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PREFACE

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Director of Indonesian Center for Agricultural Library and Technology Dissemination

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[Institution performance of agricultural extension institute (BPP) supporting agricultural extension revitalization in West Sumatra (Indonesia)]. ***Keragaan kelembagaan Balai Penyuluhan Pertanian (BPP) mendukung revitalisasi penyuluhan pertanian di Sumatera Barat***/Hosen, N. (Balai Pengkajian Teknologi Pertanian Sumatera Barat, Sukarami (Indonesia)). [Proceedings of the national seminar on innovation and specific location technology transfer supporting agricultural revitalization. Book 2], Medan, 5 June 2007/Sudana, W.; Moudar, D.; Jamil, A.; Yufdy, P.; Napitupulu, B.; Daniel, M.; Simatupang, S.; Nainggolan, P.; Hayani; Haloho, L.; Darmawati; Suryani, S. (eds.). Bogor (Indonesia): BBP2TP, 2007: p. 786-791, 3 tables; 9 ref. 631/152/SEM/p bk2

SUMATRA; EXTENSION ACTIVITIES; ADVISORY OFFICERS; AGRICULTURAL DEVELOPMENT; AGRICULTURAL WORKERS.

The extension institution at BPP level of West Sumatra in 2006 is still weak, and this condition will influence extension institution performance. The amount of extension workers was not adequate and unevenly distributed between region with indicator of extension worker/village ratio of < 1, this mean the amount of extension workers was smaller than the quantity of village in BPP region. The BPP was not available on every sub-district. The facilities at BPP level were limited, especially audiovisual equipments, and demonstration plot as technology exhibition. Most of extension workers aged 40-50 years old, and 25% aged more than 50 years old. This condition showed that in the next 5-10 years, the quantity of extension workers will be decreasing if the quantity of extension workers was not added. The education level of extension workers was adequate (D-III) and some of them was S-1 level. The recommendation to policy maker at province and district was (i) the quantity of extension workers should be added at least two persons in one village; (ii) The facilities, such as operational budget and some infrastucture dissemination should be improved to support science and technology development at each BPP.

E10 AGRICULTURAL ECONOMICS AND POLICIES

152 MARTIN, E.

Economic feasibility and social benefit of social forestry program at industrial plantation forest. ***Kelayakan ekonomi dan manfaat sosial program perhutanan sosial pada hutan tanaman industri***/Martin, E.; Fitriyanti, H. (Balai Penelitian dan Pengembangan Hutan Tanaman, Palembang (Indonesia)). *Jurnal Penelitian Hutan Tanaman* (Indonesia) ISSN 1829-6327 (2006) v. 3(2) p. 117-128, 5 tables; 14 ref.

INDUSTRIAL CROPS; SOCIAL FORESTRY; ECONOMIC ANALYSIS.

There was a doubt concerning about Indonesian Social Forestry Concept that are liable to be acted as industrial plantation forest management by stakeholders. This research was aimed at gaining an objective description wether social forestry program can be optioned as Indonesian industrial plantation forest management. Research was conducted at PT. Musi Hutan Persada as one of Indonesian industrial plantation forest concession holder. This company have been applied the variance of social forestry, namely MHBM for company-community partnership at concession areas and MHR for its developing plantation forest at private owned land. Economic feasibility study and social benefit review were used to analyse the data. The result of the research showed that MHBM was enonomically feasible for company on current interest 14% till 15.55%, while rate of return for MHR can achieve 17.89%. Social benefit from social forestry application were felt both company and community. The data showed that fire on land

concession tended to decrease, social conflict intensity was reduced, and source of people income and work alternative were more extended since social forestry program were implemented.

E14 DEVELOPMENT ECONOMICS AND POLICIES

153 BUSYRA, B.S.

Agroecological zone study to support agricultural commodity development in Bungo District, Jambi Province (Indonesia). ***Studi zona agroekologi untuk pengembangan komoditas pertanian di Kabupaten Bungo, Provinsi Jambi***/Busyra, B.S.; Salwati (Balai Pengkajian Teknologi Pertanian Jambi (Indonesia)); Nildalina. [Proceedings of the national seminar on innovation and specific location technology transfer supporting agricultural revitalization. Book 2], Medan, 5 June 2007/Sudana, W.; Moudar, D.; Jamil, A.; Yufdy, P.; Napitupulu, B.; Daniel, M.; Simatupang, S.; Nainggolan, P.; Hayani; Haloho, L.; Darmawati; Suryani, S. (eds.). Bogor (Indonesia): BBP2TP, 2007: p: 728-736, 1 table; 22 ref. 631/152/SEM/p bk2

AGRICULTURAL PRODUCTS; AGRICULTURAL DEVELOPMENT; AGROECOSYSTEMS; AGROFORESTRY; LAND USE; FARMING SYSTEMS; SUSTAINABILITY; SUMATRA.

Agro-ecological zone (AEZ) is one of the ways to operationally direct agricultural development planning. The objective of the study was to analyze AEZ and land utilitization in supporting agricultural commodity development in Bungo District, Jambi Province. The study applied an Expert System Method developed by Indonesian Center for Soil and Agroclimatic Research. The stages of the study consisted of (1) AEZ map formulation, (2) Data interpretation into expert system, (3) Data analysis through GIS, and field verification. Bungo District has an area of 465,899 ha, where 12.30% of it lays on area over 700 m asl, 87.70% on 0-700 m asl. The results showed that Bungo District comprised of four soil ordo, namely Entisols, Inceptisols, Ultisols dan Oxisol, with 4 groups, namely Dystrudepts, Kandiudox, Hapludox dan Hapludults. Four main zones including 11 subzones of AEZ. Zone I consisted of lax1, lax2, lbx1, and lbx2 with agroforestry system (preserved forest and producing forest) and the area was 44,365 ha (9.52%). Zone II comprised of zone IIax and IIbx with plantation system and the area was 81,580 ha (17.51%). Zone IIIax and IIIbx was allocated to agroforestry or alley cropping system of 200,002 ha (42.93%). Zone IV consisted of zone IVax1 for wet cropping system of 42,766 ha (9.18%) and IVax2 dry cropping system of 97,529 ha (20.93%) and Zone IVbx1 for lowland rice intensification of 27 ha (0.01%). In general, the existing land utilization of estate crops, food crops and vegetable in Bungo District has not yet suitable based on agroecological zone. It was expected that the presence of AEZ maps would be a future agricultural development guide in Bungo District.

154 KARTONO, G.

Role of AEZ and LQ in extension of horticulture in East Java (Indonesia). ***Peran ZAE (zona agroekologi) dan LQ (location quotient) dalam pengembangan hortikultura di Jawa Timur***/Kartono, G.; Ernawanto, Q.D.; Saraswati, D.P. (Balai Pengkajian Teknologi Pertanian Jawa Timur, Malang (Indonesia)). *Buletin Teknologi dan Informasi Pertanian BPTP Jawa Timur* (Indonesia) ISSN 1410-8976 (2006) v. 9 p. 23-32, 10 ref.

HORTICULTURE; EXTENSIFICATION; AGROECOSYSTEMS; AGRICULTURAL DEVELOPMENT; JAVA.

Regional development which based on sustainable agriculture and agricultural resources efficiency is the main component to be considered. The extension of commodities in unfavourable agroecology will result unoptimal productivity, also need high input and risk. Therefore, commodity zoning suitable to

agroecological condition is the firt step that could help in setting program. East Java AIAT has already inventoried characteristics and identification of the potency of East Java Province, that resulted in geographical information system format, and published as East Java agroecology zone map with scale 1:250.000, that are devided into 5 main zones based on sloppy region (zone I, II, III, IV and V), with 30 sub zone based on the climate, completed with biophysic characters and alternative commodities. AEZ map was used to prepare a suitable zone map for pummelo in Magetan, and further it is hoped that this map will be used to other commodities, that in turn it will be used to determine the main commodities of each region to be developed. Identification of main commodity could be done through several approaches, one of them by using location quotient (LQ). Main fruit crops commodity in East Java was found around 22 commodities, namely mango, banana, zappota, longan, durio, star fruit, citrus, and mangosteen, while there was 16 main vegetable commodities, namely pepper, shallot, cucumber, tomato, pakchoy, cabbage and potato.

155 KASMIYATI

Effect of sociocultural characteristic of community to the adaptation of agricultural technology. ***Pengaruh karakteristik sosial budaya masyarakat terhadap penerapan teknologi pertanian: studi pada petani sayuran dataran tinggi Kota Batu Propinsi Jawa Timur***/Kasmiyati. *Buletin Teknologi dan Informasi Pertanian BPTP Jawa Timur* (Indonesia) ISSN 1410-8976 (2006) v. 9 p. 7-22, 4 tables; 12 ref.

FARMERS; ADAPTATION; INNOVATION ADOPTION; TECHNOLOGY; SOCIOCULTURAL ENVIRONMENT.

The aim of this research was to know the sociocultural characteristic of farmer as users to the adaptation of agricultural technology. Research was conducted at two villages, namely Torongrejo Village, Junrejo Subdistrict, Batu, and Giripurno Village, Bumiaji Subdistrict, Batu, East Java using explanatory survey to test hyphotesis by simple random sampling proportional. Location was selected purposively and as analysis unit was farmers (as owners and labours). Data was collected by using interview method and questionnaire and analyzed using descriptive method - Pearson Product Moment Correlation. Result showed that sociocultural analysis of farmers including education, empathy, communication, and future orientation and farmer's response towards technology adaptation was significantly affected adoption of technology innovation. Descriptive analysis showed that socio cultural characteristics of vegetable farmers in Batu was low, that in turn resulted a negative response and relatively low adaptation of the farmers towards technology innovation.

156 PURWANTO

[Improving farmer groups institutions in supporting agricultural development in East Java (Indonesia)]. ***Penguatan kelembagaan kelompok tani dalam mendukung pembangunan pertanian di Jawa Timur***/Purwanto; Syukur, M.; Santoso, P. *Buletin Teknologi dan Informasi Pertanian BPTP Jawa Timur* (Indonesia) ISSN 1410-8976 (2006) v. 9 p. 41-51, 4 tables; 7 ref.

AGRICULTURAL DEVELOPMENT; FARMERS ASSOCIATIONS; PARTICIPATION; INCENTIVES; FINANCIAL INSTITUTIONS; JAVA.

Empowerment of farmers' groups and improvement of farmers' knowledge and skill are extremely important to improve agricultural products competitiveness to face free market in globalization era. These are based on the idea that farmers' groups are the main user (stake holders) of agricultural technology innovation. The purpose of this research was to identify the problem of production institutional aspect (farmers' groups) in supporting agricultural development in East Java. The research was conducted using

survey method involving four farmers' groups in Blitar and Tulungagung Regencies. Data was analyzed descriptively using cross tabulation techniques. The results showed several findings as follows: in general, farmers' groups were formed based on technical importance to facilitate coordination with existing government program (program oriented), lack of independency and sustainability of the groups. Participation and solidarity of group members in group activities were still relatively low.

157 RAMIJA, K.E.

Prospects and challenges of cocoa development at Selayang Village, Selesai Subdistrict, Langkat District, North Sumatra (Indonesia). ***Peluang dan tantangan pengembangan kakao di Desa Selayang, Kecamatan Selesai, Kabupaten Langkat, Sumatera Utara***/Ramija, K.E.; Nazir, D. (Balai Pengkajian Teknologi Pertanian Sumatera Utara, Medan (Indonesia)). [Proceedings of the national seminar on innovation and specific location technology transfer supporting agricultural revitalization. Book 2], Medan, 5 June 2007/Sudana, W.; Moudar, D.; Jamil, A.; Yufdy, P.; Napitupulu, B.; Daniel, M.; Simatupang, S.; Nainggolan, P.; Hayani; Haloho, L.; Darmawati; Suryani, S. (eds.). Bogor (Indonesia): BBP2TP, 2007: p. 792-802, 3 ill., 8 tables; 14 ref. 631/152/SEM/p bk2

THEOBROMA CACAO; AGRICULTURAL PRODUCTS; ECONOMIC DEVELOPMENT; FARMING SYSTEMS; FARMERS ASSOCIATIONS; PARTICIPATION; SOCIOECONOMIC ENVIRONMENT; INFRASTRUCTURE; TECHNOLOGY; SUMATRA.

Cacao is an important commodity for most people in Langkat District as an income source. Many challenges were found on cacao development that needed to be further assessed in order to find the solutions through planning arrangement which are suitable to local condition and agreed by beneficiaries. The assessment objective was to identify the problems and challenges of cacao development by using PRA (Participatory Rural Appraisal) method. Fifty persons of farmer society were involved in the study. The participants consisted of 25, 5, 5, 6, 2, 3, and 4 persons as key farmers, religious personage, custom personage, village board, irrigation water distributor, extension workers, and traders, respectively. According to assessment results, data has been obtained concerning existing cacao farming condition, product price problems, and problems that need to be solved immediately such as cultivation technique (pruning, balanced fertilizer, postharvest, pests and diseases control), drying method (water content at SNI based), as well as farmer institution (unestablished farmers group), ineffective marketing agent (product marketing center) due to capital insufficient. By overcoming of these problems, the opportunity for cacao development then is mostly possible and presumably can accelerate local economic growth.

E16 PRODUCTION ECONOMICS

158 SOMANTRI, A.S.

Dynamic system analysis for policy of supply of cassava: case study in Bogor Regency (Indonesia). ***Analisis sistem dinamik untuk kebijakan penyediaan ubi kayu: studi kasus di Kabupaten Bogor***/Somantri, A.S. (Balai Besar Penelitian dan Pengembangan Pascapanen Pertanian, Bogor (Indonesia)); Machfud. *Buletin Teknologi Pascapanen Pertanian* (Indonesia) ISSN 1858-3504 (2006) v. 2(1) p. 36-48, 15 ill., 3 tables

CASSAVA; SUPPLY BALANCE; POLICIES; JAVA.

The availability of cassava's model consists of 3 sub models such as supply, consumption, and industrial needs. There are five scenarios according to model purposes, which are (1) scenario without policy (preservation effort); (2) scenario with land-resource efficiency policy; (3) scenario with productivity

improvement policy; (4) scenario with land-resource efficiency and productivity improvement policy; (5) scenario with consumption and industrial needs improvement impact. Analysis result indicates that if there is a descent of plant area 2% annually, cassava's supply in Bogor Regency estimated will be run out in 2008 if there is no preservation effort (scenario 1). Preservation effort expanding 1% of planting area annually would be able to fulfill cassava's need for the next 10 years (scenario 2). While preservation effort through productivity improvement of 19 ton/ha would only able to fulfill cassava's need until 2011 (scenario 3). Preservation by planting area expansion of 0.5% annually and productivity improvement of 19 ton/ha (scenario 4) would be able to fulfill cassava's need until the next 10 years. Assumed that the change of consumption level is 0.009 ton/capita/year followed by the change of industrial needs especially tapioca industry of 2.5 ton/unit/day then cassava's production would not be able to fulfill the need of cassava for more than 10 years (scenario 5). To overcome the problem on scenario 5, land expansion of 1% annually and productivity improvement rate of 19 ton/ha should be conducted. The effort would be able to fulfill cassava's need for the next 10 years.

E20 ORGANIZATION, ADMINISTRATION AND MANAGEMENT OF AGRICULTURAL ENTERPRISES OR FARMS

159 KOTADINY, E.R.

Relation between farmer livestock to the costs income and its efficiency in the transmigration region Buru Regency (Indonesia). ***Hubungan antara skala usaha peternakan sapi rakyat dengan biaya, pendapatan, dan efisiensi ekonomi di daerah transmigrasi Kabupaten Buru***/Kotadiny, E.R. (Balai Pengkajian Teknologi Pertanian Maluku, Ambon (Indonesia)). *Buletin Teknologi dan Informasi Pertanian BPTP Jawa Timur* (Indonesia) ISSN 1410-8976 (2006) v. 9 p. 95-103, 4 tables; 8 ref.

CATTLE; LIVESTOCK; COSTS; INCOME; EFFICIENCY; ECONOMICS; COST ANALYSIS; MALUKU.

