time, SWOT analysis was conducted to find out, evaluate, and arrange direction of agricultural development location, improvement of cultivation technology and also social culture.

012 ROSITA S.M.D.
Technology to support organic farming on medicinal plant: case of ginger (*Zingiber officinale* Rose.). *Kesiapan teknologi mendukung pertanian organik tanaman obat: kasus jahe (Zingiber officinale Rose.)*/ Rosita S.M.D. (Balai Penelitian Tanaman Obat dan Aromatik, Bogor (Indonesia)) . *Perspektif* (Indonesia) ISSN 1412-8004 (2007) v. 6(2) p. 75-84, 4 tables; 26 ref.

ZINGIBER OFFICINALE; TECHNOLOGY; ORGANIC AGRICULTURE; CULTIVATION.

Interest on organic farming have been raised either within developed or developing countries, especially to whom it might has a concern on human being and environment healths. Those circumstances indicate that there are potential markets to be exploited. Organic farming in Indonesia had not been appropriately implemented. However, some horticultural products such as organic vegetable have been produced and marketed locally, though in a limited numbers and volume. Except for domestic market, increase on demand for organic products in global market are arisen within years. Those included the organic products for food and neutraceutical. Ginger is one of medicinal crops with a good market demand, especially to be exported as a raw material for food and drink supplement industries. Instead for herbal medicine, food and drink supplement industries, the needs on organic product of ginger would be significantly arisen its economic value. Therefore, available technology supporting organic farming on ginger should be identify. Important factors to be concerned in organic farming on ginger are (a) land use, (b) seeds, (c) fertilizers, (d) integrated control on pest and disease management, (e) buffer zone, and (f) cropping systems. Whereas the problems to be solved are a) the availability of organic ginger seeds with high quality, b) technology on pest and disease control management, c) synergism cropping system within ginger and others crops.

E16 PRODUCTION ECONOMICS

013 IRAWAN, B.
Performance and foresight of horticulture development. *Kinerja dan prospek pembangunan hortikultura*/ Irawan, B.; Tarigan, H.; Wiryono, B.; Hestina, J.; Ashari (Pusat Analisis Sosial Ekonomi dan Kebijakan Pertanian, Bogor (Indonesia)). [Proceedings of performance and prospect of Indonesia's agriculture sector development], Jakarta, 20 Dec 2006/ Suradisastra, K.; Yusdja, Y.; Hadi, P.U. (eds.). Bogor: PSEKP, 2007; p. 66-80, 11 tables; 10 ref. 631.001.6(594)/SEM/p

HORTICULTURE; PRODUCTION; PRODUCTIVITY; CONSUMPTION; YIELDS; PRICE STABILIZATION; TRADE.

Horticulture development expressed in growth of production and yield, price stabilities, balance of trade in 2000-2005 and the achievement of production target in 2007 indicates an unsuccessfull performances. During the period of Indonesia Bersatu Cabinet, rate of production growth overseases for commodities with decreasing tend in consumption and the dependency of production growth on harvested area tend to increase, this situation can lead to higher competition with other crops in area used. Rate of yield tend to decrease for banana and orange, the opposite for shallot and orchids. The products prices are more fluctuated due to considerable price increase in January 2006, while deficit trade of horticulture products tend to increase with an increasing deficit growth rate. Production target of shallot seem to be difficult to achieve and more easy for orange, but it should be noted that this situation may come from inaccurate data of orange production target. To increase shallot production a special program of shallot in dryland area, which includes the development of better

varieties, local seed producers and incentive system, should be conducted. Implementations of SOP, GAP and GHP are also important to produce better quality of products, particularly ones of exported products, while institutions development should be conducted to improve the competitiveness of agribusiness system.

E20 ORGANIZATION, ADMINISTRATION AND MANAGEMENT OF AGRICULTURAL ENTERPRISES OR FARMS

014 ARSANTI, I.W.

Vegetable farming systems in upland areas of Indonesia: appreciation for multifunctionality of agriculture, economic and environmental externalities. *Sistem usaha tani tanaman sayuran di Indonesia: apresiasi multifungsi pertanian, ekonomi dan eksternalitas lingkungan* / Arsanti, I.W.; Boehme, M. (Humboldt University of Berlin (Germany), Agricultural and Horticultural Faculty). [Proceedings of the seminar on multifunctionality and revitalization of agriculture], Bogor, 27-28 Jun 2006/ Dariah, A.; Nurida, N.L.; Irawan; Husen, E.; Agus, F. (eds.) Badan Penelitian dan Pengembangan Pertanian, Jakarta (Indonesia). Jakarta: Badan Litbang Pertanian, 2006; p.195-230, 8 ill., 12 tables; 15 ref. 63(594)/SEM/p

VEGETABLE CROPS; FARMING SYSTEMS; HIGHLANDS; MULTIPLE USE; ECONOMIC ENVIRONMENT; FARM SURVEYS; INDONESIA.

The uplands in Indonesia are distributed in most of all islands of Indonesia and used not only as agriculture areas in this time, but also as industrial and tourism areas. Vegetable farming system (VFS) in uplands of Indonesia includes some commodities, like mustard, cabbage, potato, carrot, and cauliflower. The focus of analysis in this research are: (1) How are multisectors appreciate the multifunctionality of agriculture? (2) How are characteristic of land resources in the study area? and (3) How are economic and environment conditions of VFS in upland areas in Indonesia? This research was conducted by using descriptive analysis, Domestic Resource Cost (DRC), Private Cost Revenue (PCR), Contingent Valuation Method (CVM) and Cost Benefit Analysis (CBA), especially for calculation on economic value and environmental externalities. Based on that, appropriate policy to support multifunctionality of agriculture in upland agriculture can be formulated in promotion of permanent agricultural land and increasing farmers' welfare. This research was carried out for 12 months in catchment areas in Bandung (Pangalengan), Wonosobo (Kejajar), and Karo (Berastagi, Simpang Empat) Regencies by using two fields of main vegetable commodities located in each region in order to uniform the physical condition of agroecology. It was then applied a respondent's classification based on commodity on these two fields in each region. Respondents were randomly choosen with proportional number at each class. In each field of region, there were 25 respondents, so that the total respondents were 50 farmers. The number of all respondents in all regions was 150 farmers. This research showed that vegetable farming system in upland areas of Indonesia has profit both of financially and economically, comparative and competitive advantages, especially for potato in Kejajar. Value of environmental economic had a negative effect to comparative advantage, because the increase of expenses were not accompanied with the increase of revenues, but VFS was still profitable. Meanwhile, VFS gave social economic benefit in some aspects such as revenue, import substitution, biodiversity, husbandry, development of vegetable industry and technology, institution, education, risk management and tourism. On the other hand it also generated costs, not only in social economic aspects, such as expenditure of VFS, opportunity cost and health, but also in physical geography aspects like water contamination

in upstream and downstream areas, sedimentation, waterfloods, erosion, water reservoir and degradation of land.

015 RINA D.Y.

[Farming system assessment in monotonous swampland of South Kalimantan (Indonesia)]. ***Pengkajian sistem usaha tani di lahan lebak Kalimantan Selatan***/ Rina, D.Y. (Balai Penelitian Lahan Rawa, Banjarbaru (Indonesia)); Qomariyah, R. [Proceedings of the seminar on the science and technology 2006], Yogyakarta, 2-3 Aug 2006/ Mudjisihono, R.; Udin, L.Z.; Moeljopawiro, S.; Soegandhi, T.M.S.; Kusnowo, A.; Karossi, A.T.A.; Masyudi, M.F.; Sudihardjo, A.M.; Musofie, A.; Wardhani, N.K.; Sembiring, L.; Hartanto (eds.) Lembaga Ilmu Pengetahuan Indonesia, Jakarta (Indonesia). Yogyakarta : BPTP Yogyakarta, 2006; p. 207-215, 6 tables; 14 ref. 631.145/.152/SEM/p

ORYZA SATIVA; CAPSICUM ANNUUM; ZEA MAYS; FARMING SYSTEMS; SOCIOECONOMIC ENVIRONMENT; INNOVATION; TECHNOLOGY TRANSFER; FARM INCOME; SWAMP SOILS; COST ANALYSIS; KALIMANTAN.

Swampland area has not yet used optimally, because there are many land biophysic and social economic constraints causing low production and low farmer income. To solve this problem in increasing farmer income, integrated farming system, which are specific location and suitable to biophysic and social economic condition of farmer is highly needed. The aims of the assessment were to produce the new integrated farming model which were adaptable, profitable and continuously increasing farmer income. The assessment were done in Hulu Sungai Selatan District of South Kalimantan. The assessment came out in the farmer area of 4.8 ha involving 12 cooperator farmers. The farming system model was tabukan (rice field) planted by upland rice, while on the guludan were chilli and maize and as the control was non cooperator farmers which selected randomly by survey and record assessment location. The data was collected by survey and record keeping, and analyzed by R/C and MBCR. The result showed that the introduced model increased the cooperator farmer income of 144% compared to the non cooperator farmer, and the model was recommended to be developed (MBCR = 6.29). The availability of farmer resources (both land and labour) were adequate, but not the capital.

016 WASITO

Family role of labor's sugar cane plantation in sheep development in Kuala Begumit and goat in Klumpang (Deli Serdang, Indonesia). ***Peran keluarga buruh perkebunan tebu dalam pengembangan domba di Kuala Begumit dan Kambing di Klumpang***/ Wasito; Khairiah (Balai Pengkajian Teknologi Pertanian Sumatera Utara, Medan (Indonesia)). [Proceedings of the national seminar on innovation and specific location technology transfer supporting agriculture revitalization. Book 2], Medan, 5 Jun 2007/Sudana, W.; Moudar, D.; Jamil, A.; Yufdy, P.; Napitupulu, B.; Daniel, M.; Simatupang, S.; Nainggolan, P.; Hayani; Haloho, L.; Darmawati; Suryani, S. (eds.) Balai Besar Pengkajian dan Pengembangan Teknologi Pertanian, Bogor (Indonesia). Bogor: BBP2TP, 2007; p.887-894, 2 ill., 2 tables; 17 ref. 631/152/SEM/p bk2

SHEEP; GOATS; ANIMAL PRODUCTION; FARMS; LIVESTOCK MANAGEMENT; INNOVATION ADOPTION; TRADITIONAL TECHNOLOGY; FAMILY LABOUR; PARTICIPATION; SUMATRA.

Livestock development in the future is not simply alter packaging, but also concerning contents and substance changes, and also gives added value, and strengthens bargaining position of livestock farmer. To know this phenomenon, a study was conducted using survey method through interview using questionnaire, circumstantial interview, and participatory focus group discussion on 25 respondents in Kuala Begumit (Langkat) and 25 respondents in

Klumpang (Deli Serdang), and also observation and self participation in natural setting. The result showed that all respondents were Javanese ethnic, main work as labor in sugar cane plantation and raising livestock. Sheep farming at Kuala Begumit was better than that in Klumpang due to role and assessment of impact Institute for Agricultural Technology and Livestock Services, existence of innovator of early adopter, as well as adoption and diffusion of technology. Livestock dynamics before monetary crisis was better compared to monetary crisis. This case was not happened in Klumpang plantation.

E21 AGRO-INDUSTRY

017 KARIM, N.M.
Development of citrus agro business community based in District of Rantau Pulung, Regency of Kutai, East Kalimantan (Indonesia). ***Pengembangan agribisnis komunitas di Kecamatan Rantau Pulung, Kabupaten Kutai Timur, Kalimantan Timur (Indonesia)*** / Karim, N.M. (P.T. Kaltim Prima Coal, Samarinda (Indonesia)). Proceedings of the national seminar of citrus, Jakarta, 13-14 Jun 2009 / Winarno, M.; Sabari; Subandiyah, S.; Setyobudi, L.; Supriyanto, A. (eds.) Jakarta: Puslitbanghorti, 2008; p. 47-52, 1 table; 2 ref.

CITRUS; COMMUNITY DEVELOPMENT; AGROINDUSTRIAL SECTOR; SEED PRODUCTION; VIRUSFREE PLANTS; TECHNOLOGY TRANSFER; FARMERS ASSOCIATION; PARTICIPATION; INTEGRATED CONTROL; MOTIVATION; KALIMANTAN.

In order to anticipate the closing of coal mine in 2021, PT Kaltim Prima Coal (KPC)has conducted Community Development Programs. One of them is agribusiness of potential commodities including citrus which cooperates with Indonesian Citrus and Subtropical Fruits Research Institute (ICSFRI). Based on the potency and constraint found at the field, the programs have been arranged which covered: 1) Citrus free disease seed production, 2) Recommended technology application assistance, 3) Dissemination material arrangement, 4) Standard operating procedure (SOP) arrangement, 5) Grower groups empowerment. In 2007, approximately 69.000 new plants have been distributed to farmers even though the produced bud for grafting from bud multiplication block has not sufficient for the demand yet. Assisted grower groups reach number 31 groups and 8 seed producers. SOP has been arranged and it is hoped to be finished in the end of 2007. Cooperation among related institutions and also the synergism of program realization have to be improved in usage of local resources to realize tough and sturdy citrus agribusinesses at Rantau Pulung and its arounds.

018 KEMALA, S.
Development strategy of black pepper agribusiness system to increase farmers' income. ***Strategi pengembangan sistem agribisnis lada untuk meningkatkan pendapatan petani*** / Kemala, S. (Pusat Penelitian dan Pengembangan Perkebunan, Bogor (Indonesia)). *Perspektif* (Indonesia) ISSN 1412-8004 (2007) v. 6(1) p. 47-55, 45 ref.

PEPPER; AGROINDUSTRIAL SECTOR; FARM INCOME; DIVERSIFICATION.

Pepper as "King of Spice" is the first product to be commerced between West and East. Nowadays, black pepper has an important role on the economy of Indonesia as an export commodity, providing job opportunity, raw material of internal country industry, and direct consumption in the country. The existing pepper farming, however, is not related with the processing industry, downstream industry, as well as monetary, service industry and

marketing. As the consequences, pepper agribusiness fails to distribute additional value, and is not able to increase farmers' income. Some factors influencing agribusiness system in Indonesia unable to be developed, i.e. (1) most of the technology could not be adopted by the farmers, (2) unavailable cheap equipment, (3) less pepper product diversification, (4) existence of competitors in the world pepper market (Brazil, India, Malaysia, Thailand, and Vietnam), and (5) technology component resulted from experiments, as well as policy cannot be adopted by the farmers. The strategy to develop black pepper agribusiness in Indonesia, therefore, must be conducted through (1) integrated pests and diseases management program, (2) development of agricultural equipment industry followed with its network distribution, (3) product diversification to increase market absorption capacity, (4) promotion program of marketing on the world market, through embassy and other institutions, and (5) empowering farmers in the existing organization such as KUAT, APLI, KIMBUN and KUD.

019 SUPRIYANTO, A.
Model of agribusiness development of community-based citrus orchard. ***Model pengembangan agribisnis kebun jeruk rakyat*** / Supriyanto, A. (Balai Penelitian Tanaman Jeruk dan Buah Subtropika, Tlekung). Proceedings of the national seminar of citrus, Jakarta, 13-14 Jun 2009 / Winarno, M.; Sabari; Subandiyah, S.; Setyobudi, L.; Supriyanto, A. (eds.) Jakarta: Puslitbanghorti, 2008 p. 31-46, 4 ill., 3 tables; 9 ref.

CITRUS; AGROINDUSTRIAL SECTOR; COMMUNITY DEVELOPMENT; INNOVATION ASSOCIATIONS; SEED PRODUCTION; VIRUSFREE PLANTS; FARMERS ASSOCIATION; TECHNOLOGY TRANSFER; SMALL FARMS; MARKETING CHANNELS.

Within the last five years, development of citrus agribusiness in Indonesia was very impressive. In 2006, total production of 72,390 ha harvesting area was 2,565,543 ton, and put Indonesia in the biggest ten citrus production in the world; even in mandarin group (Mandarin, Tangerine, Clementine and Satsuma), Indonesia was in the second place after China. The quantities of imported citrus tend to increase year-by-year, but there were also exported citrus even though in limited quantities. Although the productivity was relatively high, the quality of the fruits was low and heterogenous due to weakness of grower groups and the central production consists of many small and scattered orchards owned by grower instead of vast orchards. This condition caused the adoption of recommended technology was running slowly and created low bargaining position for growers. Empowerment of citrus grower organization or citrus grower's groups will be a leverage point to start citrus agro business development which is competitive and sustainable. Establishing a strong citrus nursery industry is needed to fulfill the citrus stock both for new plantation and second planting. A specific stakeholders and location of Standard Operating Procedure for citrus production should be formulated soon and socialized properly to citrus growers with grower's group as the smallest training unit. Uniting of some Citrus Grower's Groups which are closely located into Citrus Grower's Groups Affiliation or Association will happen occasionally following the member and organization needs i.e. establishing packing house and producing processed products. At the same time, all agribusiness players on the central citrus production area play in a role to synergy their activities in order to manage supply chain be more efficient. The modern condition of community based citrus industry will not be realized without the role of government to facilitate the infrastructure establishment needed to realize the competitive and sustainable modern citrus agroindustry in Indonesia.

E50 RURAL SOCIOLOGY AND SOCIAL SECURITY

020 ELIZABETH, R.
Socio-metamorphosis phenomenon of farmers: towards the favor of disadvantage farmer's community in rural areas related to people's economy concept. *Fenomena sosiologis metamorphosis petani: ke arah keberpihakan pada masyarakat petani di pedesaan yang terpinggirkan terkait konsep ekonomi kerakyatan*/ Elizabeth, R. (Pusat Analisis Sosial Ekonomi dan Kebijakan Pertanian, Bogor (Indonesia)). *Forum Penelitian Agro Ekonomi* ISSN 0216-4361 (2007) v. 25(1) p. 29-42, 2 ill., 1 table; 38 ref.

FARMERS; SOCIOECONOMIC DEVELOPMENT; AGRICULTURAL POLICIES; PEASANT WORKERS; SOCIAL GROUPS; RURAL AREAS.

The adoption of modernization paradigm which majoring efficiency principle in agricultural development has caused the change in rural peasant social structure. The changes are especially related to farm land ownership creating the substratum of peasant, i.e., the upper and lower level of peasant. All peasant definitions are equal by its diametric and equip by each other, so that it needs a study in relation to its pattern change, interaction, and institution that historically experienced by the peasant society. The influencing development factors affecting peasant daily life should refer to the potential and the empowerment of the society. This is very important in order to adapt and sustain the development without losing the norms, values, and souls of indigenous knowledge. *Ekonomi kerakyatan* (people's economy) concept represents the economic idea trying to formulate the interpretation base and the development aspiration of the people's fairness and prosperity. This concept would become the peasant empowerment base for their prosperity and earnings improvement. Agricultural revitalization is needed to help improve people's quality of life which could be achieved through: active participation of the society, skills development of human resource, improvement of landholdings title and agricultural productive assets on the basis of farm labor, technology and financial development, enhancement of rural organizations including self-help financial support, and improvement of agriculture resource-based development.

021 RUSASTRA, I W.
Farmer's welfare and thoughts on poverty alleviation. *Kesejahteraan dan pemikiran penanggulangan kemiskinan petani*/ Rusastra, I W.; Ariani, M.; Rachman, H.P.S. (Pusat Analisis Sosial Ekonomi dan Kebijakan Pertanian, Bogor, Indonesia). [Proceedings of performance and prospect of Indonesia's agriculture sector development], Jakarta, 20 Dec 2006/ Suradisastra, K.; Yusdja, Y.; Hadi, P.U. (eds.) Bogor: PSEKP, 2007; p.114-125, 1 ill., 25 ref. 631.001.6(594)/SEM/p

FARMERS; POVERTY; WELFARE ECONOMICS.

The state of development and nature of poverty in developing countries differs to that in developed countries. In Indonesia, poverty is divided into two categories: chronic and transient poverty, each requiring a different intervention. Social-safety net programs should be devoted to the chronically poor, while a sustainable community development approach is more appropriate for the transient poor, aimed at empowering them within a finite time frame. This paper proposes holistic community empowerment and development as an alternative approach to poverty alleviation. This can be done in the following ways: (a) changing individual- or partial-sector programs to multi-sector community development; (b) mainstreaming informal employment and promoting gender equality; (c) legally empowering poor people; and (d) to provide support to minimize negative impacts of trade liberalization on income and employment of the poor. The implementation of this approach is hoped to

transform the rural-urban structure which further help the government's focus on macroeconomic growth and social-safety net programs devoted to the elderly, infirm and the chronically poor.

022 SURADISASTRA, K.
Status and trend of farmers institutional development. *Status dan arah pengembangan kelembagaan petani*/ Suradisastra, K.; Basuno, E.; Tarigan, H. (Pusat Analisis Sosial Ekonomi dan Kebijakan Pertanian, Bogor (Indonesia)). [Proceedings of performance and prospect of Indonesia's agriculture sector development], Jakarta, 20 Dec 2006/ Suradisastra, K.; Yusdja, Y.; Hadi, P.U. (eds.). Bogor: PSEKP, 2007; p. 106-113, 7 ill., 14 ref. 631.001.6(594)/SEM/p

AGRICULTURAL SECTOR; FARMERS ASSOCIATIONS; GOVERNMENT.

Agriculture sector's institutional function was strongly influenced by the government's coercive policy. So far, technology has been used as coercive tool to bind farmers in groups or institutions that support the government's sector development program. Such coercion was also in line with the government's political commitment. Yet, in certain conditions, such coercive strategy was able to boost agricultural production. The reform era offers a consensus to develop macro policy that functions as general guidance for sector institutional development. At the local level, a micro initiative should also be developed to support the ongoing local development program. The formation and implementation of both macro- and micro-initiative should be suitable to the existing cultural ecology.

E70 TRADE, MARKETING AND DISTRIBUTION

023 KUSTIARI, R.
Market development of world coffee and its implication for Indonesia. *Perkembangan pasar kopi dunia dan implikasinya bagi Indonesia*/ Kustiari, R. (Pusat Analisis Sosial Ekonomi dan Kebijakan Pertanian, Bogor (Indonesia)). *Forum Penelitian Agro Ekonomi* ISSN 0216-4361 (2007) v. 25(1) p. 43-55, 1 ill., 5 tables; 20 ref.

COFFEA; MARKETS; ECONOMIC COMPETITION; EXPORTS; IMPORTS; INDONESIA.

The fast growing trend of world coffee production in the world creates an excess of its supply, encouraging a more intense of competition among the exporting countries. This situation leads to a decreasing trend of fluctuate price of world coffee. The objective of this paper is to assess the world coffee market behavior in order to make an appropriate strategy and direction of coffee industry policies. Indonesia's market share in traditional market tends to decrease, and therefore, it is necessary to diversify market destination and commodity composition, in addition to efforts to increase the export of processed coffee.

F01 CROP HUSBANDRY

024 GUSMAINI
Potency of *Artemisia annua* development in Indonesia. *Potensi pengembangan budidaya Artemisia annua L. di Indonesia* / Gusmaini; Nurhayati, H. (Balai Penelitian Tanaman Obat dan Aromatik, Bogor (Indonesia)). *Perspektif* (Indonesia) ISSN 1412-8004 (2007) v. 6(2) p. 57-67, 3 ill., 32 ref.

ARTEMISIA ANNUA; CULTIVATION; ADAPTATION; CHEMICAL COMPOSITION; CLIMATES; RESEARCH; INDONESIA.

Artemisia as medicinal plant was proven can cure malaria disease more effective than quinine pill. Artemisia is introduced plant from sub tropical area but it can grow well in tropical area. The potency to develop Artemisia in Indonesia is highly prospective since some areas have suitable agro-ecology for Artemisia's growth and the availability of delayed flowering clones which can grow well in Indonesia. To obtain high yield and also high artemisinin content, some factors should be considered in cultivating Artemisia in Indonesia: (1) selected location suitable for its growth, (2) selected plant material, and (3) manipulated agroclimate environment such as pruning, application of organic and inorganic fertilizer, shading, and microbe application.

025 HARNOWO, D.
Technology component for soybean seed production. ***Komponen teknologi produksi benih kedelai/*** Harnowo, D.; Sutardi (Balai Penelitian Kacang-kacangan dan Umbi-umbian, Malang (Indonesia)). [Proceedings of the seminar on production increase of legume and root crops supporting food autonomy], Malang, 8 Sep 2006/ Harnowo, D.; Rahmiana, A.A.; Suharsono; Adie, M.M.; Rozi, F.; Subandi; Makarim, A.K. (eds.). Bogor: Puslitbangtan, 2007; p. 172-185, 1 ill., 7 tables; 19 ref. 633.1/.4-115/SEM/p

GLYCINE MAX; CULTIVATION; SEED PRODUCTION; CROP MANAGEMENT; PLANTING DATE; PLANT POPULATION; DENSITY; HARVESTING DATE; SELECTION; TECHNOLOGY.

The use of high quality seed is one of the important factor for increasing crop productivity. The use of certified seeds by farmers is low. Farmers generally use seed from their previous harvested crops, from market or grain seller, from other farmers of harvested crops, from the previous season or locations. The final quality of seeds (after storing) is affected by the application of pre-harvest technology. No differences between the crop management practices for seed production and grains (for consumption). However, the technology components for seed production should be applied in order to provide growth environment ideally for seed producing crops. The technology components for seed production consist of appropriate planting season, land preparation, regular planting with optimal plant population, fertilization, irrigation and pest and diseases management, and optimal harvest time.

026 IRAWATI, A.F.C.
Assessment of pepper (*Piper nigrum* Linn.) in Bangka Belitung (Indonesia). ***Pengkajian budidaya lada (Piper nigrum Linn.) di Bangka Belitung***/ Irawati, A.F.C.; Ahmadi; Issukindarsyah (Balai Pengkajian Teknologi Pertanian Kepulauan Bangka Belitung (Indonesia)). [Proceedings of the seminar on the science and technology 2006], Yogyakarta, 2-3 Aug 2006/ Mudjisihono, R.; Udin, L.Z.; Moeljopawiro, S.; Soegandhi, T.M.S.; Kusnowo, A.; Karossi, A.T.A.; Masyudi, M.F.; Sudihardjo, A.M.; Musofie, A.; Wardhani, N.K.; Sembiring, L.; Hartanto (eds.) Lembaga Ilmu Pengetahuan Indonesia, Jakarta (Indonesia). Yogyakarta: BPTP Yogyakarta, 2006; p. 473-478, 3 ill., 2 tables; 6 ref. 631.145/.152/SEM/p

PIPER NIGRUM; CULTIVATION; ALTERNATIVE AGRICULTURE; ORGANIC FERTILIZERS; INORGANIC FERTILIZERS; NEEM EXTRACTS; TECHNOLOGY TRANSFER; FERTILIZER APPLICATION; PRODUCTIVITY; BANGKA.

Pepper is one of the essential commodity in Bangka Belitung (Babel) Province. Eventhough, there are some problems in cultivating pepper, such as decreasing production, quality, and farmers interest. The aims of this assessment was to introduce and apply pepper cultivation technology packages which were environmentally friendly to increase productivity and efficiency. The assessment was carried out by applying introduced technology package in four locations in Babel. The results showed that application of introduced package increased productivity and efficiency. It showed by increasing plant condition and decreasing pests and diseases attack intensity.

027 MURWATI

[Technology adoption of shallot and chili cultivation in south coastal sandy land of Yogyakarta (Indonesia)]. ***Adopsi teknologi budi daya bawang merah dan cabai merah di lahan pasir pantai selatan DIY***/ Murwati; Sukar; Suparjana (Balai Pengkajian Teknologi Pertanian Yogyakarta (Indonesia)). [Proceedings of the national seminar on the agricultural technology innovation and institutions to increase communities empowerment. Book 2], Yogyakarta, 24-25 Ags 2007/ Wardhani, N.K.; Mudjisihono, R.; Masyhudi, M.F.; Jamal, E.; Wirianata, H.; Suroso; Hartati, R.M.; Hermantoro; Sayekti, A.S. (eds.). Yogyakarta: BPTP Yogyakarta, 2007; p. 633-638, 8 tables; 7 ref. 631.152/SEM/p bk2

ALLIUM ASCALONICUM; CAPSICUM ANNUUM; SANDY SOILS; INTERCROPPING; CULTIVATION; TECHNOLOGY; TECHNOLOGY TRANSFER; JAVA.

A research aimed to know the change of farmer's behaviour as the impact of the adoption of garlic and red chilli cultivation technology in south coastal sand area, Yogyakarta. The research was held in Srigading Village, Sanden Subdistrict, Bantul Regency in 2006. The location was determined purposively. The diffused location was Gadingsari Village, Sanden Subdistrict, Bantul Regency. This research involved 30 respondents, 15 cooperator farmers from 3 farmer clusters (1) Tani Manunggal cluster, (2) Tangguh Lestari cluster, and (3) Tangguh Rejeki cluster and 15 non-cooperator farmers which determined by simple random method from Raharja farmer cluster. The result indicated that the adoption study of garlic and red chilli cultivation technology was able to give behaviour change of cooperator farmer, but not yet in knowledge. Whereas, garlic and red chilli cultivation technology has been diffused to non-cooperator farmer.

028 ROSTIANA, O.

Effects of indole butyric acid and naphthaleneacetic acid on the root induction of pyrethrum [*Chrysanthemum cinerariifolium* (Trevir.) Vis.] clone Prau 6 in vitro. ***Pengaruh indole butyric acid (IBA) dan naphthaleneacetic acid (NAA) terhadap induksi perakaran tunas piretrum [Chrysanthemum cinerariifolium (Trevir.) Vis.] klon Prau 6 secara in vitro***/ Rostiana, O.; Seswita, D. (Balai Penelitian Tanaman Obat dan Aromatik, Bogor (Indonesia)). *Buletin Penelitian Tanaman Rempah dan Obat* ISSN 0251-0824 (2007) v.17(1) p. 39-48, 1 ill., 2 tables; 28 ref.

CHRYSANTHEMUM CINERARIAEFOLIUM; IBA; NAA; BOTANICAL PESTICIDES; CLONES; PLANT PROPAGATION; IN VITRO CULTURE; LENGHT; ROOTS.

Pyrethrum is one of botanical pesticides producing plant that has beneficial value to be improved as the substitution of synthetic pesticide, which is considered to be harmful for both of human and environment. In order to obtain a sufficient planting material, in vitro propagation had been performed. Rooted-shoots derived from in vitro cultured adapted better than that of unrooted one, when transplanted into the field (acclimatization). Therefore, in this research root induction of pyrethrum clone Prau 6-in vitro shoots were conducted by applying indole butyric acid (IBA) and naphthaleneacetic acid (NAA). Experiment was

arranged in a single factor completely randomized design with 10 replications. The treatment tested was application of synthetic auxins (IBA or NAA) into MS medium in 5 different level of concentrations (0.2; 0.4; 0.6; 0.8; 1.0 mg/l), and control (without auxin). The parameters observed were time to root-initiation, number and length of root, and root characteristic, at 6 weeks after subcultured. The results showed that application of IBA or NAA into MS medium significantly affected root initiation time, root number, length and characteristic of root, 6 weeks after subcultured. Induced-root on the medium containing 0.2 mg/l IBA showed better characteristic as compared to others treatments with roundedform, shorter initiation time (12.5 days), large amount of root (14.1) and longer root (1.47 cm).

029 SUPRIADI

Feed availability and increasing the productivity of dried area by irradiation of sorghum plantation. ***Penyediaan pakan dan peningkatan produktivitas lahan kering melalui budidaya sorgum hasil iradiasi/*** Supriadi; Musofie, A. (Balai Pengkajian Teknologi Pertanian Yogyakarta (Indonesia)); Hoeman, S.. [Proceedings of the seminar on the science and technology 2006], Yogyakarta, 2-3 Aug 2006/ Mudjisihono, R.; Udin, L.Z.; Moeljopawiro, S.; Soegandhi, T.M.S.; Kusnowo, A.; Karossi, A.T.A.; Masyudi, M.F.; Sudihardjo, A.M.; Musofie, A.; Wardhani, N.K.; Sembiring, L.; Hartanto (eds.) Lembaga Ilmu Pengetahuan Indonesia, Jakarta (Indonesia). Yogyakarta: BPTP Yogyakarta, 2006; p. 553-561, 2 ill., 6 tables; 8 ref. 631.145/.152/SEM/p

SORGHUM BICOLOR; CULTIVATION; VARIETIES; IRRADIATION; LAND PRODUCTIVITY; DRY FARMING; FORAGE; AGRONOMIC CHARACTERS; PROXIMATE COMPOSITION.

Sorghum has good ability to grow well whether in tropic or subtropic climate and tolerant to different climate. In Indonesia sorghum grow well in lowland to highland up to 1500 asl and also has higher adaptability to drought compare to other food crops. To support the extensification program to dry farming, sorghum is one of alternative food crop which able to be developed toward food self-sufficiency. The experiment was done by randomized completely design (RCD) with one treatment: 8 accession number of sorghum from irradiation result generated from durra variety and two national varieties with 3 repetitions. The parameters were agronomic characters, productivity, nutritive value of dried forages and seed. The data was analyzed by one way ANOVA, continued by DMRT. The result showed that sorghum grew well in Inceptisols, the highest protein content was obtained by national variety, but real production estimation of nutritive value in kg/ha and the highest forages in ton/ha sorghum were accession number B-72, B-95, and B-100. Those three of sorghum were expected to be recommended in dry areas.

030 SUTARDI

Potential analysis of tomato cultivation system of Kaliurang varieties in Sleman District, Yogyakarta Special Region (Indonesia). ***Analisis potensi sistem budidaya tomat varietas Kaliurang di Kabupaten Sleman, Daerah Istimewa Yogyakarta***/ Sutardi; Riyanto, D.; Sudihadjo, A.M. (Balai Pengkajian Teknologi Pertanian Yogyakarta (Indonesia)). [Proceedings of the seminar on the science and technology 2006], Yogyakarta, 2-3 Aug 2006/ Mudjisihono, R.; Udin, L.Z.; Moeljopawiro, S.; Soegandhi, T.M.S.; Kusnowo, A.; Karossi, A.T.A.; Masyudi, M.F.; Sudihardjo, A.M.; Musofie, A.; Wardhani, N.K.; Sembiring, L.; Hartanto (eds.) Lembaga Ilmu Pengetahuan Indonesia, Jakarta (Indonesia). Yogyakarta: BPTP Yogyakarta, 2006; p.615-622, 1 ill., 3 tables; 8 ref. 631.145/.152/SEM/p

LYCOPERSICON ESCULENTUM; VARIETIES; CULTIVATION; LAND SUITABILITY; SOIL CHEMICOPHYSICAL PROPERTIES; SOIL IMPROVEMENT;

SEED CERTIFICATION; CROP MANAGEMENT; ORGANIC FERTILIZERS; YIELD INCREASES; JAVA.

Good tomato farming system should be based on plant growth requirement in term of soil biophysics supported by farmland quality; social and culture factors. Merapi mountainside area (800 m asl) at approximately 6,510 ha has been intensively cultivated for several food crops; estate crops; vegetable crops, ornamental crops, fruits (salacca) and also forest trees. Result of land properties was highly determined or influenced by behavior of farm land such as water availability, air circulation, root growth, erosion sensitivity, availability of nutrients and etc. Result of analysis indicates that farm behavior that determining plant growth is farm quality, high yield and profitable if applying organic material. Result of study on tomato of Kaliurang varieties will give beneficial and high yield if in its cultivation applied package technology consisted of 1) processing soil tillage, 2) usage of certified seed, 3) usage of high yielding varieties, 4) arrangement of cropping pattern, 5) plant spacing, 6) usage of balanced fertilizing, 7) diseases and pest control, 8) irrigation, and 9) harvest and postharvest.

031 SUWANDI

Determination of shallot cultivation technology package at low and medium elevation through analysis of composite index model. ***Penentuan paket teknologi budi daya bawang merah di dataran rendah dan medium melalui pendekatan analisis model indeks komposit/*** Suwandi (Balai Pengkajian Teknologi Pertanian Jakarta (Indonesia)); Rosliani, R.; Moekasan, T.K. *Jurnal Hortikultura* ISSN 0853-7097 (2008) v. 18(4) p. 420-429, 14 tables; 14 ref.

ALLIUM ASCALONICUM; VARIETIES; CULTIVATION; TECHNOLOGY; LOWLAND; YIELDS.

The experiment was conducted at lowland (Kramat, Tegal, Central Java), and at medium land (Rancaekek, West Java). The objectives of the experiment was to find out the appropriate cultivation technology package of shallot at low and medium land through analysis of composite index model. The treatment consisted of 2 factors of A: 5 varieties of shallot (No. 86, No. 88, No. 22, No. 33, and var. Menteng/Majalengka for medium land and var. Kuning for lowland), factor B: 3 kinds of cultivation technology package of shallot. Experimental design was split plot with 3 replications. Analyses were done using combination data variance analysis, individual data variance analysis and composite index model of factor analysis. The results showed that the best recommended variety of shallot for low land at Kramat, Tegal was var. Kuning, and the cultivation technology package was T3. While the best recommended variety of shallot for medium land were var. Menteng, clone no. 33, and clone no. 88, and the cultivation technology package was T1. Cultivation of shallot at medium land gave lower bulb weight-loss than at lowland.

032 TAUFIQ, A.

Integrated crop management (ICM) for soybean in acid dryland in Lampung (Indonesia). ***Pengelolaan tanaman terpadu kedelai di lahan kering masam Lampung/*** Taufiq, A.; Heriyanto; Arsyad, D.M.; Hardaningsih, S. (Balai Penelitian Tanaman Kacang-kacangan dan Umbi-umbian, Malang (Indonesia)). [Proceedings of the seminar on production increase of legume and root crops supporting food autonomy], Malang, 8 Sep 2006/ Harnowo, D.; Rahmiana, A.A.; Suharsono; Adie, M.M.; Rozi, F.; Subandi; Makarim, A.K. (eds.). Bogor: Puslitbangtan, 2007; p. 216-232, 3 ill., 8 tables; 12 ref. 633.1/.4-115/SEM/p

GLYCINE MAX; CULTURAL METHODS; VARIETIES; CROP MANAGEMENT; FERTILIZER APPLICATION; DOSAGE EFFECTS; DOLOMITE; CROP PERFORMANCE; YIELD COMPONENTS; ACID SOILS; SUMATRA.

Acid dry land in Lampung is a potential area for soybean development. Although, this area commonly has high acidity and low fertility, its productivity could be increased with appropriate management. The ICM on soybean in acid dry land Lampung was carried out in farmer's field in Buminabung Subdistrict, Central Lampung District during the first rainy season 2005/2006 and the second rainy season 2006. The objective of this activity was to verify an alternative soybean cultural practice in acid dry land. The cultural practice examined consisted of fertilization package (75 kg urea + 100 kg SP36 + 100 kg KCl/ha) and soil amelioration with dolomite of 500 kg CaO/ha (equal to 1500 kg/ha of dolomite with the grade as that available in the local market). Soybean cultivars used were Sinabung, Kaba, Burangrang, and Anjasmoro. Beside ICM, there was superimpose trial during the second rainy season 2006. The objective of the superimpose trial was to examine the residual effect of dolomite, increasing of SP36 and KCl dosage. The results showed that soybean yield obtained from ICM activity was high both in the first rainy season (1.76 - 2.02 t/ha) and in the second one (1.59 - 2.08 t/ha). By practicing the recommended cultural practices, farmer obtained high profit (Rp 2.1 to 3.1 million/ha). The result from superimpose trial showed that application of 1,500 kg/ha dolomite to soybean in the first rainy season still had residual effect to soybean in the second one. Increasing SP36 fertilizer rate from 100 kg/ha (recommended) to 150 kg/ha increased soybean yield of 12% (from 2.14 to 2.39 t/ha), and the profit Rp 750,000/ha. Increasing KCl fertilizer rate from 100 kg/ha (recommended) to 150 kg/ha did not increase yield. The application of dolomite of 1,500 kg/ha increased soil pH, Ca and Mg availability, and decreased exchangeable A1.

F02 PLANT PROPAGATION

033 SUDOMO, A.

Effect of number on axillary buds on the survival rate and growth of cutting of four mulbery hybrids. ***Pengaruh jumlah mata tunas terhadap kemampuan hidup dan pertumbuhan setek empat jenis hibrid murbei***/ Sudomo, A. (Balai Besar Penelitian Bioteknologi dan Pemuliaan Tanaman Hutan, Ciamis, Indonesia); Pujiono, S.; Na`iem, M. *Jurnal Pemuliaan Tanaman Hutan* ISSN 1693-7147 (2007) v.1(1) p. 29-42, 5 tables; 9 ref.

MORUS ALBA; HYBRIDS; CUTTINGS; MOISTURE CONTENT; FOREST PLANTATIONS; CHEMICOPHYSICAL PROPERTIES.

The study aimed to examine the effect of number of axillary buds on different types of mulberry hybrid and their interaction on the survival rate and cuttings growth. The research was conducted using factorial randomized block design, consisting of two treatment factors, i.e. four types of mulberry hybrid (M. SHA 4 x M. LUN 109, *M. multicaulis* x *M. indica*, *M. australis* x *M. nigra* x *M. indica*) and four different numbers of axillary buds with 3 replications and 30 replicates for each unit experiment. The research showed that there were effects of axillary bud number, types of mulberry hybrid, and their interaction on the survival rate and growth of stem cuttings of mulberry hybrids. The number of axillary bud for the best growth of stem cuttings of mulberry hybrid for the best sprout length of cutting and the highest survival percentage (81.668%) was 3 axillary buds, while the 4 buds was the best according to the rank of whole parameter. The best cutting type of mulberry hybrid according to the rank of whole parameter was *M. australis* x *M. indica*. Interaction between mulberry hybrid and the best number according to the rank whole parameters was *M. australis* x *M. indica* with 4 sprout number.

F03 SEED PRODUCTION AND PROCESSING

034 SUBAGIYO

Paddy seeding agriculture development prospect in Subur Technological Clinic and Agribusiness of Bantul District, Yogyakarta Special Region (Indonesia). ***Prospek usaha tani perbenihan padi di klinik teknologi dan agribisnis Subur Bantul, Daerah Istimewa Yogyakarta***/ Subagiyo; Widyayanti, S.; Rustijarno, S. (Balai Pengkajian Teknologi Pertanian Yogyakarta (Indonesia)). [Proceedings of the seminar on the science and technology 2006], Yogyakarta, 2-3 Aug 2006/ Mudjisihono, R.; Udin, L.Z.; Moeljopawiro, S.; Soegandhi, T.M.S.; Kusnowo, A.; Karossi, A.T.A.; Masyudi, M.F.; Sudihardjo, A.M.; Musofie, A.; Wardhani, N.K.; Sembiring, L.; Hartanto (eds.) Lembaga Ilmu Pengetahuan Indonesia, Jakarta (Indonesia). Yogyakarta: BPTP Yogyakarta, 2006; p. 611-614, 1 table; 6 ref. 631.145/.152/SEM/p

ORYZA SATIVA; SEED PRODUCTION; FARMING SYSTEMS; FARMERS ASSOCIATIONS; TECHNOLOGY; AGROINDUSTRIAL SECTOR; FARM INCOME; PROFITABILITY; JAVA.

The purpose of this research was to know the paddy seed farming system prospect in Subur Clinic Technology and Agribusiness Bantul. The research was conducted in February-April 2006, in Ngaglik, Patalan Village, Jetis Subdistrict, Bantul Regency. This activity was dam-area of 1 ha, with IR-64 BS paddy variety from Wijilan Seed Institute, Kulonprogo. The result showed that paddy seed farming system in Subur Clinic Technology and Agribusines, Bantul has a good prospect with production 6 ton of harvest dried paddy. The benefit of this activity was Rp 6,186,000 with R/C ratio 2.34 and B/C ratio 1.34.

F04 FERTILIZING

035 ADISARWANTO, T.

Prospect of organic fertilizer on soybean at lowland after rice. ***Prospek penggunaan pupuk organik pada kedelai di lahan sawah setelah padi/*** Adisarwanto, T.; Riwanodja (Balai Penelitian Tanaman Kacang-kacangan dan Umbi-umbian, Malang (Indonesia)). [Proceedings of the seminar on production increase of legume and root crops supporting food autonomy], Malang, 8 Sep 2006/ Harnowo, D.; Rahmiana, A.A.; Suharsono; Adie, M.M.; Rozi, F.; Subandi; Makarim, A.K. (eds.). Bogor: Puslitbangtan, 2007; p. 255-263, 10 tables; 16 ref. 633.1/.4-115/SEM/p

GLYCINE MAX; ORGANIC FERTILIZERS; FARMYARD MANURE; FERTILIZER APPLICATION; APPLICATION RATES; PLANT RESPONSE; YIELDS; IRRIGATED LAND.

Recently, the application of organic fertilizer tends to increase due to several reasons among other to produce an organic product or to increase soil fertility. Field data show that the level of soil fertility of lowland rice decrease as indicated the organic C soil content in the low-very low levels. Moreover, some nutrients such as nitrogen, potassium and sulfur also showed deficiency. The application of organic fertilizers (chicken manure 10 ton/ha, green manure 10 ton/ha, and rice straw 10 ton/ha) directly at sowing time therefore, increase soybean seed yield up to 30% especially in Vertisols, while the application of chicken manure was potential for Entisols and lnceptisols. Combination of inorganic and organic fertilizer application was potentially approarch for near future especially to increase fertilizer efficiency.

036 IRIANI, E.

[Utilization of water hyacinth and peat composts on french bean (Phaseolus vulgaris) in Karanganyar Regency (Indonesia)]. ***Pemanfaatan kompos enceng gondok dan gambut pada tanaman buncis di Kabupaten Karanganyar***/ Iriani, E.; Setiani, C.; Juanda, D. (Balai Pengkajian Teknologi Pertanian Jawa Tengah, Ungaran (Indonesia)). [Proceedings of the seminar on the science and technology 2006], Yogyakarta, 2-3 Aug 2006/ Mudjisihono, R.; Udin, L.Z.; Moeljopawiro, S.; Soegandhi, T.M.S.; Kusnowo, A.; Karossi, A.T.A.; Masyudi, M.F.; Sudihardjo, A.M.; Musofie, A.; Wardhani, N.K.; Sembiring, L.; Hartanto (eds.) Lembaga Ilmu Pengetahuan Indonesia, Jakarta (Indonesia). Yogyakarta : BPTP Yogyakarta, 2006; p. 389-393, 3 tables; 12 ref. 631.145/.152/SEM/p

PHASEOLUS VULGARIS; COMPOSTS; EICHHORNIA CRASSIPES; PEAT; ORGANIC FERTILIZERS; FERTILIZER APPLICATION; DOSAGE EFFECTS; AGRONOMIC CHARACTERS; YIELD COMPONENTS; JAVA.

Some methods of agricultural technologies have been applied in the efforts to fulfill the food needs in Indonesia, such as Panca Usaha, Sapta Usaha, Supra Insus and many more. However, there are some effects of using high dose of chemical mixture to the environment degradation, such as plant disease resistance and the soil physically, chemically and biologically. Therefore, agricultural development with the environment perspective should be done by taking some efforts with considering natural resources sustainability, which will support land giving optimal yields. *Enceng gondok* (water hyacinth) is known as fast growing water weeds. This plant can be combined with other materials, such as peat and can be used as an organic fertilizer. Study on application of organic fertilizer of peat moss and water hyacinth was tested on french beans in farmer's land in Ngargoyoso Subdistrict, Karanganyar Regency. The application result of organic fertilizer with 2 ton/ha gave french beans production of 6.5 ton/ha (7 times harvested) and with 3 ton/ha has 6.65 ton/ha. That result, if it is compared with farmer's, increases the production 600-700 kg/ha or 9-12% from 5.95 ton/ha. It increases is expected more also at each seasons with the same application. The additional input for organic fertilizer given in average of 2-3 tons/ha still give benefit with R/C value 1.4.

037 KUNTYASTUTI, H.

Nitrogen fertilization on soybean grown at lowland Entisols with paddy-soybean and soybean-soybean farming systems. ***Pemupukan N pada kedelai di lahan sawah Entisol dengan pola tanam padi-kedelai dan kedelai-kedelai***/ Kuntyastuti, H.; Wijanarko, A.; Soedarjo, M.; Manshuri, A.G. (Balai Penelitian Tanaman Kacang-kacangan dan Umbi-umbian, Malang (Indonesia)). [Proceedings of the seminar on production increase of legume and root crops supporting food autonomy], Malang, 8 Sep 2006/ Harnowo, D.; Rahmiana, A.A.; Suharsono; Adie, M.M.; Rozi, F.; Subandi; Makarim, A.K. (eds.). Bogor: Puslitbangtan, 2007; p. 243-254, 9 tables; 12 ref. 633.1/.4-115/SEM/p

GLYCINE MAX; ORYZA SATIVA; CROP MANAGEMENT; FARMING SYSTEMS; NITROGEN FERTILIZERS; SOIL CHEMICOPHYSICAL PROPERTIES; IRRIGATED LAND; FERTILIZER APPLICATION; PLANT RESPONSE; YIELD COMPONENTS.

The effect of nitrogen fertilization on soybean grown at lowland soils varies. The soil N content of the lowland Vertisols and Entisols at the soybean growing area ranges 0.07-0.36%. Whilst, the nitrate content is 5-70 mg/kg soil. A field experiment was carried out to evaluate the effect of N on soybean. The study was undertaken on lowland Entisols after the harvest of paddy and soybean crops at Kendalpayak Experimental Station, Malang. Each treatment was laid out in a randomized block design and replicated 3 times. The treatment

consisted of N rates (0, 30, 60, 90, 120, 150, 180, and 210 kg N /ha) and N source (urea and ammonium sulfate). The soybean seed was sown (40 cm x 10 cm) in plot size of 4 m x 5 m. Two seedlings/hill were maintained until the harvest. The plant variables measured were number and dry weight of nodules, plant dry matter weight, plant nutrient content (N, P, K and S), plant height, number of plants harvested, and soybean seed dry weight. The result revealed that soybean sown after paddy yielded 2.05 ton seed/ha. Nitrogen fertilizer on Entisols soil was not required since addition of N did not increase seed yield.

038 RAHARDJO, M.

Effect of organic fertilizer on productivity and quality of three java turmeric (*Curcuma xanthorrhiza* Roxb.) promising lines, in Cibinong Bogor (Indonesia). ***Pengaruh pemupukan organik terhadap produksi dan mutu tiga nomor harapan temulawak (Curcuma xanthorrhiza Roxb.) di Cibinong Bogor***/ Rahardjo, M.; Ajijah, N. (Balai Penelitian Tanaman Obat dan Aromatik, Bogor (Indonesia)). *Buletin Penelitian Tanaman Rempah dan Obat* ISSN 0251-0824 (2007) v.17(1) p. 29-38, 1 ill., 8 tables; 14 ref.

CURCUMA XANTHORRHIZA; ORGANIC FERTILIZERS; FERTILIZER APPLICATION; VARIETIES; CROP YIELDS; QUALITY; JAVA.

Productivity and quality of java turmeric were influenced by many factors, i.e. nutrition availability from fertilizer application. The objective of the research was to examine the effect of organic fertilizer on rhizome productivity and quality of three java turmeric promising lines (Balittro 1, Balittro 2 and Balittro 3). The research was conducted in Cibinong Experimental Garden, from November 2005 until October 2006. The organic fertilizer application were 10 t/ha bokashi + 90 kg/ha biofertilizer + 300 kg/ha zeolit + 300 kg/ha rock-phosphate/ha. The experiment was arranged in randomized block design with 9 replications. Plot size of experiment was 30 cm^2 with plant distance of 75 cm x 50 cm. Each plot contained 80 plants. The result showed that the rhizomes yield of three genotypes of java turmeric Balittro 1, Balittro 2 and Balittro 3 (ranged between 14.21 - 16.59 t/ha) was higher than the rate of national production (10.7 t/ha). The production of rhizomes, xanthorrizol and curcuminoid of Balittro 1 were higher than that of Balittro 2, and Balittro 3. The Balittro 1 promising line was superior java turmeric due to its higher response to organic fertilizers.

039 RUHNAYAT, A.

Determination of N, P, K macro nutrients requirements for the growth of vanilla (*Vanilla planifolia* Andrews). ***Penentuan kebutuhan pokok unsur hara makro N, P, K, untuk pertumbuhan tanaman panili (Vanilla planifolia* Andrews*)/*** Ruhnayat, A. (Balai Penelitian Tanaman Obat dan Aromatik, Bogor (Indonesia)). *Buletin Penelitian Tanaman Rempah dan Obat* ISSN 0251-0824 (2007) v.17(1) p.49-59, 5 ill., 5 tables; 14 ref.

VANILLA PLANIFOLIA; NUTRIENT REQUIREMENTS; NITROGEN; PHOSPHORUS POTASSIUM; DOSAGES; NUTRIENT UPTAKE.

Experiment was performed at the greenhouse of Indonesian Medicinal and Aromatic Crops Research Institute to determine the needs of N, P, and K nutrients for the growth of vanilla. Experiments were conducted in two stages: (1) Determination of optimum nutrients concentration by using a modified Hewitt standard solution, i.e. control (aquadest); 0.5; 1.0; 1.5; 2.0; and 2.5 concentrations to standard, (2) Determination of critical, sufficient, optimum and redundant values of N, P and K nutrients. Then, the best result determined was applied as a standard for optimum concentration in the second stage. The treatments were the optimum concentration minus N (LON); LON + 0.5 N; LON + 1 N; LON + 1.5 N; LON + 2 N; the optimum concentration minus P (LOP); LOP + 0.5 P; LOP + 1 P; LOP + 1.5 P; LOP + 2 P; the optimum concentration minus K (LOK); LOK + 0.5 K; LOK + 1 K; LOK + 1.5 K;

and LOK + 2 K. The growth medium used for those treatments was potted (30 cm x 40 cm) quartz sand. Experiments were arranged in randomized block design, replicates 3 times with 12 plants/treatment. Parameters observed were length and diameter of stem, number of leaves, leaf area index and the color of leaves, as well as leaf nutrient content (uptake). Critical, sufficient, optimum and redundant values were compared by using correlation and regression analyses. The results showed that the optimum nutrients for the growth of vanilla was 1.8 concentration to standard. The requirements of N and P nutrients for the growth of vanilla were ranged of 90.7 - 453.9 mg NO_3/l and 16.8 - 83.7 mg PO_4/l, respectively. At the range of application, the higher nutrient applied, the better growth response were observed. Though, the curve of K nutrient requirement remained linier. Uptake of N and P nutrients in vanilla leaves at the sufficient growth condition were ranged of 1.23 - 1.90% and 0.08 - 0.12%, respectively. Moreover, at the critical growth condition the uptake of N and P was ≤ 1.23% and ≤ 0.08%, respectively.

040 SITORUS, B.

[Effect of saw ash application on the supply of N, P, K nutrients, pH changes and growth of soybean in Ultisols soil]. ***Suplai hara N, P, K dan perubahan pH serta pertumbuhan tanaman kedelai dengan pemberian abu serbuk gergaji pada tanah Ultisol/*** Sitorus, B.; Lahuddin (Universitas Sumatera Utara, Medan (Indonesia). Fakultas Pertanian). [Proceedings of the national seminar on innovation and specific location technology transfer to support agriculture revitalization. Book 1], Medan, 5 Jun 2007/ Sudana, W.; Moudar, D.; Jamil, A.; Yufdi, P.; Napitupulu, B.; Daniel, M.; Simatupang, S.; Nainggolan, P.; Hayani; Haloho, L.; Darmawati; Suryani, S. (eds.) Balai Besar Pengkajian dan Pengembangan Teknologi Pertanian, Bogor (Indonesia). Bogor: BBP2TP, 2007; p. 296-301, 4 ill., 5 tables; 7 ref. 631.152/SEM/p bk1

GLYCINE MAX; SAWDUST; ASHES; MINERAL CONTENT; NUTRIENT AVAILABILITY; SOIL FERTILITY; SOIL PH; ION EXCHANGE CAPACITY; GROWTH; ACRISOLS.

Content mineral in saw ash could be used as source of nutrient for plant growth. Soil analysis after 2 (two) weeks incubation period and after final stage of vegetative period have done refer to total-N, available-P; exchangeable-K, soil pH and plant growth. The research was conducted in the glass house and chemistry laboratory of Agriculture Faculty of North Sumatra University, Medan, arranged in a randomized completely block design with level 0; 5; 10 and 15 g saw ash on 5 kg of oven dry Ultisols. The analysis after two weeks incubation period showed that exchangeable-K was significantly increased but neither with total-N or available-P. After vegetative period, the analysis showed that total-N, available-P and exchangeable-K, soil pH was significantly increased both in incubation and final vegetative period. There was no significantly effect of treatments on plant growth parameter such as shoot biomass. Correlation test for available-P and exchangeable-K were not significantly influence due to increase of soil pH after soil treated by saw ash.

041 SOEHARSONO

Effect of urea substitution with organic fertilizer on the *Brachiaria brizantha* grass growth. ***Pengaruh substitusi pupuk urea dengan pupuk organik terhadap pertumbuhan rumput Brachiaria brizantha***/ Soeharsono (Balai Pengkajian Teknologi Pertanian Yogyakarta (Indonesia)); Sugiyarti. [Proceedings of the seminar on the science and technology 2006], Yogyakarta, 2-3 Aug 2006/ Mudjisihono, R.; Udin, L.Z.; Moeljopawiro, S.; Soegandhi, T.M.S.; Kusnowo, A.; Karossi, A.T.A.; Masyudi, M.F.; Sudihardjo, A.M.; Musofie, A.; Wardhani, N.K.; Sembiring, L.; Hartanto (eds.) Lembaga Ilmu Pengetahuan

Indonesia, Jakarta (Indonesia). Yogyakarta: BPTP Yogyakarta, 2006; p. 355-361, 3 ill., 5 tables; 15 ref. 631.145/.152/SEM/p

BRACHIARIA BRIZANTHA; UREA; ORGANIC FERTILIZERS; FERTILIZER APPLICATION; GROWTH; PRODUCTIVITY.

The aim of the research was to investigate the influence of urea substitution with organic fertilizer on *Brachiaria brizantha* grass productivity. The research used randomized completely block design (RCBD) with five treatments of urea substitution for organic fertilizer: P-I (100% : 0%); P-II (75% : 25%); P-III (50% : 50%); P-IV (25% : 75%) and P-V (0% : 100%). The variables measured were plant height, bud number, leaf number per stool and dry-matter production from two crop harvest periods. The data were analyzed by analysis of variance if there were significant differences, it was followed by duncan multiple range test. The result showed that substitution of urea with the organic fertilizer influenced growth (plant height of 20 day age) with the best treatment P-III (21.78 cm), and the best productivity of fresh grass were at treatment P-IV (25.86 ton/ha).

042 SRIHARTI

[Trial of composting from pineapple waste]. ***Uji coba pembuatan kompos dari limbah nenas***/ Sriharti; Salim, T. (Balai Besar Pengembangan Teknologi Tepat Guna-LIPI, Subang (Indonesia)). [Proceedings of the seminar on the science and technology 2006], Yogyakarta, 2-3 Aug 2006/ Mudjisihono, R.; Udin, L.Z.; Moeljopawiro, S.; Soegandhi, T.M.S.; Kusnowo, A.; Karossi, A.T.A.; Masyudi, M.F.; Sudihardjo, A.M.; Musofie, A.; Wardhani, N.K.; Sembiring, L.; Hartanto (eds.) Lembaga Ilmu Pengetahuan Indonesia, Jakarta (Indonesia). Yogyakarta: BPTP Yogyakarta, 2006; p. 363-367, 2 tables; 3 ref. 631.145/.152/SEM/p

PINEAPPLES; INTERMEDIATE MOISTURE FOODS; WASTE UTILIZATION; COMPOSTING; CHEMICAL COMPOSITION; COMPOSTS; QUALITY.

Experiment on making compost from pineapple waste has been done by using the pineapple waste from "dodol nanas" processing activity. The composting process was done in composter (drum type) with capacity of 20 kg and a heap of pineapple waste covered by plastic sheets. To improve the process Agrisimba and Bioactivator were used as starter. The chemical characteristic of pineapple wastes were analysed on its moisture content, pH value, and C/N ratio. The compost products were analysed on its moisture content, pH value, C/N ratio, P_2O_5, K_2O, CaO MgO, S, Na, Cl, Fe, Mn, Zn and Al content. The result of analysis showed that the compost produced (NCb, Nb, NCa) gave pH value, moisture content, total nitrogen, organic-C, P_2O_5, K_2O, MgO, S, Fe, Mn, Zn and Al content meet the standard for SNI. Whereas C/N ratio of compost produced does not meet the standard for SNI, international and special market.

043 WIJANARKO, A.

Phosphate calibration test for soybean plant on Ultisols Seputih Banyak, Central Lampung (Indonesia). ***Uji kalibrasi P pada tanaman kedelai di tanah Ultisol Seputih Banyak Lampung Tengah***/ Wijanarko, A.; Sudaryono (Balai Penelitian Tanaman Kacang-kacangan dan Umbi-umbian, Malang (Indonesia)). [Proceedings of the seminar on production increase of legume and root crops supporting food autonomy], Malang, 8 Sep 2006/ Harnowo, D.; Rahmiana, A.A.; Suharsono; Adie, M.M.; Rozi, F.; Subandi; Makarim, A.K. (eds.). Bogor: Puslitbangtan, 2007; p. 233-242, 1 ill., 5 tables; 13 ref. 633.1/.4-115/SEM/p

GLYCINE MAX; NUTRIENT AVAILABILITY; SOIL FERTILITY; PHOSPHATE FERTILIZERS; FERTILIZER APPLICATION; PLANT RESPONSES; YIELDS; ACRISOLS; SUMATRA.

Phosphate (P) fertilizer requirements depend on crops and soil factor. Fertilizer efficiency can be done if the information on nutrient status and dynamic of nutrient content at soil and nutrient requirement of crops is available. With this approach, nutrient requirement for crop in various soil conditions (low, medium and high nutrient status) could be accounted. The objective of this research was to determine the nutrient availability and estimate P fertilizer recommendation for soybean on Ultisols, Central Lampung, Lampung Province. This research was conducted at glass house of ILETRI. A completely randomized design was used with 3 replicates. This experiment was consisted of 2 steps. The first step was to create a series of soil P by adding P: 0.00x, 0.25x, 0.50x, 0.75x and 1.00x, where x was amount of P required to obtain the level of 0.2 ppm P soil solution. The second step was five dosages of P fertilizer in each status of soil P by adding P fertilizer: 0, 18, 36, 54 and 72 kg P_2O_5/ha. The result showed that low, medium and high level of soil P availability extracted by Bray I was <5, 5-23 and >23 ppm P, respectively. While those levels extracted by Bray II was <11, 11-38 and >38 ppm P. The recommendation of P fertilizer for soybean on Ultisols of Central Lampung which has low, medium and high soil P status was 104, 86 and 40 kg SP36/ha, respectively.

044 WINARTI, E.

Treatment on broiler manure and their institutional which handling. *Pengolahan limbah kandang ayam potong dan kelembagaan yang menangani*/ Winarti, E.; Musofie, A.; Wardhani, N.K. (Balai Pengkajian Teknologi Pertanian Yogyakarta (Indonesia)). [Proceedings of the seminar on the science and technology 2006], Yogyakarta, 2-3 Aug 2006/ Mudjisihono, R.; Udin, L.Z.; Moeljopawiro, S.; Soegandhi, T.M.S.; Kusnowo, A.; Karossi, A.T.A.; Masyudi, M.F.; Sudihardjo, A.M.; Musofie, A.; Wardhani, N.K.; Sembiring, L.; Hartanto (eds.) Lembaga Ilmu Pengetahuan Indonesia, Jakarta (Indonesia). Yogyakarta: BPTP Yogyakarta, 2006; p. 415-419, 1 ill., 4 tables; 5 ref. 631.145/.152/SEM/p

BROILER CHICKENS; FARMYARD MANURE; WASTE MANAGEMENT; PROBIOTICS; UREA; ORGANIC FERTILIZERS; QUALITY; FARMER ASSOCIATIONS.

The assessment was done to observe probiotic effect of broiler manure treatment to the organic fertilizer quality and its institutional which handle the wastes processing. The manure treatment used completely randomized design with 4 treatments and 3 replications by adding probiotic and urea as treatment. The treatments were (A) 1 ton manure add by 4 kg urea and 4 kg probiotic; (B) 1 ton manure add by 3 kg urea and 3 kg probiotic; (C) 1 ton manure add by 2 kg urea and 2 kg probiotic; and (D) 1 ton manure without addition of urea and probiotic (control). The result showed that nitrogen content of treatment A was higher than that of control (P>0.005). The carbon content on treatment D (control) was higher than that of treatment A, B, and C. The institutional was established by discussion between crop and livestock farmer. The discussion result revealed an agreement that the livestock farmer would be responsible for handling on broiler manure treatment. The assessment concludes that broiler manure treatment using probiotic is able to produce a good quality of organic fertilizer. The livestock farmer would be responsible for the handling of broiler manure treatment.

045 YUSUF, A.

Assessment of fertilization for growth and production of soybean. ***Kajian pemupukan terhadap pertumbuhan dan produksi kedelai***/ Yusuf, A. (Balai Pengkajian Teknologi Pertanian Sumatera Utara, Medan (Indonesia)). [Proceedings of the national seminar on innovation and specific location technology transfer to support agriculture revitalization. Book 1], Medan, 5 Jun 2007/ Sudana, W.; Moudar, D.; Jamil, A.; Yufdi, P.; Napitupulu, B.; Daniel, M.; Simatupang, S.; Nainggolan, P.; Hayani; Haloho, L.; Darmawati; Suryani, S. (eds.) Balai Besar Pengkajian dan Pengembangan Teknologi Pertanian, Bogor (Indonesia). Bogor : BBP2TP, 2007; p. 171-178, 7 tables; 10 ref. 631.152/SEM/p bk1

GLYCINE MAX; COMPOSTS; NPK FERTILIZERS; FERTILIZER APPLICATION; GROWTH; APPLICATION RATES; AGRONOMIC CHARACTERS; YIELD COMPONENTS; YIELD INCREASES.

To study the influence of fertilization on the performance of agronomic characters, yield components and yield of soybean, a fertilization experiment of soybean was conducted in rice field at INPPTP Pasar Miring, Deli Serdang Regency in wet season of 2005/2006 (November 2005 until February 2006). The experiment was designed in a randomized completely block design (RCD) whith four replications. The treatments consisted of 6 (six) fertilizations, namely (1) without fertilizer, (2) organic matter in the form of 5 t/ha of compost, (3) 50 kg of urea/ha, (4) 50 kg/ha of urea + 50 kg/ha of SP-36 + 50 kg/ha of KCl, (5) 50 kg/ha of urea + 100 kg/ha of SP-36 + 100 kg/ha of KCl, and (6) 50 kg/ha of urea + 150 kg/ha of SP-36 + 150 kg/ha of KCl. The results showed that the treatment of 5 t/ha compost + urea + SP-36+ KCl had increased significantly the seed yield of soybean. The highest seed yield of soybean (2.97 t/ha) was obtained in the treatment of urea + SP-36 and + KCl at dosage of 50, 150 and 150 kg. The application of 50 kg/ha urea produced seed yield of 1.56 t/ha that seem to be lower when 5 t/ha of compost was applied (1.87 /ha). While in no fertilizer applied, the seed yield of soybean was 1.22 t/ha.

F08 CROPPING PATTERNS AND SYSTEMS

046 AKMAL

[Soybean production increase through integrated crop management approach in Lestaridadi dryland, Serdang Bedagai, North Sumatra (Indonesia)]. ***Peningkatan produktivitas kedelai melalui pendekatan pengelolaan tanaman terpadu pada lahan kering Lestaridadi, Kabupaten Serdang Bedagai, Sumatera Utara/*** Akmal (Balai Pengkajian Teknologi Pertanian Sumatera Utara, Medan (Indonesia)). [Proceedings of the national seminar on innovation and specific location technology transfer to support agriculture revitalization. Book 1], Medan, 5 Jun 2007/ Sudana, W.; Moudar, D.; Jamil, A.; Yufdi, P.; Napitupulu, B.; Daniel, M.; Simatupang, S.; Nainggolan, P.; Hayani; Haloho, L.; Darmawati; Suryani, S. (eds.) Balai Besar Pengkajian dan Pengembangan Teknologi Pertanian, Bogor (Indonesia). Bogor: BBP2TP, 2007; p. 49-53, 4 tables; 8 ref. 631.152/SEM/p bk1

GLYCINE MAX; CROP MANAGEMENT; INTEGRATED PLANT PRODUCTION; FARMING SYSTEMS; TECHNOLOGY TRANSFER; PRODUCTIVITY; YIELD COMPONENTS; YIELD INCREASES; DRY FARMING; SUMATRA.

The assessment of increasing the productivity of soybean on integrated crop management (ICM) was conducted on May - December 2006 in Lestaridadi Village, Subdistrict of Perbaungan, Serdang Bedagai on farm research of 3 ha with 5 farmers in Srimurni Farmer Group. The objective of this assessment was to improve the productivity of soybean in integrated crop management farming system. Result showed that the grain productivity of

soybean were 1,750 - 1,950 kg/ha and in average 1,840 kg/ha. Based on the economic analysis, the profit margin was Rp 2,428,500/ha, while Rp 1,155,000/ha was obtained by non cooperator farmer.

047 HANDAYANI, F.

Shallots and red chilli performance intercropping system in coastal area. ***Keragaan beberapa varietas tumpangsari bawang merah dan cabai merah di lahan pasir pantai/*** Handayani, F.; Nurbani (Balai Pengkajian Teknologi Pertanian Kalimantan Timur, Samarinda (Indonesia)). [Proceedings of the seminar on the science and technology 2006], Yogyakarta, 2-3 Aug 2006/ Mudjisihono, R.; Udin, L.Z.; Moeljopawiro, S.; Soegandhi, T.M.S.; Kusnowo, A.; Karossi, A.T.A.; Masyudi, M.F.; Sudihardjo, A.M.; Musofie, A.; Wardhani, N.K.; Sembiring, L.; Hartanto (eds.) Lembaga Ilmu Pengetahuan Indonesia, Jakarta (Indonesia). Yogyakarta: BPTP Yogyakarta, 2006; p. 513-519, 4 tables; 11 ref. 631.145/.152/SEM/p

ALLIUM ASCALONICUM; CAPSICUM ANNUUM; VARIETIES; INTERCROPPING; GROWTH; AGRONOMIC CHARACTERS; CROP PERFORMANCE; YIELDS; COASTAL SOILS.

The aim of this research was to evaluate the effect of intercropping among shallot with red chilli to the growth and yield of shallot, and to determine the most suitable shallot variety for intercropping with red chilli on coastal area. Five shallot varieties, i.e. Local Kulon Progo, Kuning, Bima, Biru and Tiron were intercropped with red chilli variety of keriting in randomized completely block design with three blocks as replications. The result showed that the intercropping and monoculture system did not affect on growth and yield of shallot. The most stable shallot varieties are Kuning and Bima. From the ATER value, the most suitable shallot varieties for intercropping with red chilli on coastal area were Kuning and Tiron.