Farming system of cattle needs relatively big capital and cost analysis is the main factor in decision making to the sustainability of farming system. An assessment was conducted at Wayapo land, Buru Utara Timur District, Buru Regency, from September to October 2005. The objective was to know the relationship between the scale of livestock farming compare to production costs, farming system return and its economic value. The assessment used a survey method, taking 5 villages purposively and 78 respondents of each village using a stratified random sampling which divided into 3 strata, small, moderate and high ownership level. Result showed that there was a significant correlation between farming system scale with production costs, return and income among the three scales, but not R/C ratio value. The three farming system scales did not show maximal economic value. The higher the farming system system scale the production costs and gave higher return and income.

160 SANNANG, Z.

[Improving farmer group ability through Prima Tani approach in Parigi Moutong Regency, Central Sulawesi (Indonesia)]. ***Peningkatan kemampuan kelompok tani dengan pendekatan Prima Tani di Kabupaten Parigi Moutong Sulawesi Tengah***/Sannang, Z.; Hutahaean, L. (Balai Pengkajian Teknologi Pertanian Sulawesi Tengah, Palu (Indonesia)). [Proceedings of the national seminar on innovation and specific location technology transfer supporting agricultural revitalization. Book 2], Medan, 5 June 2007/Sudana, W.; Moudar, D.; Jamil, A.; Yufdy, P.; Napitupulu, B.; Daniel, M.; Simatupang, S.; Nainggolan, P.; Hayani; Haloho, L.; Darmawati; Suryani, S. (eds.). Bogor (Indonesia): BBP2TP, 2007: p. 780-785, 2 tables; 5 ref. 631/152/SEM/p bk2

SULAWESI; FARMERS ASSOCIATIONS; EXTENSION ACTIVITIES; RESEARCH SUPPORT; INNOVATION; TECHNOLOGY TRANSFER; PARTICIPATION; AGROINDUSTRIAL SECTOR.

Prima Tani is an integrated model of research-extension-agribusiness-supporting service linkages. Extension organization of agriculture in Parigi Moutong regency, Central Sulawesi in autonomous era become terribly since there is no institution of extension service. Research and extension activities in Torue Subdistrict, Parigi Moutong Regency can be combined with Prima Tani goal. The objective of study was to obtain impact of Prima Tani activies to improve farmer group capability. Survey method using questionnaires was used in this research. Data was analyzed descriptively and presented in tables. Results indicated that there were five farmers group improved from beginner to intermediate with value among 256-478. Pomponelangi, Solo, Benau A, Benau B, Pekalongan, Sampalue A and Sampalue B were the name of farmers groups which proceed to higher level. While other seven farmer groups still occuplied beginner group with value 181-249. Besides, establishment of agribusiness clinic gave positive effect on improving farmers' group capability.

161 SIAGIAN, D.R.

[Fruit commodities zoning at North Sumatra (Indonesia) scale 1 : 250.000]. ***Pewilayahan beberapa komoditas buah-buahan di Sumatera Utara skala 1 : 250.000***/Siagian, D.R.; Girsang, M.A. (Balai Pengkajian Teknologi Pertanian Sumatera Utara, Medan (Indonesia)). [Proceedings of the national seminar on innovation and specific location technology transfer supporting agricultural revitalization. Book 2], Medan, 5 June 2007/Sudana, W.; Moudar, D.; Jamil, A.; Yufdy, P.; Napitupulu, B.; Daniel, M.; Simatupang, S.; Nainggolan, P.; Hayani; Haloho, L.; Darmawati; Suryani, S. (eds.). Bogor (Indonesia): BBP2TP, 2007: p. 803-811, 4 ill., 5 tables; 10 ref. 631/152/SEM/p bk2

FRUITS; AGRICULTURAL PRODUCTS; AGROECOSYSTEMS; FARMING SYSTEMS; SITE FACTORS; LAND SUITABILITY; SUSTAINABILITY; FARM INCOME; SUMATRA.

The problem of orange farming system at North Sumatra is low productivity (6.5 t/ha) with various quality, whereas the potential yield can reach 20 t/ha. Passion fruit productivity in North Sumatra is low (20 t/ha) as well if compare with its production from Malaysia (60 t/ha). As one of exotic fruits, mangosteen is luxurious commodity in abroad, so the market for fresh fruit is good. Inappropriate mangosteen management resulted in low productivity and quality. Apple demand for North Sumatra is still depend from anothers places and imported from abroad. But, there werw some places in North Sumatra that suitable for apple. One of efforts in increasing farm income is to establish agribusiness development center or zone for four commodities where agroecological zoning (AEZ) should be done to support efficient specific location technology with considering worker supply, capital and farmer ability.

162 TOGATOROP, M.H.

[Role of livestock as an farming system component in rice field ecosystem to increase farmers income]. ***Peran serta ternak sebagai salah satu komponen usaha tani ekosistem lahan sawah untuk peningkatan pendapatan petani***/Togatorop, M.H.; Sudana, W. (Balai Besar Pengkajian dan Pengembangan Teknologi Pertanian, Bogor (Indonesia)). [Proceedings of the national seminar on innovation and specific location technology transfer supporting agricultural revitalization. Book 2], Medan, 5 June 2007/Sudana, W.; Moudar, D.; Jamil, A.; Yufdy, P.; Napitupulu, B.; Daniel, M.; Simatupang, S.; Nainggolan, P.; Hayani; Haloho, L.; Darmawati; Suryani, S. (eds.). Bogor (Indonesia): BBP2TP, 2007: p. 630-638, 7 tables; 11 ref. 631/152/SEM/p bk2

LIVESTOCK; IRRIGATED RICE; FARMING SYSTEMS; TENURE; REARING TECHNIQUES; EXTENSIVE HUSBANDRY; FARM INCOME.

Assessment was carried out in the villages of Karawang in West Java, Parigi Moutong in Central Sulawesi, Musi Rawas in South Sumatra, and Pesisir Selatan in West Sumatra. The data was collected through a survey using a structured questionnaire with respondents of 30 farmers in each village. The respondents were selected randomly, while the village in each kabupaten and farmer's groups were selected close to the Prima Tani activity. The data were analysed descriptively and financially. The results showed that the farmer's education level as family head, and his wife in Tolai and Tindaki, Rejosari and Bangun Sari (transmigration area) villages were higher than those in the villages of Parakan and Karangjaya, including Surantih village (non-transmigration area). Food crop farming systems were still dominating farmer's work in these villages. Raising animals in villages of Parakan and Karangjaya, Bangun Sari and Rejosari were dominated by local chicken, followed by ducks, whereas in Tolai and Tindaki Villages, pigs were the dominant animals followed by local chicken, while in Surantih village the local chicken followed by large ruminants. Irrigated rice fields ownership of an average of 0.40 ha was officially owned by 59% of farmers in Parakan and Karangjaya Villages, whereas in Tolai and Tindaki Villages around 91% of farmers owned 1.47 ha. Further, in Rejosari and Bangunsari Villages 95% of the respondents owned on average 0.78 ha irrigated rice field were higher compared to 92% of the respondents in Surantih Village owning 0.46 ha. The contribution to income from animals in Surantih, Tolai and Tindaki, Rejosari and Bangunsari, Parakan and Karangjaya Villages were 15.36%; 9.36%: 8.71% and 1.16%, respectively. The animals (although still extensively raised) played a significant role in increasing farmers' income, apart only from food crops (rice and other crops) that in Parakan and Karangjaya Villages contributed 57.20%, Tolai and Tindaki Villages around 43.94%, Rejosari and Bangunsari Villages 38.91, and Surantih Village 17.49% of the total farmers income.

163 WILDAYANA, E.

[Design of farmer's women working program as an income source on integrated farming system]. ***Rancang bangun program kerja wanita tani sebagai sumber nafkah pada sistem usaha tani terpadu***/Wildayana, E. (Universitas Sriwijaya, Palembang (Indonesia). Fakultas Pertanian). *Habitat* (Indonesia) ISSN 0853-5167 (2006) v. 17(4) p. 279-292, 3 ill., 5 tables; 14 ref.

FARMERS; WOMEN; FARMING SYSTEMS; PLANNING; FARM INCOME.

The research aimed to make design of farmer's women working program as an income source through integrated farming system. The research site was located in Sukanegeri Village, Banding Agung Subdistric, South OKU District, South Sumatra Province and has been done in 2005-2006. The design contruction was done through several activity steps, as follows SWOT analysis, problem analysis, objective analysis, determining strategic in farmer's women working program, and making logical framework matrix. The research results showed that the general condition of the research location was suitable for integrated farming system because climate, soil and agricultural commodities supported development of integrated farming system. Socioeconomic condition and institution in village also supported development of farmer's women working program as income source. Participation of farmer's women in integrated farming system should be studied from aspect of marriage age, joining with family planning, distribution of main work of farmer's women, description of farmer's women work pattern, time allocation in farm activities, and contribution of income from farmer's women to total family income. SWOT analysis revealed internal factors and external factors. From this result, it can be made logical framework matrix for design of farmer's women working program as an income source on integrated farming system.

E21 AGRO-INDUSTRY

164 HARDIANTO, R.

Study on the potency of the development and growth of corn and cassava processing activities in Tuban (Indonesia). ***Studi potensi pengembangan dan penumbuhan usaha pengolahan jagung (Zea mays) dan ubi kayu (Manihot utilissima) di Kabupaten Tuban***/Hardianto, R.; Suhardjo; Suhardi (Balai Pengkajian Teknologi Pertanian Jawa Timur, Malang (Indonesia)); Kurniawan, S. *Buletin Teknologi dan Informasi Pertanian. BPTP Jawa Timur* (Indonesia) ISSN 1410-8976 (2006) v. 9 p. 52-68, 6 ill., 13 ref.

MAIZE; CASSAVA; FOOD TECHNOLOGY; PROCESSING; COTTAGE INDUSTRY; PROXIMATE COMPOSITION; ORGANOLEPTIC ANALYSIS; ECONOMIC ANALYSIS; JAVA.

The development and growth of corn and cassava processing was expected to improve added value and nutritive content as local food sources and at the end increasing farmers income in the village. Study was conducted at four districts, at corn and cassava production centre in Tuban, namely Tuban, Montong, Plumpang, and Palang Subdistricts. Technology introduced were the processing of cassava flour, instant tiwul, tortila corn and cassava flour chips, using a small diesel machine. The potency of corn and cassava in Tuban was 3.026.937 quintal and 1.277.291 quintal, respectively, where most of them was sold as fresh product, and only little was prepared as processed food. Existing processing activities found in Tuban were 5 units of fried corn, 20 units cassava flour chips, 100 units fermented cooking and 20 units cassava chips. Preparation of instant tiwul fortified with 20% of green bean was the most preferred product due to its attractive colour, texture and delicius taste compared to fortified material. Tiwul fortified with soybean, green bean and bean were having protein content 7.31%; 6.09% and 5.97%, fat content 1.07%; 1.35% and 1.33%; crude fibre 4.01%; 5.76% and 5.93%, respectively; while economic analysis showed profit improvement by Rp 19,350; Rp 30,600 and Rp 12,600 per 50 kg dried chips, respectively. Corn tortila with MSG + salt was preferred by consumers, having 1.29% water content, 1.88% ashes, 7.60% protein, 24.49% fat, and 64.74% carbohydrate. Plastic package was relatively good material, providing profit by Rp 2,000/kg of corn. Soybean and green bean flour chips fortified were more preferred by consumers due to its colour, texture and taste compared to fortified product.

E70 TRADE, MARKETING AND DISTRIBUTION

165 AGUSTIAN, A.

[Marketing analysis of cabbage crop in Karo Regency, North Sumatra (Indonesia)]. ***Analisis pemasaran komoditas kubis di Kabupaten Karo Provinsi Sumatera Utara***/Agustian, A.; Tarigan, H. (Pusat Analisis Sosial Ekonomi dan Kebijakan Pertanian, Bogor (Indonesia)). [Proceedings of the national seminar on innovation and specific location technology transfer supporting agricultural revitalization. Book 2], Medan, 5 June 2007/Sudana, W.; Moudar, D.; Jamil, A.; Yufdy, P.; Napitupulu, B.; Daniel, M.; Simatupang, S.; Nainggolan, P.; Hayani; Haloho, L.; Darmawati; Suryani, S. (eds.). Bogor (Indonesia): BBP2TP, 2007: p. 720-727, 1 ill., 2 tables; 5 ref. 631/152/SEM/p bk2

CABBAGES; COMMODITY MARKETS; MARKETING CHANNELS; MARKETING MARGINS; SUPERMARKETS; RETAIL MARKETING; PROFITABILITY; SUMATRA.

The objective of this research was to analyze cabbage farming and also cabbage marketing chain and margin in Karo District, North Sumatra. The research was conducted in 2005. Data collected, including primary and secondary data, were analyzed quantitatively and qualitatively. The results of the research were: (1) Average cabbage yield was 27.950 ton/ha/season with price level of Rp 745/kg and R/C ratio of 2.12; (2) There were some various cabbage marketing paths; farmers sold their production either to village collector traders/agents, sub-district collector traders or wholesalers; (3) The highest cabbage marketing

margin was obtained by supermarkets (Rp 1,700/kg), followed by suppliers (630/kg), retailers (Rp 400/kg) and traders in the central market (Rp 250/kg); (4) Marketing margin distribution tended to be uneven where farmers' share to marketing institutions' price of supermarkets, suppliers, traders in the central market, and retailers was very small. This fact reflected that the increase in cabbage price in retailing/traditional market was not transmitted well to farmer/producer level. As a consequence, farmers still had no better profit.

166 DELIANA, Y.

Differences of transaction cost between vertical integration and free transaction of corn at small trader level in East Java (Indonesia). ***Perbedaan biaya transaksi antara integrasi vertikal dan transaksi bebas di tingkat pedagang pengumpul jagung di Jawa Timur***/Deliana, Y. (Universitas Padjadjaran, Bandung (Indonesia). Fakultas Pertanian). *Jurnal Agrikultura* (Indonesia) ISSN 0858-2885 (2008) v. 16(3) p. 195-199, 5 tables; 7 ref.

MAIZE; MARKETING; COSTS; MARKETING MARGINS; JAVA.

The main problem of corn marketing in East Java is that the price of farm gate always low either at the peak production season or the time of corn scarcity with farmer share of 30% - 40%. It is predicted that the low price of corn at the farm gate was caused by high transaction cost. According to the theory, transaction cost of vertical integration is less than that of free transaction. To know that theory is correct, the research has been taken by using the explanatory survey method to 35 respondents of wholesaler conducted by census from 14 districts in East Java and 63 small trader selected by simple random sampling. The result of this research showed that for those who practiced vertical integration, the transaction cost was even higher than that of free transaction at small trader level, which was contradictive with the theory. Vertical integration did not result in more profit than free transaction, and this existing transaction practiced between small trader and wholesaler was based upon selling practicality, not based on transaction cost.

167 FERIZAL, M.

[Distribution and marketing of rice in Nanggroe Aceh Darussalam (Indonesia)]. ***Distribusi dan pemasaran beras di Nanggroe Aceh Darussalam***/Ferizal, M. (Balai Pengkajian Teknologi Pertanian Nanggroe Aceh Darussalam, Banda Aceh (Indonesia)); Ramija, K.E. [Proceedings of the national seminar on innovation and specific location technology transfer supporting agricultural revitalization. Book 2], Medan, 5 June 2007/Sudana, W.; Moudar, D.; Jamil, A.; Yufdy, P.; Napitupulu, B.; Daniel, M.; Simatupang, S.; Nainggolan, P.; Hayani; Haloho, L.; Darmawati; Suryani, S. (eds.). Bogor (Indonesia): BBP2TP, 2007: p. 753-758, 3 tables; 4 ref. 631/152/SEM/p bk2

RICE; ECONOMIC DISTRIBUTION; MARKETING MARGINS; STOCKS; CONSUMER PRICES; TRADE CYCLES; SUMATRA.