048 SUDARTO

Use of cashew land with multiple cropping of maize and rice in dryland of Dompu, NTB (Indonesia). ***Pemanfaatan lahan pertanian jambu mete dengan tumpangsari jagung dan padi di lahan kering Dompu NTB/*** Sudarto; Suriadi, A. (Balai Pengkajian Teknologi Pertanian Nusa Tenggara Barat, Mataram (Indonesia)). [Proceedings of the seminar on the science and technology 2006], Yogyakarta, 2-3 Aug 2006/ Mudjisihono, R.; Udin, L.Z.; Moeljopawiro, S.; Soegandhi, T.M.S.; Kusnowo, A.; Karossi, A.T.A.; Masyudi, M.F.; Sudihardjo, A.M.; Musofie, A.; Wardhani, N.K.; Sembiring, L.; Hartanto (eds.) Lembaga Ilmu Pengetahuan Indonesia, Jakarta (Indonesia). Yogyakarta: BPTP Yogyakarta, 2006; p. 453-457, 3 tables; 8 ref. 631.145/.152/SEM/p

ANACARDIUM OCCIDENTALE; ZEA MAYS; ORYZA SATIVA; MULTIPLE CROPPING; LAND USE; MONOCULTURE; FARMERS; PARTICIPATION; TECHNOLOGY TRANSFER; FARM INCOME; DRY FARMING; NUSA TENGGARA.

Assessment on multiple cropping of maize and rice as intermediate plant has done in Songgajah Village, Kempo Subdistrict of Dompu. On area of 5 ha, which are involving 10 farmer households through on farm research. Farmers actively involved during the research and mentored by researchers and field extension officers. Data were collected and analyzed descriptively. Analysis of B/C ratio were used for determine economic eligibility of the farming system. The results showed that vegetative growth of rice was better in non-cooperator farmers than that in the cooperators. Production in multiple cropping system were about 3,891 kg/ha and 938 kg/ha, respectively, while yield of corn and rice in monoculture

system were about 4,575 kg/ha and 2,600 kg/ha, respectively. Net income for cooperator farmer was about Rp 1,517,925/ha; B/C ratio of 0.56, while net income of non-cooperator farmer for corn and rice monoculture were about Rp. 1,256,250/ha; B/C ratio of 0.47 and Rp 344,700 /ha; B/C ratio of 0.15, respectively. It was suggested that farmers might utilized their land through multiple cropping system to increase their income.

049 YUSRON, M.

Effect of Andrographis - corn cropping pattern and dosage of organic and natural fertilizers on yield and quality of Andrographis. ***Pengaruh pola tanam sambiloto-jagung serta dosis pupuk organik dan alam terhadap produksi dan mutu sambiloto (Andrographis paniculata Nees)***/ Yusron, M.; Gusmaini; Januwati, M. (Balai Penelitian Tanaman Obat dan Aromatik, Bogor (Indonesia)). *Jurnal Penelitian Tanaman Industri* ISSN 0853-8212 (2007) v.13(4) p. 147-154, 2 ill., 6 tables; 18 ref.

DRUG PLANTS; CROP MANAGEMENT; ZEA MAYS; ORGANIC FERTILIZERS; GROWTH; APPLICATION RATES; YIELDS; QUALITY.

An increasing demand of organic herbal medicinal plants encourages the effort to change the use of inorganic fertilizers with organic and natural fertilizers. Field experiment on andrographis was conducted at Cicurug Research Station from June to December 2006. The aim of this experiment was to obtain optimum dose of organic and natural fertilizers of andrographis - corn cropping pattern. The experiment was conducted using factorial randomized block design and three replications, where the plot size was 3 m x 4 m and plant spacing was 30 cm x 40 cm. The first factor was cropping systems i.e. (1) P0 = monoculture and (2) P1 = intercropping of andrographis and corn (plant spacing of corn was 150 cm x 20 cm), while the second factor was dose of organic and natural fertilizers per hectare, i.e.: (a) D1 = 10 ton compost + 300 kg rock phosphate + 60 kg biofertilizer, (b) D2 = 10 ton compost + 300 kg rock phosphate + 60 kg biofertilizer + 300 kg zeolite, (c) D3 = 10 ton compost + 500 kg rock phosphate + 60 kg biofertilizer, (d) D4 = 10 ton compost + 500 kg rock phosphate + 60 kg biofertilizer + 300 kg zeolite, (e) D5 = 20 ton compost + 300 kg rock phosphate + 60 kg biofertilizer, (f) D6 = 20 ton compost + 300 kg rock phosphate + 60 kg biofertilizer + 300 kg zeolite. (g) D7 = 20 ton compost + 500 kg rock phosphate + 60 kg biofertilizer, (h) D8 = 20 ton compost + 500 kg rock phosphate + 60 kg biofertilizer + 300 kg zeolite, and (i) D9 = 10 ton manure + 200 kg urea + 200 kg SP36 + 100 kg. Treatment D9 is a recommended fertilizers dose, which was used as a comparative dose. The result showed that cropping pattern and natural fertilizers dosage did not affect growth parameters, except number of branch. Cropping pattern and natural fertilizers dosage significantly affected number of branch. The highest number of branch of 32.92 was achieved on fertilizers dosage of 10 ton compost + 500 kg rock phosphate + 60 kg biofertilizer. The treatments significantly affected yield of symplicia of andrographis. The yield of symplicia of monoculture system at the first harvest was 507.07 kg/ha and the second was 797.56 kg/ha, which was 18% and 15% higher than that of intercropped system. Yield of corn ranged between 3,278 kg/ha and 4,134 kg/ha. At the first harvest, the highest symplicia yield (614.87 kg/ha) was achieved at the treatment of inorganic recommended dosage, while at the second harvest the highest yield of andrographis symplicia (896.63 kg/ha) was obtained from the treatment of 20 ton compost + 300 kg rock phosphate + 60 kg biofertilizer and 300 kg zeolite. This value, however, was not significantly different to the yield of the treatment of 10 ton compost + 300 kg rock phosphate + 60 kg biofertilizer + 300 kg zeolite, which was 835.10 kg/ha. All treatments resulted good quality of symplicia which meet MMI standard quality.

F30 PLANT GENETICS AND BREEDING

050 BOBIHOE, J.
High potential of soybean line on swamp land area of Jambi Province (Indonesia). ***Galur harapan kedelai berpotensi hasil tinggi di lahan pasang surut Provinsi Jambi***/ Bobihoe, J. (Balai Pengkajian Teknologi Pertanian Jambi (Indonesia)); Prajitno. [Proceedings of the seminar on the science and technology 2006], Yogyakarta, 2-3 Aug 2006/ Mudjisihono, R.; Udin, L.Z.; Moeljopawiro, S.; Soegandhi, T.M.S.; Kusnowo, A.; Karossi, A.T.A.; Masyudi, M.F.; Sudihardjo, A.M.; Musofie, A.; Wardhani, N.K.; Sembiring, L.; Hartanto (eds.) Lembaga Ilmu Pengetahuan Indonesia, Jakarta (Indonesia). Yogyakarta: BPTP Yogyakarta, 2006; p. 533-535, 1 table; 7 ref. 631.145/.152/SEM/p

GLYCINE MAX; VARIETY TRIALS; GENOTYPE ENVIRONMENT INTERACTION; HIGH YIELDING VARIETIES; INTERTIDAL ENVIRONMENT; SUMATRA.

To support the improvement of soybean variety program, the research was conducted on swamp land area to find soybean line having high production and adaptive capability in swamp land area in Jambi Province. The activities were conducted in Bandar Jaya Village, Rantau Rasau Subdistrict, East Tanjung Jabung. The experiment method used randomized completely block design with 4 repetitions, 5 lines of soybean as a treatment and 4 lines as control. The results showed that soybean line of B4F-4HW-169-160 and MSC9234-D-3 had high yield potency at swamp land area. The highest yield was obtained by MSC9234-D-3 (1.83 ton/ha).

051 GINTING, E.
Characterization of protein content and physical properties of fifteen soybean germplasm seeds. ***Karakterisasi kadar protein dan sifat fisik biji 15 plasma nutfah kedelai/*** Ginting, E.; Ratnaningsih; Kuswantoro, H. (Balai Penelitian Tanaman Kacang-kacangan dan Umbi-umbian, Malang (Indonesia)). [Proceedings of the seminar on production increase of legume and root crops supporting food autonomy], Malang, 8 Sep 2006/ Harnowo, D.; Rahmiana, A.A.; Suharsono; Adie, M.M.; Rozi, F.; Subandi; Makarim, A.K. (eds.) Pusat Penelitian dan Pengembangan Tanaman Pangan, Bogor (Indonesia). Bogor : Puslitbangtan, 2007; p. 486-494, 1 ill., 2 tables; 16 ref. 633.1/.4-115/SEM/p

GLYCINE MAX; GERMPLASM COLLECTIONS; GENOTYPES; SEED CHARACTERISTICS; PROTEIN CONTENT; CHEMICOPHYSICAL PROPERTIES.

The physical and chemical characteristics, particularly seed size and protein content would dictate the utilization of soybean and the quality of processed products. Therefore, a study on the seed physical and chemical characteristics of 15 soybean germplasm was performed at the Physical and Thermal Laboratory and the Food Chemistry Laboratory of ILETRI, Malang from November 2005 to January 2006. The trials used randomized completely design with 3 replications. The results showed that 12 soybean genotypes belonged to yellow seeded, two genotypes had yellow greenish seed and one genotype was black seeded. Based on the 100 grain weight, only one genotype was categorized as big seeded while seven genotypes, respectively were medium and small seeded. MLG 3346 genotype gave the highest value of 100 grain weight (13.89 g), while the lowest one was seen on Nanti dan MLG 2822 genotypes. Eight soybean genotypes had relatively high protein content (>40% dw), suggesting that they were promising as cross materials for soybean breeding with high protein content. The highest protein content (43.77% dw) was showed by MLG 3304, while MLG 3276 and MLG 3236 genotypes gave the lowest value (36.69% dw and 36.93% dw, respectively). MLG 3346 and MLG 3304 genotypes which had big seed sizes (10.72-13.89

g), yellow seed colour and high protein content (42.43-43.77% dw) seem to be suitable for tempe and tofu preparation purposes.

052 HARTATI, D.
Estimation of genetic diversity within and among pulai (*Alstonia scholaris* (L.) R.Br) provenance revealed by RAPD marker. ***Pendugaan keragaman genetik di dalam dan antar provenan pulai (Alstonia scholaris (L.) R.Br.) menggunakan penanda RAPD***/ Hartati, D. (Universitas Gadjah Mada, Yogyakarta (Indonesia). Fakultas Pertanian); Rimbawanto, A.; Taryono; Sulistyaningsih, E.; Widyatmoko, A.Y.P.B.C. *Jurnal Pemuliaan Tanaman Hutan* ISSN 1693-7147 (2007) v.1(2) p. 89-98, 1 ill., 4 tables; 6 ref.

ALSTONIA; BIODIVERSITY; GENETIC RESOURCES; RAPD.

Pulai (*Alstonia scholaris* (L.) R. Br.) is forest tree species having high economic value and has been under intensive utilization. Conservation effort and breeding strategies should be carried out to prevent its extinction. The study of genetic diversity using RAPD marker can assess polymorphism through banding patterns from amplified DNA. The aims of this research were to estimate genetic diversity within and among pulai populations, investigate distribution of genetic diversity, and genetic relationship between pulai provenances. Leaf samples were taken from eighteen pulai provenances in Indonesia, namely Lubuk Linggau, Pendopo, Benakat, Banten, Bantul, Gunungkidul, Bali, Purworejo, Perawang, Mataram, Sumbawa, Kupang, Timor Tengah Selatan, Agam, Solok, Gowa, Makassar, and Kendari. Genetic diversity was analyzed using 23 primers and produced 114 polymorphic loci. Results showed that the distribution of genetic diversity within provenance was higher than that of among provenance. Cluster analysis revealed that the eighteen provenances was split into two major groups. The first group consisted of provenance of Lubuk Linggau, Banten and Pendopo. The second group comprised of provenance of Benakat, Perawang, Agam, Solok, Bali, Kendari, Bantul, Purworejo, Gunungkidul, Mataram, Sumbawa, Gowa, Makassar, Kupang, and Timor Tengah Selatan. In general, the genetic relationships among eighteen provenances did not show the relation between genetic diversity and geographic distribution of pulai provenance.

053 KRISTAMTINI
Vegetative appearance of some local rice germplasm in Yogyakarta Special Region (Indonesia). ***Keragaan vegetatif beberapa plasma nutfah padi lokal Daerah Istimewa Yogyakarta (DIY)/*** Kristamtini; Prajitno, A.K.S.; Sudihardjo, A.M. (Balai Pengkajian Teknologi Pertanian Yogyakarta (Indonesia)). [Proceedings of the seminar on the science and technology 2006], Yogyakarta, 2-3 Aug 2006/ Mudjisihono, R.; Udin, L.Z.; Moeljopawiro, S.; Soegandhi, T.M.S.; Kusnowo, A.; Karossi, A.T.A.; Masyudi, M.F.; Sudihardjo, A.M.; Musofie, A.; Wardhani, N.K.; Sembiring, L.; Hartanto (eds.) Lembaga Ilmu Pengetahuan Indonesia, Jakarta (Indonesia). Yogyakarta: BPTP Yogyakarta, 2006; p. 571-574, 1 table; 4 ref. 631.145/.152/SEM/p

ORYZA SATIVA; INDIGENOUS ORGANISMS; GERMPLASM COLLECTION; GENOTYPE ENVIRONMENT INTERACTION; GENETIC VARIATION; GENETIC CORRELATIONS; GENETIC RESOURCES; RESOURCE CONSERVATION; JAVA.

Yogyakarta Special Region has some local rice germplasm to be developed and conserved. The aim of the experiment was to evaluate the vegetative appearance of some local rice germplasm of Yogyakarta. The experiment was conducted at Duwetsari, Padasan, Pakembinangun Pakem, Sleman, Yogyakarta in April 2006 using randomized block design with three replications and 12 local rice germplasm i.e. Mandel, Segreng, Cempo Merah, Saodah Merah, Ander Merah, Pandan Wangi, Mentik Putih, Rojolele, Gepyok, Kenanga, Menur, Lestari and Cempo Putih. The result of vegetative observation showed that there was

a significant difference of 12 local rice germplasms planted on parameters of seedling, plant height, and number of tiller. It means that each of their height has genetic potential of vegetative characters, which indicated by a correlation between seedling height with plant height, although between seedling height with number of tiller and plant height with number of tiller were not correlated. Five local rice germplasms has been selected based on vegetative characters i.e. Cempo Merah, Pandan Wangi, Mentik Putih, Kenanga and Menur.

054 MASKROMO, I.
Genetic diversity of Areca nut (*Areca catechu* L.) germplasm in Gorontalo (Indonesia). *Keragaman genetik plasma nutfah pinang (Areca catechu* L.*) di Provinsi Gorontalo*/ Maskromo, I.; Miftahorrachman (Balai Penelitian Tanaman Kelapa dan Palma Lain, Manado (Indonesia)). *Jurnal Penelitian Tanaman Industri* ISSN 0853-8212 (2007) v.13(4) p. 119-154, 4 ill., 2 tables; 11 ref.

ARECA CATECHU; GENETIC VARIATION; GERMPLASM; SULAWESI.

Areca nut is one of the palm crops found throughout Indonesia, particularly Sumatra. Outside Sumatra Island, the crop exists in Gorontalo Province, Sulawesi. The exploration is conducted to observe potency of areca nut germplasm as basic information for future development in Gorontalo. The purpose of exploration was to identify genetic diversity and to collect the areca nut in that area. Survey was done at three regencies chosen purposively. There were six areca nut accessions identified, namely Duhia Da'a from Marisa District, Pohuwato Regency, Tingkohubu I and Tingkohubu II from Suwawa District, Bone Bolango Regency, and Huntu I, Huntu II and Huntu III from Batuda'a District, Gorontalo Regency. They were various in size and shape, and so far for genetic distance. Accesions which have high potential production are Duhia Da'a, Tingkohubu I and of Tingkohubu II, while for the materials of complementary in custom ceremony and culture is Tingkohubu II.

055 PURNOMO
Phonetic relationships of Phalaenopsis hybrid to the species of *Phalaenopsis amboinensis* J.J. Smith, *P. violacea* Witte, and *P. amabilis* (L.) BI. in Yogyakarta (Indonesia) base on their morphological characters. *Hubungan kekerabatan fenotik Phalaenopsis hibrida terhadap spesies Phalaenopsis amboinensis J.J. Smith, P. violacea Witte, dan P. amabilis (L.) BI. di Yogyakarta berdasarkan sifat morfologinya*/ Purnomo; Susandarini, R.; Kanina, G. (Universitas Gadjah Mada, Yogyakarta (Indonesia). Fakultas Biologi). [Proceedings of the seminar on the science and technology 2006], Yogyakarta, 2-3 Aug 2006/ Mudjisihono, R.; Udin, L.Z.; Moeljopawiro, S.; Soegandhi, T.M.S.; Kusnowo, A.; Karossi, A.T.A.; Masyudi, M.F.; Sudihardjo, A.M.; Musofie, A.; Wardhani, N.K.; Sembiring, L.; Hartanto (eds.) Lembaga Ilmu Pengetahuan Indonesia, Jakarta (Indonesia). Yogyakarta: BPTP Yogyakarta, 2006 p.501-512, 16 ill., 2 tables; 16 ref. 631.145/.152/SEM/p

PHALAENOPSIS; HYBRIDS; GENETIC CORRELATION; SPECIES; GENETIC VARIATION; IDENTIFICATION; PLANT ANATOMY; AGRONOMIC CHARACTERS; JAVA.

The objective of this study is to determine phonetic relationship of twelve Phalaenopsis hybrids and three species commonly used as a parental on orchid's hybridization, i.e. *Phalaenopsis amboinensis* J.J. Smith, *Ph. violacea* Witte, and *Ph. amabilis* (L.) BI. The samples of *Phalaenopsis amboinensis*, *Ph violacea*, *Ph. amabilis* and 12 Phalaenopsis hybrids were collected from Giri Orchid Nursery, Sleman and Merapi Orchid Nursery, Muntilan. The hybrids and species of Phalaenopsis were treated as operational taxonomix

units (OTU's). The OTU's was compared based on sixty morphological characters from root, stem, leaves, and flowers. Morphological data was analyzed descriptively to create parallel identification key. Binary and multistate scoring and coding was done followed by standardization of the data. Similarity level was determined using Jaccard association coefficient. Clustering of the OTU's was conducted by average linkage method (Sokal Sneath, 1963) to create a dendrogram. The results showed that 12 Phalaenopsis hybrids and 3 species can be identified morphologically using identification key. The dendrogram indicated that Phalaenopsis "Sogo Davis", Phalaenopsis hybrid (green sepal petal), Phalaenopsis hybrid (red sepal petal), *Ph. violacea*, Phalaenopsis hybrid (yellow sepal petal), and *Ph. amboinensis* have close relationship based on star-shape perianth (stauroglottis), as a diagnostic character of Zebrinae and Amboinense section. The hybrids of Phalaenopsis sogo John x Ching Her Budha, Phalaenosis Doudii Goddes x Sogo Black (Ho's Franch Fantasia), Phalaenosis Queen Beer mantefon have close relationship and have an intermediate characters between Phalaenopsis and Zebrinae-Amboinense section, with character of Phalaenopsis section being more dominant. Whereas Phalaenopsis hybrid (white sepal petal), *Ph. amabilis*, Ph. Min Shing Cinderella x Taisuko Fire Bird, Ph. hybrid 163, Ph. hybrid 568, Ph. tretes Beauty x Musashiro Tinny have close relationship, indicated by a rounded perianth (amabilis) as a dominant character of Phalaenopsis section.

056 PURWANTORO

Performance of some soybean strains in Ultisols. ***Keragaan beberapa galur kedelai di tanah Ultisols/*** Purwantoro; Kuswantoro, H.; Arsyad, D.M. (Balai Penelitian Tanaman Kacang-kacangan dan Umbi-umbian, Malang (Indonesia)). [Proceedings of the seminar on production increase of legume and root crops supporting food autonomy], Malang, 8 Sep 2006/ Harnowo, D.; Rahmiana, A.A.; Suharsono; Adie, M.M.; Rozi, F.; Subandi; Makarim, A.K. (eds.). Bogor: Puslitbangtan, 2007; p. 23-32, 5 tables; 19 ref. 633.1/.4-115/SEM/p

GLYCINE MAX; PROGENY TESTING; GENETIC RESISTANCE; GENOTYPE ENVIRONMENT INTERACTION; HIGH YIELDING VARIETIES; AGRONOMIC CHARACTERS; ADAPTABILITY; ACRISOLS.

Ultisols is potential to be developed as soybean planting area, since the availability is large and the utilization has not been used optimally for agriculture in Indonesia. On the other hand, Ultisols face problem on micronutrient toxicity and macronutrient deficiency caused by low pH. Twenty four lines of F8 (13 lines of medium seed size and 11 lines of big seed size) and six check varieties (Tanggamus, Sibayak, Seulawah, Wilis, Burangrang, and Panderman) were evaluated on acid soil in South Sumatra (SMK Gelumbang Research Station South Sumatra and Astomulyo Punggur Central Lampung) at the first planting season of 2005 and 2006. The experiment was designed in randomized completely block design with three replications. The result of the experiment showed that lines x environmental interaction on same characters of seed yield, plant height, number of branches per plant, and number of pod per plant were significant. Lines of Msr/SJ-5.23.4.1-3-28-3 and W3898-14-3-17 were well adapted on Ultisol at SMK Gelumbang Research Station. Lines of W3578-16/MLG 3072-2, W3898-14-3-17, D3465-42-215, MSr/SJ-5.2334.1.3-28-3 and SJ-5/Msr.99.4.5.5-1-6-1 were well adapted on Ultisol at Astomulyo Punggur Central Lampung. Lines of W3898-14-3-17, D3465-42-2-15, MSr/SJ-5.2334.1.3-28-3 and SJ-5/Msr.99.4.5.5-1-6-1were relatively stable on both two locations with 2 ton/ha seed yield.

057 PURWATI, R.D.

Usage of fusaric acid (FA) in vitro selection of abaca resistant to *Fusarium oxysporum* f.sp. cubense. ***Penggunaan asam fusarat dalam seleksi in vitro untuk resistensi abaka terhadap Fusarium oxysporum f.sp. cubense***/ Purwati, R.D.; Setyo-Budi, U. (Balai Penelitian Tanaman Tembakau dan Serat, Malang (Indonesia)); Sudarsono. *Jurnal Penelitian Tanaman Industri* ISSN 0853-8212 (2007) v.13(2) p. 64-72, 3 ill., 4 tables; 29 ref.

MUSA TEXTILIS; SOMACLONAL VARIATION; SELECTION; IN VITRO; DISEASE RESISTANCE; FUSARIUM OXYSPORUM.

Wilt fusarium disease caused by *Fusarium oxysporum* Schlecht f.sp. *cubense* is one of the major diseases of *Musa* sp. including abaca, and it could decrease 20-65% fiber productivity. One of the method to solve this problem is utilization of resistant abaca clones. In vitro selection using fusaric acid (FA) as selective agents is an effective method to produce resistant abaca clones to Foc infection. Culturing abaca embriogenic calli (EC) and shoots on MT medium containing various FA concentrations was used to determine FA inhibition effects. Sub-lethal concentration was defined as one inhibiting more than 90% proliferation of abaca EC and shoots. In vitro selection to identify FA insensitive SE was conducted using FA sub-lethal concentration. Following plantlet regeneration and acclimatization, the regenerated abaca lines were grown in the glasshouse for testing against Foc using detached leaf dual culture test. The objectives of this study were to (1) evaluate growth inhibition of abaca EC and shoots by FA, (2) determine sub-lethal concentration of FA, (3) identify FA insensitive variants of abaca somatic embryos (SE) through in vitro selection followed by plantlet regeneration, and (4) evaluate resistance of regenerated plantlets against Foc infection. Results of the experiment showed FA inhibited abaca EC and shoots growth while sub-lethal concentration of FA was 50 mg/l. Following in vitro selection, 85 plantlets of Tangongon and 28 of Sangihe-1 were regenerated from FA insensitive SE. The original Tangongon genotype was highly susceptible against Foc infection. Meanwhile, among three Foc tested lines derived from Tangongon, two lines were considered resistant and one was slightly susceptible. However, resistance against Foc of variants derived from Sangihe-1 have not been evaluated in this experiment due to the plantlets were not strong enough to be acclimatized.

058 ROCHMAN, F.
Temanggung tobacco promising lines with high productivity and resistant to lincat disease. ***Galur harapan tembakau temanggung produksi tinggi dan tahan penyakit lincat***/ Rochman, F.; Suwarso; Murdiyati, A.S. (Balai Penelitian Tanaman Tembakau dan Serat, Malang (Indonesia)). *Jurnal Penelitian Tanaman Industri* ISSN 0853-8212 (2007) v. 13(2) p. 57-63, 10 tables; 11 ref. Appendix

NICOTIANA TABACUM; HIGH YIELDING VARIETIES; PRODUCTIVITY; YIELDS; PSEUDOMONAS SOLANACEARUM; MELOIDOGYNE; NICOTINE.

The main problem in Temanggung tobacco cultivation is low productivity caused by increasing land erosion and invasion of endemic disease called 'lincat'. Lincat is a disease caused by a complex invasion of three pathogens, i.e. *Meloidogyne* spp. (root-knot nematode), *Ralstonia solanacearum* (bacteria) and *Phytophthora nicotianae* (fungus). Hybridization between variety Sindoro 1 (moderately resistant to *R. solanacearum* but susceptible to *Meloidogyne* spp. and highly susceptible to *P. nicotianae*) and virginia tobacco (resistant to these three pathogens) has resulted in six lines. These lines were planted in three locations for 3 years and were evaluated for their yield, grade index, crop index, and resistance intensity to these three pathogens, using randomized block design with 3 replications. Two promising lines were resulted from this evaluation i.e. (1) Line A, having productivity of tobacco sliced 0.880 ton/ha, grade index 40.28 crop index 35.47 and nicotine content 5.52%. In comparison to standard variety, the productivity, grade index, and crop index of this line increased of 48.08%, 4.87%, and 53.73%, respectively, and nicotine content decreased of 15.06%. Moreover, this line is moderately resistant to *R. solanacearum* and tolerant to *Meloidogyne* spp. (2) Line E has productivity of tobacco sliced 0.869 ton/ha, grade index 36.01 crop index 31.87 and nicotine content 6.00%. The productivity and crop

index of this line had also increased of 46.23% and 38.12%, respectively, and grade index and nicotine content had decreased of 6.25% and 2.56%, respectively compared to standard variety. This line was moderately resistant to *R. solanacearum* and tolerant to *Meloidogyne* spp.

059 SISWANTO, T.J.

Germplasm of kepel (*Stelechocarpus burahol*) as a potencial and scarce plant. *Manfaat plasma nutfah kepel (Stelechocarpus burahol) sebagai tanaman langka dan potensial*/ Siswanto, T.J.; Sudihardjo, A.M.; Kristamtini (Balai Pengkajian Teknologi Pertanian Yogyakarta (Indonesia)). [Proceedings of the seminar on the science and technology 2006], Yogyakarta, 2-4 Aug 2009/ Mudjisihono, R.; Udin, L.Z.; Moeljopawiro, S.; Soegandhi, T.M.S.; Kusnowo, A.; Karossi, A.T.A.; Masyudi, M.F.; Sudihardjo, A.M.; Musofie, A.; Wardhani, N.K.; Sembiring, L.; Hartanto (eds.) Lembaga Ilmu Pengetahuan Indonesia, Jakarta (Indonesia). Yogyakarta: BPTP Yogyakarta, 2006; p. 295-298, 2 ill., 8 ref. 631.145/.152/SEM/p

ANNONACEAE; DRUG PLANTS; ENDANGERED SPECIES; GERMPLASM CONSERVATION; MEDICINAL PROPERTIES; ECONOMIC VALUE.

Many germplasm of plants found in Yogyakarta Special Region and one of them is Kepel (*Stelechocarpus burahol*). The plant was potential to be developed and it cannot be found in other places. In Yogyakarta, Kepel is classified as phenomenal plant and has some benefits, namely for deodorant material, drugs, fruit preservatives. Recently, the plant is mainly found in specific places, such as in surroundings of Yogyakarta Palace and Jatimulyo Village, Girimulyo District, Kulonprogo Regency. The distribution of the plant is covered on volcanic sediment area that showed as breksi and conglomerate stones. The research was done in Yogyakarta Municipality and Kulonprogo Regency area, with the purpose was to know the potency and some benefits of kepel (*Stelechocarpus burahol*). The result showed that the fruit shape was very interesting, the color was brown, fruit peel was thin and very sweet taste. The benefits were as drug materials, no alcoholic content, and the leaves can be used as neuro acid diseases. Therefore, the conservation of the plant was highly required.

060 SUDIHARDJO, A.M.

Correlations between soils characterize to the germplasm characterization of *Annona squamosa*. *Korelasi karakterisasi tanah terhadap karakterisasi plasma nutfah tanaman srikaya*/ Sudihardjo, A.M.; Riyanto, D. (Balai Pengkajian Teknologi Pertanian Yogyakarta (Indonesia)). [Proceedings of the seminar on the science and technology 2006], Yogyakarta, 2-3 Aug 2006/ Mudjisihono, R.; Udin, L.Z.; Moeljopawiro, S.; Soegandhi, T.M.S.; Kusnowo, A.; Karossi, A.T.A.; Masyudi, M.F.; Sudihardjo, A.M.; Musofie, A.; Wardhani, N.K.; Sembiring, L.; Hartanto (eds.) Lembaga Ilmu Pengetahuan Indonesia, Jakarta (Indonesia). Yogyakarta: BPTP Yogyakarta, 2006; p. 369-374, 11 ref. 631.145/.152/SEM/p

ANNONA SQUAMOSA; GERMPLASM; AGRONOMIC CHARACTERS; SOIL CHEMICOPHYSICAL PROPERTIES; LAND SUITABILITY; PLANT ANATOMY.

The plant characterization study of *Annona squamosa* germplasm, which grown on different soil Lithic Usthorthents of Watugajah, Gedangsari, Gunungkidul Regency and Lithic Hapludolls of Purwodadi, Tepus District, Gunungkidul Regency showed difference of accession. It could be seen from the result of plant characterization, that were plant morphology, leaf, flower, condition, fruit and also seeds. The fruit size gave significant differences which caused by difference of environmental conditions, parent material, and climate condition. Differences on parent material could derivated differences of soil mineralogy, soil particle (sand, dust and clay). In the same age which was about 5 years as in Lithic land of Gedangsari of Gunungkidul produced 10 kg/tree with green skin fruit known

as *Annona squmosa* var. lumut. Meanwhile in Lithic Hapludolls of Tepus only produced 5 kg/tree with yellow skin fruit, known as *Annona squamosa* var. gading. Hence, it might be given impact to the characteristic of *Annona squamosa* and their chemical content. The objective of this study was to develop *Annona squamosa* suitable with their own soil characteristics.

061 SUMIRAT, U.
Selection of superior genotypes of *Coffea canephora* Pierre on controlled hybrid population using cluster analysis method. *Seleksi genotipe unggul Coffea canephora Pierre pada populasi bastar terkontrol menggunakan metode analisis gerombol*/ Sumirat, U.; Priyono; Mawardi, S. (Pusat Penelitian Kopi dan Kakao Indonesia, Jember (Indonesia)). *Pelita Perkebunan* ISSN 0215-0212 (2007) v.23(2) p. 89-103, 3 ill., 3 tables; 24 ref.

COFFEA CANEPHORA; SELECTION; HYBRIDS; YIELDS; GENOTYPES.

Selection of superior genotypes of Robusta coffee (*Coffea canephora*) to that have important agronomic characters should be conducted to increase its productivity. The aim of this research was to select superior genotypes of Robusta coffee with high yielding varieties and high proportion of large bean. Selection was conducted on controlled hybrid populations, developed from three crossing parental clones, i.e. BP961 x Q121 (A), BP409 x Q121 (B) and BP961 x BP409 (C). Selection was done by applying cluster analysis with complete linkage and Euclidean distance as the clustering method. The result of the research showed that the selection was successful to identify superior genotypes of Robusta coffee for high yield and high proportion of large bean. The parameters used (cherries weight/tree, bean weight/tree, bean size percentage > 6.5 mm and 100 cherries weight) were effective in clustering the superior genotypes, indicated by increased minimum and average value of population. Yield potential and percentage of bean size > 6.5 mm of those genotypes were having better performance than the control genotype and their parent. The selection codes A 95, B 28, B 62, B 66, B 74 and C 38 were considered as promising superior genotypes of Robusta coffee.

062 SUYAMTO
Inheritance of flower and thricom color characters in soybean. *Pewarisan karakter warna bunga dan bulu polong pada kedelai/* Suyamto (Balai Penelitian Tanaman Kacang-kacangan dan Umbi-umbian, Malang (Indonesia)). [Proceedings of the seminar on production increase of legume and root crops supporting food autonomy], Malang , 8 Sep 2006/ Harnowo, D.; Rahmiana, A.A.; Suharsono; Adie, M.M.; Rozi, F.; Subandi; Makarim, A.K. (eds.). Bogor: Puslitbangtan, 2007; p. 9-14, 3 tables; 7 ref. 633.1/.4-115/SEM/p

GLYCINE MAX; GENETIC INHERITANCE; FLOWERS; COLOUR; TRICHOMES; AGRONOMIC CHARACTERS; GENETIC CONTROL.

Every individual brings a couple of gene, which is one from male parent and the other one from female parent. If a couple of this gene is two different allele, the dominant allele will be expressed. Recessive allele that is not expressed will still be inherited to gamete formed. Six lines of F2 population consisted of SHR/100H, 100H/SHR, SHR/IAC100, IAC100/SHR, Baluran/100H, and 100H/Baluran were used for inheritance study of flower color character. Four lines from same population consisted of MITRA/100H, 100H/MITRA, KAWI/100H, and 100H/KAWI were used for inheritance study of thricom colour character. Evaluation was carried out in Muneng experimental farm, Probolinggo, East Java from February to May 2006. All of ten lines were planted within plot with 3.5 m length, plant spacing of 40 cm x 10 cm, one plant/hill. Basal fertilization consisted of 50 kg urea, 100 kg SP36, and 75 kg

KCl per hectare. All of these fertilizers were dibbled beside seed hole at planting. Flower and thricom colour based on individual plant were observed at flowering and seed filling stage respectively. The data analysis based on a Mendelian expectation ratio, which were: 3:1 (dominant), 9:7 (duplicate of recessive ephystasis), 13:3 (dominant and ephystasis recessive), 15:1 (ephystasis iso), 1:2:1 (no dominant), 9:3:4 (ephystasis recessive), 9:6:1 (semi ephystasis), and 12:3:1 (dominant ephystasis). These ratio values were computed by using Chi-square method. The result showed that the inheritance of flower and thricom colour characters of ten lines were controlled by simple gene (genic simple) and following a Mendelian segregation or its modification with ratio 3:1. In addition, there were two lines (100H/SHR and SHR/IAC100) for flower colour and one line (KAWI/100H) for the thricom colour that had two values of segregation ratio (3:1 and 13:3).

063 UMAYAH, A.

Genetic diversity of isolates of *Phytophthora palmivora* from cocoa in Indonesia. *Keragaman genetik isolat Phytophthora palmivora dari tanaman kakao di Indonesia*/ Umayah, A.(Universitas Sriwijaya, Palembang (Indonesia). Fakultas Pertanian); Sinaga, M.S.; Sastrosumarjo, S.; Sumaraw, S.M.; Purwantara, A. *Pelita Perkebunan* ISSN 0215-0212 (2007) v.23(2) p.129-138, 4 ill., 2 tables; 21 ref.