Rice is a strategy commodity in Nanggroe Aceh Darussalam (NAD) Province. Government intervention policy on rice is quite intensive particularly through subsidy policy on farm and off-farm levels. The study aimed at investigating rice distribution and marketing system in NAD Province. Primary data was collected using snowball survey technique observing rice flow from producer farmers, marketing agents, and consumers. In depth study used selected respondents from Aceh Besar District and Banda Aceh City. While the study also covered Pidie, Aceh Tamiang, Aceh Tengah, and Simeuleu Districts. Secondary data was collected from relevant institutions and references. The study showed that rice distribution and stock in NAD Province were dynamic having high monthly fluctuation. Unstable distribution caused rice price

fluctuation in several districts, as a rice surplus or deficit area. Rice marketing margin, consisting of marketing cost and profit, was relatively high that in turn made income proportion for rice farmer was smaller and consumer price becomes high. Rice distribution system should be improved by increasing the role of BULOG in stabilizing rice stock and price.

168 INDRAWANTO, C.

Vetiver oil prices forecasting with artificial neural network method. ***Prakiraan harga akarwangi: Aplikasi metode jaringan syaraf tiruan*** /Indrawanto, C. (Pusat Penelitian dan Pengembangan Perkebunan, Bogor (Indonesia)); Eriyatno; Fauzi, A.M.; Machfud; Sukardi; Soetrisno, N. *Jurnal Penelitian Tanaman Industri* (Indonesia) ISSN 0853-8212 (2007) v. 13(2) p. 14-19, 6 ill., 2 tables; 19 ref.

VETIVERIA ZIZANIOIDES; PRICES; ESSENTIAL OILS; FORECASTING; NEURAL NETWORKS; JAVA.

Vetiver and vetiver oil prices forecasting with artificial neural network method has been done. Time series data from January 2000 to August 2006 was used to forecast the prices for 24 months ahead. The best result for forecasting of vetiver was got using sigmoid binary activation in hidden layer, sigmoid bipolar activation in output layer and transformation data spread (0,1). The best result for forecasting of vetiver oil prices was gotten using sigmoid bipolar activation in hidden layer, sigmoid binary activation in output layer and transformation data spread (0,1). The result shows that the average forecasting prices of vetiver and vetiver oil in 2007 and 2008 higher than the prices needed for vetiver farming and vetiver oil agroindrustry to reach break event point.

169 ISKANDAR-MIRZA

Goat collector trader characteristic in Beureuneun animal market Pidie District (Indonesia). ***Karakteristik pedagang pengumpul daging di pasar hewan Beureuneun Kabupaten Pidie***/Iskandar-Mirza; Yusriani, Y.; Azis, A. (Balai Pengkajian Teknologi Pertanian Nanggroe Aceh Darussalam, Banda Aceh (Indonesia)). [Proceedings of the national seminar on innovation and specific location technology transfer supporting agricultural revitalization. Book 2], Medan, 5 June 2007/Sudana, W.; Moudar, D.; Jamil, A.; Yufdy, P.; Napitupulu, B.; Daniel, M.; Simatupang, S.; Nainggolan, P.; Hayani; Haloho, L.; Darmawati; Suryani, S. (eds.). Bogor (Indonesia): BBP2TP, 2007: p. 748-752, 12 ref. 631/152/SEM/pbk2

GOATS; MERCHANTS; DOMESTIC TRADE; BEHAVIOUR; CONSUMER PRICES; CAPITAL; FARM INCOME; SUMATRA.

A preliminary research concerning goat collector trader was conducted in Beureuneun in August 2005. This research aimed at investigating the characteristic of local trader collector called "blantik" in this market. The sample of animal market location was collected based on the variability of trader in the market. The data collected was analyzed using descriptive statistic. Result showed that: 1) The goat trader was commonly local peasant with experience in trading between 3-45 years. 2) Amount of workday was 2 days a week with income Rp 50,000-200,000 each market day. Number of goat selling since each market day ranging between 2-15 head. 3) The goat collector trader bought the goat from farmer or village goat collector, and remain difficult to find good quality goat. 4) The trade activities was conducted using cash system. 5) The consumer preferred the red, black and nut-brown colored goats. 6) The source of capital used for trade was from themselves. 7) The highest sales transaction occurred during Idul Adha.

170 LUKISWARA

Performance of bananas market: a case in the three subdistrict of bananas production center, Cianjur Regency, West Java (Indonesia). ***Kinerja pasar pada pasar komoditas pisang (Musa sp.): suatu kasus di tiga kecamatan sentra produksi pisang Kabupaten Cianjur, Jawa Barat***/Lukiswara (Universitas Padjadjaran, Bandung (Indonesia). Fakultas Pertanian). *Jurnal Agrikultura* (Indonesia) ISSN 0858-2885 (2008) v. 16(3) p. 200-206, 3 tables; 6 ref.

BANANAS; MARKETS; JAVA.

The objective of this study was to evaluate the performance of banana (*Musa* sp.) market in the three sub-districts of banana production centres in Cianjur Regency. The research used descriptive and explanatory survey method. Number of farmers sampled in this study were 230 banana farmers and 72 various traders. The data were analyzed descriptively by using Ravallion model. Empirical analysis indicated that there was no strong market integration between producer's market and retailer's or consumer's market. The conclusion is that the market performance is less efficient.

171 RACHMAT, R.

Consistency and correlation of rice quality and price at market level. ***Konsistensi dan korelasi mutu dengan harga beras giling di tingkat pasar***/Rachmat, R.; Sudaryono; Suismono; Thahir, R. (Balai Besar Penelitian dan Pengembangan Pascapanen Pertanian, Bogor (Indonesia)). *Buletin Teknologi Pascapanen Pertanian* (Indonesia) ISSN 1858-3504 (2006) v. 2(1) p. 70-75, 7 ill., 2 tables; 5 ref.

RICE; PRICES; QUALITY; AMYLOSE; CONSUMER BEHAVIOUR.

The price of rice at local market is a true indicator of consumer preferences and may not necessarily follow government standards. Rice consumers tend to buy the best quality that they can afford and discriminate using a range of different factors depending on locality and economy. The most common factors considered are varieties, impurity, aroma, color, and percentage of broken grains, degree of milling, grain shape and size. The objective of the research was to analyze the relationship between price and the relevant quality parameters in market place. Locations of the survey were Karawang, Subang in West Java, and Jakarta. The activity was conducted from April 2004 to March 2005. Monthly rice samples were taken from two traders at each market, and three samples per trader. The data collection covered the varieties, quality class (grade 1, grade 2, and grade 3) and the prices for each. Samples were analyzed monthly for physical properties and the chemical quality analyses using Rapid Visco Analyser. Seasonal price fluctuations were found to be bigger on provincial markets than that in the capital and could reach up to Rp 350/kg (10%). The quality incentive, defined as the additional return assuming the quality level can be raised from Grade 3 to Grade 1, was up to Rp 700/kg (25%). The monthly price difference among markets could reach Rp 630/kg (22%). Major quality criteria in the market were moisture content, head rice percentage, purity and color. Range of chalkiness was between 10-20% and head rice between 69-84%. Chemical quality analysis indicated that the amylose content was 20-21% or intermediate level, gelatinization temperature was high to intermediate and gel consistency was 65-70. It also showed that the chemical quality of the individual grades varied over time. Rice`s color from chromameter data indicated that the yellowness of kernel influenced the consumption preference and resulted in price difference. In the large retail outlets there was no correlation between rice variety and retail price but a strong correlation was found between retail price and the grade.

F01 CROP HUSBANDRY

172 ADINUGRAHA, H.A.

Growth of leafy cuttings of bread fruit trees taken from Nusa Tenggara Barat (Indonesia) with the application of growth regulator hormone. ***Pertumbuhan setek pucuk sukun asal dari populasi Nusa Tenggara Barat dengan aplikasi zat pengatur tumbuh***/Adinugraha, H.A.; Moko, H. (Pusat Penelitian dan Pengembangan Hutan Tanaman, Yogyakarta (Indonesia)); Cepi. *Jurnal Penelitian Hutan Tanaman* (Indonesia) ISSN 1829-6327 (2006) v. 3(2) p. 93-100, 2 tables; 16 ref.

ARTOCARPUS ALTILIS; CUTTINGS; PLANT GROWTH SUBSTANCES; GROWTH; NUSA TENGGARA.

Propagation of breadfruit trees (*Artocarpus altilis*) could be conducted by leafy cuttings method. The objective of experiment was to evaluate the effect of shoot cuttings position and growth regulators. The experiment was conducted at the Center for Plantation Forest Research and Development, Yogyakarta from May to October 2005. The experiment was arranged as completely randomized design with 2 factors, the first factor was shoot cuttings position, i.e. upper shoot cuttings (P1) and lower shoot cutting (P2), meanwhile the second factor was growth regulator concentration, i.e. K0 = control, K1 = 25%, K2 = 50%, K3 = 75% and K4 = 100%. Each treatment consisted of 6 replications and 8 samples of shoot cuttings each. The parameters were observed on percentage of shoot growth, percentage of rooted cutting, the number and length of root, which conducted for one month interval. The experiment result showed that upper shoot cutting gave better effect significantly on percentage of shoot growth, percentage of rooted cutting, the number and length of root percentage of shoot growth, percentage of roots, the number and length of root than lower shoot cuttings, the growth regulator also gave better effect on all parameters observed than control.

173 ARIFIN, Z.

[Improving rainfed land rice productivity through gogorancah culture technique]. ***Peningkatan produktivitas padi lahan sawah tadah hujan melalui teknik tanam gogorancah***/Arifin, Z. *Buletin Teknologi dan Informasi Pertanian. BPTP Jawa Timur* (Indonesia) ISSN 1410-8976 (2006) v. 9 p. 1-6, 1 ill., 4 tables; 4 ref.

ORYZA SATIVA; UPLAND RICE; RAINFED FARMING; PRODUCTION INCREASE; CULTIVATION; IRRIGATION; FERTILIZER APPLICATION; PEST CONTROL; DISEASE CONTROL; HARVESTING; ECONOMIC ANALYSIS.

According to meet food consumption, especially rice, paddy productivity was still need to be increased, including upland rice farming. Paddy productivity on the upland area could be increased by applying gogorancah practices, consisted of the use of superior varieties, improving soil tilling, planting, irrigation, fertilization, controlling pests and diseases and harvesting practices. Application gogorancah in upland rice farming, rice production could increased the production by 13%.

174 DJAZULI, M.

[Assessment of three patchouli varieties cultivation on post-tsunami disaster in Nanggroe Aceh Darussalam (Indonesia)]. ***Pengkajian budidaya tiga varietas nilam pada lahan pasca bencana Tsunami di Nanggroe Aceh Darussalam***/Djazuli, M.; Hermanto; Wuladari, S. (Balai Penelitian Tanaman Rempah dan Obat, Bogor (Indonesia)). [Technical report on research of Indonesian Spices and Medicinal

Crops Research Institute year 2005. Book 3]/Laba, I W.; Hobir; Trisilawati, O.; Rosman, R.; Wahyuno, D.; Wulandari, S.; Hermanto; Taufik, E. (eds.). Bogor (Indonesia): Balittro, 2006: p. 67-77, 6 tables; 13 ref. 633.8/BAL/l bk 3

POGOSTEMON CABLIN; VARIETIES; ADAPTATION; CULTIVATION; MARGINAL LAND; GROWTH; SUMATRA.

One of the effect of Tsunami wave was the disappearence of patchouli which was one of the mainstay and income source for NAD farmers. In order to find out the adaptable new patchouli varieties, a field study was conducted at marginal soil at Banda Aceh and optimal soil as the control at Pidie Regency from January to December 2005. The results showed that Tsunami mud deposit has covered the previous soil under recovery process after one year fallow condition. The ability of patchouli growth, however, was lower than the grass that grew wildly. The tolerant level of patchouli to salinity stress was low and vary among tested varietiesi. Growth percentage of new varieties of Sidikalang, Tapak Tuan and Lhokseumawe ranged from 45.1% to 58.7% higher than that of local variety of Pidie (25.9%). Under optimal condition at production center at Pidie Regency, viability of the fourth varieties tested were higher than 90% and almost no difference among tested varieties. Yield potency represented by branch number of var. Sidikalang was 10.33 branches/plant, higher than that of other tested varieties. Branch number of var. Lhokseumawe, Tapak Tuan and Local Pidie at two month after planting were 8.33; 5.67; and 5.67 branches/plant, respectively.

175 ERYTHRINA

Growth and yield of jatropha (*Jatropha curcas* Linn.) at different plant spacing. *Pertumbuhan dan hasil tanaman jarak pagar (Jatropha curcas* Linn.*) pada berbagai jarak tanam*/Erythrina (Balai Pengkajian Teknologi Pertanian Lampung (Indonesia)). [Proceedings of the national seminar on innovation and specific location technology transfer supporting agricultural revitalization. Book 2], Medan, 5 June 2007/Sudana, W.; Moudar, D.; Jamil, A.; Yufdy, P.; Napitupulu, B.; Daniel, M.; Simatupang, S.; Nainggolan, P.; Hayani; Haloho, L.; Darmawati; Suryani, S. (eds.). Bogor (Indonesia): BBP2TP, 2007: p. 549-553, 3 tables; 8 ref 631/152/SEM/p bk 2

JATROPHA CURCAS; SPACING; GROWTH; AGRONOMIC CHARACTERS; YIELDS; SOIL CHEMICOPHYSICAL PROPERTIES; ACID SOILS.

Plant population significantly affected plant production under acid upland soils condition. The experiment was conducted in Natar experimental station, South Lampung from January 2006 to April 2007. The experiment was aimed at comparing the effect of different plant spacing on the growth and yield of jatropha under upland acid soils. The experiment was arranged in randomized block design consisted of 4 treatments of plant spacing: (a) 3.0 m x 2.0 m, (b) 2.5 m x 2.0 m, (c) 2.0 m x 2.0 m and (d) 1.5 m x 2.0 m with 6 replications. The plant spacing significantly affected plant height, stem diameter, as well as canopy diameter of Jatropha. Nine months after planting, the smaller the plant spacing the higher the plant height but the smaller stem and canopy diameters of Jatropha than wider plant spacing. The highest grain yield of Jatropha (724 kg/ha) was produced under plant spacing of 1.5 m x 2.0 m (population 3.333 tree/ha) and significantly higher than other plant spacing.

176 HARMANTO

Effect of screen sizes on performance of an adapted greenhouse for tomato production in the humid tropics. *Pengaruh ukuran screen terhadap kinerja rumah tanam teradaptasi untuk budi daya tomat di daerah tropis*/Harmanto (Balai Besar Pengembangan Mekanisasi Pertanian, Serpong (Indonesia)); Tantau,

H.J.; Salokhe, V.M. *Jurnal Enjiniring Pertanian* (Indonesia) ISSN 1693-2900 (2006) v. 4(1) p. 33-40, 3 ill., 4 tables; 11 ref.

LYCOPERSICON ESCULENTUM; CULTIVATION; GREENHOUSES; PROTECTIVE SCREENS; YIELDS; QUALITY; PRODUCTION; HUMID TROPICS.

High internal temperatures as well as intrusion of serious diseases by insect are the main problem in tomato production in the tropics. The concept of an adapted greenhouse which had a large ventilation opening covered by UV-stabilized net had been proposed and tested. The main goal of the study was to determine the effect of net sizes on the performance of the adapted greenhouse. Microclimate, ventilation rates, crop performance and biological plant protection were used to evaluate the greenhouse's performance. The results revealed that the use of different mesh sizes of nets as cladding materials over ventilation opening has a significant effect on microclimate, ventilation rate, total yield, fruit quality, and pest exclusion. Compared to the 40 mesh greenhouse, ventilation rates in the 78 and 52 mesh greenhouses were reduced by 50% and 35%, respectively. Consequently, the internal air temperature was also increased by 1 to 3^{o}C. Regarding air temperature only minor differences have been observed. However, differences in absolute humidity were much more pronounced and statistically significant. Humidity in the 78 mesh greenhouse was two times higher than that in the 40 mesh greenhouse. The 52 mesh was chosen as a compromise size of nets to be appropriately used for tropical greenhouse due to its advantages to the others.

177 JANUWATI, M.

[Assessment of Zingiberaceae cultivation on integrated crops-livestock farming systems at agroclimatic zones in Southern East Java (Indonesia)]. ***Pengkajian budi daya tanaman temu-temuan pada model usaha tani tanaman-ternak pada zone agroekologi Jawa Timur Selatan***/Januwati, M.; Yusron, M.; Pribadi, E.R. (Balai Penelitian Tanaman Rempah dan Obat, Bogor (Indonesia)). [Technical report on research of Indonesian Spices and Medicinal Crops Research Institute year 2005. Book 2]/Laba, I W.; Hobir; Trisilawati, O.; Rosman, R.; Wahyuno, D.; Wulandari, S.; Hermanto; Taufik, E. (eds.). Bogor (Indonesia): Balittro, 2006: p. 320-327, 1 ill., 6 ref. 633.8/BAL/l bk2

ZINGIBERACEAE; CULTIVATION; LIVESTOCK; FARMING SYSTEMS; AGROCLIMATIC ZONES; SPACING; MULTIPLE CROPPING; INTEGRATION; JAVA.

Zingiberaceae including turmeric, curcuma, gingers, East India galangal and galanga were known as shading plant tolerant. Based on their characteristic, Zingiberaceae could be intercropped with other crops such as horticulture, estate or food crops to improve farmer income and land use efficiency. This research was aimed at finding out ideal intercropping system for upland agroecological zone of East Java. The treatment consisted of several intercropping systems between Zingiberaceae and food crops (rice and groundnut), under shading conditions of one year old teak plantation. The experiment located in Mojorejo, Wates Subdistrict, Blitar District on Latosols soil 200 m/asl, C type of Schimdt and Ferguson classification. Fertilizer application per hectare was 14 ton of compost (bokashi), 250 kg urea, 300 kg SP-36 and 300 kg KCl. Planting distance were 20 cm x 20 cm for East India galangal and groundnut, 50 cm x 50 cm for turmeric, 40 cm x 60 cm for galanga, 15 cm x 20 cm for rice. The activities consisted of several mix cropping patterns for plant production technique, to promote better farmers' income has not yet been known since field experiment just started. The agronomic data from first month after planting showed that growth percentages were 95% for turmeric, 90% for East Indian galangal and 70% for galanga. The farmers prefered to cultivate Zingiberaceae intercropped with food crop and young teak plantation except curcuma.

178 NOGROHO, P.A.

[Role of *Mucuna bracterata* cover crop in rubber crop cultivation]. *Peranan penutup tanah Mucuna bracteata dalam budi daya tanaman karet*/Nogroho, P.A.; Istianto; Tistama, R. (Balai Penelitian Karet Sungai Putih, Medan **(Indonesia)**). [Proceedings of the national seminar on innovation and specific location technology transfer supporting agricultural revitalization. Book 2], Medan, 5 June 2007/Sudana, W.; Moudar, D.; Jamil, A.; Yufdy, P.; Napitupulu, B.; Daniel, M.; Simatupang, S.; Nainggolan, P.; Hayani; Haloho, L.; Darmawati; Suryani, S. (eds.). Bogor (Indonesia): BBP2TP, 2007: p. 535-542, 8 tables; 12 ref. 631/152/SEM/p bk2

HEVEA BRASILIENSIS; CULTIVATION; COVER PLANTS; MUCUNA; PLANT LITTER; SOIL STRUCTURE; SOIL FERTILITY; SOIL WATER CONTENT; SOIL MICROORGANISMS; SOIL CHEMICOPHYSICAL PROPERTIES.

Recently one of LCC (legume cover crop) which develop in rubber estates is *Mucuna bracteata*. This legume has many advantages than other conventional LCC, especially in nutrients return due to litter production. Mucuna's litter around 2.5-7 more than other conventional LCC. Beside nutrients return, *M. bracteata's* litter also keep soil fertility. Physically *M. bracteata* can repair soil structures, increase soil moisture and make soil color more darkish. The structure of loose soil will make root penetration easier especially for immature rubber. Commonly, the soil which more darkish will repair soil aeration and give the optimal temperature for growing of macro and microorganism. Biologically Mucuna's root make mutualism relationship with rhizobium to compose bacteria nodules, and this nodule fixed N2 from the air. Finally, the thick shoot produced by *M. bracteata* enable create the condusive microclimate for microorganism growth. For developing purpose, propagation of *M. bracteata* are different than other conventional LCC. There are several ways of *M. bracteata* propagation as follows: (1) Cutting and shading, (2) Folding and planting, and (3) by seed. The propagation by technique of cutting and shading or folding and planting was succeeded around 70-80%.

179 RUSMIN, D.

Influence of harvesting time on the seed viability and the relationship with herb yield of king bitter (*Andrographis paniculata* Nees). *Pengaruh umur panen terhadap viabilitas benih serta hubungannya dengan produksi terna sambiloto (Andrographis paniculata* Nees*)*/Rusmin, D. (Balai Penelitian Tanaman Obat dan Aromatik, Bogor). *Jurnal Penelitian Tanaman Industri* (Indonesia) ISSN 0853-8212 (2007) v. 13(2) p. 20-26, 5 table, 17 ref

DRUG PLANTS; HARVESTING DATE; SEED; VIABILITY; GROWTH; YIELDS.

One of the main factors influencing the viability of king bitter (*Androraphis paniculata* Nees) is appropriate harvesting time. Based on this problem a research was conducted to study the relationship between seed maturity and seed viability, and herb yield of king bitter. The research was conducted at Cimanggu Experimental Station and in the laboratory of Indonesia Medical and Aromatic Crops Research Institute (IMARCRI) from March 2005 to March 2006. The experiment was arranged in a randomized block design with 10 seed maturity stages and 4 replications. Maturity seed tested was 18, 21, 22, 23, 24, 25, 26, 27, 28, and 29 days after anthesis. The observations were made on seed quality (percentage of seed germination, and rate of seed germination), plant growth (plant height, number of branches) and herb yield (fresh herb weight, leaf dry weight, and stem dry weight). The results of experiment indicated that (1) seed maturity affected seed germinaton, and rate of seed germination of king bitter, the highest seed germination and germination rate were achieved by seeds harvested at 21 and 22 days after anthesis, (2) stage of seed harvesting affected on the plant height and number of branches at 1 month after planting. The highest plant height and number of branches were found on the treatments of seeds harvested at 26 and 27 days after anthesis, they were 39.63 and 36.58 cm and 16.71 and 16.61; (3) seed maturity also affected herb production, such as wet weight of plants, dry weight of leaf and dry weight of steam at 3

moths after planting. Wet weight of plant, dry weigth of leaf and dry weight of stem were achieved at the treatments of seeds harvested at 27 days after anthesis, they were 291.25, 28.27 and 28.86 g. The lowest of wet of plant weight, dry weight of leaf and dry weight of stem were found on the seeds harvested at 18 days after anthesis. They were 217.09, 22.10 and 20.24 g. Moreover, the stage of harvesting did not influence the number of branches at 3 months after planting.

180 SYAKIR, M.

[Assessment of pepper farming system at dry lowland area in East Kalimantan (Indonesia)]. ***Pengkajian budi daya lada usaha tani zone agroekologi lahan kering dataran rendah Kalimantan Timur***/Syakir, M.; Manohara, D.; Maslahah, N.; Nappu, B.; Nurbani. [Technical report on research of Indonesian Spices and Medicinal Crops Research Institute year 2005. Book 1]/Laba, I W.; Hobir; Trisilawati, O.; Rosman, R.; Wahyuno, D.; Wulandari, S.; Hermanto; Taufik, E. (eds.). Bogor (Indonesia): Balittro, 2006: p. 218-233, 2 tables; 10 ref. Appendices 633.8/BAL/l bk1

PIPER NIGRUM; FARMING SYSTEMS; CULTIVATION; DRY FARMING; LOWLAND; KALIMANTAN.

East Kalimantan is one of the new white pepper producing area in Indonesia, beside of West and Central Kalimantan. In this region, pepper plantations are commonly conducted on podsolic soils, using wood supports with low agro-inputs. Local superior black pepper types are used, and the production ranges from 300 to 700 g/vine. This technology gap should be overcome by introducing innovation of pepper cultivation through "The Participatory Development of Agricultural Technology Project". This activity started in 2004, which is a collaboration between the Balai Pengkajian Teknologi Pertanian (BPTP) in East Kalimantan with the Balai Penelitian Tanaman Rempah dan Obat (Balittro). The activities include (1) establishment of a mother plant garden of superior black pepper, like Natar 1, Petaling 1, local superior type of black pepper, using gamal trees (*Gliricidia maculata*) as supports, and (2) improvement of the maintenance of existing farmers pepper garden of 5 years old, using wood supports. The establishment of superior pepper garden is located at the experimental garden of the BPTP in Samboja village, and the improvement of farmers pepper garden in Loa Janan Village, Loa Janan District. Application of the innovation of pepper cultivation was conducted with a training of trainer's method. Further on the activities at the experimental garden will function as a demonstration plot, where farmers can get information and see how the innovation of pepper cultivation should be conducted. The activities at both locations were completed in December 2004. A manual or instruction book is available at the Samboja experimental garden, as a handbook during maintenance of the gardens. Activities at the farmer's garden at Loa Janan Village were emphazised on upkeeping method of pepper garden, like removing hanging and ground shoots, mounding the root area of pepper, fertilizer applications and control of diseases.

181 TISTAMA, R.

[Effort on increasing legume (*Pueraria javanica*) seed production and viability through flowering induction]. ***Usaha peningkatan produksi dan viabilitas biji kacangan Pueraria javanica melalui induksi pembungaan***/Tistama, R.; Sumarmadji (Balai Penelitian Karet Sungei Putih, Medan). [Proceedings of the national seminar on innovation and specific location technology transfer supporting agricultural revitalization. Book 2], Medan, 5 June 2007/Sudana, W.; Moudar, D.; Jamil, A.; Yufdy, P.; Napitupulu, B.; Daniel, M.; Simatupang, S.; Nainggolan, P.; Hayani; Haloho, L.; Darmawati; Suryani, S. (eds.). Bogor (Indonesia): BBP2TP, 2007: p. 543-548, 3 ill., 2 tables; 10 ref. 631/152/SEM/p bk2

PUERARIA PHASEOLOIDES; INDUCEED FLOWERING; PLANT GROWTH SUBSTANCES; PACLOBUTRAZOL; NAA; SEED; VIABILITY; SEED PRODUCTION; SEED WEIGHT; FLOWERS.

Pueraria javanica is one of the most commonly legume cover crops (LCC) used in rubber plantations. LCC is useful for accelerate rubber tree growth in immature stage and potentially for fodder. Seed production in Indonesia is still low, while the need is very high. The research was conducted to increase the legume seed production and viability via flowering induction. The research was conducted in two stages. The first stage was observed several plant growth regulators (PGRs) concentration levels of NAA, paclobutrazol, ethylene, KH_2PO_4 and small trellis of bamboo treatment. The second stage was continuing the first experiment using two of the best treatment. The parameters observed were number of flowering, seed production, seed weight and seed viability. The first observation showed that paclobutrazol 200 ppm and NAA 100 ppm treatment were the effective treatment to induce PJ flowering. The effect was stable if the PGRs were treated in larger scale. The seed production, seed weight and seed viability also increased by PGRs treatment. Paclobutrazol 200 ppm increased flowering number of 185% and seed production of 51.2% above the control. The effect was followed by increasing of seed viability 81.7%. NAA treatment was not significantly increased number of flowering 53,9%, but seed production was not significantly increased. The seed viability increased 73.7%. The small trellis of bamboo treatment increased number of flowering equal to PGRs treatment. The number of flowering would be twice if it was combined with paclobutrazol 100 ppm treatment.

182 YUSRON, M.

[Cultivation technology assessment of *Zingiberaceae* on intertidal land in South Sumatra (Indonesia)]. ***Pengkajian teknologi budi daya temu-temuan di lahan pasang surut Sumatera Selatan***/Yusron, M.; Yuhono, J.T.; Bermawie, N.; Januwati, M. (Balai Penelitian Tanaman Rempah dan Obat, Bogor (Indonesia)). [Technical report on research of Indonesian Spices and Medicinal Crops Research Institute year 2005. Book 2]/Laba, I W.; Hobir; Trisilawati, O.; Rosman, R.; Wahyuno, D.; Wulandari, S.; Hermanto; Taufik, E. (eds.). Bogor (Indonesia): Balittro, 2006: p. 328-335, 2 tables; 7 ref. 633.8/BAL/l bk2

ZINGIBERACEAE; CULTIVATION; APPROPRIATE TECHNOLOGY; INTERTIDAL ENVIRONMENT; LAND SUITABILITY; GROWTH; SUMATRA.

Since the last 10 years ISMECRI has evaluated and characterized some *zingberaceae* families and has found some high yielding clones, which supported by its cultivation technologies. To accelerate technology transfer, since 2005 ISMECRI and AIAT of South Sumatra have collaborated in research and assessment on *zingiberaceae* cultivation technologies in swamp areas. This activity was carried out in three years to obtain appropriate technology. The activity was carried out at AIAT experimental station at Karang Agung, South Sumatra. The cultivation technology tested consisted of land management techniques and cultivation technologies of three ginger, curcuma and turmeric. One month after plating, plant grew well, and the percentage of growth was more than 75%. Three clones of little ginger showed better growth than local clone. The growth percentage of curcuma clone (K2) was lower than that of local clone. The growth percentage of three turmeric number was lower than that of local clone. Plants grew well with range of plant height of Zingiberaceae; curcuma and turmeric were 20-40 cm, 25-45 cm, and 60-70 cm, respectively.

183 ZAINI, Z.

Acceleration of technology transfer on integrated crop management through rice check. ***Percepatan alih teknologi pengelolaan tanaman terpadu melalui penanda padi***/Zaini, Z. (Balai Pengkajian Teknologi Pertanian Lampung, Bandar Lampung (Indonesia)). [Proceedings of the national seminar on

innovation and specific location technology transfer to support agricultural revitalization], Medan, 5 June 2007/Sudana, W.; Moudar, D.; Jamil, A.; Yufdi, M.P.; Napitupulu, B.; Daniel, M.; Simatupang, S.; Nainggolan, P.; Hayani; Haloho, L.; Darmawati; Suryani, S. (eds.). Bogor (Indonesia): BBP2TP, 2007: p. 61-69, 2 ill., 1 table; 10 ref. 631.152/SEM/p bk 1

ORYZA SATIVA; CROP MANAGEMENT; INTEGRATED PLANT PRODUCTION; CULTURAL METHODS; TECHNOLOGY TRANSFER; FARMING SYSTEMS; PROFITABILITY; YIELD INCREASES; GROSS MARGINS.

Government has launched national program to increase rice production with target of 2 million tons of husked rice in 2007 and continues increasing by 5% yearly until 2009. The increasing of rice production would be achieved through IPM approach in 2 millions hectare of rice field. Rice check is not only a technology package, but also a combination of technologies and learning processes. It is similar to Farmer Field Schools that promoted integrated pest management (IPM). However, rice check promotes ICM. ICM dictated that technology recommendations for yield improvement be developed and transferred to farmers as a holistic and integrated package. Rice check differed from other approaches on: (a) presenting technologies as key checks, (b) checking of management by comparing farmer management results against the key checks to help farmers recognize best farming practice, and (c) learning through the farmer groups that help farmers use the rice check system. This had been demonstrated in Binong Subdistrict, West Java. The more key checks achieved the higher the yield and gross margins.

F02 PLANT PROPAGATION

184 PRAHARDINI, P.E.R.

[Tissue culture application on cut flower propagation]. ***Aplikasi kultur jaringan pada perbanyakan bunga potong***/Prahardini, P.E.R. *Buletin Teknologi dan Informasi Pertanian. BPTP Jawa Timur* (Indonesia) ISSN 1410-8976 (2006) v. 9 p. 87-94, 1 table; 17 ref.

GLADIOLUS; ORCHIDACEAE; ORNAMENTAL PLANTS; CHRYSANTHEMUM; CUT FLOWERS; IN VITRO CULTURE; PLANT PROPAGATION; TISSUE CULTURE; EXPLANTS.