THEOBROMA CACAO; PHYTOPHTHORA PALMIVORA; GENETIC VARIATION; RAPD; INDONESIA.

Randomly amplified polymorpic DNA (RAPD) is an analysis technique for genetic variations of plant pathogen, which is known quite efficient, accurate and informative. RAPD analysis was used to differentiate isolates of *Phytophthora palmivora* collected from 6 main cocoa growing provinces in Indonesia, namely North Sumatra, Lampung, West Java, East Java, South Sulawesi and Southeast Sulawesi. These 20 isolates of *P. palmivora* showed high genetic similarity ranging from 88% to 98%. This result showed that the chance of developing of new strains of the *P. palmivora* of pod rot pathogen of cocoa in the future is very low, among 2% - 12 %.

064 YULLIANIDA

Genetics improvement of soybean seed storability through modification of endogenous characters. *Perbaikan genetik daya simpan benih kedelai melalui modifikasi karakter endogenous/* Yullianida (Balai Penelitian Tanaman Kacang-kacangan dan Umbi-umbian, Malang (Indonesia)). [Proceedings of the seminar on production increase of legume and root crops supporting food autonomy], Malang, 8 Sep 2006/ Harnowo, D.; Rahmiana, A.A.; Suharsono; Adie, M.M.; Rozi, F.; Subandi; Makarim, A.K. (eds.). Bogor: Puslitbangtan, 2007; p.44-54, 1 ill., 2 tables; 21 ref. 633.1/.4-115/SEM/p

GLYCINE MAX; BREEDING METHODS; SEED; VIGOUR; SEED CHARACTERISTICS; KEEPING QUALITY; GENETICALLY MODIFIED ORGANISMS; POSTHARVEST PHYSIOLOGY.

Tropical climate in Indonesia with high temperature and humidity can race fastly of soybean deterioration rate in storage. Seed deterioration represents degradation process in seed quality and irreversible caused by physiological and biochemical change which for example caused by seed endogenous factor. In this time, effort to increase soybean seed storability have conducted many, but only by certain seed treatment, while research toward genetics potential in improving seed storability still very limited. From various literature, it was obtained that seed characteristic correlation to seed storability and can be made as selection criteria, for example low seed coat permeability, seed coat pigmentation, low unsaturated fat content, high isoflavon content which is have positive correlation with protein content, soluble sugar content (low monosaccharide and high oligosaccharide), and also high ratio

between seed coat weight and total seed weight. In molecular breeding, start to be conducted by technique of QTL (Quantitative Trait Loci) mapping for seed storability character. If DNA marker or gene have been found, hence is open chance for the improvement of genetically soybean seed storability.

065 YUSUF, A.
Performance on some of soybean pre-eminent varieties in Pasar Miring (North Sumatra (Indonesia)). ***Keragaan sifat agronomis beberapa varietas unggul kedelai di Pasar Miring/*** Yusuf, A. [Proceedings of the national seminar on innovation and specific location technology transfer to support agriculture revitalization. Book 1], Medan, 5 Jun 2007/ Sudana, W.; Moudar, D.; Jamil, A.; Yufdi, P.; Napitupulu, B.; Daniel, M.; Simatupang, S.; Nainggolan, P.; Hayani; Haloho, L.; Darmawati; Suryani, S. (eds.) Balai Besar Pengkajian dan Pengembangan Teknologi Pertanian, Bogor (Indonesia). Bogor: BBP2TP, 2007; p. 179-185, 5 tables; 11 ref. 631.152/SEM/bk1

GLYCINE MAX; VARIETY TRIALS; ADAPTATION; IRRIGATED LAND; AGRONOMIC CHARACTERS; VIABILITY; YIELD COMPONENTS; HIGH YIELDING VARIETIES; SUMATRA.

To study performance of agronomic characters, yield components and yield of some pre-eminent varieties of soybean, the examination of adaptation varieties has been executed on lowland rice at rice field farm of INPPTP Pasar Miring Deli Serdang which have 3 years dried since wet season of 2005/2006 (November 2005 to February 2006). The research was arranged in randomized block design with four replications. Eight varieties were used as the treatment from ILETRI Malang (Anjasmoro, Panderman, Burangrang, Sinabung, Wilis and Ijen and also 1 local variety). The result of the experiment showed that Anjasmoro variety has gave the higher yield equal to 2.48 t/ha and lower yield of Panderman variety (1.43 t/ha). Whereas other varieties gave yield above 1.8 t/ha including local variety which gave the result of 1.97 t/ha. Two varieties (Anjasmoro and Wilis) had pods which containing 3 seeds with high percentage around 40%.

066 ARIEF, R.W.
[Analysis of relative quality of maize protein by in vivo through PDCAAS method]. ***Analisis kualitas relatif protein jagung secara in vivo dengan metode PDCAAS/*** Arief, R.W. (Balai Pengkajian Teknologi Pertanian Lampung, Bandar Lampung (Indonesia)). *Jurnal Pengkajian dan Pengembangan Teknologi Pertanian* ISSN 1410-959X (2007) v.10(2) p.96-105, 1 ill., 10 tables; 17 ref.
MAIZE; VARIETIES; PROTEIN; PROTEIN CONCENTRATES; PROXIMATE COMPOSITION; QUALITY; MICE; LABORATORY ANIMALS; IN VIVO EXPERIMENTATION; IN VIVO DIGESTIBILITY.

The protein content in each maize varieties depends on its quantity and quality. The quality of protein in food materials is determined by its protein rate and amino acid pattern, because every type of cereal has different composition and amino acid pattern. The protein is needed to grow and produce and to keep a normal health, so that the ideal protein must have amino acid formation that matches with the requirement of human and animal. PDCAAS represents a way of newly introduced by FAO to compare the quality of all kinds of protein pursuant to requirement of amino acid at human being. The research was executed by using *in vivo* method on white mice (Sparague Dawley) as an attempted animal, and applies 4 maize varieties as main feed to know the quality of protein. The four maize varieties used were QPM Srikandi Kuning (A); QPM Srikandi Putih (B); Bisi 2 (C); Lamuru (D), and group of metabolite (E) which only perceived its protein rate of digestion. The parameters observed

are amino acid score, protein consumed, protein in faeces, digestion power, real digestion power and PDCAAS. The results showed that Lamuru variety has the best quality of protein with PDCAAS value of 46.02 and statistically was not different with Srikandi Kuning variety that has PDCAAS value 42.92. In conclusion, the varieties are acceptable as a primary food for developing countries such as Indonesia, due to good protein quality.

F60 PLANT PHYSIOLOGY AND BIOCHEMISTRY

067 KARDINAN, A.

Potency of *Ocimum* spp. as repellent to *Aedes aegypti* mosquito. *Potensi selasih sebagai repellent terhadap nyamuk Aedes aegypti* / Kardinan, A. (Balai Penelitian Tanaman Obat dan Aromatik, Bogor (Indonesia)). *Jurnal Penelitian Tanaman Industri* ISSN 0853-8212 (2007) v. 13(2) p. 39-42, 2 ill., 2 tables; 15 ref

OCIMUM; REPELLENTS; AEDES AEGYPTI; ESSENTIAL OILS.

The objective of the research was to evaluate the protection ability of *Ocimum* spp. (*gratisimum* and *bassilicum*) against *Aedes aegypti* mosquito (vector of Dengue Hemorrhagic Fever). Ocimum was evaluated in the form of essential oil diluted with liquid paraffin at concentrations of 20%; 10%; 5% and 2.5%. Female mosquitos reared in the laboratory were placed in the cages. Alternately, treated and untreated hand (control) were inserted into the cage containing mosquitos. The number of mosquitos perched on the hand were counted every hour, lasting for six hours. Result showed that Ocimum was prospecting to be developed as a mosquito repellent, although its repellency was still under the repellency of synthetic repellent (DEET). The repellency of *O. gratisimum* was better than that of *O. bassilicum* since *O. gratisimum* possessing variety of active ingredient beside eugenol (37.35%), such as thymol (9.67%) and cyneol (21.14) compared to *O. bassilicum* which was only possessing eugenol of 46%.

068 PRIMADONA, I.

[Prospect of Indonesian crops for anticancer]. *Prospek tumbuhan Indonesia sebagai antikanker*/ Primadona, I.; Udin, L.Z.; Andriyani, R. (Pusat Penelitian Kimia-LIPI, Bandung (Indonesia)). [Proceedings of the Seminar on the Science and Technology 2006], Yogyakarta, 2-3 Aug 2006/ Mudjisihono, R.; Udin, L.Z.; Moeljopawiro, S.; Soegandhi, T.M.S.; Kusnowo, A.; Karossi, A.T.A.; Masyudi, M.F.; Sudihardjo, A.M.; Musofie, A.; Wardhani, N.K.; Sembiring, L.; Hartanto (eds.) Lembaga Ilmu Pengetahuan Indonesia, Jakarta (Indonesia). Yogyakarta: BPTP Yogyakarta, 2006; p. 55-60 631.145/.152/SEM/p

DRUG PLANTS; CELLS; NEOPLASMS; INDONESIA.

Cancer is one of killing diseases and the number of cancer sufferer in the world is continously increase. Recently, there is still no drugs which can cure cancer disease effectively, so it is necessary to look for Indonesian plants having high potential as cancer drugs. Sixty four Indonesian plants were extracted by ethanol and its bioactivity was tested using A-431, HCT116 and MCF57 cell lines. All of the samples were tested by SRB (sulphorhodamine B) method. The culture cells added by sample fixed with trichloroacetic acid (TCA) was stained with SRB. Unbound dye was removed by washing with 1% acetic acid and protein-bound dye was extracted with unbuffered tris base for determination of optical density (515 nm) with microtiter plate reader. The result of IC50 analysis showed that there was 7 species have an anticancer activity to A-431 cell line and 19 species have an anticancer activity to MCF7 cell line.

069 SARASWATI, V.

[Antioxidant activity of endophytic fungi isolated from *Taxus sumatrana*]. *Aktivitas antioksidan dari isolat jamur endofit Taxus sumatrana*/ Saraswati, V.; Andayani, D.G.S.; Raymond, J.P.; Amin, M. (Pusat Penelitian Kimia, Bandung (Indonesia)) ; Artanti, N.; Harmastini. [Proceedings of the seminar on the science and technology 2006], Yogyakarta, 2-3 Aug 2006/ Mudjisihono, R.; Udin, L.Z.; Moeljopawiro, S.; Soegandhi, T.M.S.; Kusnowo, A.; Karossi, A.T.A.; Masyudi, M.F.; Sudihardjo, A.M.; Musofie, A.; Wardhani, N.K.; Sembiring, L.; Hartanto (eds.) Lembaga Ilmu Pengetahuan Indonesia, Jakarta (Indonesia). Yogyakarta: BPTP Yogyakarta, 2006; p. 173-175, 2 tables; 4 ref. 631.145/.152/SEM/p

TAXUS; INDIGENOUS ORGANISMS; ENDOPHYTES; ANTIOXIDANTS; ISOLATION; FERMENTATION.

The bark of *Taxus sumatrana* endemic plant has known have antioxidant activity. In order to investigate the antioxidant activity from endophytic fungi isolated from *Taxus sumatrana*, preliminary study and free-radical scavenging effect assay has been performed on fermentation medium from 4 isolates of endophytic fungi. The result showed that the fermentation medium of TsC14 5% and TsC14 10 % of isolates gave antioxidant activity with percentage of inhibition 54.21% and 38.82%, respectively for TsC14 5% on the concentration of 0.3125 mg/ml and TsC14 10% (0.1875 mg/ml).

070 UDIN, L.Z.

[Study of the interaction between *Phaleria macrocarpa* fruit extract with the DNA cell MCF-7]. *Studi interaksi ekstrak buah mahkota dewa dengan DNA cell MCF-7*/ Udin, L.Z. (Pusat Penelitian Kimia-LIPI, Bandung (Indonesia)). [Proceedings of the seminar on the science and technology 2006], Yogyakarta, 2-3 Aug 2006/ Mudjisihono, R.; Udin, L.Z.; Moeljopawiro, S.; Soegandhi, T.M.S.; Kusnowo, A.; Karossi, A.T.A.; Masyudi, M.F.; Sudihardjo, A.M.; Musofie, A.; Wardhani, N.K.; Sembiring, L.; Hartanto (eds.) Lembaga Ilmu Pengetahuan Indonesia, Jakarta (Indonesia). Yogyakarta: BPTP Yogyakarta, 2006; p. 111-119, 6 ill., 2 tables; 10 ref. 631.145/.152/SEM/p

DRUG PLANTS; FRUIT; PLANT EXTRACTS; DNA; HPLC; ANTIGENS; NEOPLASMS.

The high level of cancer disease in Indonesia and the scarcity of anticancer drugs have encouraged many scientists to carry out series of cancer drug discovery research. Novel drugs could be explored from natural product resources such as plants that usually being used for traditional medicine materials. Since the plants is a chemical library that consist of various chemical compounds, the interaction between the molecules that are derived from natural product resources and cell component of organism should be known before novel drugs being designed. The method to investigate the mechanism has been developed on molecular level based on High Throughput Screening method. Deoxyribonucleic acid (DNA) is the polynucleotide that carries genetic information was which selected as an essential macromolecule and potential receptor for drug interaction. In order to study the mechanism, a dot blotting method was carried out to observe the interaction between *Phaleria macrocarpa* extract with the chromosomal DNA molecule of MCF-7 Cell Line. The isolated DNA was dropped onto the membrane then was mixed into plant extract for overnight incubation. The interaction results were analyzed with high performance liquid chromatography (HPLC) methods. The HPC chromatogram of *P. macrocarpa* extract exhibited the reduction of peaks with the retention time 1.145 minutes and 5.184 minutes.

H10 PESTS OF PLANTS

071 ASIKIN, S.
[Potential of artificial attractants on fruit flies]. ***Potensi zat atraktan buatan terhadap lalat buah/*** Asikin, S.; Thamrin, M. (Balai Penelitian Pertanian Lahan Rawa, Banjarbaru (Indonesia)). [Proceedings of the seminar on the science and technology 2006], Yogyakarta, 2-3 Aug 2006/ Mudjisihono, R.; Udin, L.Z.; Moeljopawiro, S.; Soegandhi, T.M.S.; Kusnowo, A.; Karossi, A.T.A.; Masyudi, M.F.; Sudihardjo, A.M.; Musofie, A.; Wardhani, N.K.; Sembiring, L.; Hartanto (eds.) Lembaga Ilmu Pengetahuan Indonesia, Jakarta (Indonesia). Yogyakarta: BPTP Yogyakarta, 2006; p. 411-414, 2 tables; 6 ref. 631.145/.152/SEM/p

FRUIT CROPS; TEPHRITIDAE; FRUIT DAMAGING INSECTS; PEST CONTROL; BIOPESTICIDES; ATTRACTANTS; MIGRATORY PESTS.

Fruit fly (*Dacus* sp.) is one of pests that attack bitter melon, chilli, jackfruit, etc. These pests cause brown to dark spotted in fruit then become rotten. In order to control this pest, farmers generally use chemical insecticides. Farmers do not aware to the side effects of pesticide such as resurgence and resistance of pest, kill the natural enemies, and toxic to flora, fauna and human. To avoid those effects, it is needed to use environmentally friendly insecticides. Currently, the attractants for fruit fly made of soybean + sugar and sugarcane + msg has been found. These attractants are cheap and easy to be applied. The research was arranged according to RCBD, 3 replications. Research result showed that the attractants reduced fruit fly damage between 2-5%, whereas at control without attractants the damage between 80-100%. By using these attractants controlling fruit fly by insecticides can be reduced.

072 ASIKIN, S.
[Utilizing plants as botanical pesticide for controlling pest and disease of vegetable crops]. ***Bahan tumbuhan sebagai pestisida nabati dalam mengendalikan hama dan penyakit sayuran***/ Asikin, S.; Thamrin, M. (Balai Penelitian Pertanian Lahan Rawa, Banjarbaru (Indonesia)). [Proceedings of the seminar on the science and technology 2006], Yogyakarta, 2-3 Aug 2006/ Mudjisihono, R.; Udin, L.Z.; Moeljopawiro, S.; Soegandhi, T.M.S.; Kusnowo, A.; Karossi, A.T.A.; Masyudi, M.F.; Sudihardjo, A.M.; Musofie, A.; Wardhani, N.K.; Sembiring, L.; Hartanto (eds.) Lembaga Ilmu Pengetahuan Indonesia, Jakarta (Indonesia). Yogyakarta: BPTP Yogyakarta, 2006; p. 427-436, 6 tables; 19 ref. 631.145/.152/SEM/p

VEGETABLE CROPS; PEST CONTROL; DISEASE CONTROL; BOTANICAL PESTICIDES; PLANT EXTRACTS; MORTALITY; MIGRATORY PESTS.

Generally, to growth horticulture, especially vegetable crops, farmers usually use synthetic pesticide for controlling pest and disease in cultivating vegetables crops. Incorrect and continous pesticide application will cause negative effects on consumer and environment. Therefore, using plants as biopesticide for controlling pest and disease should be considered for pesticide application. Research result showed that *Chromolaena odorata*, *Melaleuca* sp, *Pitycerium biforcatum*, *Pangium edule*, "*tumbuhan mercon*", "*kuringkit*", "*cabai* (sirih hutan)", could effectively control leafworm, green semilooper, diamond back moth, and cucurbit caterpillar, while *Cassia* sp was effective for controlling anthracnose disease.

073 BALFAS, R.
Transmission of stunted growth disease on black pepper by three insect vectors. ***Penularan penyakit kerdil pada tanaman lada oleh tiga jenis serangga vektor***/ Balfas, R.; Samsudin; Sukamto (Balai Penelitian Tanaman Obat dan Aromatik, Bogor (Indonesia));

Lakani, I. *Jurnal Penelitian Tanaman Industri* ISSN 0853-8212 (2007) v.13(4) p. 136-141, 2 ill., 2 tables; 19 ref.

PEPPER; FERRISIA VIRGATA; PLANOCOCCUS; APHIS GOSSYPII; CUCUMBER MOSAIC CUCUMOVIRUS; TRANSMISSIONS.

Stunted growth disease is one of the most important diseases on black pepper caused by piper yellow mottle virus (PYMV) transmitted by mealy bugs (*Planococcus minor* and *Ferrisia virgata*) and cucumo mosaic virus (CMV) transmitted by *Aphis gossypii*. These experiments were conducted at laboratory and greenhouse to examine the capability of the insects in transmitting the disease. The insects were fed on black pepper plant for 24 hours, then transferred to healthy black pepper seedlings for 24 hours (*A. gossypii*) and 48 hours (*P. minor* and *F. virgata*). Each plant was treated with 1, 3, 7 and 10 insects. Other disease transmission test with *A. gossypii* was carried out using the similar method, but each plant was treated with 10 insects and used three source plants (diseased plants from Bangka, Sukabumi and Bogor). Mechanical disease transmission was also carried out to black pepper plant using the three sources of diseased plants the treated plants were then incubated in the glasshouse. ELISA was used for disease detection with antiserum and Agdia. The results showed that high transmission rate (up to 100%) were obtained in transmission with *P. minor* and *F. virgata*. No disease symptoms were shown in black pepper seedlings treated with *A. gossypii*. In the other transmission test, however, some plants showed symptoms. The similar symptoms were also seen on black pepper plants which were mechanically inoculated. The ELISA showed that the plants were positive for CMV. These experiments suggested that *P. minor* and *F. virgata* are very efficient vectors for PYMV, whereas *A. gossypii* was confirmed as vector of CMV of black pepper with limited ability in transmitting the disease.

074 BALIADI, Y.

[Natural enemies host plants and control of *Aphis glycines* by using botanical pesticides in acid dryland in Lampung (Indonesia)]. ***Musuh alami, tanaman inang, dan pengendalian Aphis glycines dengan pestisida nabati di lahan kering masam Provinsi Lampung/*** Baliadi, Y. (Balai Penelitian Tanaman Kacang-kacangan dan Umbi-umbian, Malang (Indonesia)). [Proceedings of the seminar on production increase of legume and root crops supporting food autonomy], Malang, 8 Sep 2006/ Harnowo, D.; Rahmiana, A.A.; Suharsono; Adie, M.M.; Rozi, F.; Subandi; Makarim, A.K. (eds.) Pusat Penelitian dan Pengembangan Tanaman Pangan, Bogor (Indonesia). Bogor: Puslitbangtan, 2007; p. 461-471, 8 tables; 18 ref. 633.1/.4-115/SEM/p

GLYCINE MAX; APHIS GLYCINES; CONTROL METHODS; LEAF EATING INSECTS; NATURAL ENEMIES; HOST PLANTS; BOTANICAL INSECTICIDES; APPLICATION RATES; DISEASE TRANSMISSION; ENTOMOGENOUS FUNGI; ARID ZONES.

The outbreak of *Aphis glycines* and the associated viruses have widely distributed at almost all of soybean fields in Indonesia. An average of *A. glycines* infestation during 1997-2001 was 786 ha. The main purposes of the study are to investigate the eco-biology of *A. glycines* focused on its hosts, natural enemies, and control method using botanical insecticide in acid dry soil condition. The experiment was laid out in October 2005 – May 2006 at Tulangbawang, Lampung Province. The experiment was conducted in randomized block design with four replications. The plot size was 5 m x 6 m. Five botanical mixed solutions namely, P1= *Swietenia mahogani* leaf + *Alpinia galanga* + *Andropogon nardus*, P2= *Annona muricata* leaf + *Acorus calamus* + *Allium sativum*, P3= *Nicotiana tabacum* leaf + *Cocos*

nucifera oil, P4= *Annona muricata* + *Nicotiana tabacum* + *Pogostemon cablin* leaves powder, P5= *Annona squamosa* + *Swietenia mahogani* + *Azadirachta indica* seeds powder were used. Chemical insecticides namely deltametrin (P6) and water (P7) were employed as a control. Each treatment was applied five times at 7, 14, 21, 28, and 28 days after planting. The population of *A. glycines* was recorded by direct counting method. The natural enemy and alternative host were identified following the natural enemies and weeds identification handbook. It appeared that a mixed solution of *Annona squamosa* + *Swietenia mahogani* + *Azadirachta indica* seeds powder was more effective in reducing (56.29%) winged *A. glycines* adults which obligately responsible in field virus transmission than other solutions. The results also successfully identified 17 predators, two parasitoids, and eight new alternate hosts of *A. glycines*. Most of the enemies are belong to *Coccinellidae* family. Three common fungi that parasitize insects, namely *Beauveria* sp., *Nomuraea riley* and *Entomophthora* sp. were abundantly found at the experimental site. Interestingly, the presence of *Solenopsis geminate*, *Monomorium destructor*, and Camponotus ants were a great sign that soybean plant was colonized with *A. glycines*. Similarly, this chosed solution also decreased (46.15%) a number of virus-infested plants and resulting in increase soybean yield at amount 0.16 t/ha, respectively.

075 INDRAYANI, I G.A.A.

Effects of bract size of several cotton accessions to American bollworm injury level. *Pengaruh ukuran braktea beberapa aksesi kapas terhadap tingkat serangan hama penggerek buah Helicoverpa armigera (Hubner)*/ Indrayani, I G.A.A.; Sumartini, S. (Balai Penelitian Tanaman Tembakau dan Serat, Malang (Indonesia)). *Jurnal Penelitian Tanaman Industri* ISSN 0853-8212 (2007) v.13(4) p. 125-129, 2 ill., 1 table; 18 ref.

GOSSYPIUM HIRSUTUM; BRACTS; HELICOVERPA ARMIGERA; COTTON; PLANT ANATOMY.

Conventional method by crossing technique based on plant morphological characters is still used in providing resistant varieties of cotton against insect bollworms. A number of genetic characters are now available and have been studied for their assosiation with insect pests resistance such as hairiness, okra leaf, frego bract, nectar, and high gossypol. Regarding to boll damage by *H. armigera*, it can be mentioned that there are many other morphological characters of cotton directly contribute to bollworm damage, such as floral bract. As a part of boll, it is estimated that bracts associated with bollworm attacked due to their larger size compared with boll size. The objective of the study was to find out the effect of bract size in relation to bollworm damage on cotton accessions. The study was conducted at Experimental Station of Indonesian Tobacco and Fiber Crops Research Institute in Asembagus, Situbondo, East Java from January to December 2006. Eighteen of fifty cotton accessions were used as treatment and they were arranged in randomized block design (RBD) with three replications. Five randomly cotton plants from each accession and five young bolls, sampled from the selected plants were brought in the laboratory to collect information on bract and boll sizes. Boll damage was determined by counting the damaged bolls in the field as well as the seed cotton yield. The result showed that bract size was positively correlated with boll damage (R^2 = 0.9014). Higher damaged bolls occurred on bolls which is covered completely by bracts. There is variation between length and wide size of bracts among cotton accessions and both showed positive correlation to bract area (R^2 = 0.876; R^2 = 0.894). Based on this study, higher resistance of cotton variety against *H. armigera* will possibly be provided through combination between bract size and any other morphological characters of cotton.

076 KARDINAN, A.

Effect of several botanical oils mix against trapping ability to fruit fly. *Pengaruh campuran beberapa jenis minyak nabati terhadap daya tangkap lalat buah/* Kardinan, A.

(Balai Penelitian Tanaman Obat dan Aromatik, Bogor (Indonesia)). *Buletin Penelitian Tanaman Rempah dan Obat* ISSN 0251-0824 (2007) v. 17(1) p. 60-66, 1 ill., 2 tables; 16 ref.

PSIDIUM GUAJAVA; INSECT CONTROL; TEPHRITIDAE; BOTANICAL PESTICIDES; MELALEUCA; EUGENOL; BRACTOCERA; TRAPPING.

Research regarding the effect of mixing of some plants (botanical oils) against trapping ability to fruit flies has been done at guava fruit garden in Bogor in 2006. Research was arranged in randomized block design with eight treatments and four replications. Treatments consisted of some botanical oils: (1) palm, (2) nutmeg, (3) cinnamon, (4) melaleuca, (5) melaleuca + palm (1:1), (6) melaleuca + nutmeg (1:1), (7) melaleuca + cinnamon (1:1) and comparative attractant (hogy) which is traded in the market. Melaleuca oil resulting from distillation of *Melaleuca bracteata* leaves consisted of 80% methyl eugenol, meanwhile hogy consisted of 75% methyl eugenol. Treatments (oil) were dropped as much as 1 ml into cotton bud in the trap. The trap were made from mineral drinking water bottle (600 ml), then hang on the tree as high as 2 m above of soil surface. Observations were done on the number, species and sex of fruit flies trapped every week, during four weeks. Result showed that nutmeg and palm oil were better and compatible to be mixed with melaleuca oil since these mixing oils were able to trap a number of fruit flies more than that trapped by hogy (comparative treatment), although the content of methyl eugenol (40%) was lower than that in the hogy (75%). Cinnamon oil was not compatible to be mixed with melaleuca oil (antagonist), due to its lower trapping ability compared to other treatments tested. Nutmeg oil could act as fruit flies attractant, although its trapping ability was still low.

077 MARWOTO

Leaf extract potency of *Aglaia odorata* for soy legums pest controller. *Potensi ekstrak daun Aglaia odorata untuk pengendalian hama polong kedelai/* Marwoto (Balai Penelitian Tanaman Kacang-kacangan dan Umbi-umbian, Malang (Indonesia)). [Proceedings of the seminar on production increase of legume and root crops supporting food autonomy], Malang, 8 Sep 2006/ Harnowo, D.; Rahmiana, A.A.; Suharsono; Adie, M.M.; Rozi, F.; Subandi; Makarim, A.K. (eds.). Bogor: Puslitbangtan, 2007 p.396-404, 2 ill., 15 ref. 633.1/.4-115/SEM/p

GLYCINE MAX; AGLAIA; LEAVES; PLANT EXTRACTS; BOTANICAL INSECTICIDES; PEST CONTROL; SEED DAMAGING INSECTS; RIPTORTUS; NEZARA VIRIDULA; ETIELLA ZINCKENELLA; HELICOVERPA ARMIGERA.

The yield loss caused by pod borer in soybean crop is considered high, moreover plants will produce no yield, right now. Synthetic insecticide is still used for controling the insects. Application of high dose and more frequent insecticides will cause: (1) residual effect on product, (2) resistantcy and resurgency of insects (3) To kill natural enemy of usefull insect, and (4) make pollution for environment and a hazard material for life. The result of experiment showed that *A. odorata* leaf extract as botanical insecticide can effectively control insects. The function of *A. odorata* extracts is as contact poison, stomach poison, and anti-feeding compound. Other advantages for using botanical insectisides are (1) to increase quality and quantity of agriculture product and free from pollution of synthetic materials, (2) safe for environment, (3) to minimize environment degradation, and (4) to decrease residual poison effect and resistancy/resurgency of insects. *A. odorata* leaf extract can be used as insecticide to control pod sucking effectively. Result of application of 5% leaf extract showed that seed damage can be minimized up to 13.3% (compared to control 22.7%) and yield loss of soybean up to 41.7%. Using 5% *A. odorata* leaf extract to control pod borer will

minimize seed damage up to 2.46% (compared to control 12%) and yield loss of soybean up to 46%.

078 PRAYOGO, Y.
Growth, sporulation, and viability of entomopathogenic fungi *Verticillium lecanii* in botanical oil. ***Pertumbuhan, sporulasi, dan viabilitas cendawan entomopatogen Verticillium lecanii pada media minyak nabati/*** Prayogo, Y.; Suharsono (Balai Penelitian Tanaman Kacang-kacangan dan Umbi-umbian, Malang (Indonesia)). [Proceedings of the seminar on production increase of legume and root crops supporting food autonomy], Malang, 8 Sep 2006/ Harnowo, D.; Rahmiana, A.A.; Suharsono; Adie, M.M.; Rozi, F.; Subandi; Makarim, A.K. (eds.). Bogor: Puslitbangtan, 2007; p. 384-395, 2 ill., 1 table; 40 ref. 633.1/.4-115/SEM/p

VERTICILLIUM LECANII; ENTOMOGENOUS FUNGI; SPORULATION; GROWTH; FUNGAL SPORES; VIABILITY; PLANT OILS; PEST CONTROL.

Verticillium lecanii is effective entomopatogenic fungi to control pod sucking bug (*Riptortus linearis*). The fungi infect on various *R. linearis* developmental stages, from egg to adult. On the other hand, the effectiveness of the fungi in the field was affected by solar radiation. Therefore, a laboratory research to study the effect of botanical oils on the growth, sporulation, and viability of *V. lecanii* was conducted at Mycology Laboratory of Indonesian Legume and Tuber Crops Research Institute (ILETRI) in January to March 2006. Randomized completely design was used with ten replications. Eight botanical oils, i.e. (1) sunflower, (2) coconut, (3) cotton seed, (4) soybean, (5) peanut, (6) sesame, (7) candle nut, and (8) maize were used. The fungi were inoculated on medium with 1% botanical oil and potato dextrose agar (PDA) were studied medium as control. The result showed that all botanical oils increased fertility, sporulation, and viability of *V. lecanii*. The peanut, soybean, and coconut oil significantly increased the effectiveness of fungi. Diameter colony of *V. lecanii* increased over 70%, sporulation 87%, and viability about 93%. Therefore, peanut oil, soybean oil, and coconut oil suggested to increase the effectiveness of *V. lecanii*. The candle oil, cotton oil, maize oil, sunflower oil, and sesame oil can be used to increase the effectiveness of *V. lecanii.*

079 SOETOPO, D.
Status of technology and prospect of ecofriendly entomopathogenic fungus *B. bassiana* against insect pests of estate crops. ***Status teknologi dan prospek Beauveria bassiana untuk pengendalian serangga hama tanaman perkebunan yang ramah lingkungan***/ Soetopo, D.; Indrayani, I G.A.A. (Balai Penelitian Tanaman Tembakau dan Serat, Malang (Indonesia)). *Perspektif* ISSN 1412-8004 (2007) v.6(1) p. 29-46, 1 ill., 3 tables; Bibliography p. 41-46

INDUSTRIAL CROPS; INSECT CONTROL; BEAUVERIA BASSIANA; BIOLOGICAL CONTROL AGENTS.

Chemical insecticides for pests control are causing environmental problems, such as reducing susceptibility of insect pests to a number of chemical insecticides, outbreaks of secondary pest, air and soil pollution, and human poisoned due to directly contact with the pesticides. Insect pathogen, a pest control bioagent, can be used as an alternative component control for reducing chemical insecticide usage. The entomopathogenic fungi, *B. bassiana* is currently being developed as a potential of alternative bioinsecticide. Mode of action of the fungi is initially started by adhesion and penetrating of the spore through insect cuticule, and its mycelium then develop inside the insect body prior the insect death. Its conidia will grow soon after the insect die. High pathogenicity will show when *B. bassiana* expose to appropriate target pests. Several Indonesian strains and isolates of *B. bassiana* have been

proven to be pathogenic against several major insect pests of cotton, oil palm, pepper, coconut and tea. Two *B. bassiana* isolates, viz. Bb4a and BbEd10 were found to be effective against cotton bollworm, *H. armigera* with the average percentage of mortality by 80-87.5% based on laboratory study. Both the LT50 and LT90 of the two isolates were 8.96-9.62 days and 19.69-22.27 days, respectively and these LT were shorter than that of other isolate, Fb4 (19-48 days). *B. bassiana* was also effective for controlling oil palm larvae (*D. catenata*), pepper stem borer (*L. piperis*), and tea leaf caterpillar (*E. bhurmitra*). *B. bassiana* can be applied by spraying method over the plant canopy, applied as soil treatment, or by mixing the conidia with compost. Temperature and humidity are the abiotic factors that able to influence the growth of conidia. *B. bassiana* spore is less active or even inactive when directly exposed to ultraviolet, therefore spraying conidia in the early morning (< 08.00 a.m) or in the evening (> 15.00 p.m) may avoid the reduction of conidia activity. *B. bassiana* is also safe to non-target insect including beneficial insect and natural enemies. Temperature and humidity are more stabile within estate plantation ecosystem and both will support the fungus epizootic development. Therefore using *B. bassiana* seems to hold great promise in controlling the major insect pests of estate crops.

080 SUHAENDAH, E.

Test of leaf extract of *Toona sureni* and *Beauveria bassiana* fungi to bagworm mortalities of *Paraserianthes falcataria*. *Uji ekstrak daun suren dan Beauveria bassiana terhadap mortalitas ulat kantong pada tanaman Paraserianthes falcataria*/ Suhaendah, E.; Hani, A.; Dendang, B. (Balai Penelitian Kehutanan, Ciamis (Indonesia)). *Jurnal Pemuliaan Tanaman Hutan* ISSN 1693-7147 (2007) v.1(1) p.15-20, 4 tables; 8 ref.

ALBIZIA; BEAUVERIA BASSIANA; BIOLOGICAL CONTROL; MORTALITY; PARASERIANTHES FALCATARIA.

Cultivation of albizia as high priority of community forest of West Java in large scale have turned into monoculture stand. These stand has become vulnerable to insect attack such as bagworm. Attack of bagworm occured in the dry season causing growth retardation which in some cases leads to tree death. The aim of this research is to examine the effect of leaf extract of *Toona sureni* and extract of *Beauveria bassiana* fungi to kill bagworm and also compare its effectiveness level effectively with organophosphate synthetic insecticides. The result showed that at 7 day after application, highest mortality of bagworm were found on trees treated with *T. sureni* leaf extract (100%) followed by *B. bassiana* (92.31%) and organofosfat synthetic insecticides (76.15%).