Recently, cut flower such as gladiolus, orchids, chrysanthemum, lily, tuberose and anthurium are mostly preferred by consumers. Increasing demand of cut flower required the supply of qualified seed. Cut flowers propagation done by farmers use seed, corm and bud propagation. Seedling produced was relatively low, need long time and not in uniform condition. *In vitro* technology could be used as an alternative to replace cut flowers propagation done by farmers nowadays. This technology was done at laboratory using sterile condition with culturing an explant to produce whole plant in the test tube. The benefit of the *in vitro* technology is that produced huge number of seed rapidly in the same time. The stages of the *in vitro* technology are initiation, multiplication, rooting, acclimatization and planting. The successfull of each stage depend on the selection of culture media and addition of plant growth regulator properly. Every genus and varieties of the plant required specific explant, cultured media and growth regulator for their propagation.

185 ROSTIANA, O.

Application of purine and urea types of cytokinins in shoot multiplication of anise (*Pimpinella anisum* L.). ***Aplikasi sitokinin tipe purin dan urea pada multiplikasi tunas anis (Pimpinella anisum* L.*) in vitro***/Rostiana, O. (Balai Penelitian Tanaman Obat dan Aromatik, Bogor (Indonesia). *Jurnal Penelitian Tanaman Industri* (Indonesia) ISSN 0853-8212 (2007) v. 13(2) p. 1-7, 3 ill., 3 ref.

PIMPINELLA ANISUM; CYTOKININS; ESSENTIAL OILS; PLANT PROPAGATION; UREA; SHOOTS; IN VITRO CULTURE; CULTURE MEDIA.

Pimpinella anisum L. or sweet anise is annual-herbaceous plant belongs to the Umbelliferae family. The fruit of anise contains of essential oil, which is mainly consisted of trans-anethol (90%). Essential oils of anise is mainly used as an antiseptic, antispasmodic, anticancer, carminative, expectorant and has also been used as component in soap, perfumery, tooth paste, and skin cream productions. Since this crop is mainly cultivated in subtropical region, anise cultivation in Indonesia has not been performed. To obtain sufficient numbers of anise planting materials *in vitro* propagation was conducted by applying benzyl amino purine (BAP) and thidiazuron (TDZ). In this research TDZ or BAP were applied at various concentrations (0.1 mg/l: 0.2 mg/l; 0.3 mg/l; 1 mg/l; 2 mg/l; 3 mg/l) to induce shoots in MS-solid culture media. The highest number of shoots obtained in those two types of cytokinins containing media from the initiation stage was subcultured into the media supplemented with different cytokinins (TDZ to BAP or BAP to TDZ) at 0.3 mg/l or 3 mg/l levels. The results showed that medium with the addition of TDZ resulted higher numbers of shoot (3.26-6.28) than that of medium with an addition of BAP (1.86-2.78). However, rosette shoots were dominant in TDZ containing medium. On the other hand, medium with and addition of BAP resulted in less numbers of shoots with taller nodes. Subculture of anise into different kinds of cytokinins increased the numbers of proliferated-shoots and recovered abnormal shoots

F03 SEED PRODUCTION AND PROCESSING

186 HASANAH, M.

Technology in managing of seed medicinal crops in Indonesia. ***Teknologi pengelolaan benih beberapa tanaman obat di Indonesia***/Hasanah, M.; Rusmin, D. (Balai Penelitian Tanaman Obat dan Aromatik, Bogor (Indonesia)). *Jurnal Penelitian dan Pengembangan Pertanian* (Indonesia) ISSN 0216-4418 (2006) v. 25(2) p. 65-73, 2 tables; 21 ref.

DRUG PLANTS; SEED PRODUCTION; HARVESTING; DRYING; STORAGE; INDONESIA.

The problems in developing traditional medicine is a large part of raw material (about 80%) come from forest or natural habitation and the rest about 20% from traditional cultivation. Raw material supply which still depends on nature has caused genetic erosion on at least 54 kinds of medicinal crops. To guarantee the continuous supply of raw material of traditional medicine and also to anticipate the increasing demand in the future, development of medicinal crops farming is needed. One of the problems in developing medicinal crops is lack of information on utilizing of high quality seed and seed research activities. As a result most of farmers still use bad quality seeds and finally it will influence the productivity and quality of the product. Besides, more than 80% of medicinal crops are categorized as recalcitrans and hard to handle. According to those problems, researches have been conducted in relation to harvesting time, seed production, seed handling, seed drying, seed storage, and seed packaging.

187 HASANAH, M.

[Effect of production and treatments on ***Andrographis paniculata*** **seed].** ***Pengaruh cara produksi dan penanganan benih sambiloto***/Hasanah, M.; Rusmin, D.; Melati; Wahyuni, S.; Sukarman (Balai Penelitian Tanaman Rempah dan Obat, Bogor (Indonesia)). [Technical report on research of Indonesian Spices and Medicinal Crops Research Institute year 2005. Book 2]/Laba, I W.; Hobir; Trisilawati, O.; Rosman, R.; Wahyuno, D.; Wulandari, S.; Hermanto; Taufik, E. (eds.). Bogor (Indonesia): Balittro, 2006: p. 76-90, 3 ill., 6 tables; 16 ref. 633.8/BAL/l bk2

DRUG PLANTS; SEEDLINGS; SEED TREATMENT; GERMINABILITY; SEED PRODUCTION; KEEPING QUALITY.

Research was conducted to find out physiological maturity, determine appropriate harvest time and to evaluate seed storability up to the end of the 2005. The observation was conducted in Cimanggu Experimental Garden (Seed Production Unit). Two research activities were (1) determining physiological maturity of the seed by evaluating maximum dry weight until reach maximum vigour. Maximum dry weight together with germination percentage, germination rate, and uniformity of seed were evaluated using moisture content method, and (2) determining the seed storability up to 3 months storage. There were two treatments for storage condition, i.e. storage room condition and material for seed package. Two storage rooms were laboratory room and cool storage room and then three packaging materials, i.e. plastic bag, aluminium foil and paper. The development of germination percentage up to 3 months were evaluated together with the condition of moisture content, uniformity of the seed and germination rate each month. Results indicated that physiological maturity was reached at 26 days after anthesis where the maximum dry weight and maximum vigour were reached. Maximum dry weight indicated by hard capsule and purple green color. Moisture content of the seed was 21.52% and seed dry weight was 14.9 x 10^{-4} g. Germination percentage inclined every month up to 79.33% in 3 months when seed stored at laboratory room. Among three packaging materials, only paper bag showed the highest germination percentage (51%). The great king of bitters seed remained dormant for 5-6 months.

188 PRAHARDINI, P.E.R.

[Assessment of potato seed in East Java (Indonesia)]. ***Pengkajian perbenihan kentang di Jawa Timur***/Prahardini, P.E.R. *Buletin Teknologi dan Informasi Pertanian. BPTP Jawa Timur* (Indonesia) ISSN 1410-8976 (2006) v. 9 p. 33-41, 11 tables; 8 ref.

SOLANUM TUBEROSUM; POTATOES; SEED PRODUCTION; QUALITY; VIRUSFREE PLANTS; GROWTH; YIELD COMPONENTS; ECONOMIC ANALYSIS; JAVA.

The main problem of the reducing productivity of potato in East Java is the lack of qualified potato seed at fair price at farmers level. A locally specific technology is highly needed to build farmers seed producers at production center. A complete component technology for farmers such as supply the virus free potato seed and production instruments to produce potato seed, especially for extension seed. Besides, farmers will choose the most profitable method to produce qualified potato seed. Potato seed technology at farmers' seed producers consisted of the components such as varieties, location, isolation of location, planting suitable to specific location, selection and inspection, harvesting, sorting and grading of the seed. The profitable technology package can be determined as alternative local specific technology for producing high qualified potato seed.

F04 FERTILIZING

189 EDI, S.

[Farming analysis of cabbage at some fertilizer formula made by farmer in Kerinci Plateau (Indonesia)]. ***Analisis usaha tani kubis pada beberapa formula pupuk petani di Dataran Tinggi Kerinci***/Edi, S. (Balai Pengkajian Teknologi Pertanian Jambi (Indonesia)); Nildalina. [Proceedings of the national seminar on innovation and specific location technology transfer supporting agricultural revitalization. Book 2], Medan, 5 June 2007/Sudana, W.; Moudar, D.; Jamil, A.; Yufdy, P.; Napitupulu, B.; Daniel, M.; Simatupang, S.; Nainggolan, P.; Hayani; Haloho, L.; Darmawati; Suryani, S. (eds.). Bogor (Indonesia): BBP2TP, 2007: p. 715-719, 3 tables; 9 ref. 631/152/SEM/p bk2

BRASSICA OLERACEA CAPITATA; FARMING SYSTEMS; FERTILIZERS; FORMULATIONS; DOSAGE EFFECTS; PRODUCTION; ECONOMIC ANALYSIS; HIGHLANDS; SUMATRA.

Vegetable productivity of Jambi Province at farmer level is relatively still low, resulting in weak market competitiveness and unoptimal farmer benefit. One of its causes is inappropriate cultivation technology. Generally farmers use chemical fertilizers above recommended dosages, rather than organic fertilizer and or farmyard manure, and highly pest/disease attacks push farmer to use pesticides above recommended dosages. Study aimed at finding out influence of fertilizer application to production and farming system of cabbage at different fertilizer farmer formula. The study was done in February up to July 2006, in Pelompek Village. The introduced technology used was from IVEGRI, AIAT and local farmer technology. Analysis of farming system feasibility of five cooperator farmer showed that R/C ratio and B/C ratio were more than 1, the highest number was obtained by cooperator farmer with R/C 3.85 and B/C 2.85 applying ZA 300 kg, SP-36 200 kg, KCl 200 kg and cow manure 10 t/ha. This indicated that cabbage farming system applying farmer fertilizer dosage was feasible and suggested to be further developed especially in study area.

190 GUNIARTI

[Effect of nitrogen fertilizer and its application time on the yield of *Capsicum annuum* var. Grossum cultivar blue star]. ***Pengaruh kombinasi pupuk nitrogen dan waktu aplikasi terhadap hasil tanaman paprika (Capsicum annuum var. Grossum) kultivar blue star***/Guniarti; Widiwurjani (Universitas Veteran, Surabaya (Indonesia). Fakultas Pertanian). *Habitat* (Indonesia) ISSN 0853-5167 (2006) v. 17(4) p. 332-339, 4 tables; 11 ref.

CAPSICUM ANNUUM; NITROGEN FERTILIZERS; APPLICATION DATE; VARIETIES; YIELDS; APPLICATION RATES.

The experiment aimed to study the influence of nitrogen fertilizing ratio combinations and appllications on the growth yield of Blue Star paprika. The factorial randomized block design was used in the experiment. The first factor was the ratio of nitrogen combination: 100% urea, 100% ZA, 50% urea:50% ZA, and 25% urea:75% ZA. The second factor was time of fertilizer application: 1, 2, 3, and 4 times. The result showed that there were interaction on the ratio combination of nitrogen fertilizer and application time. The combination of 50% urea and 50% ZA applied three to four times not only gave the highest yield but also the best growth. It also gave the most fruit numbers in grade B. The fourty percent combination between urea and ZA increased the weight of fruit per plant as well as per experiment plot.

191 RUSLI

[Effect of fertilizer application on the growth and production of eggplants (*Solanum melongena*) cultivated under coconut]. ***Pengaruh pupuk pada pertumbuhan dan produksi terung (Solanum melongena) ditanam diantara kelapa***/Rusli; Luntungan, H.T. (Loka Penelitian Tanaman Sela Perkebunan, Sukabumi (Indonesia)). *Habitat* (Indonesia) ISSN 0853-5167 (2006) v. 17(4) p. 260-268, 4 tables; 19 ref.

SOLANUM MELONGENA; FERTILIZER APPLICATION; APPLICATION RATES; INTERCROPPING; GROWTH; COCOS NUCIFERA; PRODUCTION; ECONOMIC ANALYSIS.

Intercropping is an alternative for coconut farmers to increase their income. Information regarding the type of intercrops which have been planted among the coconut palms in West Java is paddy gogo, peanut, maize, cassava, banana, durian, pineapple, jackfruit, clove, melinjo, sengon and bamboo. Based on

coconut areas in West Java which is 304,994 ha, the opportunity to use coconut land is high. Based on the plant spacing of coconut 9 m x 9 m, 84.5% of coconut land is able to be used for intercropping, besides coconut roots concentration is only 2 m from the stem and vertically reside in the deepnees of 30-130 cm. To find out the production of eggplants in coconut land, a research was conducted in the Research Station for Intercrops Plantation in Pakuwon, Sukabumi. The soil is Latosols with the climate of B1 according to Oldeman. The research used randomized block design consisted of three fertilizing to eggplant, i.e. (1) urea 405 kg + TSP 260 kg + KCl 360 kg + Cattle manure 15 ton, (2) urea 450 kg + TSP 290 kg + KCl 400 kg + cattle manure 15 ton, and (3) urea 495 kg + TSP 320 kg + KCl 440 kg + cattle manure 15 ton. The result showed that there was no effect of the 3 kinds of treatments on crop height, stem diameter, number of branches, number of leaves, dry plant material weight, fruit length, fruit diameter, and fruit weight. The fertilizer application influenced only the number of fruits per plant and the weight of fruit per ha. The treatment of urea 450 kg +TSP 290 kg + KCl 400 kg + cattle manure 15 ton produced 4.44 fruits/plant and 7.30 ton fruits/ha. It did not differ with the treatment of urea 405 kg + TSP 260 kg + KCl 360 kg + cattle manure 15 ton which produced 4.00 fruits/plant and 6.90 ton fruit/ha, but it differed with treatment of urea 495 kg + TSP 320 kg + KCl 440 kg + cattle manure 15 ton which yielded 3.71 fruits/plant and 6.35 ton fruit/ha. According to partial economic analysis the gross income of the treatment of urea 450 kg + TSP 290 kg + KCl 400 kg + cattle manure 15 ton was 4.03 milion rupiahs, and the treatment of urea 405 kg + TSP 260 kg + KCl 460 kg + cattle manure 15 ton was 3.66 milion rupiahs, and the treatment of urea 495 kg + TSP 320 kg + KCl 360 kg + cattle manure 15 ton was 2.85 milion rupiahs.

192 WINARTI, S.

[Evaluation of organic matter residues on rice - sengon agroforestry system in Ultisols]. ***Evaluasi residu pemberian bahan organik dalam sistem agroforestri padi - sengon pada Ultisol***/Winarti, S.; Surawijaya, P.; Hutapea, S.M. (Universitas Palangka Raya (Indonesia). Fakultas Pertanian). *Habitat* (Indonesia) ISSN 0853-5167 (2006) v. 17(4) p. 340-351, 9 tables; 19 ref.

ORYZA SATIVA; PARASERIANTHES FALCATARIA; ORGANIC MATTER; RESIDUES; PH; ACRISOLS.

Under tropical condition, the rapid decline of soil fertility when land is cleared and cultivated has emphasized the key role played by soil organic matter in sustaining soil productivity. Soil organic matter, its composition and the process of humification play central role in soil fertility. The study was started by colleting soil samples, and then were analysed for organic carbon and humid acid content, pH, extractable phosporus, and total nitrogen, continued by pot experiment using randomized block design arranged in split plot pattern with soil is taken from under three densities of sengon (3 x 1), (3 x 2), and (3 x 3) m, as main plot and five levels of organic residue fertilizers (0, 5, 10, 15, and 20 t/ha) as sub-subplot which have been given the organic matter of last three years. The result showed that the organic matter given of last three years influenced soil pH, content of chlorophyl a and chlorophyl b, shoot root ratio and harvest index of upland rice planted at soil taken from under different three densities of sengon, but content of organic carbon and humic acid, total nitrogen, extractable phosporus at soil and relative leaf water content of upland rice were not significant.