081 TENGKANO, W.

Influence of food availability and time of infestation on adult *Ooencyrtus malayensis* Ferr survival rate in soybean field. *Pengaruh ketersediaan pakan dan waktu infestasi terhadap daya bertahan hidup imago Ooencyrtus malayensis Ferr di pertanaman kedelai*/ Tengkano, W. (Balai Penelitian Tanaman Kacang-kacangan dan Umbi-umbian, Malang (Indonesia)). [Proceedings of the seminar on production increase of legume and root crops supporting food autonomy], Malang, 8 Sep 2006/ Harnowo, D.; Rahmiana, A.A.; Suharsono; Adie, M.M.; Rozi, F.; Subandi; Makarim, A.K. (eds.). Bogor: Puslitbangtan, 2007; p. 358-368, 1 ill., 1 table; 14 ref. 633.1/.4-115/SEM/p

GLYCINE MAX; OOENCYRTUS; SEED DAMAGING INSECTS; PARASITOIDS; RIPTORTUS; FEEDS; INFESTATION; MORTALITY; BIOLOGICAL CONTROL AGENTS; SURVIVAL.

Ooencyrtus malayensis Ferr (Hymenoptera: Encyrtidae) is one of the potential egg parasitoid of pod sucking bugs in Indonesia. Mass rearing of the parasitoid has successfully been done in the laboratory using *Riptortus linearis* eggs and additional food with 10% sugar or honeybee for the adult. To studied factors affecting *O. malayensis* effectiveness as a biocontrol for pod sucking bugs in Indonesia, a greenhouse experiment (semifield) was conducted. With and without 10% sugar solution as additional food were applied as a main plot. The parasitoid were released at 7.30 am, 12.00 pm and 4.30 pm respectively as subplot. The experiment was designed in split plot in four replications. The results showed that food addition for *O. malayensis* adult significantly affected the mortality of parasitoid at 1, 2, 3, 4, 5, 6, and 7 days after parasitoid were released. However, the time of parasitoid realesed did not affect the mortality. No interactions between food addition with the time of parasitoid released were found. The mortality of adult parasitoid at one day after released on the treated with additional food was ranged 4-5/replicate lower than no additional food with adult mortality (8-21). At four days after released, the mortality increased up to 13-15 adults/replicate on treated with food addition, while on no food addition the mortality was higher of 75-82 adults/replicate. At 7 days observation, the mortality either on food addition or no food addition was increased. The mortality on treated with food addition, increased up to 23-27 adults/replicate, and the mortality rate on without food addition was higher varied from 98-99 *O. malayensis* adults/replicate. It was concluded that food addition for adults would increase the longevity of parasitoid. Therefore, to increase the role of *O. malayensis* as a biocontrol for pod sucking bugs food availability is a prerequisite factor.

H20 PLANT DISEASES

082 CORRYANTI

Development of arbuscular mycorrhizhae and growth of teak (*Tectona grandis* Linn. F.) seedlings inoculated with spores of arbuscular mycorrhizae fungi originated from soil in teak forest. *Perkembangan mikoriza arbuskula dan pertumbuhan bibit jati (Tectona grandis Linn. F.) yang diinokulasi spora fungi mikoriza arbuskula asal tanah hutan tanaman jati*/ Corryanti (Perum Perhutani, Yogyakarta (Indonesia)); Soedarsono, J.; Radjagukguk, B.; Widyastuti, S.M. *Jurnal Pemuliaan Tanaman Hutan* ISSN 1693-7147 (2007) v.1(2) p. 51-61, 3 ill., 22 ref.

TECTONA GRANDIS; GIGASPORA; GLOMUS; GROWTH; INOCULATION; SEEDLINGS; VESICULAR ARBUSCULAR MYCORRHIZAE.

The objective of the study was to determine the effect of arbuscular mycorrhizal fungi collected from soil of teak plantation forest on the growth of teak seedlings related to mycorrhizal association development. The study used completely randomized design with three levels of inoculant's factor, consisting of control (uninoculated), inoculation with Gigaspora spores and inoculation with Glomus spores, with ten replications. Isolated spores originated from soil of teak plantation forest in Tangen, Surakarta. The planting medium was a mixture of soil and sand at 1:1 (v/v) sterilized prior to be used. NPK fertilizers was applied at amount 0.0625 g per seedling mixed into the planting medium. Observations were conducted during five months period. The data were analyzed using analysis of variance method and the differences among treatments were analyzed using the Duncan's Multiple Range Test at 5% level of significance. The results showed that inoculation with arbuscular mycorrhizal fungi increased teak seedling growth, with *Gigaspora* sp. inoculation giving the highest growth. The uptakes of N, P, K and Ca increased by both *Gigaspora* sp. and *Glomus* sp. inoculations. The increase of seedling growth was accompanied by large increase in infection percentage as well as sporulation. The highest infection and sporulation were found with *Gigaspora* sp. inoculation. These results showed that in the soil of teak plantation forest in Tangen of the grumusol type, relatively low NPK fertilization (0.0625 g per seedlings)

and inoculation with spores of arbuscular mycorrhizal fungi improved teak seedling growth, increased nutrient uptake, as well as improved mycorrhizal association development in teak seedlings.

083 HALIMAH

Intensity of vascular streak dieback on several cocoa clones collected by Indonesian Coffee and Cocoa Research Institute. *Intensitas penyakit vascular streak dieback pada sejumlah klon kakao koleksi Pusat Penelitian Kopi dan Kakao Indonesia*/ Halimah; Sri-Sukamto (Pusat Penelitian Kopi dan Kakao Indonesia, Jember). *Pelita Perkebunan* ISSN 0215-0212 (2007) v.23(2) p. 118-128, 3 ill., 4 tables; 19 ref.

THEOBROMA CACAO; CLONES; ONCOBASIDIUM THEOBROMAE; VASCULAR DISEASES; DISEASE RESISTANCE.

Vascular streak dieback (VSD) disease is one of the main diseases on cocoa (*Theobroma cacao*) caused by a fungus, *Oncobasidium theobromae*. In high infection, it may cause the death of plants. This research was conducted to obtain responses of 62 cocoa clones collected by Indonesian Coffee and Cocoa Research Institute and fluctuation of disease intensity. Disease symptom was scored from 0 to 6 and then was converted to percentage of disease intensity (IP) and the rate of disease intensity (r). The result showed that 11 clones showed potential resistance to VSD, which were KW 162, KW 165, KW 523, Sca 6, K 14, Sca 12, KW 215, KW 427, KW 44, KW 426, DRC 15. The high intensity occured at June and increased at September and January and then decreased during March.

084 HARDANINGSIH, S.

[Preliminary research of rust disease control on soybean by using *Verticillium* sp.]. *Penelitian pendahuluan pengendalian penyakit karat kedelai menggunakan jamur hiperparasit Verticillium sp*./ Hardaningsih, S. (Balai Penelitian Tanaman Kacang-kacangan dan Umbi-umbian, Malang (Indonesia)). [Proceedings of the seminar on production increase of legume and root crops supporting food autonomy], Malang, 8 Sep 2006/ Harnowo, D.; Rahmiana, A.A.; Suharsono; Adie, M.M.; Rozi, F.; Subandi; Makarim, A.K. (eds.). Bogor: Puslitbangtan, 2007; p. 445-450, 3 tables; 12 ref. 633.1/.4-115/SEM/p

GLYCINE MAX; PHAKOPSORA PACHYRHIZI; BIOLOGICAL CONTROL; VERTICILLIUM LECANII; HYPERPARASITISM; APPLICATION RATES; DISEASE TRANSMISSION.

Rust disease caused by *Phakopsora pachyrhizi* is important disease in soybean. Application of the hyperparasitic fungus, *Verticillium* sp. is an alternative control besides fungicide, resistant variety, and cultural method. The objective of the research is to determine the level of parasitization of *Verticillium* sp. to soybean rust pustules. The experiment was conducted in the laboratory and screen house. In laboratory, the detached leaf of Wilis variety were treated with *Verticillium lecani*, *Verticillium* sp., captan, and *Phaleria macrocarpa* leaf powder. In screen house, Wilis variety were treated at 5, 6, and 7 week after planting. The experiments indicated that in the laboratory experiment, the two Verticillium were capable parazitized rust soybean more than 80%. Captan and *P. macrocarpa* leaves powder suppressed 76% and 90% pustules. In screen house Verticillium in 5 wap with 10^4 /ml spore density was effective parasitized rust pustule up to 74% in rust intensity 51-75% leaf area infected and not different with 6 wap (83%) and 7 wap (74%). Verticillium did not affect seed weight and yield components.

085 NISA, K.

[Inhibition kinetics by neem seed extracts on *Alternaria porri* growth causes shallot disease]. *Kinetika penghambatan oleh ekstrak biji mimba (Azadirachta indica A.Juss) pada pertumbuhan jamur Alternaria porri penyebab penyakit tanaman bawang merah*/ Nisa, K.; Damayanti, E.; Wheni, I, A.; Maryana, R.; Krido W., S. (Balai Penelitian dan Pengembangan Teknologi Kimia-LIPI, Yogyakarta (Indonesia)). [Proceedings of the seminar on the science and technology 2006], Yogyakarta, 2-3 Aug 2006/ Mudjisihono, R.; Udin, L.Z.; Moeljopawiro, S.; Soegandhi, T.M.S.; Kusnowo, A.; Karossi, A.T.A.; Masyudi, M.F.; Sudihardjo, A.M.; Musofie, A.; Wardhani, N.K.; Sembiring, L.; Hartanto (eds.) Lembaga Ilmu Pengetahuan Indonesia, Jakarta (Indonesia). Yogyakarta: BPTP Yogyakarta, 2006; p. 395-400, 3 ill., 1 table; 12 ref. 631.145/.152/SEM/p

ALLIUM ASCALONICUM; PATHOGENS; ALTERNARIA PORRI; AZADIRACHTA INDICA; NEEM EXTRACTS; CHLOROFORM; ETHANOL; EXTRACTIONS; BOTANICAL PESTICIDES.

The aim of the research was to know the rate availability of neem seed extracts to inhibit growth rate of *Alternaria porii*. *Alternaria porii* is known as pathogenic fungus causes onion plant disease, purple blotch. Neem seed extraction was carried out by maceration method using some organic solvents which were n-hexane, chloroform, ethanol and aquadest. Aquadest and dimethyl sulfoxide (DMSO) were used as control. Each extract was applied on *Alternaria porii*. The growth of this fungus was observed for 7 days after inoculation. On seventh day, the extract which used aquadest as solvent could inhibit *Alternaria porii*'s growth with inhibition value was 45.46%. The growth of fungus increased in aquadest. The other neem seed extracts using n-hexane, chloroform and ethanol solvents have no different in inhibiting *Alternaria porii*. On seventh day, the growth of this fungus still increased. However, the fungus growth rate that had been inhibited by neem seed extracts were slightly less than that grew in DMSO control medium. Neem seed extract using n-hexane as solvent had the highest inhibition value (31.26%) between the other extracts. The result of thin layer chromatography analysis showed that the neem seed extract using n-hexane as a solvent contains bioactive compound such of terpenoid.

086 PUSTIKA, A.B.

[Disease development on several horticulture plants controlled by *Trichoderma* spp. and *Gliocladium* spp. in Kulonprogo (Indonesia) farmland]. *Perkembangan penyakit berbagai tanaman hortikultura pada penggunaan Trichoderma spp. dan Gliocladium spp. di kawasan pertanian pantai Kulonprogo*/ Pustika, A.B.; Musofie, A. (Balai Pengkajian Teknologi Pertanian Yogyakarta (Indonesia)). [Proceedings of the national seminar on the agricultural technology innovation and institutions to increase communities empowerment. Book 1], Yogyakarta, 24-25 Aug 2007/ Wardhani, N.K.; Mudjisihono, R.; Masyhudi, M.F.; Jamal, E.; Wirianata, H.; Suroso; Hartati, R.M.; Hermantoro; Sayekti, A.S. (eds.). Yogyakarta: BPTP Yogyakarta, 2007; p. 67-73, 4 ill., 10 ref. 631.152/SEM/p bk1

WATER MELONS; CUCUMIS MELO; ALLIUM ASCALONICUM; CAPSICUM ANNUUM; ALTERNARIA; CUCUMBER MOSAIC CUCUMOVIRUS; BIOLOGICAL CONTROL AGENTS; GLIOCLADIUM; TRICHODERMA; APPLICATION RATES.

Soilborne diseases consist of wilt disease on melon and water melon, moler disease (*Fusarium oxysporum* fsp. cepae) on shallot, and crown rot (*Sclerotium* spp.) disease on pepper were dominant diseases in the area. Losses due to the diseases could be up to 80%. In this research, wilt disease on water melon, melon, shallot and pepper was controlled with *Trichoderma* spp. and *Gliocladium* spp. T-test 5% was used to distinguish the result of crops controlled with *Trichoderma* spp. and *Gliocladium* spp. and without *Trichoderma* spp. and *Gliocladium* spp. Promising way to suppress the disease incidence in level 5% was obtained

within 2 years assessment action. The result showed that soil application with 500 g of *Trichoderma* spp. and *Gliocladium* spp. mixed with 20 kg of organic fertilizer suppressed soilborne diseases incidence i.e., moler could be suppressed onto 4.5% compared with control (30.9%); water melon wilt could be controlled up to 1.9% rather than control (18.9%); melon wilt intensity decreased onto 1.2% compared with control (9.8%); and wilt Sclerotium on pepper could be controlled up to 2% rather than control (6%). In contrast, *Trichoderma* spp. and *Gliocladium* spp. could not suppress non soilborne diseases such as Alternaria on shallot, Alternaria on water melon, budur on melon, and pepper rot.

087 PUSTIKA, A.B.

[Effect of biological control agents on Fusarium control on watermelon and melon]. ***Kontribusi agensia pengendalian hayati dalam upaya pengendali penyakit layu Fusarium pada tanaman semangka dan melon***/ Pustika, A.B.; Sutardi; Musofie, A.; Wardhani, N.K. (Balai Pengkajian Teknologi Pertanian Yogyakarta (Indonesia)). [Proceedings of the seminar on the science and technology 2006], Yogyakarta, 2-3 Aug 2009/ Mudjisihono, R.; Udin, L.Z.; Moeljopawiro, S.; Soegandhi, T.M.S.; Kusnowo, A.; Karossi, A.T.A.; Masyudi, M.F.; Sudihardjo, A.M.; Musofie, A.; Wardhani, N.K.; Sembiring, L.; Hartanto (eds.) Lembaga Ilmu Pengetahuan Indonesia, Jakarta (Indonesia). Yogyakarta : BPTP Yogyakarta, 2006; p. 335-339, 2 ill., 1 table; 8 ref. 631.145/.152/SEM/p

CITRULLUS LANATUS; CUCUMIS MELO; FUSARIUM OXYSPORUM; BIOLOGICAL CONTROL AGENTS; TRICHODERMA; GLIOCLADIUM; DISEASE TRANSMISSION.

Melon and water melon were cultivated in coastal area of Yogyakarta Special Region. The commodities have lots of diseases, especially disease which are caused by soil-borne pathogen such as *Fusarium oxysporum, Trichoderma* sp. and *Gliocladium* sp. were two of the antagonistic fungi that could be used as alternatives in controlling the diseases rather than chemical fungicides. The disease intensity on plants controlled by the antagonistic fungi is 2%, lower than uncontrolled plants (20%). *Trichoderma* sp. and *Gliocladium* sp. could suppress the disease development, therefore the disease intensity in generative phase is not higher than that in vegetative phase.

088 RAYATI, D.J.

Effectiveness of nutrient application on development of blister blight disease (*Exobasidium vexans*) infection on tea. ***Efektivitas aplikasi nutrien terhadap perkembangan infeksi penyakit cacar (Exobasidium vexans) pada tanaman teh***/ Rayati, D.J. (Pusat Penelitian Teh dan Kina, Gambung (Indonesia)). *Jurnal Penelitian Teh dan Kina* ISSN 1410-6507 (2007) v.10(1-2) p. 15-24, 2 ill., 3 tables; 17 ref.

CAMELLIA SINENSIS; NUTRIENTS; APPLICATION RATES; EXOBASIDIUM; INFECTION; PHYLLOSPHERE.

The availability of nutrients on the leave surface determines the natural colonization of phyllosphere-saprophytic microorganisms, which may have an important role as natural control agents of foliar diseases. Research has been conducted to know the effectiveness of nutrients application on development of blister blight disease (*Exobasidium vexans*) infection on tea, in its relation to their effects on the natural colonization of saprophytic molds and yeasts on the phyllosphere of tea. The research was carried out at Ciliwung Tea Estate (1,350 m asl), Puncak, Bogor Regency, West Java, using randomized completely block design

(RCBD). with 6 treatments and 3 replications. The treatment tested were: urea (Czapex Dox + yeast extract), (sucrose + yeast extract), copper fungicide, (copper fungicide + glucose), and control. The nutrients and fungicide were sprayed, with observation parameters were Disease Intensity Index (DII), as well as population of saprophytic molds and yeasts of tea phyllosphere. The results showed that in heavy attack condition (above 60%), application of nutrient, urea (Czapex Dox + yeast extract), as well as (sucrose + yeast extract) could effectively suppress blister blight disease infection. Their effectiveness were not significantly different each other, and were comparable to copper-chemical fungicide, with average efficacy level 20.35%. The effectiveness of (Czapex Dox + yeast extract) and (sucrose + yeast extract) applications in suppressing blister blight disease infection were related to their effects on the population of saprophytic molds and yeasts on the phyllosphere of tea. which increased with the occurrence of the two nutrient applications. Application of copper fungicide did not decrease the population of saprophytic molds and yeast on the phyllosphere of tea. The addition of glucose at copper fungicide application could increase the population of saprophytic molds and yeasts on the phyllosphere of tea, but did not result in the increase of the effectiveness on blister blight disease.

089 RAYATI, D.J.

Study of the community of saprophytic microorganisms on tea phyllosphere. ***Studi komunitas mikroorganisme saprofit pada filosfer teh*****/** Rayati, D.J. (Pusat Penelitian Teh dan Kina, Gambung (Indonesia)). *Jurnal Penelitian Teh dan Kina* ISSN 1410-6507 (2007) v. 10(1-2) p. 1-14, 5 ill., 7 tables; 19 ref.

CAMELLIA SINENSIS; MICROORGANISMS; PHYLLOSPHERE; BIODIVERSITY; ENVIRONMENT.

The occurrence of the community of saprophytic microorganisms on the leaf surface (phyllosphere) of tea may become a potential source for obtaining antagonistic microoganisms which is useful for biological control of blister blight disease on tea. Research has been conducted to know composition/diversity and population of saprophytic microorganisms on the phyllosphere of tea, and its variation at different environmental conditions of tea production system. Environmental factors studied covered: elevation, season, clone, shade tree, and fungicide spraying. Saprophytic microorganisms were isolated from tea leave samples collected from various tea plantations in West Java which represented the environmental conditions studied, using leaf washing technique. The results showed that the composition of the community of saphropytic microorganisms on the phyllosphere of tea consisted of molds (11 isolates), yeasts (26 isolates), and bacteria (20 isolates). Most of the mold isolates were Cladosporium, whereas yeasts and bacteria were dominated by pink yeasts and cream-chomogenic bacteria, respectively. Based on its population, the highest population colonized the phyllosphere of tea was bacteria, with the population comparison between bacteria, yeasts, and molds was 70:4:1. Based on its finding frequency, there were 8 kinds of saprophytic microorgannisms dominantly found on tea phyllosphere, viz. mold J25 (Cladosporium variable), yeasts R4 (unpigmented yeasts), R11 (*Rhodotorula rubra*), R15 (yellow yeasts), and R19 (orange yeast), bacteria B5 (yellow-chromogenic bacterium), B6 (yellow-chromogenic bacterium), and B7 (cream-chromogenic bacterium). The diversity and population of saprophytic microorganisms on the phyllosphere of tea were highly varied at different environmental conditions of tea production system.

090 SUBANDYAH, S.

Growth of CVPD research at Gadjah Mada University. ***Perkembangan penelitian CVPD di Universitas Gadjah Mada*** / Subandiyah, S. (Universitas Gadjah Mada, Yogyakarta, Fakultas Pertanian); Iwanami, I.; Beattie, A. *Proceedings of the national seminar of citrus*, Jakarta, 13-14 Jun 2009 / Winarno, M.; Sabari; Subandiyah, S.; Setyobudi, L.; Supriyanto, A. (eds.) Jakarta: Puslitbanghorti, 2008 p.53-59, 4 ill., 3 tables; 9 ref

CITRUS; VIROSES; PHLOEM; VIRUSFREE PLANTS; DISEASE CONTROL; INTERCROPPING.

CVPD or Huanglongbing (HLB) is caused by Candidatus Liberibacter asiaticus which is a gram negative bacteria that infects phloem and can only be characterized through molecular technique. Outside symptom appear on leaves including blotching/mottle, chlorosis with tiger stripping to evenly distributed on leaves. Leaf size varies from normal to small size with blotching, asymmetric and firm shape. Fe and Zn concentration of sick plant are lower than those of health one. Either polyclonal or monoclonal antibodies have been produced to detect CVPD but they gave unsatisfied results. PCR technique and sequencing of PCR results was succeed to characterize CVPD isolate from Indonesia and Japan, and based on DNA sequence gene phage. DNA polymerase-like CVPD infection in Indonesia at least caused by two strains. Using free disease citrus plants on orchard is highly prevent CVPD. Control with intercropping system with guava and windbreaker could protect citrus plant from *D. citri* in orchard.

H60 WEEDS AND WEED CONTROL

091 DARANA. S.
Effectivity of pre-emergence bioherbicide on the growth of weed in tea plantation. ***Efektivitas formulasi bioherbisida pratumbuh terhadap pertumbuhan gulma di perkebunan teh***/ Darana, S. (Pusat Penelitian Teh dan Kina, Gambung (Indonesia)). *Jurnal Penelitian Teh dan Kina* ISSN 1410-6507 (2007) v.10(1-2) p.25-31, 2 tables; 16 ref.

CAMELLIA SINENSIS; PLANTATIONS; HERBICIDES; CHROMOLAENA ODORATA; LANTANA CAMARA; GROWTH; WEED CONTROL.

Previous researches stated that leaf extract of two weed species found in tea plantation, i.e. kirinyuh (*Chromolaena odorata*) and saliara (*Lantana camara*) contained allelopathic compounds which could be used for weed control in tea plantation. An experiment was carried out in 2006 to develop and evaluate the effectiveness and storability of bioherbicide formulations extracted from *C. odorata*, as well as *L. camara*, for weed control in tea plantation. The experiment was conducted in the laboratory as well as in the field. Six emulsified concentration (EC) formulations with 4 replications were arranged in RCBD. Result showed that all EC formulations developed as bioherbicide with allelopathy compounds extracted from leaf of kirinyuh and saliara had high storability and their effectiveness were higher than thet of mechanical weeding as the control. The best formulation was obtained from bio-herbicide of saliara leaf extract with emulsifier 0.5%.

J11 HANDLING, TRANSPORT, STORAGE AND PROTECTION OF PLANT PRODUCTS

092 MUDJISIHONO, R.
[Storage method of maize grain by hermetic system]. ***Cara penyimpanan biji jagung dengan hermetic system***/ Mudjisihono, R.; Purwaningsih, H.; Siswanto, N. (Balai Pengkajian Teknologi Pertanian Yogyakarta (Indonesia). [Proceedings of the national seminar on agricultural innovation and technology transfer for rural industrial agribusiness development in marginal area. Book 3: technology transfer and agricultural economic sociology], Ungaran, 8 Nop 2007/ Muryanto; Prasetyo, T.; Prawirodigdo, S.; Yulianto;

Hermawan, A.; Kushartanti, E.; Mardiyanto, S.; Sumardi (eds.). Bogor: BBP2TP, 2007; p. 126-131, 3 tables; 7 ref.

MAIZE; GRAIN; STORAGE; PLASTICS.

Food stocking is the main problem for ensuring agricultural and national development security. Corn is one of the main acceptable staple foods to substitute rice, since it is rich in carbohydrate. Therefore, it is necessary to pay attention to postharvest handling, in order to fulfill high quality food stock requirement. The present study was addressed to evaluate the validity of hermetic plastic system to store corn grain. The study was conducted under the participatory (on farm research) management, involved a farmers group at Porot Village Cluster, Getas Village, Kaloran Subdistrict, District of Temanggung. Data analysis were performed for technology aspect, economic social, and innovated technology. Technology aspect analysis was focused on the performance of the equipment, whereas economic aspect was justified through the main capital for equipment application, and the social economic aspect was examined using descriptive analysis at village level. The results showed that the use of hermetic plastic system improved storage duration of corn grain. Moreover, germination of the corn stored using hermetic system (78.4%) was higher than that stored in non hermetic system (71.4%).

K10 FORESTRY PRODUCTION

093 ADINUGRAHA, H.A.

Growth of shoot cuttings from coppice shoots of *Eucalyptus pellita* F. Muell. seedlings at the nursery. *Pertumbuhan stek pucuk dari tunas hasil pemangkasan semai jenis Eucalyptus pellita F. Muell. di persemaian*/ Adinugraha, H.A.; Pujiono, S. (Balai Besar Penelitian Bioteknologi dan Pemuliaan Tanaman Hutan, Ciamis (Indonesia)). *Jurnal Pemuliaan Tanaman Hutan* ISSN 1693-7147 (2007) v.1(1) p.43-49, 1 ill., 4 tables; 11 ref.

EUCALYPTUS PELLITA; SEEDLINGS; GROWTH; PLANT NURSERIES; SHOOT PRUNING.

The aim the experiment was to investigate the success rate of shoot cuttings growth on different media and the height of hedging of *Eucalyptus pellita* F. Muell seedlings. The first factor was media compound, consisting of 3 levels: sand, coconut husk, and mixture of sand + coconut husk (1:1). The second factor was the height of hedging, consisting of 4 levels: 5 cm, 10 cm, 15 cm and 20 cm above the ground. The result showed that all of the treatments significantly affected the success rate of shoot cuttings. The cuttings from seedlings, which hedged at 15 cm above ground showed the best result. The media that gave the best rooting success was river sand. The average shooting percentage was 15 - 95%, shoot length 0.45 cm - 6.20 cm, shoot dry weight 0.005 g - 0.049 g and root volume 0.020 ml - 0.123 ml.

094 SIARUDIN, M.

Characteristic and variation of *Acacia mangium* Willd. wood physical properties in many planting spacings and axial-radial position. *Karakteristik dan variasi sifat fisik kayu Acacia mangium willd. pada beberapa jarak tanam dan kedudukan aksial-radial*/ Siarudin, M. (Balai Penelitian Kehutanan, Ciamis (Indonesia)); Marsoem, S.N. *Jurnal Pemuliaan Tanaman Hutan* ISSN 1693-7147 (2007) v.1(1) p. 1-13, 7 ill., 4 tables; 16 ref.

ACACIA MANGIUM; DENSITY; MOISTURE CONTENT; FOREST PLANTATIONS; CHEMICOPHYSICAL PROPERTIES.

This study aimed to identify characteristic and variation of *A. mangium* wood physical properties in different planting spacings and axial-radial position. Materials used were 8

years old *A. mangium* wood from Subanjeriji, Palembang, South Sumatra with three spacings: 2 m x 3 m, 2 m x 4 m and 3 m x 3 m. Three sample trees in diameter of 21 cm - 25 cm from each planting spacing were taken randomly. Specimens in each tree were taken in 3 axial position (bottom, middle, and top of trunk), and 3 radial position (near pith, middle and near bark). Parameters measured were wood density, fresh moisture content (FMC), equilibrium moisture content (EMC), total tangential shrinkage (TS), radial shrinkage (RS), longitudinal shrinkage (LS) and T/R ratio (T/R). The result showed that total average of wood density, FMC, EMC, TS, RS, LS, and T/R were 0.45 g/cm^3; 13.33%; 118.40%; 7.63%; 3.53%; 0.71% and 2.23%, respectively. Differences on wood physical properties of three spacing were found at FMC, TS and LS; while other properties were relatively not different. Based on the density, FMC and dimension change, *A. mangium* wood grown in 2 m x 4 m planting spacing showed the best performance, followed by 3 m x 3 m and 2 m x 3 m. Based on axial orientation, wood density, FMC, EMC, and TS tend to decrease from bottom to upper stem, while other properties were not different. Based on radial orientation, the wood density and TS tend to increase from near the pith to near the bark, while FMC and LS have reversed pattern.

095 SIARUDIN, M.

Effect of mycorrhizae and wood vinegar on the seedling growth of five provenances of *Paraserianthes falcataria*. *Uji pengaruh mikoriza dan cuka kayu terhadap pertumbuhan lima provenan sengon di pesemaian* / Siarudin, M. (Balai Penelitian Kehutanan, Ciamis (Indonesia)). *Jurnal Pemuliaan Tanaman Hutan* ISSN 1693-7147 (2007) v.1(1) p. 21-27, 2 ill., 4 tables; 8 ref

ALBIZIA; PARASERIANTHES FALCATARIA; GROWTH; SEEDLINGS; MYCORRHIZAE; PROVENANCE.

The objective of the study was to increase the growth of 5 provenances of albizia (*Paraserianthes falcataria* L. Nielsen) in the nursery. The experimental design was split plot design, with 5 provenances of albizia as main plot and 3 treatments (wood vinegar application, mychorrizae application, and control) as subplot. Each subplot consisted of 45 seeds as sample. Growth parameter observed was delta height, that is the difference of height between measurement at the early application (3 weeks age of seedling) and at the last measurement (10 weeks age of seedling). The data obtained was then analyzed by using analysis of variance and continued with Duncan test. The result showed that mychorrizae and wood vinegar application have significant effect in the growth of albizia seedling. The best performance was shown at wood vinegar application (average height 75.48 cm and delta height 66.62 cm), mychorrizae application (average height 66.44 cm and delta height 59.22 cm) and control (average height 58.92 cm and delta height 52.48 cm) respectively. Provenance differences were also significant. The best performance were shown at provenance of Candiroto, Kediri, Ciamis, Wamena, and Subang. Delta height of each provenance after 7 weeks application were 67.65 cm, 62.93 cm, 60.15 cm, 53.37 cm, dan 53.11 cm; while the total height at 10 weeks age of seedling were 74.44 cm, 69.33 cm, 69.14 cm, 61.02 cm and 60.80 cm, respectively.

096 SUDOMO, A.

Growth of *Gmelina arborea* Linn seedling by using mycorrhizae, enriched organic fertilizer and wood vinegar. *Pertumbuhan semai Gmelina arborea Linn dengan pemberian mikoriza, pupuk organik diperkaya dan cuka kayu*/ Sudomo, A.; Hani, A.; Suhaendah, E. (Balai Penelitian Kehutanan, Ciamis (Indonesia)). *Jurnal Pemuliaan Tanaman Hutan* ISSN 1693-7147 (2007) v.1(2) p. 73-80, 1 ill., 2 tables; 14 ref.

GMELINA ARBOREA; SEEDLINGS; FERTILIZER APPLICATION; ORGANIC FERTILIZERS; VINEGAR; WOOD; GROWTH.

The objective of the research was to find out the influence of mycorrhizae, enriched organic fertilizer, and wood vinegar combination on growth of *G. arborea* seedling. The research was conducted in the nursery area of Ciamis Forestry Research Institute on November 2006 to January 2007. The research used completely randomized design (CRD) with six treatments. The research showed that mycorrhizae, enriched organic fertilizer and wood vinegar combination produced 50.87 cm of the best growth of tree's height. The enriched organic fertilizer in treatment combination (M1N0C0 vs M1N1C0) has a significant effect on growth of *G. arborea* seedling's height. The treatment combination of M1N1C0 (44.63 cm) showed a better result than the MiNOCO (35.55 cm). Wood vinegar in treatment combination has not significant difference on growth of *G. arborea* seedling's height.

L01 ANIMAL HUSBANDRY

097 KURNIANITA T.
[Potency and opportunity of beef cattle development in optimizing local resources of Srandakan District, Bantul Regency of Yogyakarta Special Region (Indonesia)]. ***Potensi dan peluang pengembangan usaha ternak sapi potong dalam memanfaatkan sumberdaya lokal di Kecamatan Srandakan Bantul Provinsi Daerah Istimewa Yogyakarta***/ Kurnianita T.; Soeharsono; Rustijarno, S.(Balai Pengkajian Teknologi Pertanian Yogyakarta (Indonesia)). [Proceedings of the seminar on the science and technology 2006], Yogyakarta, 2-3 Aug 2009/ Mudjisihono, R.; Udin, L.Z.; Moeljopawiro, S.; Soegandhi, T.M.S.; Kusnowo, A.; Karossi, A.T.A.; Masyudi, M.F.; Sudihardjo, A.M.; Musofie, A.; Wardhani, N.K.; Sembiring, L.; Hartanto (eds.) Lembaga Ilmu Pengetahuan Indonesia, Jakarta (Indonesia). Yogyakarta: BPTP Yogyakarta, 2006; p. 253-259, 2 tables; 7 ref. 631.145/.152/SEM/p

BEEF CATTLE; ANIMAL HUSBANDRY; TRADITIONAL TECHNOLOGY; FARMERS ASSOCIATIONS; HUMAN RESOURCES; NATURAL RESOURCES; PRODUCTION POSSIBILITIES; ANIMAL HEALTH; ANIMAL HOUSING; JAVA.

The purpose of this assessment was to describe the potency and opportunity of beef-cattle development in Srandakan Subdistrict, Bantul. The assessment method was survey with PRA (Participatory Rural Appraisal) approach in livestock farmer group Andini Mukti of Jopaten, Poncosari Village, Srandakan District of Bantul Regency. Data was analyzed by SWOT analysis. Beef cattle were a dominant livestock raised most by farmers. Beef cattle was placed in one area and fed local feeds such as grass, hay and other unprocessed agricultural wastes. Most farmers used simple technology and raising cattle as saving and not for market oriented. Considering natural resources potency and human resources and also existing institutes, beef cattle farming can be developed by technology application in optimizing the local resources by applying feeding management, improvement of animal housing, sanitation, pests and diseases control, waste processing, improvement of the institutional capability and access.

098 SULISTIYONO, I.
Effect of alternative feed to nunukan chicken in production period. ***Pengaruh penggunaan pakan alternatif pada ayam nunukan periode produksi/*** Sulistiyono, I.; Wafiatiningsih; Bariroh, N.R. (Balai Pengkajian dan Teknologi Pertanian Kalimantan Timur, Samarinda (Indonesia)). [Proceedings of the seminar on the science and technology 2006], Yogyakarta, 2-3 Aug 2006/ Mudjisihono, R.; Udin, L.Z.; Moeljopawiro, S.; Soegandhi, T.M.S.; Kusnowo, A.; Karossi, A.T.A.; Masyudi, M.F.; Sudihardjo, A.M.; Musofie, A.; Wardhani, N.K.; Sembiring, L.; Hartanto (eds.) Lembaga Ilmu Pengetahuan Indonesia,

Jakarta (Indonesia). Yogyakarta: BPTP Yogyakarta, 2006; p. 527-530, 3 tables; 11 ref. 631.145/.152/SEM/p

CHICKENS; ENDANGERED SPECIES; TRADITIONAL TECHNOLOGY; ANIMAL HUSBANDRY; INTENSIVE HUSBANDRY; FEEDS; INGREDIENTS; GROWTH PERIOD; WEIGHT GAIN; FEED CONVERSION EFFICIENCY.