193 YUSRON, M.

[Effect of fertilizer rates on the quality and production of ***Andrographis paniculata*** **Ness.].** ***Pengaruh tingkat pemupukan terhadap mutu dan produksi sambiloto***/Yusron, M.; Gusmaini; Januwati, M. (Balai Penelitian Tanaman Rempah dan Obat, Bogor (Indonesia)). [Technical report on research of Indonesian Spices and Medicinal Crops Research Institute year 2005. Book 2]/Laba, I W.; Hobir; Trisilawati, O.; Rosman, R.; Wahyuno, D.; Wulandari, S.; Hermanto; Taufik, E. (eds.). Bogor (Indonesia): Balittro, 2006: p. 11-24, 8 tables; 17 ref. 633.8/BAL/l bk2

DRUG PLANTS; FERTILIZER APPLICATION; APPLICATION RATES; PLANTING; SPACING; PRODUCTION; YIELDS; QUALITY; CROPPING SYSTEMS.

The quality of herbal simplicia is determined by genetic characteristic, variety, ecological conditions, cultivation technology, and postharvest process. Therefore, in order to produce a good quality of simplicia, it should be supported by good agricultural practices. Some research institutions have been carried out various experiments, but research activities dealing with technology to produce good quality simplicia is still limited. The research was conducted at KP. Cicurug. Plot size was 3 m x 4 m with planting distance of 30 cm x 40 cm (1 plant/planting hole), and planted in beds. As much as 10 ton manure and 150 kg SP-36/ha were applied at planting time as basal fertilizers, while urea was applied three times at 0, 4 and 8 MAP, one third each, and KCl was applied at planting time. The research was carried out using split plot design, where main plot was planting system, consisted of (1) P0=monoculture; (2) P1=intercropped with corn, planting distance of corn was 150 cm x 20 cm; and (3) P2=intercropped with corn, planting distance of corn was 120 cm x 20 cm. The subplot was urea and KCl dosage, consisted of (a) D1=150 kg urea + 100 kg KCl; (b) D4=200 kg urea + 100 kg KCl; (c) D5=200 kg urea + 150 kg KCI; (d) D3=150 kg urea + 200 kg KCl (e) D6=200 kg urea + 200 kg KCl. The results showed that plant growth was significantly affected by cropping system and dosage of urea and KCl. The treatments also influenced yield and quality of andrographis simplicia. The highest biomass yield (656.84 kg simplicia/ha) and quality of andrographis (15.80%) was achieved at monoculture and 200 kg urea + 200 kg KCl/ha. However, intercropping system with corn was more profitable than monoculture. In this intercropping system, andrographis yield was 8.5% lower than that of monoculture system. However, this decrease may be substituted by corn yield. The quality of simplicia was meet MMI standard.

F06 IRRIGATION

194 JANUWATI, M.

[Effect of water need level on quality and production of *Andrographis paniculata* Ness.]. *Pengaruh tingkat kebutuhan air terhadap mutu dan produksi sambiloto*/Januwati, M.; Pribadi, E.R.; Yusron, M.; Maslahah, N. (Balai Penelitian Tanaman Rempah dan Obat, Bogor (Indonesia)). [Technical report on research of Indonesian Spices and Medicinal Crops Research Institute year 2005. Book 2]/Laba, I W.; Hobir; Trisilawati, O.; Rosman, R.; Wahyuno, D.; Wulandari, S.; Hermanto; Taufik, E. (eds.). Bogor (Indonesia): Balittro, 2006: p. 25-37, 1 ill., 14 tables; 25 ref. 633.8/BAL/l bk2

DRUG PLANTS; WATER REQUIREMENTS; WATERING; AGRONOMIC CHARACTERS; SOIL WATER CONTENT; GROWTH; PRODUCTION; YIELDS; QUALITY.

This experiment was conducted at Cimanggu Research Installation, Bogor, started in September 2005. Randomized completely design with five replications have been used. The treatment consisted of five levels of water treatment 3, 4, 5, 6, and 7 mm/day. The water treatment showed that there was no significant response to the growth and simplicia production, but water treatment of 4 mm/day produced the highest plant height, leaf area per plant and quality of simplicia. The highest quality of simplicia was 12.6% produced by 4 mm/day water treatment and produced 6.39 g/plant or 357.84 kg/ha of simplicia (harvesting I). The 2 and 6 mm/day water treatment suppressed the quantity and quality of simplicia production. So, the production decrease was 26.7% and 30.8% and the quality of simplicia was 11.9% and 11.8%. Water need of andrographis was similar to vegetable or food crop or the optimum development area at B climate type of Scmitdh and Ferguson classification and under C climate type area with watering if the water level of rain was not enough.

195 PRABOWO, A.

Management of micro irrigation system for horticulture and palawija. ***Pengelolaan sistem irigasi mikro untuk tanaman hortikultura dan palawija***/Prabowo, A.; Wiyono, J. (Balai Besar Pengembangan Mekanisasi Pertanian, Serpong (Indonesia)). *Jurnal Enjiniring Pertanian* (Indonesia) ISSN 1693-2900 (2006) v. 4(2) p. 83-92, 5 ill., 11 tables; 10 ref.

HORTICULTURE; FOOD CROPS; TRICKLE IRRIGATION; SPRINKLER IRRIGATION; YIELDS; ECONOMIC ANALYSIS.

The objective of research is to develop field irrigation system using both drip and sprinkler devices. The research was carried out at several plots in the BBP Mektan, Serpong, at 2005 whereas the plots were divided into two treatments, i.e. drip and sprinkler irrigation systems with the size of 2,000 m^2 each. Chilli, maize and groundnut were selected as the experimental crops. For farming system, chilli and maize crops were irrigated by drip irrigation while groundnut crops were irrigated by sprinkler system. Water balance analysis was used as a method to estimate crop water requirements. The method used some important parameters such as: climate, soil properties and crop coefficient. Crop coefficient was calculated using 3 units of lysimeter planted by the crops mentioned above. Meanwhile, climatic data were obtained from the meteorological station nearby the location at Balai Meteorologi dan Geofisika Region II, Tangerang. All data obtained were used as the input of CROPWAT-FAO program to simulate weekly crop water requirement. The output of the program was strictly used as guideline for irrigating the crops. The results revealed that distribution uniformity of drip irrigation for chilli and maize crops were 82.82% (SU) or 88.74% (DU) and 83.46% (SU) or 88.21% (DU), respectively. For groundnut crop, the distribution uniformity of sprinkler was obtained at 89.91% (CU). Crop yield of chilli was of 4.40 to/ha, maize of 6.60 ton/ha and peanut of 2.46 ton/ha. Meanwhile, water productivity for each crop was 1.22 kg/m^3 for chilli, 1.96 kg/m^3 for maize and 0.60 kg/m^3 for groundnut crops, respectively. The cost of drip irrigation included engine for crop farming of chilli and maize were Rp 25,137,000/ha and Rp 26,167,000/ha, respectively, while for the groundnut crop was Rp 20,677,000/ha, respectively, while for groundnut crop was Rp 20,677,000/ha, respectively. Break even point for drip irrigation was equivalent to 3 times of seasons of chilli crops. It was also found that micro irrigation was not economically feasible for maize and groundnut farming system. Outcome of this study is expected to be used as some important information in developing a drip irrigation system such as: land size, soil type, topography, crop coefficient, crop water requirement, crop spacing and water resource condition.

F08 CROPPING PATTERNS AND SYSTEMS

196 RAMADHAN, M.

[Research on citronella cropping systems with other essential oil crops (*Cinnamomum zeylanicum* and *Clausena anisata*)]. ***Penelitian pola tanam serai wangi dengan tanaman atsiri lainnya (kayu manis Ceylon dan Klausena)***/Ramadhan, M.; Adria; Irwandi; Burhanuddin (Balai Penelitian Tanaman Rempah dan Obat, Bogor (Indonesia)). [Technical report on research of Indonesian Spices and Medicinal Crops Research Institute year 2005. Book 3]/Laba, I W.; Hobir; Trisilawati, O.; Rosman, R.; Wahyuno, D.; Wulandari, S.; Hermanto; Taufik, E. (eds.). Bogor (Indonesia): Balittro, 2006: p. 18-22, 3 tables; 8 ref. 633.8/BAL/l bk3

CYMBOPOGON; CINNAMOMUM ZEYLANICUM; CLAUSENA; MULTIPLE CROPPING; GROWTH.

The research of multiple cropping of citronella with other essential oil crops (*C. zeylanicum* and *Clausena anisata*) was done in 3 ha at Laing Solok experimental garden, West Sumatra. This area is located at 460 m asl with Red Yellow Podzols soil type. The research was done from January to December 2005. It used randomized block design (RBD) that consists of 4 replications. The plot size was 20 m x 50 m or 1,000

M^2. The treatments were (1). citronella with *C. zeylanicum,* population standard (citronella 5,250, zeylanicum 720 trees/ha); (2). citronella with zeylanicum, optimal population (citronella 5,250 and zeylanicum 960 trees/ha); (3). citronella with clausena, population standard (citronella 4,000 and clausena 1.700 trees/ha); (4). citronella with clausena, optimal population (citronella 4,000 and clausena 2,040 trees/ha); (5). citronella with zeylanicum and clausena, standard population (citronella 2,500, zeylanicum 540 and clausena 600 trees/ha); (6). citronella with zeylanicum and clausena, optimal population (citronella 2,500, zeylanicum 720 and clausena 720 trees/ha). Parameters observed were number of citronella per clumps stalk, length of the longest citronella leaves per clumps, height of zeylanicum and clausena crops, the branches number of citronella, clausena and zeylanicum, production of wet leaves per clumps/trees, production of wet leaves per plot, zeylanicum production of dry bark per plot, content and oil quality, also feasibility of citronella, zeylanicum and clausena. The results revealed that plant growth was good enough, but it has not yet showed the different growth each others, it may be caused by crop age which is still 1-1.5 month after planting. Further research should be done in the following year to obtain the complete data as which are appropriate with the research purposes.

197 SEBAYANG, L.

[Integrated crop management (ICM) application of lowland rice farming system on tsunami affected area, South Nias (Indonesia)]. ***Penerapan teknologi dengan pendekatan pengelolaan tanaman terpadu pada usaha tani padi sawah di lahan sawah bekas tsunami, Nias Selatan***/Sebayang, L. (Balai Pengkajian Teknologi Pertanian Sumatera Utara, Medan (Indonesia)). [Proceedings of the national seminar on innovation and specific location technology transfer to support agricultural revitalization. Book 1], Medan, 5 June 2007/Sudana, W.; Moudar, D.; Jamil, A.; Yufdi, M.P.; Napitupulu, B.; Daniel, M.; Simatupang, S.; Nainggolan, P.; Hayani; Haloho, L.; Darmawati; Suryani, S. (eds.). Bogor (Indonesia): BBP2TP, 2007: p. 214-219, 4 tables; 8 ref. 631.152/SEM/p bk1

IRRIGATED RICE; CROP MANAGEMENT; INTEGRATED PLANT PRODUCTION; FARMING SYSTEMS; TECHNOLOGY TRANSFER; YIELD COMPONENTS; IRRIGATED LAND; SOIL SALINIZATION; SUMATRA.

South Nias is new regency from Nias. Tsunami in 2005 resulted 45 ha total area salinisation of agricultural land, soil erosion and deposition of saline marine sediment in low land area along South Nias coastline. Teluk Dalam Subregency was the most tsunami affected with 60-70% rice needs of South Nias comes from Sumatra Island. South Sumatra AIAT and local agricultural office have collaborated for increasing rice productivity through integrated crop management on rice farming system application on tsunami-affected area. The activity was conducted on 1 ha farmer's land, started on September to December 2006 in Teluk Dalam Subregency. Varieties planted were Ciherang, Sunggal, Cilosari, Kapuas and Banyuasin. The research showed that harvested dry rice grain (t/ha) Ciherang was 8.1; Sunggal 7.3; Cilosari 7.0; Kapuas 5.9; dan Banyuasin 5.6.

198 SIHITE, E.

Analysis of goat livestock farm with cassava plants in Laut Tador Village, Asahan District (Indonesia). ***Analisis usaha tani ternak kambing dengan tanaman ubi kayu di Desa Laut Tador, Kabupaten Asahan***/Sihite, L. (Loka Penelitian Kambing Potong Sungei Putih, Galang, Deli Serdang, Medan (Indonesia)); Haloho, L. [Proceedings of the national seminar on innovation and specific location technology transfer to support agricultural revitalization. Book 2], Medan, 5 June 2007/Sudana, W.; Moudar, D.; Jamil, A.; Yufdy, M.P.; Napitupulu, B.; Daniel, M.; Simatupang, S.; Nainggolan, P.; Hayani; Haloho, L.; Darmawati; Suryani, S. (eds.). Bogor (Indonesia): BBP2TP, 2007: p. 874-879, 4 tables; 8 ref. 631/152/SEM/p bk2

GOATS; CASSAVA; FARMS; AGROPASTORAL SYSTEMS; INTEGRATION; ECONOMIC ANALYSIS; EFFICIENCY; COST BENEFIT ANALYSIS; SUMATRA.

Cassava and livestock agribusinesses represent the entire kinds of business that can be operated in relatively small capital and integrative manner as well as is able to generate income for farmers. Survey of cassava farm and livestock were carried out to see the expense, revenue and income and also business efficiency. Respondent was selected in simple random sampling; 30 farmers were taken from Laut Tador Village, Air Putih Subdistrict, Asahan District. Data were collected by direct interview using questionnaire. In addition, data secondary were also collected from village and subdistrict office, livestock agency and other related agencies. Survey results showed that goat livestock and cassava farm could be done in integrated way and was able to increase the overall efficiency. It was shown by higher benefit cost ratio (BCR) value of goat livestock 2.76%, and cassava farm, 2.57%. If taken together, both businesses would resulted in BC Ratio of 2.66% and hence these businesses were feasible.

F30 PLANT GENETICS AND BREEDING

199 BERMAWIE, N.

[Characterization and evaluation of pennywort (*Centella asiatica*) germplasm]. ***Karakterisasi dan evaluasi plasma nutfah pegagan***/Bermawie, N.; Meynarti S.D.I.; Purwiyanti, S.; Suryatna (Balai Penelitian Tanaman Rempah dan Obat, Bogor (Indonesia)). [Technical report on research of Indonesian Spices and Medicinal Crops Research Institute year 2005. Book 2]/Laba, I W.; Hobir; Trisilawati, O.; Rosman, R.; Wahyuno, D.; Wulandari, S.; Hermanto; Taufik, E. (eds.). Bogor (Indonesia): Balittro, 2006: p. 280-294, 6 tables; 6 ref. 633.8/BAL/l bk 2

DRUG PLANTS; GERMPLASM; SELECTION; PLANT PHYSIOLOGY; AGRONOMIC CHARACTERS; GROWTH.

Characterization and evaluation were undertaken to obtain morphological characteristics, yield and quality of Asiatic pennywort accessions. Twelve accessions obtained from exploration in Java, Sumatra and Bali were planted in Cicurug experimental garden, Sukabumi at 550 m asl, using randomized block design with three replications. Each accession was planted at 20 cm x 20 cm plant spacing at 4 m x 1 m plots, so that each plot contained 100 plants. Cow dung manure (20 t/ha) were applied two weeks before planting, urea 200 kg/ha, SP-36 and KCl 100 kg/ha each were applied at the time of planting. Parameters observed are qualitative characters such as plant height, number of runner, number of leaf, and qualitative characters such as leaf shape, leaf margin, leaf surface, colour of stem, leaf, and flower. Analysis of variance followed by DMRT indicated variation on number of characters such as plant height, number of vena, number of leaf on main branch, number of leaf on young branch, number of roots, leaf length, leaf width, runner length, also fresh and dry weight. No variation was found in leaf thickness, number of node, and number of root per node. Accession from Malaysia differed from the other accessions in number of branch, number of leaf per branch, stem diameter, also fresh and dry weights. The highest fresh weight (86.11 g/plant) and the lowest dry weight (1.67 g/plant) were obtained from accession of Malaysia, which was significantly different from the other accessions. Variation on qualitative characters such as leaf shape, leaf margin and leaf surface were observed. Leaf margin in accession from Bali was dentate, while in the other accessions were undulate. Leaf surface in Malaysian accessions was smooth compared to rough surface as the other accessions. The quality and active principles of the accessions have not yet been evaluated; these parameters were needed to determine accessions with good performance in medicinal plants. Information on yield potential, quality and the contents of the active principles were needed and might be used in determining breeding material which has high contribution to the achievement of superior varieties.