Nunukan chicken is original germplasm of East Kalimantan. Their population became scarce and extinct. Their traditionally raising which also mix with other native chicken made their purity decreased. The limited nutrition also makes its productivity decreased. The aim of this study was to obtain ration feed suitable for nunukan chicken through intensive raising. The study was arranged in completely randomized design (CRD) with 3 treatments and 3 replications. Each replication used 4 hens and 1 cock, so the total population was 45 (36 hens and 9 cocks), with age of 20-23 weeks. The treatment consisted of commercial native chicken feed (treatment 1), comercial layer feed (treatment 2), alternative feed (treatment 3). The result showed that alternative feed gave significant result in term of gain and feed conversion. Alternative feed gave 225.13 g/head of body weight which was higher compared to other feed ration. Commercial feed gave 130.24 g/head and commercial layer feed gave 115.83 g/head. Alternative feed also gave better feed conversion (6.34) than the commercial native chicken feed (8.22).

099 YUSDJA, Y.
Livestock production: achievement and prospect. ***Pembangunan peternakan: pencapaian dan prospek***/ Yusdja, Y.; Sayuti, R.; Wahyuning, S.; Sejati, W.K.; Sodikin, I.; Ilham, N.; Sinuraya, Y.F. (Pusat Analisis Sosial Ekonomi dan Kebijakan Pertanian, Bogor (Indonesia)). [Proceedings of performance and prospect of Indonesia's agriculture sector development], Jakarta, 20 Dec 2006/ Suradisastra, K.; Yusdja, Y.; Hadi, P.U. (eds.). Bogor: PSEKP, 2007; p. 44-65, 13 ill., 2 tables; 17 ref. 631.001.6(594)/SEM/p

ANIMAL HUSBANDRY; ECONOMIC GROWTH; ECONOMIC ANALYSIS.

Livestock production and development has been recognized as a reasonable power on the country's economic growth. Nevertheless, after the recovery and economic crisis impact and avian influenza break (Al) in 2003-2005, livestock production and development continuously face various problems. During 2006, the livestock subsector was unable to move from its situation in the previous years. Population over extracting, feed and water shortage during the dry season, were the primary problems of livestock development. Such situation provided little hope of achievement in year 2007. The government is expected to overcome such situation related to livestock development through the following steps: providing better service to livestock farmers in terms of developing livestock potential for the benefit of the people, providing and developing water supply system and feedstuffs.

L02 ANIMAL FEEDING

100 BIDURA, I G.N.G.
Effect of katuk (*Sauropus androgynus*) and garlic (*Allium sativum*) leaf meal in diets on performance of broiler. ***Pengaruh penggunaan daun katuk (Sauropus androgynus) dan daun bawang putih (Allium sativum) dalam ramsum terhadap penampilan ayam broiler/*** Bidura, I G.N.G.; Candrawati, D.P.M.A.; Sumardani, N.L.G. (Universitas Udayana, Denpasar (Indonesia). Fakultas Pertanian). *Majalah Ilmiah Peternakan* ISSN 0853-899 (2007) v.10(1) p. 17-21, 3 tables; 14 ref.

BROILER CHICKENS; ALLIUM SATIVUM; SAUROPUS; LEAF MEAL; RATIONS; UNRESTRICTED FEEDING; PROXIMATE COMPOSITION; BODY WEIGHT; ANIMAL PERFORMANCE.

This experiment was carried out at Tabanan, Bali to study the effect of katuk (*Sauropus androgynus*), garlic (*Allium sativum*) leaf meal, and its combination in diets on performance of broilers aged 2 - 7 weeks. The experiment used a completely randomized design (CRD) with four treatments and six replications. The treatments were diets without katuk or garlic leaf meals as a control (A), diets with 3% katuk leaf meal (B), 3% garlic leaf meal (C), and 1.5% katuk + 1.5% garlic leaf meal (D). All diets were in mash form, isocalory (ME: 290 kcal/kg) and isoprotein (CP: 20%). Feed and water were offered *ad libitum*. Result of this experiment showed that feed and water consumption, final body weight, and weight gain in treatment B, C, and D were increased significantly (P<0,05) compared to the control. Utilization of 3% garlic leaf meal in diets was more effective for increasing the performance of broiler than 3% katuk leaf meal or its combination. Its was conluded that utilization of 3% katuk, garlic leaf meal, and its combination in diets increased body weight gains and feed efficiencies of broilers aged 2 - 7 weeks. Garlic leaf meal in diets was more effective for increasing body weight gains and feed efficiency of broiler than katuk leaf meal or its combination.

101 FEBRISIANTOSA, A.

[Effect of fermented cassava meal supplemented by chitin waste as feed on the physical quality of quail egg]. ***Kualitas fisik telur puyuh dengan pemberian pakan hasil fermentasi onggok yang disupplementasi limbah proses pembuatan kitin***/ Febrisiantosa, A.; Julendra, H. (Balai Pengembangan Proses dan Teknologi Kimia-LIPI Yogyakarta (Indonesia), Unit pelaksana Teknis). [Proceedings of the seminar on the science and technology 2006], Yogyakarta, 2-3 Aug 2009/ Mudjisihono, R.; Udin, L.Z.; Moeljopawiro, S.; Soegandhi, T.M.S.; Kusnowo, A.; Karossi, A.T.A.; Masyudi, M.F.; Sudihardjo, A.M.; Musofie, A.; Wardhani, N.K.; Sembiring, L.; Hartanto (eds.) Lembaga Ilmu Pengetahuan Indonesia, Jakarta (Indonesia). Yogyakarta: BPTP Yogyakarta, 2006; p. 329-333, 2 tables; 17 ref. 631.145/.152/SEM/p

QUAILS; FEEDS; WASTE UTILIZATION; CASSAVA; FERMENTATION; SUPPLEMENTS; CHITIN; PROXIMATE COMPOSITION; EGG SHELL; LAYING PERFORMANCE; QUALITY.

A research to utilize chitin production waste as one of poultry feed materials has been done. The aim of this research was to find out the effect of fermented cassava meal supplemented by chitin waste as feed on egg physical quality yielded by quail (*Coturnix-coturnix japonica*). This research was conducted by experimental method with completely randomized design. The treatments were various fermented cassava meal with chitin waste supplementation as feed, i.e. A (25% demineralization waste supplementation), B (15% deproteination waste supplementation), C (25% demineralization waste and 15% deproteination waste supplementation) and K (0.02% urea supplementation) as control. The parameters measured were egg weight, haugh unit and egg shell thickness. The results indicated that the treatment had not significantly affected physical quality of yielded quail eggs. Fifteen percent deproteination waste addition at cassava fermentation process (treatment B) showed the highest egg weight (10.8015 g). The highest average haugh unit value was reached by control K (86.7839%), whereas the highest tendency of average shell thickness was reached by treatment C (0.533 mm).

102 HERDIAN, H.

[Effect of pelleting process on the quality of ruminant feedstuff]. ***Pengaruh proses pelleting terhadap peningkatan kualitas pakan ternak ruminansia***/ Herdian, H.; Julendra, H.; Susanto, A.; Khasanah, Y. (Balai Pengembangan Proses dan Teknologi Kimia - LIPI,

Yogyakarta (Indonesia)). [Proceedings of the seminar on the science and technology 2006], Yogyakarta, 2-3 Aug 2006/ Mudjisihono, R.; Udin, L.Z.; Moeljopawiro, S.; Soegandhi, T.M.S.; Kusnowo, A.; Karossi, A.T.A.; Masyudi, M.F.; Sudihardjo, A.M.; Musofie, A.; Wardhani, N.K.; Sembiring, L.; Hartanto (eds.) Lembaga Ilmu Pengetahuan Indonesia, Jakarta (Indonesia). Yogyakarta: BPTP Yogyakarta, 2006; p. 133-138, 5 ill., 5 tables; 8 ref. 631.145/.152/SEM/p

BEEF CATTLE; RUMINANTS; PELLETING; FEEDS; QUALITY; INGREDIENTS; DIGESTIBILITY.

In natural condition ruminants have digestive systems consisting of two parts, they are rumen and gastrointestinal tract. With this existing rumen, the animals can consumed the high level of crudes fiber feedstuff such as cellulose/hemicellulose. There are some disadvantages for this kind of feedstuffs, they are volume bulkiness, low digestibility and easily damage. Some methods have been conducted to solve those problems increasing feed quality through pelleting technology. This research explains characteristic and effet of pelleting process on increasing feed quality. Completely randomized design was used for the experimental design consisting of two kinds of treatments, they are pelleting and unpelleting (as feed) process replicated 3 times and evaluated by the analysis of variance. The feedstuff used were concentrate, forage and total mixed ration (TMR). The result showed that pelleting process significantly increased the dry matter digestibility of forage and TMR.

103 KARDA, I W.

Effect of post-ingestive feed back of nutrients on intake of oven-dried gliricidia leaves. ***Pengaruh umpan balik nutrien terhadap konsumsi daun gamal kering oven oleh ternak domba***/ Karda, I W. (Universitas Mataram, Nusa Tenggara Barat (Indonesia). Fakultas Peternakan). *Majalah Ilmiah Peternakan* ISSN 0853-8999 (2007) v.10(1) p. 1-4, 3 tables; 13 ref.

SHEEP; GLIRICIDIA; LEAVES; DRIED PRODUCTS; FEED INTAKE; NUTRIENTS; FEEDING LEVEL.

Two trials were conducted to assess the effect of post ingestive feed back of nutrients on intake of gliricidia leaves by sheep. In trial 1, six rumen fistulated sheep were used to compare four dietary treatments in a randomized completely block design. Gliricidia leaves were fed *ad libitum* with no additives treatment (1) or with 15 mg metoclopramide/kg body weight treatment (2), or 0.5% body weight of ground barley grain treatment (3), or 0.5% body weight of cotton seed meal treatment (4) administered into the rumen within 30 minutes before feeding the leaf. In trial 2, the same sheep as in trial 1 were used to compare four dietary treatments in a randomized completely block design. Gliricidia leaves were fed *ad libitum* (treatment 1), or with 0.5% body weight of cottonseed meal either administered into the rumen before feeding the leaf (treatment 2), or mixed with the leaf (treatment 3), or fed separately prior to offering the leaf (treatment 4). The results showed that administration of cottonseed meal into the rumen in trial 1 increased significantly daily intake of gliricidia leaves compared to the control treatment, or to administration of metoclopramide into the rumen (285 g vs. 171 g vs. 142 g) dry matter. However, administration of ground barley grain into the rumen was not significantly differ from any other treatment. In addition, none of dietary manipulations in trial 2 increased intake of gliricidia leaves by the sheep.

104 PRAYUWIDAYATI, M.

Use of fermented-ammoniated sugarcane bagasse in sheep ration. ***Penggunaan bagas tebu teramonisasi dan terfermentasi dalam ransum ternak domba/*** Prayuwidayati, M.; Widodo, Y. (Universitas Lampung, Bandar Lampung (Indonesia). Fakultas Pertanian). *Majalah Ilmiah Peternakan* ISSN 0853-899 (2007) v.10(1) p. 9-12, 1 ill.; 4 tables; 14 ref.

SHEEP; SUGAR BYPRODUCTS; AMMONIA; FERMENTATION; RATIONS; CRUDE PROTEIN; DIGESTIBILITY; RUMEN DIGESTION.

Ammoniation and fermentation of sugarcane bagasse could improve its nutritional quality. The use of sugarcane bagasse, as an ingredient in ration formulation of ruminants could affect the sheep performance. The objective of this expreriment was to study the effect of using graded levels of fermented-ammoniated sugarcane bagasse as an ingredient in sheep's ration on the performance of sheep. This in vivo trial consisted of 4 treatments with 3 replications in each treatment and was conducted in a completely randomized block design. Crude protein and metabolizable energy contents of the ration were 13-14% and 3.1 Mcal/kg of dietary dry matter, respectively. The treatments were the use of 0%, 5%, 10%, and 15% of fermented-ammoniated sugarcane bagasse in sheep rations. The treatment had no significant effect on crude protein digestibility and nitrogen retention, but it had significant effect on ruminal ammonia concentration, and ruminal VFA concentration.

105 PUDJIONO, S.

Effect of feeding mulberry hybrid on productivity and quality of cocoon silkworm. ***Pengaruh pemberian pakan murbei hibrid terhadap produktivitas dan kualitas kokon/*** Pudjiono, S. (Balai Besar Penelitian Bioteknologi dan Pemuliaan Tanaman Hutan, Bogor (Indonesia)); Na'iem, M. *Jurnal Pemuliaan Tanaman Hutan* ISSN 1693-7147 (2007) v.1(2) p. 81-87, 1 table; 9 ref.

COCOONS; SILKWORMS; MORUS ALBA; HYBRIDS; PRODUCTIVITY; QUALITY.

Hybridization in *Morus* sp. has given a significant impact on increasing leaf productivity. There are some good performance Morus hybrids such as *M. nigra* x *M. indica* (M.NI), *M. australis* x *M. indica* (M.AsI), and *M. alba* var kanva which might be good for feeding materials of silkworm. However, it is necessary to test the leaf suitability as feeding material to the quality of cocoon that will be produced. Therefore a feeding experimentation using *Bombyx mori* L. (bivoltine silkworm egg F1 China and Japan double crossed with the code C 301) and three kinds of mulberry hybrids was established. The research was located in Grogolan Village at 500 m asl, 2.500 mm - 3.000 mm rainfall per year, 75% relative humidity and 25^{o}C-30^{o}C temperature. The study was arranged in randomized completely design with three replications. The result showed that the effects of hybrid mulberry leaves were not significant for the survival percentage of silkworm instar I - III, the survival percentage of silkworm instar IV - V, weight of cocoon, weight of cocoon shell, cocoon shell percentage, length of filament, weight of filament, filament percentage and reliability of cocoon. There was significant difference in rendement of rearing. In general, leaves of those three hybrids are suitable for silkworm feeding.

106 PURWANTARI, N.D.

Use of upland tea plantation area for forage production in supporting livestock industry. ***Pemanfaatan lahan bekas perkebunan di dataran tinggi untuk pengembangan tanaman pakan ternak/*** Purwantari, N. D.; Lubis, D. (Balai Penelitian Ternak, Bogor (Indonesia)); Isdiyanto. *Jurnal Penelitian Teh dan Kina* ISSN 1410-6507 (2007) v.10(1-2) p. 32-43, 2 ill., 9 tables; 11 ref.

PENNISETUM PURPUREUM; PANICUM MAXIMUM; LEUCAENA; PLANTATIONS; LAND USE; UPLAND SOILS; FORAGE; FEEDS; LIVESTOCK.

Experiment was conducted in upland of tea plantation, Gambung, Bandung, West Java, for 2 years. The altitude of the site was 1250-1500 asl, temperature 16-22^{o}C, rainfall 2500-3000 mm/year, soil type Andosol with pH 5.6. Alley cropping systems was applied with *Pennisetum purpureum* and *Panicum maximum* grassess and shurb legume *Leucaena diversifolia* were grown as hedgerow. The plants were grown at three different land sloping, 0-5%, 15-30%, 40-50%. Parameter measured were forage production, chemical analysis of forage and digestibility. Results showed that grasses *P. purpureum* and *P. maximum* were harvested for 8 times and twice for legume *Leucaena diversifolia*. The highest fresh weight and dry weight of *P. purpureum* were obtained at 20-30% land sloping which were 826.6 kg/plot/year equivalent 93.9 ton/ha/year and 173.3 kg/plot/year equivalent 19.7 ton/ha/year, respectively and the lowest forage production was at 40-50% land sloping. The same pattern was occurred for *P. maximum*, the highest forage production was 522 kg/plot/year for fresh weight equivalent 59.3 ton/ha/year and 121.6 kg/plot/year for dry weight or 14.3 ton/ha/year. The forage production for both grasses fluctuated by seasons. At the dry season, forage production of *P. purpureum* decreased ranging of 20.1-89 kg/plot and at rainy season, the forage production has increased significantly, in range of 103.5-257.6 kg/plot. Similar pattern was obtained for *P. maximum*.

107 SINURAT, A.P.
Improving nutrient values of solid heavy phase for corn substitute in poultry diet. ***Peningkatan nilai gizi solid phase dalam ransum unggas sebagai pengganti jagung***/ Sinurat, A.P.; Purwadaria, T.; Bintang, I.A.K.; Pasaribu T. (Balai Penelitian Ternak, Bogor (Indonesia)). *Jurnal Ilmu Ternak dan Veteriner* ISSN 0853-7380 (2007) v.12 (2) p. 87-95, 9 tables; 17 ref.

LAYER CHICKENS; RATIONS; PALM OILS; LIQUID WASTES; NUTRIENT IMPROVEMENT; MAIZE; FEEDS; FERMENTATION.

Solid heavy phase (SHP), a byproduct material of palm oil factory obtained by ceramic filtration from liquid waste could be produced approximately 2 million tons/year. The byproduct has a potential for substituting corn in poultry feed. A series of experiment was carried out to improve nutrient value of the SHP in order to obtain a feedstuff that can substitute corn in poultry feed. The SHP was processed by either fermentation or enzymatic process. The product was then dried and analysed for its nutrient values. Fermentation process was carried out by altering the dry matter of the substrate (40 or 50%), while enzymatic process was carried out by altering the dose and kind of enzymes used. The process producing best nutrient values was considered for producing materials for a feeding trial. In this trial, the products were used in diet formulation to substitute 25 or 50% of the corn included in the control diet. The results showed that the fermentation process could be conducted with dry matter of substrate at either 40 or 50%. The fermentation process significantly improved the nutrient values of SHP as shown by decreasing crude fibre and increasing the crude protein, amino acids and ME value. The results showed that the Balitnak enzyme (BS4) was optimum when added at 10 ml/kg dry matter SHP, while the commercial enzyme (EK) was optimum at level of 2 g/kg dry matter SHP. Results of feeding trial showed that 25% of corn in layer diet could be substituted with dried SHP or SHP + enzymes. This substitution tended to improve performances (egg production, egg weight and FCR) of the laying hens. Substitution of 25 or 50% corn with the fermented SHP tends to reduce the performance of the laying hens. Similar trend also occurred when 50% of the corn substituted with the enzymatically processed SHP.

108 WIDIAWATI, Y.

Comparison of fermentation kinetics (*in vitro*) of grass and shrub legume leaves: the pattern of VFA concentration, estimated CH_4 and microbial biomass production. ***Perbandingan pola fermentasi (in vitro) dari rumput dan daun pohon legum: pola konsentrasi VFA, estimasi produksi CH_4 dan biomasa mikroba***/ Widiawati, Y.; Thalib, A. (Balai Penelitian Ternak, Bogor (Indonesia)). *Jurnal Ilmu Ternak dan Veteriner* ISSN 0853-7380 (2007) v.12(2) p. 96-104, 5 ill., 2 tables; 25 ref.

GRASSES; FEED LEGUMES; BROWSE PLANTS; VOLATILE FATTY ACIDS; IN VITRO; MICROBIAL PROTEINS; BIOMASS.

In the process of fermentation, rumen microbes normally convert major fractions of carbohydrates and proteins in a feed to useful end-products (i.e. VFA, microbial protein and B-vitamins) and some waste products (i.e. CH_4 and CO_2). The pattern of these end-products depend largely on the fraction contained in the feed eaten by the animal. Two types of feeds, namely grass and shrub legume, leucaena have different fraction proportions. Grass contains more fibre but less protein compared to shrub legumes. Thus in the rumen they might be fermented to produce different pattern of end products. The experiment was conducted to examine the pattern of VFA, CH_4 and microbial protein products of the two types of feeds when fermented in the rumen. In vitro method was used to determine the pattern of these end-products. Results showed that the grass produced more total VFA/mg organic matter degraded (0.0229 mM/mg vs 0.0075 mM/mg) and CH_4 gas (0.20 mole/mg vs 0.09 mole/mg) but less propionate in partial and less microbial protein (2646 g vs 2656 g) compared to the legume. Approximately 32% less CH_4 (per mg OM degraded) would be produced from leucaena compared to that produced from grass, which mean that there will be less energy loss as CH_4 thus more energy for animal production.

L10 ANIMAL GENETICS AND BREEDING

109 SAID, S.

Rescuing genetic material of unexpectedly die animal. ***Menyelamatkan materi genetik hewan yang mati mendadak***/ Said, S. (Pusat Penelitian Bioteknologi, Bogor (Indonesia)); Saili, T. *Jurnal Ilmu Ternak dan Veteriner* ISSN 0853-7380 (2007) v.12(2) p. 147-152, 2 tables; 23 ref.

RATS; SPERMATOZOA; TESTES; GERMPLASM; LABORATORY ANIMALS.

Rat cauda epididymis were kept in l.5 ml centrifuge tubes containing 1 ml milli-Q water or physiological saline (0.9% NaCl) and stoned and freezed at -196°C without cryoprotectant for up to 7 days. After thawing of the cauda epididymis, all spermatozoa were non-motile immediately after collected. All oocytes injected with sperm heads (nuclei) of spermatozoa collected from frozen-thawed cauda epididymis in saline were activated (100%) and gradually decreased ($P<0.05$) in cauda epididymis frozen in milli-Q water at -196°C (86%), and in control (69%). In activated oocytes, a large proportion of sperm heads had transformed into male pronuclear formation (66-78%). When 1 cell embryos were cultured for 120 h, 7% developed to blastocyst stages. These results indicated that genetic materials of species (at least in the rat) that had unexpectedly die can be saved by a simple method.

L51 ANIMAL PHYSIOLOGY - NUTRITION

110 NATSIR, A.

Effects of microwave radiation on rumen degradation characteristics of barley straw cut at two different stages of maturity. ***Pengaruh radiasi microwave terhadap***

karakteristik degradasi rumen jerami barley yang dipotong pada tingkat umur yang berbeda/ Natsir, A. (Universitas Hasanuddin Makasar (Indonesia). Fakultas Peternakan). *Jurnal Ilmu Ternak dan Veteriner* ISSN 0853-7380 (2007) v.12(2) p. 112-117, 4 tables; 24 ref.

BARLEY STRAW; MICROWAVE RADIATION; BIODEGRADABILITY; RUMEN DIGESTION; NUTRITIVE VALUE; MATURITY.

A common approach for improving the nutritive value of low quality roughages and crop by-products is by pre-treatment or processing either physical, chemical, or biological treatments. Microwave radiation is one type of physical treatment that could be used to treat low quality roughages. Research was carried out to investigate the effects of microwave radiation on the rumen degradation characteristics of barley straw obtained from two different stages of maturity. The experiment was arranged factorially based on completely randomized block design. The first factor was stage of maturity, straw cut during the soft elongation time (Cl) and during the harvest time (C2). The second factor was levels of microwave radiation times (MWRT) (T0 = control, without MWR; T1 = MWR for 1 minute, T2 = MWR for 2 minutes). The results indicated that nutritive values of barley straw obtained from Cl sampling time were significantly better than that obtained from the C2 sampling time in terms of a higher rumen degradation rate and a much greater total potential rumen degradability. In contrast, MWR did not have significant effects on the rate of degradation and total potential degradability of straw in the rumen.

111 PRABOWO, A.

Utilization of mixed cellulolytic microbes from termite extract, elephant faeces solution and buffalo ruminal fluid to increase in vitro digestibility of king grass. *Penggunaan mikroba selulolitik campuran dari ekstrak rayap, larutan feses gajah dan cairan rumen kerbau untuk meningkatkan kecernaan in vitro rumput raja*/ Prabowo, A. (Balai Pengkajian Teknologi Pertanian Sumatera Selatan, Palembang (Indonesia)); Padmowijoto, S.; Bachruddin, Z.; Syukur, A. *Jurnal Ilmu Ternak dan Veteriner* ISSN 0853-7380 (2007) v.12(2) p. 105-111, 1 ill., 2 tables; 23 ref.

PENNISETUM PURPUREUM; WATER BUFFALOES; RUMEN FLUID; ISOPTERA; EXTRACTS; ELEPHANTS; CELLULOLYTIC MICROORGANISMS; FAECES.

Cellulose is a compound of plant cell walls which is difficult to be degraded because it composed of glucose monomers linked by beta-(1.4)-bound. It will be hydrolysed by cellulase enzyme secreted by cellulolytic microbes. The effective digestion of cellulose needs high activity of cellulase enzyme. This research aims to increase in vitro king grass digestibility utilizing mixed cellulolytic microbes of termite extract, elephant faecal solution, and buffalo ruminal fluid. Twelve syringes contained gas test media were randomly divided into four treatments based on sources of microbe (SM), namely: S (SM: cattle ruminal fluid [S]), RGK (SM: mixed cellulolytic microbes of termite extract, elephant faecal solution, and buffalo ruminal fluid [RGK], with composition 1:1:1), S-RGK (SM: S + RGK, with composition 1:1), and TM (without microbe treatment). Digestibility was measured using gas test method. Average of gas production treatment of S-RGK (70.2±0.6 ml) was higher and significantly different ($P<0.01$) compared to treatment of S (60.3±0.8 ml), RGK (40.8±2.3 ml), and TM (13.3±2.0 ml). Utilization of mixed cellulolytic microbes of termite extract, elephant faecal solution, and buffalo ruminal fluid (RGK) that combined with microbes of cattle ruminal fluid (S) could increase in vitro digestibility of king grass.

L53 ANIMAL PHYSIOLOGY - REPRODUCTION

112 ARIFIANTINI, R.I.

Stallion semen cryopreservation using different cryoprotective agents on the skim milk trehalosa extender. ***Kriopreservasi semen kuda menggunakan berbagai krioprotektan pada pengencer susu skim***/ Arifiantini, R.I.; Supriatna, I. (Institut Pertanian Bogor (Indonesia). Fakultas Kedokteran Hewan). *Jurnal Ilmu Ternak dan Veteriner* ISSN 0853-7380 (2007) v.12(2) p. 139-146, 5 tables; 33 ref.

HORSES; BIOLOGICAL PRESERVATION; FREEZING; CRYOPROTECTANTS; STALLIONS; SPERMATOZOA; SKIM MILK.

Cryoprotective agents (CPAs) protect the sperm during cryopreservation. There are two general classes of CPAs, at first penetrating cryoprotectants, these pass through the sperm membrane and act both intracellular and extracellularly, and the second non-penetrating cryoprotectants, these act only extracellularly. The objective of this study was to evaluate the addition of different CPAs namely glycerol (G), combination of ethylene glycol with glycerol (EG) and dimethilformamide (DMF) using skim milk trehalosa extender. The semen was collected from 3 stallions using artificial vagina twice a weeks. The semen was evaluated, centrifugated and diluted in skim milk extender supplemented with 50 mM trehalose and three different CPAs with the concentration of sperm were 200 $x10^6$/ml. Extended semen was then packed into minitub 0.3 ml and equilibrated at 4°C for 2 hours, freeze in the liquid nitrogen vapor for 10 minutes and stored in liquid nitrogen container -196°C. After 24 hours, the semen was thawed at 37°C for 30 seconds. Results of this experiment indicated that the percentage of motile and viable sperm in skim trehalosa extender using DMF and glycerol was better than that using combination of ethylene glycol and glycerol.

113 SETIADI, M.A.

Quality of canine epididymal spermatozoa during storage at 4°C. ***Kualitas spermatozoa epididimis anjing selama penyimpanan pada suhu 4°C/*** Setiadi, M.A. (Institut Pertanian Bogor (Indonesia). Fakultas Kedokteran Hewan); Yulnawati; Suprayogi, A. *Jurnal Ilmu Ternak dan Veteriner* ISSN 0853-7380 (2007) v.12(2) p. 134-138, 2 tables; 23 ref.

DOGS; SPERMATOZOA; TESTES; STORAGE.

The aim of this study was to investigate the quality of canine epididymal spermatozoa during storage at 4°C. Spermatozoa was collected by flushing technique with physiological saline (NaCl 0.9% w/v) and diluted in modified Tris based extender containing 20% (v/v) of egg yolk for three days. The result showed that mean concentration of spermatozoa from cauda epididymal was 95.29 x 10^6 spz/ml. The percentage of progressive motility and membrane integrity of spermatozoa on time of collection was 70.71% and 72.85%, respectively. Quality of epididymal spermatozoa decreased significantly ($P<0,05$) during storage at 4°C. The percentage of progressive motility during storage were 70.71% on day 0 (H-0, after diluted), 60.71% (H-1), 45.71% (H-2), and 33.57% (H-3). The percentage of membrane integrity during storage were 72.85, 68.88, 61.06 and 47.47% on H-0, H-1, H-2 and H-3, respectivelly. In conclusion, quality of canine epididymal spermatozoa decreased during three days of storage at 4°C.

114 SUDARMADJI

Effect of prostaglandin injection on estrus percentage and pregnancy rate of the Bali and PO cows in South Kalimantan (Indonesia). ***Pengaruh penyuntikan prostaglandin terhadap persentase birahi dan angka kebuntingan sapi Bali dan PO di Kalimantan Selatan***/ Sudarmadji; Malik, A.; Gunawan, A.A.M. (Universitas Islam Kalimantan,

Banjarmasin (Indonesia). Fakultas Pertanian). *Majalah Ilmiah Peternakan* ISSN 0853-8999 (2007) v.10(1) p. 26-29, 2 tables; 15 ref.

COWS; PROSTAGLANDINS; INJECTION; PREGNANCY; OESTROUS CYCLE; PREGNANCY DIAGNOSIS; KALIMANTAN.

The objective of this research was to know the heat response and pregnancy rates of Bali and P0 cows in South Kalimantan through synchronization of oestrus using prostaglandin (PGF2alpha). Sixty nine beef cows were used in this research. The beef cows consisted of 23 Bali cows and 46 PO spread in three villages. All cows were injected with PGF2alpha twice at eleven days interval. The cows were inseminated the third day after the second injection. Pregnancy rates were observed three months after insemination. Data on oestrous percentage and pregnancy rates was analyzed using chi-square test. The result showed that after the first injection of PGF2alpha, the oestrous percentage of PO cows (67.39%) was significantly higher (P<0.01) than Bali cows (39.13%), but after the second injection all cows indicated oestrus. The pregnancy rate of Bali cows (83.33%) was significantly higher (P<0.01) than that of PO cows (47.37%).

115 SUYADNYA, P.

Increase the litter size of Bali sows using P.G. 600 injection and flushing in the form of glucose. ***Meningkatkan jumlah anak babi bali dengan menggunakan injeksi P.G. 600 dan pakan tambahan berupa glukosa***/ Suyadnya, P. (Universitas Udayana, Denpasar (Indonesia). Fakultas Pertanian). *Majalah Ilmiah Peternakan* ISSN 0853-8999 (2007) v. 10(1) p. 22-25, 1 table; 17 ref

SOWS; LITTER SIZE; INJECTION; FLUSHING; GLUCOSE; BIRTH RATE; REPRODUCTION.

The aim of this study was to increase the litter size of Bali sows using P.G. 600 injection and flushing in the form of glucose. A total of 32 Bali sows and one mature Bali boar were used. All of the Bali sows have farrowed twice. This study used completely randomized design (CRD) with 2 x 2 factorial arrangement. P.G. 600 as the first factor (H) was divided into two, i.e. without injecting P.G. 600 (H0) and with injecting P.G. 600 (H1). Flushing as the second factor (F) was also divided into two, i.e. without flushing (F0) and with flushing (F1). Thus, there were four treatment combinations in this study, namely, H0F0 (control), H0F1, H1F0, and H1F1, with eight replications. A total of 10 m1 P.G. 600 or 800 i.u. FSH and 400 i.u. LH was administered to each sow by subcutaneous injection behind the ear immediately after weaning its piglets. Flushing to each sow was started at weaning its piglets until the time of mating by adding 400 g of glucose a day to the basal ration. The result of this study showed that the average litter size of Bali sows receiving combined treatments H0F0 (control), H0F1, H1F0, and H1F1 were 6.63 ± 1.51, 7.63 ± 1.30, 750 ± 1.07 and 9.50 ± 1.41 piglets. The total litter weights at birth per-sow were 3.063 ± 0.658, 4.547 ± 0.707, 3.453 ± 0.596. and 5.191 ± 1.293 kg: and the average birth weights per-individual were 0.472 ± 0.093, 0.604 ± 0.101, 0.466 ± 0.094, and 0.560 ± 0.093 kg, respectively. Statistical analysis showed that the effect of injecting P.G. 600 (H1F0) increased significantly (P<0.05) the litter size of Bali sows, however, the litter weight at birth per-sow and birth weigth per-individual were not affected. Both effects of flushing (H0F1) and treatment combination of P.G. 600 injection and flushing (H1F1) increased significantly (P<0.05) the litter size, litter weight at birth per-sow and birth weight per-individual of Bali sows. There were no interaction effects observed between treatments to the all of variables recorded on this study.

L70 VETERINARY SCIENCE AND HYGIENE – GENERAL ASPECTS

116 SRI, A.D.G.
Antibiotic activities of anticancer and anti-microbial from endophytic microorganism. ***Aktivitas antibiotika antikanker dan antimikroba dari mikroorganisme endofitik***/ Sri A,D.G.; Raymond J.P.; Linar Z.U.; Hanafi, M.; Kardono, L.B.S.; Viena S.(Pusat Penelitian Kimia-LIPI, Bandung (Indonesia)) ; Harmastini. [Proceedings of the seminar on the science and technology 2006], Yogyakarta, 2-3 Aug 2006/ Mudjisihono, R.; Udin, L.Z.; Moeljopawiro, S.; Soegandhi, T.M.S.; Kusnowo, A.; Karossi, A.T.A.; Masyudi, M.F.; Sudihardjo, A.M.; Musofie, A.; Wardhani, N.K.; Sembiring, L.; Hartanto (eds.) Lembaga Ilmu Pengetahuan Indonesia, Jakarta (Indonesia). Yogyakarta: BPTP Yogyakarta, 2006 p. 69-73, 3 ill.; 3 tables; 6 ref. 631.145/152/SEM/p

TAXUS; ENDOPHYTES; ISOLATION; ANTIBIOTICS; NEOPLASMS; ANTIGENS; ANTIMICROBIAL PROPERTIES; ANTIFUNGAL PROPERTIES; TOXICITY; FERMENTATION.

The endophytic fungi isolated from *Taxus sumatrana* was collected from West Java Province, Indonesia. Secondary metabolite like antibiotic that have antitumor or antimicrobial activity, can be produced by fermentation process. Antitumor activity was studied by MTT assay and antimicrobial activity was determined by observing bacteria or fungal growth inhibition. Fifty percent of endophytic fungi fermentation broths displayed cytotoxic activity on T49D cell with IC50 value of 3 micro g/ml and endophytic fungi fermentation broths showed growth inhibition to bacteria pathogen, such as *Salmonella typimurium* A,B,C., *Bacillus subtilis*, *Escherichia coli*, *Staphylococcus aureus* and inhibition to fungi pathogen such as *Microsforum gypseum* and *Thricopyton* sp. with the value of inhibition up to 40 mm.

L73 ANIMAL DISEASES

117 TARIGAN, S.
Characterisation of enzymatic activities of H5N1 influenza virus. ***Karakterisasi aktivitas enzimatik neuraminidase virus influenza H5N1***/ Tarigan, S.; Indriani, R.; Darminto (Balai Besar Penelitian Veteriner, Bogor (Indonesia)). *Jurnal Ilmu Ternak dan Veteriner* ISSN 0853-7380 (2007) v.12(2) p. 153-159, 4 ill., 27 ref.

INFLUENZA VIRUS; ENZYME ACTIVITY; CLOSTRIDIUM PERFRINGENS.

One of the two glycoproteins projected from the surface of the influenza virus is identified as neuraminidase. This enzyme enables the virus to spread in the host, and therefore it plays vital roles in the viral pathogenicity. From the viewpoint of disease control, neuraminidase is used as the target for the development of anti-flu drugs, and for the development of diagnostic test to differentiate infected from vaccinated animals (DIVA). Since the roles of the enzyme are very important, information regarding the characteristics and the procedure to measure its activity, which is the purpose of this study, is essential. The optimum incubation time of the neuraminidase-substrate (fetuin) reaction and the optimum pH of the buffer were determined. The stability of the enzyme against heating, supplementation or chelating of calcium ion, and beta-propiolactone treatment were analysed. This study showed that neuraminidase from H5N1-influenza virus, in regards to the characteristics investigated in this study, was comparable to that from Clostridium perfringens. The optimum incubation time for the viral and Clostridial neuraminidases were 60 and 30 minutes, respectively; whereas, the optimum pH for both neuraminidase was 6-7. At pH 8, both neuraminidase were inactive. Supplementation of calcium ion tended to increase activity but chelating of the cation did not have any observable effects. Treatment with 0.2% beta-propiolactone for 6

hours reduced the activity, whereas heating at 60°C for 60 minutes abolished all activity. Since inactivation by beta-propiolactone is partially, neuraminidase assay could be performed safely in ordinary laboratories using beta-propiolactone-treated-influenza virus, rather than the life virus. The thermolabile nature of the enzyme will complicate any attempt to purify the enzyme.

N10 AGRICULTURAL STRUCTURES

118 QISTHON, A.
Effect of shade on thermoregulation and productivity responses of peranakan Ettawa goat. ***Pengaruh naungan terhadap respons termoregulasi dan produktivitas kambing peranakan Ettawa*****/** Qisthon, A.; Suharyati, S. (Universitas Lampung, Bandar Lampung (Indonesia), Fakultas Pertanian). *Majalah Ilmiah Peternakan* ISSN 0853-8999 (2007) v.10(1) p. 13-16, 3 tables; 6 ref.

GOATS; SHADING; THERMOREGULATION; BODY WEIGHT; PRODUCTIVITY; ANIMAL HOUSING.

This experimenet was conducted to study the effect of the use of shade on thermoregulation and growth responses of Ettawa bred goats. Eight Ettawa bred goats were allocated into a cross over design. Four goats were placed without shade and another one was placed in shade. The results of this research showed that the use of shade could provide more comfort ($P < 0.01$) compared with that of without shade in term of rectal temperature, heart rate, and respiration rate. In addition, the use of shade could more increase the daily body weight gain of PE goats more than without shade ($P < 0.01$).

N20 AGRICULTURAL MACHINERY AND EQUIPMENT

119 NOORGINAYUWATI
[Performance of water pump utilization by farmer on dry season farming in monotonous swamp areas]. ***Keragaan penggunaan pompa air di tingkat petani pada pertanaman musim kemarau di lahan lebak/*** Noorginayuwati; Rina D.,Y. (Balai Penelitian Pertanian Lahan Rawa, Banjarbaru (Indonesia)). [Proceedings of the seminar on the science and technology 2006], Yogyakarta, 2-3 Aug 2006/ Mudjisihono, R.; Udin, L.Z.; Moeljopawiro, S.; Soegandhi, T.M.S.; Kusnowo, A.; Karossi, A.T.A.; Masyudi, M.F.; Sudihardjo, A.M.; Musofie, A.; Wardhani, N.K.; Sembiring, L.; Hartanto (eds.) Lembaga Ilmu Pengetahuan Indonesia, Jakarta (Indonesia). Yogyakarta: BPTP Yogyakarta, 2006; p. 261-267, 8 tables; 6 ref. 631.145/.152/SEM/p

ORYZA SATIVA; ZEA MAYS; CAPSICUM ANNUUM; CROP MANAGEMENT; PUMPS; EQUIPMENT PERFORMANCE; DRY SEASON; SWAMP SOILS; FARMERS; PARTICIPATION; FARM INCOME.

Dry season planting on monotonous swamp areas needs sufficient water in order to gain optimum yield. Water pump technology has been introduced by government to cover the lack of water supply, but consideration both of technical and economic feasibility is needed for its development. The objectives of this research were to find out economics feasibility and external supporting factor in order to develop the utilization of water pump. The research was conducted using survey method by comparing the performance of farming system with and without water pump, enterpreneur of water pump and machine operator. Hamayung

Utara (with water pump) and Baruh Kembang (without water pump) in Daha Utara Subdistrict were determined as research site. Thirty farmers were taken sampled randomly while seven enterpreneurs and seven operators were taken purposively. Data analysis was conducted by financial analysis. The results showed that a water pump technology altered the cropping system from paddy-fallow become paddy on floaded area (tabukan) and corn + chili on highest area (guludan). These factors cumulatively caused increase of revenue and efficiency of paddy farming system (MBCR > 2), feasibilities of water pump investment showed B/C < 1, NPV > 1 and IRR < 12% of discount rate. External supporting factors (Agricultural Extension Officer and Rural Cooperation) was ineffective, while P3A (Perhimpunan Petani Pemakai Air) has not been established yet. However, the farmer showed positive perception on water pump program and governmental action to disseminate the water pump was meaningful for the farmer.

120 SIREGAR, H.P.

Design and construction of fluidized bed dryer for small and middle industries. ***Desain konstruksi fludized bed dryer untuk industri kecil menengah***/ Siregar, H.P. (Balai Besar Pengembangan Teknologi Tepat Guna-LIPI, Jakarta (Indonesia)). [Proceedings of the seminar on the science and technology 2006], Yogyakarta, 2-3 Aug 2006/ Mudjisihono, R.; Udin, L.Z.; Moeljopawiro, S.; Soegandhi, T.M.S.; Kusnowo, A.; Karossi, A.T.A.; Masyudi, M.F.; Sudihardjo, A.M.; Musofie, A.; Wardhani, N.K.; Sembiring, L.; Hartanto (eds.) Lembaga Ilmu Pengetahuan Indonesia, Jakarta (Indonesia). Yogyakarta: BPTP Yogyakarta, 2006 p.717-723, 5 ill., 2 tables; 9 ref. 631.145/.152/SEM/p

RICE; DRYING; FLUIDIZED BED PROCESSING; DESIGN; DRYERS; CONSTRUCTION; ENERGY CONSUMPTION; QUALITY; APPROPRIATE TECHNOLOGY; SMALL ENTERPRISES.

There are many constraints faced by small and middle industries for development, such as limited capital, production equipments, management and market problems, etc. in small foodstuff industries, the production or processing equipment problems are still found and many of them using simple and traditional methods to process their product, in other side, some of them can produce good quality products. Encouraging the use of the appropriate production equipments is needed to raise production capacity, product quality and efficient process energy use. This paper described the engineering design and construction of postharvest equipment for drying granular type, especially for paddy drying. The selected drying technology for this designing activity is the fluidized bed type. As known that drying process is a unit process that having intensive energy operation and also one of the biggest energy consumption unit after destillation process. However, the fluidized bed technology is known as having good heat transfer that will affecting the shorter drying time, efficient energy use and ability to produce good quality product. The main design parameters such as distributor plate component, blower and load sizing etc, will be described and also the result of preliminary test.

121 SULISTIADJI, K.

Evaluation on economic and technical aspect of chandue paddy stripper harvester. ***Evaluasi teknis dan ekonomis mesin panen padi tipe sisir (stripper) merk candue***/ Sulistiadji, K.; Handaka (Balai Besar Pengembangan Mekanisasi Pertanian, Serpong (Indonesia)). *Jurnal Enjiniring Pertanian* ISSN 1693-2900 (2006) v.4(2) p. 73-82, 4 ill., 6 tables; 11 ref.

RICE; HARVESTERS; EVALUATION; ECONOMIC ANALYSIS.

The feasibility study of paddy stripper harvester machine performed by CDART was held in Kabupaten Pinrang, South Sulawesi Province. The IRRI original design of Paddy Stripper Gathered (SG 800) was successful modified by locally artisan "Bengkel Usaha Pinrang" The

IRRI design (walking type machine) intially was modified become riding type machine and has a similar operation capability to its original design, and easier to be operated in several soil field conditions. The modified machine was popular in South Sulawesi Province, especially in Pinrang Regency known as "Chandue". The two types of the modified machine tested during the field test were (a) Chandue walking type (DP 4000), and (b) Chandue riding type (DP 6000). The principle performance of paddy stripper machine was to harvest the paddy by gathering the standing paddy in the field, combining the grain from the stalks, and let the stalks crops remained in the field. The operational cost of the two type of modified machines viewed from the economic aspect would give a benefit among 8.6-10.4 million rupiah under some estimation and assumption, i.e. (a) 60 ha field area should be covered by one machine on one season (two seasons annually), (b) 90 million rupiah as an income, (c) 79.6 million rupiah as operational cost of walking type machine (DP 4000), and 81.4 million rupiah as operational cost of riding type machine (DP 6000). "Chandue" stripper Harvester as the other modified IRRI Stripper (SG 800) machine is one of alternative paddy harvester machines that can be introduced and developed in Indonesia region where manpower was lack during harvesting season, such as in peatland and tidal swampland in outer of Java islands.

122 SUPARLAN

Design and performance evaluation of mango harvesting device. ***Rekayasa dan evaluasi kinerja alat pemetik buah mangga***/ Suparlan; Gultom, R.; Widodo, P.; Supriyanto (Balai Besar Penelitian dan Pengembangan Mekanisasi Pertanian, Serpong (Indonesia)). *Jurnal Enjiniring Pertanian* ISSN 1693-2900 (2006) v.4(2) p. 53-60, 4 ill., 1 table; 10 ref.

MANGOES; HARVESTING; EQUIPMENT; DESIGN; PROTOTYPES; EQUIPMENT PERFORMANCE; COST BENEFIT ANALYSIS.

Harvesting of mango is commonly conducted by traditional harvesting device without cutter. Therefore the pedicle of fruit usually cut near the stem end that caused the latex go out from stem end and adhere on the skin surface of fruit which affect the worst performance of fruit. The purpose of this research was to design and evaluate the performance of harvesting device of mango. Harvesting device of mango was designed to pick out mango from the tree by cutting the pedicle about 10 mm from the stem end. The length of harvester stick was 2-6 meter. This harvester was equipped with cutter where the position can be adjusted and also equipped with a basket to collect harvested fruits. Results revealed that capacity of harvesting device was 350-480 fruit/hour for Arumanis mango and 320-375 fruit/hour for Indramayu mango. The average length of stalk was more than 20 mm and the damage level of fruit (harvested without petiole) was 4.7-6.4%. Operation cost of the harvester was Rp 4,472/h or Rp 37/kg. The mango harvester operation provided a B/C ratio of 1.29.

P30 SOIL SCIENCE AND MANAGEMENT

123 PRASETYO, B.H.

Characteristics, potential, and management of Ultisols for agricultural upland development in Indonesia. ***Karakteristik, potensi, dan teknologi pengolahan tanah Ultisol untuk pengembangan pertanian lahan kering di Indonesia***/ Prasetyo, B.H.; Suriadikarta, D.A. (Balai Besar Penelitian dan Pengembangan Sumberdaya Lahan Pertanian, Bogor (Indonesia)). *Jurnal Penelitian dan Pengembangan Pertanian* ISSN 0216-4418 (2006) v.25(2) p. 39-46, 1 ill., 4 tables; 49 ref.

INDONESIA; AGRICULTURAL DEVELOPMENT; ACRISOL; SOIL CHEMICOPHYSICAL PROPERTIES; FERTILIZER APPLICATION; ORGANIC FERTILIZERS; SOIL MANAGEMENT; DRY FARMING.

Ultisols occupied almost 25% of total Indonesian land surface. The deep profiles and moderate to high cation exchange capacities of the soil make the soil has an important role in agricultural upland development. Almost all kinds of crops are able to grow and develop in this soil, except limited by climate and relief. The natural chemical fertility of Ultisols is mostly restricted on the A horizon with low organic matter content. Major plant nutrients such as phosphorous and potassium are often deficient in Ultisols, while acid to very acid soil reaction and high aluminum saturation are also specific properties of Ultisols that restrict plant growth. The presence of argillic horizon in the soil influences soil physical properties such as reduction of both macro and micropores, enlargement of surface runoff and finally supporting the soil erosion. Most of studies indicated that liming, alley cropping, and fertilizing by organic and inorganic fertilizers could overcome some constraints in Ultisols. Utilization of Ultisols would be no problem for estate crops, but for food crops the chemical properties were generally a constraint that not so easy to overcome by farmer, due to low economic condition and minimum knowledge.

P33 SOIL CHEMISTRY AND PHYSICS

124 SIAGIAN, D.R.

[Effect of organic matter and zeolite application on the pH, cation exchange capacity, growth and P absorption of maize in Entisols]. ***Pemberian bahan organik dan zeolit terhadap pH, KTK, pertumbuhan dan serapan P tanaman jagung pada tanah Entisols/*** Siagian, D.R.; Napitupulu, D.; Harahap, D.; Nainggolan, P. (Balai Pengkajian Teknologi Pertanian Sumatera Utara, Medan (Indonesia)). [Proceedings of the national seminar on the socialization of agricultural research and assessment. Book 2], Medan, 21-22 Nov 2005/ Yufdy, M.P.; Danil, M.; Nainggolan, P.; Nazir, D.; Suryani, S.; Napitupulu, B.; Ginting, S.P.; Rusastra, I W. (eds.). Bogor: PSEKP, 2006; p. 825-830, 4 tables; 7 ref. 631.17.001.5/SEM/p bk2

ZEA MAYS; GROWTH; COMPOSTS; ZEOLITES; PH; CATIONS; CATION EXCHANGE CAPACITY.

Entisols is soil which has not growing yet and built from many kind of materials, therefore this soil is not fertile. The soil can repair by giving waste and conditioner. Zeolite is one of conditioner that can save and lose the water slowly and to chase waterless, repairing water condition and soil drainage and increasing cation exchange capacity (CEC). Based on above statement, the research was conducted on effect of organic matter and zeolite on the soil chemical properties and growth of corn in Entisols. The research was conducted in greenhouse of Agriculture Faculty, North Sumatra University in Entisols soil by using durio shell compost with levels: K0 = without compost; K1= 20 ton compost/ha; K2 = 40 ton compost/ha; K3 = 60 ton compost/ha. Level of zeolite: Z0 = without zeolite; Z1 = 3 ton zeolite/ha; Z2 = 6 ton zeolite/ha. The results showed that compost had real effect to reduce pH, CEC and P adsorbtion at Entisols soil. Zeolite could increase soil pH, CEC and P adsorption. Organic matter and zeolite had real effect in increasing plant growth, plant height, crown dry matter and root dry matter after giving organic matter and zeolite.

125 SUDOMO, A.

Growth of sengon and nilam on loamy sand in agroforestry system. ***Pengaruh tanah pasir berlempung terhadap pertumbuhan sengon dan nilam pada sistem agroforestri***/ Sudomo, A. (Balai Penelitian Kehutanan, Ciamis, Indonesia). *Jurnal Pemuliaan Tanaman Hutan* ISSN 1693-7147 (2007) v.1(2) p. 63-72, 1 ill., 2 tables; 22 ref.

ALBIZIA; POGOSTEMON CABLIN; GROWTH; AGROFORESTRY; SAND; SANDY SOILS; CHEMICOPHYSICAL PROPERTIES.

Research of loamy sand soil effect on growth of agroforestry of sengon and nilam was conducted in private forestland in Sukamulih Village, Sariwangi Subdistrict, Tasikmalaya District on November 2004 to November 2006. Two kinds of soil samples were taken from the upper and lower part of private forestland area. The research was conducted by analyzing those soil samples in the laboratory. The result showed that the private forestland was loamy sand soil texture with low fertility rate. The planting activity was conducted in 3 blocks of planting area and 48 sengon were planted in each block. The diameter and height of sengon tree in loamy sand soil had good growth rate, which was 7.28 m of height and 9.48 cm of diameter in 24 months old. Meanwhile, nilam had 64.32 cm of height, 141.68 branches, and 1.29 kg of wet weight in 3 months old after cutting in monoculture cropping pattern. The loamy sand soil texture gave the positive effect on sengon and nilam growth. Therefore sengon and nilam were potentially to be developed in private forest development and degraded forestland rehabilitation.

P34 SOIL BIOLOGY

126 MUSFAL

[Assessment of mycorrhizae and phosphate fertitizer on soybean in Ultisols soil]. ***Pengkajian mikoriza dan pupuk P pada tanaman kedelai di tanah Ultisols***/ Musfal. [Proceedings of the national seminar on innovation and specific location technology transfer to support agriculture revitalization. Book 1], Medan, 5 Jun 2007/ Sudana, W.; Moudar, D.; Jamil, A.; Yufdi, P.; Napitupulu, B.; Daniel, M.; Simatupang, S.; Nainggolan, P.; Hayani; Haloho, L.; Darmawati; Suryani, S. (eds.) Balai Besar Pengkajian dan Pengembangan Teknologi Pertanian, Bogor (Indonesia). Bogor: BBP2TP, 2007; p. 243-247, 1 ill., 3 tables; 8 ref. 631.152/SEM/p bk1

GLYCINE MAX; MYCORRHIZAE; INOCULATION; PHOSPHATE FERTILIZERS; FERTILIZER APPLICATION; SYMBIOSIS; NUTRIENT UPTAKE; APPLICATION RATES; ACRISOLS.

Generally, Ultisols has low in phosporus (P) content due to high absorbtion. When mycorrhizae was added into Ultisols, the avaibility of P could be increased due to decreasing or release of P absorbed. The experiment was conducted in greenhouse of Agriculture Faculty of North Sumatra University from October-December 2006. The experiment was arranged in a factorial randomized completely block design with three replications. The first factor was mycorrhizal inoculation (M) and no mycorrhizae inoculation (M0). The second factor was phosphorus fertilizer application consisted of P0, P1, P2, and P3 in the level of 0; 0.1; 0.2; and 0.3 g/pot, respectively. The result showed that the used of mycorrhizae had increased the root infection, P uptake, available P, and shoot dry weight compared to without using of mycorrhizae (M0) treatment. The application of P only gave the lower mean value of overall variables observed.

P35 SOIL FERTILITY

127 RIYANTO, D.

[Assessment of soil fertility factors in rice productivity in rice production centre in Temon, Panjatan and Sentolo, Kulonprogo Regency (Indonesia)]. ***Kajian hubungan***

antara berbagai faktor kesuburan tanah dan produktivitas tanaman padi di sentra produksi padi Wilayah Kecamatan Temon, Panjatan dan Sentolo, Kabupaten Kulonprogo/ Riyanto, D.; Sudihardjo, A.M.; Suhardjo, M. (Balai Pengkajian Teknologi Pertanian Yogyakarta (Indonesia)). [Proceedings of the seminar on the science and technology 2006], Yogyakarta, 2-3 Aug 2006/ Mudjisihono, R.; Udin, L.Z.; Moeljopawiro, S.; Soegandhi, T.M.S.; Kusnowo, A.; Karossi, A.T.A.; Masyudi, M.F.; Sudihardjo, A.M.; Musofie, A.; Wardhani, N.K.; Sembiring, L.; Hartanto (eds.) Lembaga Ilmu Pengetahuan Indonesia, Jakarta (Indonesia). Yogyakarta: BPTP Yogyakarta, 2006; p. 381-387, 1 ill., 3 tables; 9 ref. 631.145/.152/SEM/p

ORYZA SATIVA; SOIL FERTILITY; SOIL CHEMICOPHYSICAL PROPERTIES; NUTRIENT AVAILABILITY; LAND PRODUCTIVITY; SOIL SURVEYS; SOIL ORGANIC MATTER; PRODUCTION; JAVA.

Data of any soil fertility factors coming from indogen factors of soil chemical properties and fertilizer application can be correlated to the rate of rice production in rice production center area to know the dominant factors that affect rice yield. The assessment was determined from the results of field survey, determination of land unit, and complete soil samples analysis. Location of study was determined from the area that was suitable to the development of rice growth, which were the area that have physiography of Alluvial fan or Alluvial plain in Temon, Panjatan and Sentolo Districts. Soil survey was based on the physiographical approach by field observation using base map scale of 1:25,000. Soil survey was used by grid method, which had line about 500 m, while interlines was based on the physiographical field condition. Soil characteristics observation was done by digging soil profile or taking soil sample and analysed in the laboratory to know the exact value of chemical soil properties and soil classification in the study area. The results of soil samples analysis showed that soil CEC was moderate to high, which came from the high content of Ca, Mg, and K. Total phosphate content in the soil was high, while available P was low, because of fixed by Ca cation in the soil solution. Organic matter application in the rice field was very low, while inorganic fertilizer used was urea of 300-400 kg/ha, SP-36 100 kg/ha and K very low and in some places were no applicaton of KCl. The results of correlation and regression analysis from the factors of soil fertility showed that Ca, Mg, K and organic matter content were mainly determined factors to the rice production. Hence, if it would like reduced the nutrient availability was limited rice production. Therefore nutrient status and soil fertility management should be considered seriously in order to support food selfsufficiency in the Kulonprogo Regency and accelerate national food crop production.

P36 SOIL EROSION, CONSERVATION AND RECLAMATION

128 SUHARDJO, M.

[Rice field rehabilitation in relation to rice productivity in Sendang Arum Village, Minggir District, Sleman Regency of Yogyakarta Special Region (Indonesia)]. ***Rehabilitasi lahan sawah dalam upaya peningkatan produktivitas tanaman padi di Desa Sendang Arum, Kecamatan Minggir, Kabupaten Sleman Daerah Istimewa Yogyakarta***/ Suhardjo, M.; Riyanto, D.; Sudihardjo (Balai Pengkajian Teknologi Pertanian Yogyakarta (Indonesia)). [Proceedings of the seminar on the science and technology 2006], Yogyakarta, 2-3 Aug 2006/ Mudjisihono, R.; Udin, L.Z.; Moeljopawiro, S.; Soegandhi, T.M.S.; Kusnowo, A.; Karossi, A.T.A.; Masyudi, M.F.; Sudihardjo, A.M.; Musofie, A.; Wardhani, N.K.; Sembiring, L.; Hartanto (eds.) Lembaga Ilmu Pengetahuan Indonesia, Jakarta (Indonesia). Yogyakarta: BPTP Yogyakarta, 2006; p. 421-425, 3 tables; 6 ref. 631.145/.152/SEM/p

ORYZA SATIVA; RECLAMATION; IRRIGATED LAND; SOIL IMPROVEMENT; ZEOLITES; ORGANIC FERTILIZERS; SOIL CHEMICOPHYSICAL PROPERTIES; YIELD INCREASES; JAVA.

Food self sufficiency conservation facing many constraints, which are reduction of rice productivity, fertilizer efficiency and decrease of farmland due to land conversion for non agriculture purposes. Considering that, rice production should be increased and environmental condition should be maintained, therefore rice field should be rehabilitated. In fact, clay content, soil pH, organic-C, CEC and soil micronutrient were correlated to the rice productivity. The study on its correlation was conducted at Sendang Arum Village, Minggir District, Sleman Regency on Typic Tropaqueps soil. Research design used randomized completely block design (RCBD) and replicated three times. The treatments were as follow: 1) Fine compost of 750 kg/ha, urea 150 kg/ha, SP-36 15 kg/ha, KCl 15 kg/ha; 2) Organic fertilizer + zeolit of 750 kg/ha, SP-36 as amount of 15 kg/ha an KCL 15 kg/ha; 3) Zeolit of 750 kg/ha, urea 150 kg/ha, SP-36 of 15 kg/ha and KCl 15 kg/ha; 4) Organic fertilizer of 3000 kg/ha, urea 150 kg/ha, SP-36 15 kg/ha and KCl 15 kg/ha; 5) Control (farmer's treatment), applying urea 350 kg/ha, SP-36 240 kg/ha. Plot size was followed farmer's own field, which was about 600-1200 m^2. The results showed that zeolite as soil ameliorant + organic fertilizer (cattle manure) increased rice poductivity up to 7.0 ton/ha and improved soil chemical properties. In addition, the treatments increased number of tiller, reduced rice empty grain and increased soil fertillity.

Q01 FOOD SCIENCE AND TECHNOLOGY

129 ANDRIYANI, R.
[Antibacterial activity of temu tis (*Curcuma purpunascens* BI)]. ***Aktivitas antibakteri temu tis (Curcuma purpunascens BI.)***/ Andriyani, R.; Udin, L.Z. (Pusat Penelitian Kimia-LIPI, Bandung (Indonesia)). [Proceedings of the seminar on the science and technology 2006], Yogyakarta, 2-3 Aug 2006/ Mudjisihono, R.; Udin, L.Z.; Moeljopawiro, S.; Soegandhi, T.M.S.; Kusnowo, A.; Karossi, A.T.A.; Masyudi, M.F.; Sudihardjo, A.M.; Musofie, A.; Wardhani, N.K.; Sembiring, L.; Hartanto (eds.) Lembaga Ilmu Pengetahuan Indonesia, Jakarta (Indonesia). Yogyakarta: BPTP Yogyakarta, 2006; p. 45-54 631.145/152/SEM/p

CURCUMA; BACILLUS SUBTILIS; GAS CHROMATOGRAPHY; CHEMICAL COMPOSITION.

Examination of temu tis (*Curcuma purpurascens* BI) extracts against *Bacillus subtilis* ATCC 6633, *Escherichia coli* ATCC 25922, *Pseudomonas aeruginosa* and *Staphylococcus aureus* ATCC 6538, using agar diffusion method, showed the presence of antibacterial activity. The n-hexan extract consists of two components, amorf dust and liquid. Phytochemical analysis of n-hexan showed the presence of terpenoid compounds. Further fractionation of liquid n-hexan extract showed that fractions gave high antibacterial activity. Minimal inhibitory concentration (MIC) and antibacterial activity compared to ampicillin value from its fractions were 849.37 ppm and 0.00105% for *Bacillus subtilis*; 1549.59 ppm and 0.00119% for *Escherichia coli*; 2014.65 ppm and 0.000192% for *Pseudomonas aeruginosa*; 2508.15 ppm and 0.000998% for *Staphylococcus aureus*. Analysis of fraction using gas chromatography-mass spectrometry (GC-MS) could be illustrated that fraction must probably contain limonene dioxide and pinane, 2,3-ep as the main component and other undetected compounds. Analysis also was done to the second fraction from amorf dust. Second fraction was a crystal which had melting point between 154.8-158.8^oC. Analysis

using infrared spectrophotometry showed the presence of alchyl, aromatic and alkene groups, whereas analysis using GC-MC could be concluded that amorf dust must probably contain isolongifolene component, beside other undetected compounds.

Q02 FOOD PROCESSING AND PRESERVATION

130 ABBAS, A.
Functional tea and cinnamon based beverage for those who suffer from diabetes mellitus. ***Minuman fungsional berbahan dasar teh dan kayu manis untuk penderita diabetes***/ Abbas, A. (Balai Besar Pengembangan Teknologi Tepat guna-LIPI, Subang (Indonesia)); Mahmudatussaadah, A. [Proceedings of the seminar on the science and technology 2006], Yogyakarta, 2-3 Aug 2006/ Mudjisihono, R.; Udin, L.Z.; Moeljopawiro, S.; Soegandhi, T.M.S.; Kusnowo, A.; Karossi, A.T.A.; Masyudi, M.F.; Sudihardjo, A.M.; Musofie, A.; Wardhani, N.K.; Sembiring, L.; Hartanto (eds.) Lembaga Ilmu Pengetahuan Indonesia, Jakarta (Indonesia). Yogyakarta: BPTP Yogyakarta, 2006; p. 105-110, 1 ill., 2 tables; 20 ref. 631.145/.152/SEM/p

TEA; CINNAMON; BEVERAGES; GUM ARABIC; ANTIOXIDANTS; HYPERGLYCAEMIA; SOAKING; EXTRACTION; PROXIMATE COMPOSITION; DIABETES.

A functional tea and cinnamon-based beverage making had been investigated. The benefit of tea (*Camellia sinensis*), cinnamon (*Cinnamomum burmanii*) and arabic gum is highly potential as material of antihyperglicemic. Black tea contains active components such as hydroxycacone, sinamaldehid, and daneugenol. Arabic gum is a source of soluble fibre, which is very useful for those who suffer diabetes mellitus. Experiment on tea and cinnamon stepings resulted through extraction process using hot aquadest (70-80^{o}C) and warm aquadeast (60 ^{o}C), covered glucose, pH, total titrated acids (TTA), total soluble solid (TSS), total food fibre (TFF), phenol content and anti-oxydant activity. The result of analysis on mixed tea-cinnamon and arabic gum were glucose content 2.13 ± 0.00 mg/ml, total food fibre 1.66 ± 0,02 (%), pH 4. ± 0.00, TTA 3.52 ± 0.3838 ml NaOH/100 ml, TSS 2.85 ± 0.07^{o}Brix, total phenol 39.98 ± 0.85 mg/ml (TAE), and anti-oxydant 7.28 ± 0.02 TEAC(mM).

131 ASTUTI, W.
Processing of natural zeolite from Lampung (Indonesia) as adsorbent in decreasing of free fatty acid content in crude palm oil. ***Pengolahan zeolit alam Lampung untuk menurunkan kadar asam lemak bebas dalam minyak kelapa sawit***/ Astuti, W.; Junaedi, A. (Balai Pengolahan Mineral-LIPI, Lampung, Tanjung Bintang (Indonesia)). [Proceedings of the seminar on the science and technology 2006], Yogyakarta, 2-3 Aug 2006/ Mudjisihono, R.; Udin, L.Z.; Moeljopawiro, S.; Soegandhi, T.M.S.; Kusnowo, A.; Karossi, A.T.A.; Masyudi, M.F.; Sudihardjo, A.M.; Musofie, A.; Wardhani, N.K.; Sembiring, L.; Hartanto (eds.) Lembaga Ilmu Pengetahuan Indonesia, Jakarta (Indonesia). Yogyakarta: BPTP Yogyakarta, 2006; p. 89-96, 7 ill; 4 ref. 631.145/.152/SEM/p

PALM OILS; ZEOLITES; PROCESSING; ADSORBENT; HEATING; OVENS; FREE FATTY ACIDS; ADSORPTION.

The research on processing of natural zeolite from Lampung as adsorbent in decreasing free fatty acid content in crude palm oil has been done. Natural zeolite from Lampung has high adsorption power that can be used for decreasing free fatty acid content in crude palm oil and vegetable oil that has been used. Decreasing free fatty acid content in crude palm oil is necessaryly done because free fatty acid content is one of standards that used to determine

oil quality. Natural zeolite from Lampung must been activated before used as adsorbent. Activation was done in two methods i.e. chemical method using HCl solution and physical method that use heating with oven at 200^{o}C. Adsorption of free fatty acid in crude palm oil was done in two methods, i.e. batch method and column method. Batch method was done with speed of strirrer 575 rpm for one hour. The best condition for this method was weight percentage of zeolite 15%, concentration of HCl solution 4.5% and without heating (at room temperature). The result obtained in this condition was decreasing of free fatty acid 17.86% from early FFA degree of 5.41% to 4,59%.

132 BARLINA, R.

Effect of coconut water and young coconut kernel ratio and storage duration to the quality of coconut water concentrate. ***Pengaruh perbandingan air kelapa dan penambahan daging kelapa muda serta lama penyimpanan terhadap serbuk minuman kelapa***/ Barlina, R.; Karouw, S.; Hutapea, R.(Balai Penelitian Tanaman Kelapa dan Palma Lain, Manado (Indonesia)); Towaha, J. *Jurnal Penelitian Tanaman Industri* ISSN 0853-8212 (2007) v.13(2) p.73-80, 5 ill., 5 tables; 21 ref.

COCONUTS; COCONUT WATER; STORAGE; BEVERAGES; CHEMICOPHYSICAL PROPERTIES; ORGANOLEPTIC PROPERTIES.

Coconut water and young coconut kernel have unique flavor and odour. Since these products can not be kept longer and distribution problem, so both of them are not available everywhere and anytime. Drying method with spray dryer equipment is a method to extend the product life. Generally, spray dryer is used to make some food products in powder form deriving from suspension. Raw materials used in this experiment were coconut water from both of young and mature nut and young coconut kernel. The mixture was dried with spray dryer. The objective of this research was to find out the effect of coconut water and young coconut kernel ratio to the quality of coconut water concentrate during storage. The experiment was arranged in factorial using completely randomized design with 2 replications. Factor A was maturity of coconut water consisting of (A1) young coconut water and (A2) mature coconut water. Factor B was ratio of young coconut kernel and coconut water: 15% (B1), 20% (B2), 25% (B3). Factor C was storage duration consisted of 0 month (C1), 1 month (C2), 2 months (C3), 3 months (C4) and 4 months (C5). The variables observed were as follow potassium content, fiber content, colour, flavor, odour, total plate count, acidity, total soluble solid, total acid and water content. The results showed that coconut water concentrate had 7.59-9.50% of total soluble solid, acidity (pH) 4.94-5.35 and total acid 25.85-43.90. By using 20% young coconut kernel in mature coconut water obtained product with fiber content of 4.70-5.54% and the highest potassium content around 1,328.58 mg/100 g. Score of organoleptic test were as follow colour was 3,617-3,719 (neither like nor dislike), odour was 3.00-3.96 (neither like nor dislike to like) and flavor was sweet about 2,503.96 (like). Total plate count of coconut water concentrate was about 3.724.43 log CFU/g. Maturity of coconut water affected fiber content. Adding young coconut kernel affected total soluble solid. Whereas, interaction of coconut water maturity, adding coconut kernel and storage duration affected some variables like pH, total acid, odour, flavor and total plate count. Based on the results of flavour, moisture content, potassium content, fiber content and total plate count, coconut water concentrate had good quality. So it is potential to be developed. The best formula was formula E which was derived from mature coconut water with 20% young coconut kernel.

133 DJAAFAR, T.F.

The characteristic of arrow root tuber (*Marantha arundinacea*) in various harvest age and its products. ***Karakteristik rimpang garut (Marantha arundinacea) pada berbagai***

umur panen dan produk olahannya/ Djaafar, T.F; Rahayu, S; Sarjiman (Balai Pengkajian Teknologi Pertanian Yogyakarta (Indonesia)). [Proceedings of the seminar on the science and technology 2006], Yogyakarta, 2-3 Aug 2006/ Mudjisihono, R.; Udin, L.Z.; Moeljopawiro, S.; Soegandhi, T.M.S.; Kusnowo, A.; Karossi, A.T.A.; Masyudi, M.F.; Sudihardjo, A.M.; Musofie, A.; Wardhani, N.K.; Sembiring, L.; Hartanto (eds.) Lembaga Ilmu Pengetahuan Indonesia, Jakarta (Indonesia). Yogyakarta: BPTP Yogyakarta, 2006; p. 23-28 631.145/.152/SEM/p

MARANTA ARUNDINACEA; ARROWROOT; PROCESSED PRODUCTS; STARCH PRODUCTS; PROCESSING; HARVESTING DATE; PROXIMATE COMPOSITION.