200 BERMAWIE, N.

[Characterization of *Phyllanthus* sp. germplasm]. ***Karakterisasi plasma nutfah tanaman meniran***/Bermawie, N.; Meynarti S.D.I.; Purwiyanti, S. (Balai Penelitian Tanaman Rempah dan Obat, Bogor (Indonesia)). [Technical report on research of Indonesian Spices and Medicinal Crops Research Institute year 2005. Book 2]/Laba, I W.; Hobir; Trisilawati, O.; Rosman, R.; Wahyuno, D.; Wulandari, S.; Hermanto; Taufik, E. (eds.). Bogor (Indonesia): Balittro, 2006: p. 268-279, 6 tables; 8 ref. 633.8/BAL/l bk 2

PHYLLANTHUS; GERMPLASM; SELECTION; PLANT PHYSIOLOGY; AGRONOMIC CHARACTERS; GROWTH.

Characterization and evaluation were undertaken to obtain morphological characteristics, yield and quality of *Phyllanthus* accessions. Seven accessions obtained from exploration in Java were planted in Cicurug experimental garden, Sukabumi at 550 m asl, using randomized block design with four replications. Each plant was planted at 20 cm x 20 cm, plant spacing at 4 m x 1 m plots, so each plot contained 100 plants. Parameters observed were qualitative characters such as plant height, number of branch, number of leaves, and qualitative characters such as color of stem, leaf, flower and fruits. Results from the experiment indicated that all accessions showed high variation in almost all parameters observed. Accession from Wanayasa showed its differences from other accessions in number of branch, number of leaf per branch, leaf length, stem diameter, also fresh and dry weight. The quality and active principles of the accessions had not yet been evaluated; these parameters were needed to determine accessions with good performance as medicinal plants. Information on yield potential, quality and contents of active principles were expected and might be used in determining breeding material which had high contribution to the achievement of superior varieties.

201 BERMAWIE, N.

[Exploration of spice and medicinal plants germplasm in Papua (Indonesia)]. ***Eksplorasi plasma nutfah tanaman rempah dan obat di Papua***/Bermawie, N.; Djazuli, M.; Martono, B.; Kristina, N.N.; Lukman, W. (Balai Penelitian Tanaman Rempah dan Obat, Bogor (Indonesia)). [Technical report on research of Indonesian Spices and Medicinal Crops Research Institute year 2005. Book 2]/Laba, I W.; Hobir; Trisilawati, O.; Rosman, R.; Wahyuno, D.; Wulandari, S.; Hermanto; Taufik, E. (eds.). Bogor (Indonesia): Balittro, 2006: p. 126-172, 7 tables; 11 ref. 633.8/BAL/l bk 2

SPICE CROPS; DRUG PLANTS; GERMPLASM; GERMPLASM COLLECTIONS; ETHNOBOTANY; IRIAN JAYA.

Exploration of spices and medicinal plants were undertaken to obtain endemic crops and to increase genetic variability of spices and medicinal plants. The exploration was conducted in August 2005 in forests and villages from three different ecosystems in Manokwari, Papua, namely the seashore of Yoonnoni and Assai, lowland in Amban, Snaimboy and Mount Meja, and plateau of Miyambouw and Anggra. Secondary data were collected from local government offices, while primary information was collected by interviewing local people, traditional healers and head of villages. Collected plants have been obtained by interviewing local people and helped by local government employees. From this exploration 130 species of spices and medicinal plants were obtained and indigenous knowledge of the plants had been known. Acclimatization in the greenhouse had been done up to end of December 2005 with 93 species survived during acclimatization. The differences of temperature, soil pH, physical and texture of soil possibly caused the dead. In most of ethnics, ethnobotanical information and knowledge were passed onto the younger generation from their own relatives. But in Serui ethnic from Assai Village, the ancestors choose the person to whom the knowledge would be passed on and the descendents must kept the knowledge secret just to her/himself. Sometimes the knowledge was given to another person from non family member and the receiver had to pay or to change with other things. Generally in Manokwari

ethnics, the used plant was grouped into phytochemical compound and magic power. These activities were expected to obtain new plants which could be developed into new spices and medicinal plant's products.

202 DASWIR

[Multilocation test of citronella clones]. ***Uji multilokasi klon serai wangi***/Daswir; Idris, H.; Sumandro; Zulkarnain (Balai Penelitian Tanaman Rempah dan Obat, Bogor (Indonesia)). [Technical report on research of Indonesian Spices and Medicinal Crops Research Institute year 2005. Book 3]/Laba, I W.; Hobir; Trisilawati, O.; Rosman, R.; Wahyuno, D.; Wulandari, S.; Hermanto; Taufik, E. (eds.). Bogor (Indonesia): Balittro, 2006: p. 1-7, 4 tables; 6 ref. 633.8/BAL/l bk 3

CYMBOPOGON; CLONES; GROWTH; AGRONOMIC CHARACTERS; ADAPTATION; SOIL TYPES.

In supporting citronella crops development in Indonesia, increasing of crop productivity had been done. Clonal propagation had been carried out to local crops in increasing fresh leaf production and citronella oil yield. Multilocation test for citronella clones was done on Padang Pariaman, Laing, and Alahan Panjang experimental garden at 0.3 hectare land. This location is leveling at 20-1100 m asl with Red Yellow Podzolic soil. The research was done from January to December 2005. The research was arranged in factorial with randomized block design (RBD) consisted of six different clones as treatment and four replications. The clones used were G-113, G-115, G-127, G-135, M.BBS, and M.BLD. Plot size was 100 clumps of citronella crops, so the total population with 24 treatment combinations and 4 replications were 2700 clumps. The parameters observed were number of stump, leaf length, and ratio of leaf/leaf width in one clump, production in one plot, oil content, citronella and geraniol content. The result showed that growth and production of citronella crops up to 2 months after planting or on the first harvesting were good. The number of stump in one clump was 5.5- 4.0 stump, with leaf length in one clump was 42-56 cm for G-135 clone. The G-135 clone was more adaptive at 20-1100 m asl than other clones.

203 DENIAN, A.

[Characterization and evaluation of pale catechu germplasm]. ***Karakterisasi dan evaluasi plasma nutfah tanaman gambir***/Denian, A.; Suryani, E.; Zainuddin, M.; Yudarfis; Khotib, Y. (Balai Penelitian Tanaman Rempah dan Obat, Bogor (Indonesia)). [Technical report on research of Indonesian Spices and Medicinal Crops Research Institute year 2005. Book 3]/Laba, I W.; Hobir; Trisilawati, O.; Rosman, R.; Wahyuno, D.; Wulandari, S.; Hermanto; Taufik, E. (eds.). Bogor (Indonesia): Balittro, 2006: p. 41-47, 2 tables; 8 ref. 633.8/BAL/l bk3

UNCARIA GAMBIR; GERMPLASM; AGRONOMIC CHARACTERS; GENETIC VARIATION; EVALUATION.

The germplasm characterization and evaluation of pale catechu carried out since January-December 2005 at Laing Experimental Garden, Solok. The aim of the research was to study character of pale catechu and to evaluate 11 accessions of pale catechu germplasm. The trial was arranged in randomized block design with 11 treatments (accessions) and 4 replications. The treatment consisted of 11 accessions, i.e. (A). 01/HAR/GBR/LPK/04, (B). 02/HAR/GBR/LPK/04, (C). 05/TGD/GBR/LPK/04, (D). 07/TGD/GBR/LPK/04, (E). 02/SGT/GBR/PSL/04, (F). 05/SGT/GBR/PSLl/04, (G). 06/SGT/GBR/PSL/04, (H). 07/SGT/GBR/PSL/04, (I). 02/TBG/GBR/KPR/04, (J). 03/TBG/GBR/KPR/04, and (K). 05tTBG/GBR/KPR/04. The result indicated that vegetative growth including plant height, stem diameter, leaves number and branches number of each accession had not showed significant differences although C accession showed better vegetative growth than the others. The average of C accession plant

height, stem diameter, leaves number and leaves weight were 46.50 cm, 4.12 mm, 8.84 pieces and 1.09 g, respectively. The I accession showed the lowest vegetative growth with average plant height, stem diameter and leaves number were 19.57 cm, 3.00 mm and 7.67 pieces, respectively.

204 DJAUHARIYA, E.

[Characterization and evaluation of java noni (*Morinda citrifolia*) as medicinal plant]. *Karakterisasi dan evaluasi tanaman obat mengkudu*/Djauhariya, E.; Setiyono, R.E.; Rohimat, I.; Sarwenda (Balai Penelitian Tanaman Rempah dan Obat, Bogor (Indonesia)). [Technical report on research of Indonesian Spices and Medicinal Crops Research Institute year 2005. Book 2]/Laba, I W.; Hobir; Trisilawati, O.; Rosman, R.; Wahyuno, D.; Wulandari, S.; Hermanto; Taufik, E. (eds.). Bogor (Indonesia): Balittro, 2006: p. 295-307, 6 tables; 11 ref. 633.8/BAL/l bk 2

DRUG PLANTS; GERMPLASM; SELECTION; PLANT PHYSIOLOGY; AGRONOMIC CHARACTERS; GROWTH.

The research was carried out at Sukamulya Experimental Station, Sukabumi, West Java. Noni collections were mostly collected from Java Island. A total of 11 accessions i.e.: *Morinda citrifolia* number 1 (Moci 1) from Jasinga area, Moci 2 from Ciampea and Moci 5 from Cipaku, Bogor District, Moci 4 from Cikeusik, Moci 6 and Moci 7 from Binuangeun lake side, Pandeglang District, Moci 9 from Tasikmalaya, Moci 12 from Surakarta, Moci 19 from Semarang, and Moci 20 from Kendal District, and Moci 21 from Sukabumi District. All the accessions were planted using 4 x 4 square m in 2003. Each number of accession consisted of 10 trees, the five plants from seedling and other five plants from stem. Until December 2005 the plants were 16 months old. The data gathered in this study included: morphology and yield characteristics, but quality of the yield can not be observed, because an availability of the fruits. The result indicated that there were differences on morphology and yield characteristics. Morinda planted with seedling was grown on top direct and cylindrical, but morinda planted with stem was grown laterally and cone shaped. Moci 9 gave higher yield with 2-9 kg fruits per plant and 143-158 g per fruit. Eight numbers of morinda collections, i.e Moci 1, 2, 4, 5, 8, 9, 20, and 21 were sweet-sour tastes of fruits, Moci 12 and 19 were sweet and Moci 6 and 7 were bitter. The difference of fruit taste was related to chemical content use, and quality of fruits. Further research should be done to clarify quality and its chemical content.

205 GUSNAWATY H.S.

[Resistance test of banana seedlings resulted from induction of filtrate Foc and BDB (blood disease of breterium) by *in vitro*]. *Uji ketahanan bibit pisang barangan hasil induksi filtrat Foc dan BDB secara in vitro*/Gusnawaty H.S. (Universitas Haluoleo, Kendari (Indonesia). Fakultas Pertanian). *Habitat* (Indonesia) ISSN 0853-5167 (2006) v. 17(4) p. 305-318, 4 ill., 2 tables; 38 ref.

MUSA PARADISIACA; VARIETIES; SEEDLINGS; DISEASE RESISTANCE; IN VITRO; PATHOGENS.

This research aimed at knowing the resistance of seed of good banana resulted from induction of filtrate Foc and BDB by *in vitro*. Seed of good banana which have acclimatized was tested for its resistance by inoculating the Foc and BDB at growing media and by the end of research reisolating pathogen was done to banana seed showing the best resistance and the most susceptible banana seed. Result of reseach indicated that the banana seed generated from result of induction of filtrate Foc 2.5% showed the best resistance with not showing the disease symptom at the end of result of research and reisolating result did not show the existence of pathogen of Foc and BDB.

206 HADIPOENTYANTI, E.

[Adaptability test of some vanilla clones in Manado (Indonesia)]. ***Uji adaptasi beberapa klon panili di Manado***/Hadipoentyanti, E.; Udarno, L.; Kardinan, A.; Malia, I.E. [Technical report of research in Indonesian Spices and Medicinal Crops Research Institute year 2005. Book 1]/Laba, I W.; Hobir; Trisilawati, O.; Rosman, R.; Wahyuno, D.; Wulandari, S.; Hermanto; Taufik, E. (eds.). Bogor (Indonesia): Balittro, 2006: p. 243-250, 1 table; 15 ref. 633.8/BAL/l bk1

VANILLA PLANIFOLIA; CLONES; ADAPTATION; AGRONOMIC CHARACTERS; GROWTH; SULAWESI.

Adaptation test of some promising clones of vanilla as a collaboration research between Indonesian Spices and Medicinal Crops Research Institute (ISMECRI) and AIAT at North Sulawesi has been done in Tokin, Kelembuai, South Minahasa. The materials were four promising clones and one local cultivar as control to evaluate their morphological performance with 6 replicates. Parameter observed were plant height, stem diameter, length, width, and thickness of the leaf, internode length, root holding ability and disease attack. Gliricidia was used as living post. Vanilla plant was 1.1 years old. The plant height of clone 4 was about 153.60 cm and showed the best performance than other clones.

207 HADIPOENTYANTI, E.

[Adaptability test of some vanilla clones in Papua (Indonesia)]. ***Uji adaptasi beberapa klon panili di Papua***/Hadipoentyanti, E.; Udarno, L.; Kardinan, A.; Beding, P. [Technical report of research in Indonesian Spices and Medicinal Crops Research Institute year 2005. Book 1]/Laba, I W.; Hobir; Trisilawati, O.; Rosman, R.; Wahyuno, D.; Wulandari, S.; Hermanto; Taufik, E. (eds.). Bogor (Indonesia): Balittro, 2006: p. 234-242, 1 table; 15 ref. 633.8/BAL/l bk1

VANILLA PLANIFOLIA; CLONES; ADAPTATION; AGRONOMIC CHARACTERS; GROWTH; IRIAN JAYA.

Adaptation test of some promising clones of vanilla as a collaboration research between Indonesian Spices and Medicinal Crops Research Institute (ISMECRI) and AIAT has been done at Sanggarai, Keerom Jayapura, Papua. The materials were four promising clones and one local cultivar as control to evaluate their morphological performance with 6 replicates. Parameter observed were plant height, stem diameter, length, width, and thickness of the leaf, internode length, root holding ability and disease attack. Gliricidia was used as living post. Vanilla plant was 1.1 years old. The plant height of clone 4 was about 352.00 cm and showed the best performance than other clones.

208 HOBIR

[Experimental farms and *in vitro* germplasm conservation of spice and medicinal plants culture]. ***Konservasi plasma nutfah tanaman rempah dan obat di lapang dan in vitro***/Hobir; Bermawie, N.; Hadad E.A.; Endang H.P.; Wahyuni, S.; Martono, B.; Udarno, L.; Nova K., N.; Meynarti S.D.I.; Syahid, S.F.; Amalia; Nursalam; Miftahurohmah; Purwiyanti, S. (Balai Penelitian Tanaman Rempah dan Obat, Bogor (Indonesia)). [Technical report on research of Indonesian Spices and Medicinal Crops Research Institute year 2005. Book 2]/Laba, I W.; Hobir; Trisilawati, O.; Rosman, R.; Wahyuno, D.; Wulandari, S.; Hermanto; Taufik, E. (eds.). Bogor (Indonesia): Balittro, 2006: p. 173-255, 36 tables; 4 ref. 633.8/BAL/l bk2

SPICE CROPS; DRUG PLANTS; GERMPLASM CONSERVATION; IN VITRO CULTURE; SELECTION; HIGH YIELDING VARIETIES.