Home industry of arrowroot to starch and arrowroot chips having high market value has developed nowdays. In processing of arrowroot become starch and arrowroot chips, informaton on optimum harvest age of arrowroot should be known to produce high quality and acceptable in the consumer level. The aim of the research was to observe the optimal harvest age of arrowroot than can be used as raw material in chips and strach processing, and the characteristic of arrowroot starch and chips. Arrowroot used in this research was obtained from assessment result carried out by researcher of AIAT Yogyakarta. Arrowroot crops were harvested at age 6, 8 and 10 months after planting (map). There were three research phases, that are (1) arrowroot crop harvested at 6, 8 and 10 months after planting; (2) processing of arrowroot starch with the raw material of arrowroot harvested at 6, 8 and 10 map; and (3) processing of arrowroot chips with the raw material of arrowroot harvested at 6, 8 and 10 map. The parameter observed were the physical and chemical characteristic of arrowroot tuber, arrowroot starch at harvest age 6, 8 and 10 carried out in this research. The result showed that rate of arrowroot starch at age harvest 6, 8 and 10 map were successively 11.65%; 17.73% and 28.43%. Arrowroot fiber content of at harvest age 6, 8 and 10 map was 1.17 %; 1.67% and 3,14%. Rendemen of arrowroot starch at harvest age 6, 8 and 10 map successively was 14.81%; 14.46% and 16.37%. Amylase content of arrowroot starch at harvest age 6,8 and 10 map, successively 8.25%; 21.26% and 40.92%. Rendemen of arrowroot chips at harvest age 6, 8 and 10 map, successively 24.55%; 23.34% and 23.66%. Fiber content of arrowroot chips at harvest age 6, 8 and 10 map, successively 2.98%; 3.38% and 4.69%. Based of starch content and rendemen of starch, and also fiber content and rendemen of chip, the optimal harvest age of arrowroot crop used as the raw material of arrowroot chip processing was 6-8 map, while for starch processing was more than 10 month after planting.

134 HERMINIATI, A.

[Use of dextrin from arrowroot starch as basic food for children with autism]. ***Pemanfaatan dekstrin dari pati garut sebagai bahan dasar makanan bagi penyandang autis***/Herminiati, A.; Abbas, A. (Balai Besar Pengembangan Teknologi Tepat Guna-LIPI, Jakarta (Indonesia)). [Proceedings of the seminar on the science and technology 2006], Yogyakarta, 2-3 Aug 2006/ Mudjisihono, R.; Udin, L.Z.; Moeljopawiro, S.; Soegandhi, T.M.S.; Kusnowo, A.; Karossi, A.T.A.; Masyudi, M.F.; Sudihardjo, A.M.; Musofie, A.; Wardhani, N.K.; Sembiring, L.; Hartanto (eds.) Lembaga Ilmu Pengetahuan Indonesia, Jakarta (Indonesia). Yogyakarta: BPTP Yogyakarta, 2006; p. 61-68 631.145/152/SEM/p

ARROWROOT; STARCH PRODUCTS; DEXTRINS; FOOD; HUMAN DISEASES; ORGANOLEPTIC PROPERTIES

This research aimed to make food base which not contain gluten for children with autism. The selection of arrowroot starch as food base due to high digestibility and then made dextrin as dry conversion to increase its digestibility. The food for autism should have high digestibility and free gluten, because children with autism have abnormal digestive system, particularly when the food goes into small intestine which is commonly called as leaky gut.

Arrowroot dextrin produced color was creamy white, color in lugol solution was brownish purple contents 3.62% moisture, ash 0.18%, crude fibre 0.3%, soluble portion in cold water 93.67%, acid value 0.8 ml NaOH/100 gram and fineness (passing 80 mesh sieve) 99.37%. The characteristic of the arrowroot dextrin met the Indonesian National Standard (SNI) 01-2593, year 1992, except soluble portion in cold water 93.67%, which should be 97%.

135 MUDJISIHONO, R.

Effects of soybean flour mixture and roasting time on beverage of soy flour. ***Pengaruh pengupasan dan waktu penyaringan terhadap sifat minuman bubuk kedelai/*** Mudjisihono, R.; Purwaningsih, H.; Siswanto, N. (Balai Pengkajian Teknologi Pertanian Yogyakarta (Indonesia)). [Proceedings of the national seminar on agricultural innovation and technology transfer for rural industrial agribusiness development in marginal area. Book 3: technology transfer and agricultural economic sociology], Ungaran, 8 Nov 2007/ Muryanto; Prasetyo, T.; Prawirodigdo, S.; Yulianto; Hermawan, A.; Kushartanti, E.; Mardiyanto, S.; Sumardi (eds.) Balai Besar Pengkajian dan Pengembangan Teknologi Pertanian, Bogor (Indonesia). Bogor: BBP2TP, 2007; p. 103-115, 1 ill., 6 tables; 17 ref. 631.17.001.5/SEM/p

SOYBEANS; FLOURS; BEVERAGES; ROASTING; CHEMICOPHYSICAL PROPERTIES; ORGANOLEPTIC PROPERTIES.

An experiment to evaluate the effects of soybean flour mixture and roasting time in beverage of soy flour was conducted at Yogyakarta AIAT. Lokon variety of soybean were used in this experiment, with treatment including ratio of soybean flour mixture (100% whole grain; 50% whole grain + 50% pearled grain; and 100% pearled grain) and three roasting time of 10 minutes; 15 minutes and 20 minutes. The experiment was arranged in factorial completely randomized design with three replications. Laboratory analysis included moisture content, yield recovery of extract flour, protein content, fat content and organoleptic test. The result indicated that soy flour beverage made from soy flour mixture with 15 minutes roasting time gave good color, aroma, and taste. The addition of soybean flour mixture with three roasting time did not influence extract rate of protein and lipid content.

136 SUNANTYO

[Preliminary study on potential of *Arenga pinnata* juice quality to produce an export quality of sugar in North Maluku (Indonesia)]. ***Penelitian pendahuluan potensi kualitas nira sadapan aren untuk proses pembuatan gula semut kualitas ekspor di Maluku Utara***/ Sunantyo (Pusat Penelitian Perkebunan Gula Indonesia, Pasuruan (Indonesia)). [Proceedings of the national seminar on innovation and specific location technology transfer supporting agriculture revitalization. Book 2], Medan, 5 Jun 2007/ Sudana, W.; Moudar, D.; Jamil, A.; Yufdy, P.; Napitupulu, B.; Daniel, M.; Simatupang, S.; Nainggolan, P.; Hayani; Haloho, L.; Darmawati; Suryani, S. (eds.) Balai Besar Pengkajian dan Pengembangan Teknologi Pertanian, Bogor (Indonesia). Bogor: BBP2TP, 2007; p. 554-559, 1 table; 15 ref. 631/152/SEM/p bk2

SUGAR PALMS; TAPPING; PROCESSING; GRANULES; SUGAR; QUALITY; EXPORTS; MALUKU.

The national sugar consumption is increasing from year to year in the line with increasing of sugar consumpton per capita per year. Beside sugarcane, potential sugar producing plants are *Nypa fruticans*, palmira palm, coconut, and *Arenga pinnata*. Indonesia has many planting area of *Arenga pinnata*, so it should optimally utilized. The fasel flowers of Arenga are tapped to produce Arenga juice. A preliminary study of the quality of tapping juice in North Maluku Province showed that the quality of tapping juice from *Arenga pinnata* reach the

purity of >91%. The high quality of the juice is easily to be processed into the high quality of granular brown sugar. Generally, the processing of brown sugar from sugarcane and non sugarcane is still done conventionally, using opened pan system. Improved technology called a closed pan system designed by Indonesian Sugar Research Institute (ISRI) Pasuruan is introduced to produce export quality the granular brown sugar.

137 SUTANTO, A.
Study of corn grain processing for food. ***Kajian pengolahan jagung untuk bahan pangan/*** Sutanto, A.; Nugraheni, D. (Balai Pengkajian Teknologi Pertanian Jawa Tengah, Ungaran (Indonesia)). [Proceedings of the national seminar on agricultural innovation and technology transfer for rural industrial agribusiness development in marginal area. Book 3: technology transfer and agricultural economic sociology], Ungaran, 8 Nop 2007/ Muryanto; Prasetyo, T.; Prawirodigdo, S.; Yulianto; Hermawan, A.; Kushartanti, E.; Mardiyanto, S.; Sumardi (eds.). Bogor : BBP2TP, 2007 p.132-139, 5 tables; 10 ref.

MAIZE; PROCESSING; INSTANT FOODS; BREAKFAST CEREALS; GRAIN.

Corn is a cereal grain which is potential to substitute rice. Since nutrients content of corn is almost equal to those in rice, such grain has been claimed to be the second staple food in Indonesia. Recently, the request for corn grain is getting larger particularly for the main material for food and feed industries. Thus, corn plant is not just used for secondary plant, but its role has been changed for strategic plant in the national economic. Therefore it is important to deeply investigate the potency of corn for human food to improve its status. The seed can be processed for instant corn grain, crispy corn flake, and other meals. A study on cooked grain diversification was conducted at Kemiri Village-Cluster, Getas Village, Kaloran Subdistrict, Temanggung District. The study was performed in 2006. The present study used the on farm client oriented research. Results suggested that the instant corn grain could be modified to be attractive food as well as crispy corn flake that able to improve farmers income. It seems that implementation of professional management to both products of instant corn grain and corn flake would increase farmers income.

138 TRIYONO, A.
[Technology of dextrin from taro starch]. ***Upaya memanfaatkan umbi talas (Colocasia esculenta) sebagai sumber bahan pati pada pengembangan teknologi pembuatan dekstrin***/ Triyono, A. (Balai Besar Pengembangan Teknologi Tepat Guna-LIPI, Subang (Indonesia)). [Proceedings of the seminar on the science and technology 2006], Yogyakarta, 2-3 Aug 2006/ Mudjisihono, R.; Udin, L.Z.; Moeljopawiro, S.; Soegandhi, T.M.S.; Kusnowo, A.; Karossi, A.T.A.; Masyudi, M.F.; Sudihardjo, A.M.; Musofie, A.; Wardhani, N.K.; Sembiring, L.; Hartanto (eds.) Lembaga Ilmu Pengetahuan Indonesia, Jakarta (Indonesia). Yogyakarta: BPTP Yogyakarta, 2006; p. 97-103, 5 ill; 3 tables; 13 ref. 631.145/.152/SEM/p

COLOCASIA ESCULENTA; STARCH; PROCESSING; DEXTRINS; MOISTURE CONTENT; ASH CONTENT; GLUCOSE; VISCOSITY; ENZYMES.

The aim of this research is study technology of dextrin produced from taro starch by using α-amylase enzyme. The advantage of the research is to increase several alternatives to use taro as product diversification and expected that the results gives information of added value of taro in Indonesia. The method is begun with making taro starch from several cultivars, determination of substrates concentration and dextrination time. The main of research is treatment of various enzyme concentration i.e. a1 (0.3%), a2 (0.4%), a3 (0.5%). The physical and chemical analysis are viscosity (cp), dextrin yield (%), water content (%), ash content (%) and dextrose content (%). The result showed that taro of Apu cultivar had yield 19.57% with starch content 74.34%, water content 15.01%, ash content 1.19% and viscosity 1.3 cp. Dextrination time is 120 minutes at substrate consentration 20%. The result of dextrin

showed that the best treatment is a1 (0.3% of α-amylase enzyme) with water content 7.65%, ash content 1.29%, dextrose content 6.42%, viscosity 1.18 cp and dextrin yield 77.23%.

139 WARYAT

[Characteristic of grape (*Vitis vinifera*) quality which coated with carrageenan as raw material]. ***Karakteristik mutu buah anggur (Vitis vinifera) yang dilapisi edible coating berbahan dasar karagenan Eucheuma cottonii***/ Waryat; Thoharoh, T. (Balai Pengkajian Teknologi Pertanian Jakarta (Indonesia)). [Proceedings of the seminar on the science and technology 2006], Yogyakarta, 2-3 Aug 2006/ Mudjisihono, R.; Udin, L.Z.; Moeljopawiro, S.; Soegandhi, T.M.S.; Kusnowo, A.; Karossi, A.T.A.; Masyudi, M.F.; Sudihardjo, A.M.; Musofie, A.; Wardhani, N.K.; Sembiring, L.; Hartanto (eds.) Lembaga Ilmu Pengetahuan Indonesia, Jakarta (Indonesia). Yogyakarta: BPTP Yogyakarta, 2006; p.v29-36 631.145/152/SEM/p

GRAPES; COATING; EDIBLE FILM; PROTECTIVE COATING; CARRAGEENANS; STABILIZERS; CHEMICAL COMPOSITION.

The aim of this research was to know quality characteristic of grape (*Vitis vinifera*) which had coated in room temperature. Solution formulation of edible coating used were 1.2% carrageenan, glycerol 1.5% (w/v), CMC 1% and stearic acid (10%, 20%, 30% (w/w polimer). Ethanol 96% was used as solvent. Parameters observed were quality characteristic including physical analysis such as weight loss, moisture content, sugar content, total acid and TPT which tested every 3 days in room temperature. The result showed that addition of stearic acid 20% can decrease stability of grape acid in room temperature. Concentration of stearic acid 30% can stabilize weight loss, reduce moisture content and stabilize sugar content and TPT in grape fruit. It can be concluded that addition of stearic acid 30% can be used as fatty acid source to produce edible coating with carrageenan as raw material.

Q04 FOOD COMPOSITION

140 SENTANA, S.

[Role of pyruvic and ascorbic acid in storage life prediction of onion Southport white globe cultivar]. ***Peran asam piruvat dan vitamin C dalam memprediksi umur simpan bawang bombay kultivar Southport White Globe/*** Sentana, S. (Pusat Penelitian Fisika - LIPI, Bandung (Indonesia)). [Proceedings of the seminar on the science and technology 2006], Yogyakarta, 2-3 Aug 2006/ Mudjisihono, R.; Udin, L.Z.; Moeljopawiro, S.; Soegandhi, T.M.S.; Kusnowo, A.; Karossi, A.T.A.; Masyudi, M.F.; Sudihardjo, A.M.; Musofie, A.; Wardhani, N.K.; Sembiring, L.; Hartanto (eds.) Lembaga Ilmu Pengetahuan Indonesia, Jakarta (Indonesia). Yogyakarta: BPTP Yogyakarta, 2006; p. 587-591, 2 ill., 4 tables; 17 ref. 631.145/.152/SEM/p

ONIONS; PYRUVIC ACID; ASCORBIC ACID; KEEPING QUALITY; RELATIVE HUMIDITY; SPROUTING; DISEASE TRANSMISSION; VARIETIES.

The research was carried out to find out the role of pyruvic and ascorbic acid by determining the relationship of both acids to storage life of the Southport White Globe onion. A number of onions were stored at 20^{o}C at 60 and 70% relative humidity for 20 weeks. The relationship among those parameters were determined using the Microsoft excel program. The result showed that ascorbic acid and pyruvic acid did not have close relationships to neither sprouting nor rooting of onions. Ascorbic and pyruvic acid could therefore not be

used to predict the storage life of Southport White Globe onion. Both acids have no role in predicting onion storage life.

141 SUNARLIM, R.
[Influence of gingers and pandan leaf extract to the physical characteristic, nutritive value and taste of goat milk caramel]. ***Penambahan ekstrak jahe dan daun pandan terhadap sifat fisik, nilai gizi dan cita rasa karamel susu kambing***/ Sunarlim, R.; Triyantini (Balai Besar Penelitian dan Pengembangan Pascapanen Pertanian, Bogor (Indonesia)). [Proceedings of the seminar on the science and technology 2006], Yogyakarta, 2-3 Aug 2006/ Mudjisihono, R.; Udin, L.Z.; Moeljopawiro, S.; Soegandhi, T.M.S.; Kusnowo, A.; Karossi, A.T.A.; Masyudi, M.F.; Sudihardjo, A.M.; Musofie, A.; Wardhani, N.K.; Sembiring, L.; Hartanto (eds.) Lembaga Ilmu Pengetahuan Indonesia, Jakarta (Indonesia). Yogyakarta: BPTP Yogyakarta, 2006; p. 37-44 631.145/.152/SEM/p

GOATS; GOAT MILK; PROCESSED PRODUCTS; FLAVOURINGS; GINGER; PANDANUS; PROXIMATE COMPOSITION; ORGANOLEPTIC PROPERTIES.

The objective of the research was to produce a durable milk product, reduce the specific smell of goat milk and food diversification by adding ginger and pandan leaf extract to the milk. The research was arranged in completely randomized block design with four types of milk goat caramel (ginger extract, pandan leaf extract, mixture of ginger and pandan leaf extract, and without any addition (control)), with three replications. The parameters observed were pH value, specific gravity, nutritive value (water, protein, fat and ash) and organoleptic test. The result showed that the neutral pH was 6.2-6.5, specific gravity 1.577-2.291, protein values 3.31-4.23%, which are not significantly different statistically, but the ash content of control was the lowest (0.60%), the water percentage was the highest (5.30%), which are significantly different ($P<0.01$) compare to the three other treatments. Meanwhile, the lowest fat content was 3.89% came from extract ginger caramel, and the highest was came from extract ginger and pandan leaf mixture. The panel test of color, smell, and taste revealed that there was no significant different among the four treatments, but the performance and hardness value of control were very significantly less preferred ($P<0,01$).

Q52 FEED PROCESSING AND PRESERVATION

142 WINARTI, E.
[Improvement of male duck feed through fermentation of lactic acid bacteria]. ***Perbaikan pakan itik jantan melalui fermentasi bakteri asam laktat***/ Winarti, E.; Wardhani, N.K.; Aryanti, D. (Balai Pengkajian Teknologi Pertanian Yogyakarta (Indonesia)). [Proceedings of the seminar on the science and technology 2006], Yogyakarta, 2-3 Aug 2006/ Mudjisihono, R.; Udin, L.Z.; Moeljopawiro, S.; Soegandhi, T.M.S.; Kusnowo, A.; Karossi, A.T.A.; Masyudi, M.F.; Sudihardjo, A.M.; Musofie, A.; Wardhani, N.K.; Sembiring, L.; Hartanto (eds.) Lembaga Ilmu Pengetahuan Indonesia, Jakarta (Indonesia). Yogyakarta: BPTP Yogyakarta, 2006; p. 139-141, 3 tables; 8 ref. 631.145/.152/SEM/p

DUCKS; MALES; FEEDS; FERMENTATION; LACTIC ACID BACTERIA; FATTENING; FEED INTAKE; FEED CONVERSION EFFICIENCY; ANIMAL PERFORMANCE.

This assessment was done to understand the influence of feed fermentation by lactic acid bacteria to the growth of grower duck. The experiment was done by completely randomized design with 4 treatment and 4 replications. The treatments were (A) unfermented corn and fermented rice bran; (B) fermented corn and unfermented rice bran; (C) fermented corn and

rice bran; (D) unfermented corn and rice bran. The assessment result showed that the fermentation did not influence (P>0.05) weight of duck, feed consumption and feed conversion ratio (FCR). From the assessment, it could be concluded that lactic acid bacteria fermentation in the rice bran and corn did not influence the performance of grower duck.

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

143 ONGGO, H.

Study of PP-Kenaf blending process and their characteristic/ Onggo, H.; Subowo, W.S. (Pusat Penelitian Fisika - LIPI, Bandung (Indonesia)). [Proceedings of the seminar on the science and technology 2006], Yogyakarta, 2-3 Aug 2006/ Mudjisihono, R.; Udin, L.Z.; Moeljopawiro, S.; Soegandhi, T.M.S.; Kusnowo, A.; Karossi, A.T.A.; Masyudi, M.F.; Sudihardjo, A.M.; Musofie, A.; Wardhani, N.K.; Sembiring, L.; Hartanto (eds.) Lembaga Ilmu Pengetahuan Indonesia, Jakarta (Indonesia). Yogyakarta: BPTP Yogyakarta, 2006 p.127-131, 1 ill; 5 tables; 8 ref. 631.145/.152/SEM/p

KENAF; POLYPROPYLENE; MIXING; GRAVIMETRY; THERMAL ANALYSIS; DIFFERENTIAL THERMAL ANALYSIS; PRESSING; DENSITY; ELASTICITY; STRENGTH.

The investigation of polypropylene-kenaf blending process and their characteristic have been done. The aim of the research was to utilize of kenaf fiber grade C as filler of polypropylene plastic. The blending temperature was conducted by measuring thermal analysis of raw material using thermogravimetry (TG) and differential thermal analysis (DTA) methods. The process of blending was conducted by using laboplastomill mixer for 8 minutes, the blend then was pressed by using hot press at 175^{o}C, for 8 minutes with pressure of 50 kgf. The result was visually good, the density and modulus elasticity was increasing, but the tensile strength and the break elogation were lower then PP. By adding 1% maleic anhydride PP (MaPP) in the blend showed the increasing of tensile strength.

144 RADIYATI, T.

[Effect sucrose and sodium bicarbonate addition on the quality of *Curcuma domestica* effervescent tablet]. *Pengaruh penambahan sukrosa dan sodium bikarbonat terhadap kualitas tablet effervescent kunyit (Curcuma domestica VAHL)*/ Radiyati, T. (Balai Besar Pengembangan Teknologi Tepat Guna-LIPI, Subang (Indonesia)). [Proceedings of the seminar on the science and technology 2006], Yogyakarta, 2-3 Aug 2006/ Mudjisihono, R.; Udin, L.Z.; Moeljopawiro, S.; Soegandhi, T.M.S.; Kusnowo, A.; Karossi, A.T.A.; Masyudi, M.F.; Sudihardjo, A.M.; Musofie, A.; Wardhani, N.K.; Sembiring, L.; Hartanto(eds.) Lembaga Ilmu Pengetahuan Indonesia, Jakarta (Indonesia). Yogyakarta: BPTP Yogyakarta, 2006; p. 149-156, 2 ill; 10 tables; 7 ref. 631.145/.152/SEM/p

CURCUMA LONGA; PROCESSING; MOULDING; SUCROSE; SODIUM BICARBONATE; MOISTURE CONTENT; ASH CONTENT; ORGANOLEPTIC PROPERTIES.

The purpose of this research was to study the processing of turmeric effervescent tablet and also to decide the appropriate concentration of sucrose and sodium bicarbonate for turmeric effervescent tablet. The benefit of this research is as product diversification or alternative process for turmeric and to increase the added value of turmeric. This research was using factorial randomized block design (F = S x N = 3 x 3) with 3 replications. Factor S was

concentration of sucrose (45%, 50%, and 55%) and factor N was concentration of sodium bicarbonate (15%, 20%, and 25%). The parameters analyzed were moisture content, ash content, dissolve time, hardness, taste, colour, and aroma. The result indicated that the most preferred turmeric effervescent tablet was resulted from the process using sucrose 50% and sodium bicarbonate 20%, which had moisture content 2.75%, ash content 5.09%, dissolve time 179.4 seconds and hardness 0.18 kg/cm^2. The curcumin content of the preferred product was 3.85%.

145 SALIM, T.

[Analysis of patchouly distilling technology application in Cupunagara Village, Cisalak Subdistrict, Subang District (Indonesia)]. ***Analisis penerapan teknologi penyulingan nilam di Desa Cupunagara Kecamatan Cisalak Kabupaten Subang***/ Salim, T.; Sriharti. (Balai Besar Pengembangan Teknologi Tepat Guna - LIPI, Subang (Indonesia)). [Proceedings of the seminar on the science and technology 2006], Yogyakarta, 2-3 Aug 2006/ Mudjisihono, R.; Udin, L.Z.; Moeljopawiro, S.; Soegandhi, T.M.S.; Kusnowo, A.; Karossi, A.T.A.; Masyudi, M.F.; Sudihardjo, A.M.; Musofie, A.; Wardhani, N.K.; Sembiring, L.; Hartanto (eds.) Lembaga Ilmu Pengetahuan Indonesia, Jakarta (Indonesia). Yogyakarta: BPTP Yogyakarta, 2006; p. 143-148, 5 tables; 6 ref. 631.145/.152/SEM/p

POGOSTEMON CABLIN; DISTILLING; STEAMING; APPROPRIATE TECHNOLOGY; FARMERS ASSOCIATIONS; AGRICULTURAL ECONOMICS; TECHNOLOGY TRANSFER; SOCIOECONOMIC ENVIRONMENT; JAVA.

Evaluation on the implementation of patchouly oil distilation unit (direct steam type) has been done. The unit is implemented in Subang District by B2PTTG - LIPI in order to improve the performance of patchouly farmers in their work. The result of this study shows that the unit with the capacity of 125 kg raw material per process is feasible to be implemented. The yield of the process is between 1.8%-2.1%. The techno-economic analysis also gives positive NPV (Rp 24,219.900) and BCR 1.21. For the patchouly cultivation, the analysis also gives positive NPV (Rp 36,52.528) and BCR 1.72.

146 SUBOWO, W.S.

Utilizing kapok fiber as sound absorption material/ Subowo, W.S.; Onggo, H. (Pusat Penelitian Kimia-LIPI, Bandung (Indonesia)); Sarwono, J.. [Proceedings of the seminar on the science and technology 2006], Yogyakarta, 2-3 Aug 2006/ Mudjisihono, R.; Udin, L.Z.; Moeljopawiro, S.; Soegandhi, T.M.S.; Kusnowo, A.; Karossi, A.T.A.; Masyudi, M.F.; Sudihardjo, A.M.; Musofie, A.; Wardhani, N.K.; Sembiring, L.; Hartanto (eds.) Lembaga Ilmu Pengetahuan Indonesia, Jakarta (Indonesia). Yogyakarta: BPTP Yogyakarta, 2006 p.83-88, 4 ill; 2 tables; 6 ref. 631.145/.152/SEM/p

KAPOK; PLANT FIBERS; FIBRES; RAW MATERIALS; SOUND; ABSORPTION; ACOUSTIC PROPERTIES; TRANSMISSIONS.

Kapok fiber is a natural fiber that has outstanding properties, which are light, flexible to be formed and porous. The objective of this research was to use kapok fiber as material for absorbing sound energy, either to reduce sound reflection energy, or reduce the transmission of sound energy from inside to outside of room, vice-versa. Sound absorption materials made of kapok fiber have been prepared and tested. The material is able to absorb sound energy that fall on its surface, using loose kapok fiber that put inside of textile sack. The dimension of the sack is 1.2 m x 1.2 m, and 5 cm thickness, and the density of kapok fiber is 16 kg/m3. Nine pieces of the sacks were placed on the floor of the test room of random absorption coefficient (α-r), to meet the minimum area of the test sample is 10 m^2. The comparison sample was glass wool, with the same density and dimension. The result shows that at low frequency of 150 to 800 Hz the α-rkp is higher than that of glass wool (α-rgw), whilst for the frequency higher than 800 Hz up to 4 kHz, the alpha rkp is slightly lower than alpha rgw (see

the graph of Random Absorption Coefficient). Kapok fiber panels with the dimension of 69 cm x 69 cm, thickness of 2.5 cm and the density of 100 kg/m^3 and 200 kg/m^3 have also been made. The panels were used as samples of sound energy Transmission Loss (TL) test in order to find the sound transmission class (STC). The STC test were also done on the glass wool and the loose kapok fiber that were sandwiched between triplex panels with dimension of 69 cm x 69 cm and 5 cm thickness. The test result shows that the STC of kapok panel with the density of 200 kg/m^3 is 21 higher than that of kapok panel with the density of 100 kg/m3 19. Whilst the STC of loose kapok fiber is 22 higher than that glass wool 21. This means that kapok fiber can be used as sound absorption material to control acoustics condition in rooms or passenger cabins. It also shown that kapok fiber can be used as soundproofing material.

147 SUBOWO, W.S.
[Utilization of kapok fibre for helmet shock absorbing linear]. ***Pemanfaatan serat kapok untuk helmet shock absorbing linear***/ Subowo, W.S.; Onggo, H.; Sudirman (Pusat Penelitian Fisika - LIPI, Bandung (Indonesia)). [Proceedings of the seminar on the science and technology 2006], Yogyakarta, 2-3 Aug 2006/ Mudjisihono, R.; Udin, L.Z.; Moeljopawiro, S.; Soegandhi, T.M.S.; Kusnowo, A.; Karossi, A.T.A.; Masyudi, M.F.; Sudihardjo, A.M.; Musofie, A.; Wardhani, N.K.; Sembiring, L.; Hartanto (eds.) Lembaga Ilmu Pengetahuan Indonesia, Jakarta (Indonesia). Yogyakarta: BPTP Yogyakarta, 2006 p. 157-160, 2 ill; 1 table; 5 ref. 631.145/.152/SEM/p

KAPOK; FIBRES; USES; PRESSING; SUSPENSION SYSTEMS; ABSORBANCE.

Kapok fiber is indigenous natural fiber which abundant in Indonesia. However only a small part of the potential kapok is planted in government plantation, and production mostly is exported. The fiber has some outstanding properties are light, soft and easy to be formed. The utilization of kapok fiber so far is as matress and pillows filler, where currently it have been changed by synthetic foams, which is not environmentally friendly. The research is aimed to find out the utilization of kapok fiber based on its properties. Since the kapok properties are light, soft and easy to be formed, kapok is suitable to be used for Helmet Shock Absorbing liner (SAH), by means of hot press mould. The shock absorbing force (SAF) was tested according to SNI 09 - 1811 - 1990, and the control is SAH made of styrofoam of the commercial helmet with brand "index" made in Thailand. The result showed that the SAF value of kapok fiber SAH was better than the SAF of styrofoam, these are 175.5 - 217 kgf, and 243 - 257 kgf, respectively. The conclusion is that kapok fiber can be used for SAH with performance better than SAH made of styrofoam. Therefore kapok fiber can be developed as prospective commodity.

Q70 PROCESSING OF AGRICULTURAL WASTES

148 MIWADA, I N.S.
Modified extraction method to optimize the potential of shank slaughtered chicken byproduct to become gelatin. ***Optimalisasi potensi ceker ayam (shank) hasil limbah RPA melalui metode ekstraksi termodifikasi untuk menghasilkan gelatin***/ Miwada, I N.S. (Universitas Udayana, Denpasar (Indonesia). Fakultas Peternakan); Simpen, I N. *Majalah Ilmiah Peternakan* ISSN 0853-8999 (2007) v. 10(1) p. 5-8, 1 table; 16 ref.

CHICKENS; FEET; HIDE AND SKINS; ABATTOIR BYPRODUCTS; GELATIN; OPTIMIZATION METHODS; CHEMICOPHYSICAL PROPERTIES; EXTRACTION.

This research was conducted to study the potency of shank chicken byproduct using modified extraction methods become gelatin. A completely randomized design (CRD) was used which consisted of 3 treatment extraction method, i.e. M1 (conventional extraction method), M2 (the extraction method by chloroform and methanol) and M3 (modified extraction method). The analysis of variable indicator were pH, rendement viscosity, water and lipid content. The results of research were highest value of pH gelatin was on M3 treatment ($P<0.05$) of 6.82, followed by M2 treatment (6.49) and M1 (6.26). The highest rendement percentage ($P<0.05$) was on M3 treatment (74%), followed by M1 treatment (72.60%) and the lowest on M2 treatment (69.43%). The highest viscosity of gelatin obtained by M3 treatment (7.07 poise), followed by M2 (6.35 poise) and the lowest on M1 (3.77 poise). The highest water content of gelatin was produced by M1 and M3 treatments of 97.71% BS and 97.53% BS, respectively with a significant difference ($P<0.05$) with M2 treatment (95.77% BS). The M3 treatment reduced lipid content of gelatin ($P<0.05$) compared to other treatments. The lipid contents of gelatin were M3 (5.19% BS), M2 (5.81% BS), and M1 (7.99% BS). The application of M3 treatment was better than two other methods in terms of gelatin quality.

149 PUJIYANTO

Use of coffee pulp and minerals for natural soil ameliorant. ***Pemanfaatan kulit buah kopi dan bahan mineral sebagai amelioran tanah alami***/ Pujiyanto (Pusat Penelitian Kopi dan Kakao, Jember (Indonesia)). *Pelita Perkebunan* ISSN 0215-0212 (2007) v.23(2) p. 104-117, 2 ill., 5 tables; 21 ref.

COFFEA; THEOBROMA CACAO; COFFEE PULP; MINERALS; AGRICULTURAL WASTES; SOIL CONDITIONERS; DOSAGE.

In coffee plantation, solid waste of coffee pulp is usually collected as heap nearby processing facilities for several months prior being used as compost. The practice is leading to the formation of odor and liquid which contaminate the environment. The experiments aimed to evaluate the effect of natural soil ameliorant derived from coffee pulp and minerals were conducted at The Indonesian Coffee and Cocoa Reseach Institute in Jember, East Java. The experiments were intended to optimize the use of coffee pulp to support farming sustainability and minimize negative impacts of solid waste disposal originated from coffee cherry processing. Prior to applications, coffee pulp was hulled to organic paste. The paste was then mixed with 10% minerals (w/w). Composition of the minerals was 50% zeolite and 50% rock phosphate powder. The ameliorant was characterized on their physical and chemical properties. Agronomic tests were conducted on coffee and cocoa seedling. The experiments were arranged according to randomized completely design with 2 factors, consisted of natural ameliorant and inorganic fertilizer, respectively. Natural ameliorant derived from coffee pulp was applied at 6 levels: 0, 30, 60, 90, 120 and 150 g dry ameliorant/seedling of 3 kg soil, equivalent to 0, 1, 2, 3, 4 and 5% (w/w) of ameliorant, respectively. Inorganic fertilizer was applied at 2 levels: 0 and 2 g fertilizer/application of N-P-K compound fertilizer of 15-15-15, respectively. The inorganic fertilizer was applied 4 times during nursery of coffee and cocoa. The result of the experiment indicated that coffee pulp may be used as natural soil ameliorant. Composition of ameliorant 90% coffee pulp and 10% of minerals has good physical and chemical characteristics for soil amelioration. The composition has high water holding capacity; cations exchange capacity, organic carbon and phosphorus contents which are favorable to increase soil capacity on supporting plant growth. Application of ameliorant derived from coffee pulp increased significantly growth of coffee and cocoa seedling. There was positive interaction effect between the ameliorant and the fertilizers. Both the ameliorant and the fertilizers affected the seedling growth synergistically. Application of the ameliorant increased fertilizer efficiency.

150 SUHARTO

[Effect of catalyst concentration on furfural on corncob hydrolysis]. ***Pengaruh konsentrasi katalis terhadap perolehan furfural pada hidrolisis tongkol jagung***/ Suharto (Balai Pengembangan Proses dan Teknologi Kimia, Yogyakarta (Indonesia)); Susanto, H. [Proceedings of the seminar on the science and technology 2006], Yogyakarta, 2-3 Aug 2006/ Mudjisihono, R.; Udin, L.Z.; Moeljopawiro, S.; Soegandhi, T.M.S.; Kusnowo, A.; Karossi, A.T.A.; Masyudi, M.F.; Sudihardjo, A.M.; Musofie, A.; Wardhani, N.K.; Sembiring, L.; Hartanto (eds.) Lembaga Ilmu Pengetahuan Indonesia, Jakarta (Indonesia). Yogyakarta: BPTP Yogyakarta, 2006; p. 167-171, 2 ill; 1 table; 3 ref. 631.145/.152/SEM/p

MAIZE; AGRICULTURAL WASTES; PENTOSANS; HYDROLYSIS; CATALYSTS; SULPHURIC ACID; FURFURAL; DIGESTERS.

The needs of furfural as solvent in purification extraction of lubricating oils and for others chemical industries in Indonesia is still supplied from import. Many agricultural wastes containing pentosan as source of furfural is available in Indonesia, such as corncobs (30%), bagasse (25%), rice straw and most of them are available as solid wastes of agricultural products. Corncobs hydrolysis using sulphurid acid catalysts have been carried out with digester 500 L at operation condition (pressure 6 Bar, temperature 157^{o}C, operating time for 2 hours) to obtain by furfural. One of the factor influencing furfural yields in this hydrolysis is catalysts concentration and other operation parameters. To reduce further degradation of furfural release 10 g from digester was done immediately after this formed by releasing vapor from digester after digestion for 2 hours. The vapor released from was directly passed to destillation, so that fractionation occured and obtained destillation in two fasa : enriched furfural fasa (94% mass) and water rich fasa. The release of furfural from digester also can be assisted with open steam flow which this come into dilution in digester stream and through coil. In this research hydrolysis process and continued with open steam stream can give raw furfural of 3.8 kg for each 51 kg corncob (oven dry).

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