Germplasm conservation was aimed at maintaining genetic materials of spices and medicinal plants. The conservation was conducted by plant collection and *in vitro* conservation. The collection activities in field included crop maintenance, rejuvenation and observations on some characters in a certain crop species in respective experimental farm. As much as 655 plant species included 3312 accessions were conserved which planted in experimental farms, i.e. KP. Cimanggu (161 species, with 328 accessions), KP Sukamulya (124 species with 1189 accessions), KP Cicurug (123 species with 764 accessions), KP Gunung Putri (47 species with 153 accessions), and KP Cikampek (52 species with 275 accessions). The activities in the conservation field included crop maintenance and rejuvenation. Rejuvenation was conducted to species of Zingiberaceae in KP Cicurug and Sukamulya, Pimpinella and Pyrethrum in Gunung Putri, and patchouli, *Mentha* sp. and vetiver in Manoko. In Cikampek, relocation of cashew collection from KP Muktiharjo (Middle Java) had been done, and planted new collections, including vanilla and cashew from West Nusa Tenggara. A certain crops were also conserved in laboratory. For vegetative propagated crops or recalcitrant seeds had been maintained *in vitro*. Recently, 52 crop species had been conserved *in vitro*. Some characters of species were observed as first step in evaluation and selection on obtaining newly high yielding varieties.

209 INDRIYANI, I G.A.A.

Effect of variety and cropping pattern of cotton on population density of insect predator *Amrasca biguttula* (Ishida). *Pengaruh varietas dan pola tanam kapas terhadap kelimpahan populasi predator hama penghisap daun Amrasca biguttula (Ishida)*/Indriyani, I G.A.A; Nurindah; Sujak (Balai Penelitian Tanaman Tembakau dan Serat, Malang (Indonesia)). *Jurnal Penelitian Tanaman Industri* (Indonesia) ISSN 0853-8212 (2007) v. 13(1) p. 33-38, 4 ill., 2 tables; 24 ref.

GOSSYPIUM HIRSUTUM; VARIETIES; AMRASCA BIGUTTULA; CROP MANAGEMENT; MORTALITY; PREDATORS; CROP MANAGEMENT.

Planting resistant variety of cotton is one of cultural method for controlling sucking insect pest, *A. biguttula*. This method was widely applied by cotton farmers in Indonesia. Nevertheless, alternative control should also be found to obtain better control of this pest, e.g. biological control by using parasitoids and predators. Study on the effect of variety and cropping pattern of cotton on population density of insect predator of *A. biguttula* was carried out at Asembagus Experimental Station and in Entomology Laboratory of Indonesian Tobacco and Fiber Crops Institute in Malang from January to December 2005. The objective was to study the effect of variety and cropping pattern on cottont population density of insect predators. Treatment consists of two factors. The first factor was cotton variety based on resistance to *A. biguttula*, viz. TAMCOT SP37, Kanesia 7, and LRA 5166 which known susceptible, intermediate, and resistant to *A. biguttula*, respectively. The second factor was croping system with monoculture and intercropping with soybean. Each treatment was arranged in split plot design with three replications. Parameters observed in field study were population of *A. biguttula* and its predators. While, the laboratory study was aimed at finding out the daily prey ability of selected predator by baiting nymph of *A. biguttula*. The results showed that difference resistance of cotton variety influenced the population density of insect predator. More insect predators were found on TAMCOT SP37 and Kanesia 7 compared to LRA 5166, while the density of insect predator was not affected by different cropping pattern due to the patterns provided better environment for insect predator development. Spider and *Paederus* sp. were the dominant insect predators found in the field because their populaton was higher than those other predators. Laboratory study showed that *Paederus* sp. preyed 15-25 younger and 10-20 older instar of nymph per day, while spider ate 2-12 nymphs of both age of *A. biguttula* per day.

210 KARUNIAWAN, A.

Genetic relationships on yam bean (*Pachyrhizus erosus*) population based on leaf morphological traits. *Kekerabatan genetik populasi tanaman bengkuang (Pachyrhizus erosus) berdasarkan karakter morfologi daun*/Karuniawan, A.; Wicaksana, N. (Universitas Padjadjaran, Bandung (Indonesia)). Fakultas Pertanian). *Jurnal Agrikultura* (Indonesia) ISSN 0858-2885 (2008) v. 16(3) p. 207-212, 1 ill., 1 table; 15 ref.

PACHYRHIZUS; POPULATION GENETICS; LEAVES; PLANT ANATOMY.

Yam bean (*Pachyrhizus erosus*) is widely cultivated in Central America, Africa, Asia and Pacific. The objective of the research was to analyse genetic relationships of yam bean originated from Indonesia compared to its ancestor species from Central America. Forty three yam beans consisted of 35 genotypes from Indonesia and eight introduced genotypes from Central America were planted in a complete block design with two replications. Thirteen morphological leaves traits were used to analyse the genetic relationships among them. Results showed that yam bean populations originated from Indonesia were closely related to its ancestor species from Central America. Yam beans from Sumatra were differed from its relatives from the rest regions of Indonesia.

211 MARISKA, I.

Genetic improvement through protoplast fusion on pepper, patchouli, and eggplant. *Perbaikan sifat genotipe melalui fusi protoplas pada tanaman lada, nilam ,dan terung*/Mariska, I.; Husni, A. (Balai Penelitian dan Pengembangan Bioteknologi dan Sumber Daya Genetik Pertanian, Bogor (Indonesia)). *Jurnal Penelitian dan Pengembangan Pertanian* (Indonesia) ISSN 0216-4418 (2006) v. 25(2) p. 55-60, 8 tables; 13 ref.

PIPER NIGRUM; POGOSTEMON CABLIN; TISSUE CULTURE; SOLANUM MELONGENA; GENOTYPES; PROTOPLAST FUSION; HYBRIDIZATION.

Protoplast fusion was conducted to overcome genetic barrier arised in sexual crossing and sterility of F1 hybrid. This generally occurred in interspecific and intergeneric hybridization, such as black pepper (*Piper nigrum*), patchouli (*Pogostemon cablin*), and eggplant (*Solanum melongena* spp.). On those crops, the main problem is disease infection, caused by *Phytophthora capsici* in pepper, *Ralstonia solanacearum* in eggplant, and nematodes in patchouli. The resistance genes against those diseases were existed in wild species of the respective crops; so that, producing a resistant variety through conventional breeding is almost imposible. Hybridization is also not applicable for patchouli because the plant does not produce flower. The protoplast could be isolated with a combination of cellulase 2% + macerozyme 0.50% (for black pepper) and cellulase 0.50% + pectinase 0.50% (for eggplant and patchouli) which produced high density of protoplast. Protoplast fusion might be conducted by the application of PEG 6000 at a concentration of 30% for 20-25 minutes. By this treatment, the protoplast from cultivated crop could be fused into their wild species. Microcallus of pepper could not be regenerated, therefore somatic hybrids failed to be produced. Meanwhile, somatic hybrids of patchouli were produced with high lignin and phenol content, same as wild species. In eggplant, different hybrids were produced and some of which were resistant to *R. solanacearum*. Anther culture of the hybrids produced dihaploid plant. The haploid plant was backcrossed to their parent and the backcross (BC2) had fruit structure and color similar to cultivated eggplant.

212 NURMANSYAH

[Exploration, characterization and evaluation of essential oil crops]. ***Eksplorasi karakterisasi dan evaluasi tanaman atsiri***/Nurmansyah; Denian, A.; Bermawie, N.; Suryani, E.; Jamalius (Balai Penelitian Tanaman Rempah dan Obat, Bogor (Indonesia)). [Technical report on research of Indonesian Spices and Medicinal Crops Research Institute year 2005. Book 3]/Laba, I W.; Hobir; Trisilawati, O.; Rosman, R.; Wahyuno, D.; Wulandari, S.; Hermanto; Taufik, E. (eds.). Bogor (Indonesia): Balittro, 2006: p. 27-40, 5 tables; 8 ref. 633.8/BAL/l bk 3

ESSENTIAL OIL CROPS; GERMPLASM; PLANT INTRODUCTION; AGRONOMIC CHARACTERS; PHENOTYPES; EVALUATION.

Exploration, characterization and evaluation of true cinnamon (*Cinnamomum zeylanicum*), ylang-ylang (*Canangium odoratum var. guineana*) and clausena (*Clausena anisata*) were conducted from January to December 2005 in Laing Experimental Garden and farmer's field in Tanah Datar. The aim of study was to find out variance of true cinnamon, ylang-ylang and clausena. Plants were collected using purposive sampling method based on phenotype variation, then collected, labeled and characterized. Exploration have found 35 accessions of true cinnamon, 30 accessions of ylang-ylang and 31 accessions of clausena. Based on the characterization of several true cinnamons, it was found wide variation, especially in leaf type with ratio of length and width was 1.64-2.65. Leaf area was 28.16-75.62 cm^2, fruit type was ovoid to long circle with ratio of length and diameter was 1.35-1.84. Peel of stem was 3.00-14. 60mm. The highest rendement and essential oil content from leaf was 3.515% and 4.133% on Czl 29 accessions, however the lowest was 1.019% and 1.185% on Czl 16 accessions. The highest rendement and essential oil content from peel of stem was 1.292% and 1.468% on Czl 29 accessions, however the lowest was 0.274% and 0.309% on Czl 35 accessions. The characterization of ylang-ylang accession showed narrow variation, especially in leaf type and flower with ratio of leaf length and width leaf were 2.00-2.50, the flower weight was 31.50-45.14 g/25 flower, ratio of petal length and width was 4.67-5.89 with rendement of essential oil was 1.52-1.66%. The characterization of some accessions of clausena was showed narrow variation, especially ratio of leaf length and width was 2.40-2.84. Rendement of essential oil was 1.78-2.27% and oil content was 5.43-9.52%.

213 PRIHATINI, I.

Application of microsatellite marker for parentage analysis of *Acacia mangium* Will. ***Penggunaan penanda mikrosatelit untuk analisis induk Acacia mangium* Willd**/Prihatini, I.; Rimbawanto, A. (Pusat Penelitian dan Pengembangan Hutan Tanaman, Yogyakarta (Indonesia)); Taryono. *Jurnal Penelitian Hutan Tanaman* (Indonesia) ISSN 1829-6327 (2006) v. 3(2) p. 139-148, 3 tables; 22 ref.

ACACIA MANGIUM; MICROSATELLITES; GENETIC MARKERS; SPECIES; GENOTYPES.

Molecular marker has potential to replace the need for hand-pollination in breeding programs. Breeding arboretum of *Acacia mangium* could be established enabling crosses between selected male and female parents to take place through open pollination. Research was conducted to utilize microsatellite marker for parental analysis of *A. mangium* progenies. Parentage analysis was conducted using total genomic DNA of 251 individuals as candidate parents and 296 individuals as progenies. The PCR reactions were carried out using 15 microsatellite (SSR) markers. All of the genotypes were used to determine the pair of parent of each progenies. This research successfully detected the parent pairs of 202 (68.2%) progenies.

214 ROSTIANA, O.

[Characterization and evaluation of long pepper (*Piper retrofractum* Vahl.) germplasm]. *Karakterisasi dan evaluasi plasma nutfah cabe jawa*/Rostiana, O.; Haryudin, W.; Martono, B.; Aisyah, S. (Balai Penelitian Tanaman Rempah dan Obat, Bogor (Indonesia)). [Technical report on research of Indonesian Spices and Medicinal Crops Research Institute year 2005. Book 2]/Laba, I W.; Hobir; Trisilawati, O.; Rosman, R.; Wahyuno, D.; Wulandari, S.; Hermanto; Taufik, E. (eds.). Bogor (Indonesia): Balittro, 2006: p. 256-267, 3 tables; 11 ref. 633.8/BAL/l bk2

PIPER RETROFRACTUM; GERMPLASM CONSERVATION; SELECTION; PLANT PHYSIOLOGY; AGRONOMIC CHARACTERS; GROWTH.

Long pepper is considered as plants producing active compounds with aphrodisiac effects. However, there is no scientific prove concerning the aphrodisiac effect of the plants. Besides, there are no superior varieties of the crops to be developed. The research was conducted in Cikampek Research Installation using observation method. The aim of this research was to study the morphology and quality of 15 collection number of long pepper. The parameter observed were morphological character of leaves, stem and fruit. The result showed that there were variations among 10 collection numbers of long pepper. The variations were leaf length and leaf width both for young and old leaf. Stem of long pepper move erect, lateral and hanging branches. The fruits were conical, globular and filiform, the colour of young fruits was green and the old fruits were yellow red. The fruits length was 0.32-4.80 and diameter of 0.39-2.66 cm.

215 SUAIB

[Microspore viability of sugar cane clone POJ3025 under starvation medium and temperature stress for haploid breeding by *in vitro*]. *Viabilitas mikrospora tanaman tebu (Saccharum spp.) klon POJ3025 pada suhu dan lama inkubasi bulir yang berbeda di dalam medium B dan mannitol untuk pemuliaan haploid secara in vitro*/Suaib (Universitas Haluoleo, Kendari (Indonesia). Fakulas Pertanian); Indrianto, A.; Mirzawan P.D.N.; Mangoendidjojo, W. *Habitat* (Indonesia) ISSN 0853-5167 (2006) v. 17(4) p. 293-304, 2 ill., 3 tables; 30 ref.

SACCHARUM OFFICINARUM; CELL CULTURE; MICROSPORA; MANNITOL; IN VITRO; HAPLOIDY; CULTURE MEDIA.

An experiment to study the microspore viability under starvation medium (B medium and 0.3 M Mannitol) and temperature stress (4^oC and 34^oC) precultures during 0, 2, 4 and 7 days incubation of spikelets was conducted in Tissue Culture Laboratory at Biology Faculty, Gajah Mada University, Yogyakarta, since April until June 2005. Combinations of these three treatment mentioned were arranged in completely randomized design with 3 replications (3 panicles) for cold shock and 2 replications (2 panicles) for heat shock treatments, and was done separately in time and panicles. Percentage of microspore viability was an experimental variable measured and analyzed by F-fisher test procedure. Results of the experiment showed that neither in starvation nor in stress precultures over 7 days incubation of spikelets were affecting the viability of microspores. This investigation was also recoded that the viability of microspore were not affected by all preculture treatments within low temperature of incubation. With the high temperature preculture treaments, however, indicated that the viability of microspores either in B medium and Mannitol or in within each other treatments were significantly affected by starvation and stress treatments at $\alpha = 0.05$ level. The two and four days incubation of spikelets in both B medium and 0.3 M Mannitol under low and high temperature stresses, respectively, were the most vaporable preculture treatments in connection with the high percentage of viable microspores.

216 TASMA, I M.

[Multilocations testing of *Curcuma xanthorrhiza* promising lines on various agroecological condition]. ***Uji multi lokasi nomor-nomor harapan temulawak pada berbagai kondisi agroekologi***/Tasma, I M.; Ajijah, N.; Setiyono, R.T.; Bermawie, N.; Rosita S.M.D.; Balfas, R.; Pribadi, E.R. (Balai Penelitian Tanaman Rempah dan Obat, Bogor (Indonesia)). [Technical report on research of Indonesian Spices and Medicinal Crops Research Institute year 2005. Book 2]/Laba, I W.; Hobir; Trisilawati, O.; Rosman, R.; Wahyuno, D.; Wulandari, S.; Hermanto; Taufik, E. (eds.). Bogor (Indonesia): Balittro, 2006: p. 110-125, 4 ill., 8 tables; 16 ref. 633.8/BAL/l bk2

CURCUMA XANTHORRHIZA; HIGH YIELDING VARIETIES; GENOTYPES; CULTIVATION; GROWTH; YIELDS; ADAPTATION; AGROCLIMATIC ZONES.

The discovery and release of superior varieties both in term of productivity and yield quality are the first important step to support the success of the national Javanese turmeric plantation development. To achieve the goal a multilocations test on six promising Javanese turmeric numbers together with a landrace was conducted in the fiscal year 2005. Studies were carried out in three locations of Javanese turmeric centrer production in West and Central Java Provinces. Among the sites used for the study, two were located at West Java Province, i.e. Cipenjo Village located in the Cileungsi Subdistrict and within the Bogor District that represents the lowest altitude (200 m asl) and the Ganjarresik Village located within the Wado Subdistrict and the Sumedang District representing the highest altitude (800 m asl). Another location was located in Central Java Province which was in Kragilan Village of the Mojosongo Subdistrict and the Boyolali District. The last test site represents the medium altitude (450 m asl). Soil sample of each test site was analyzed at the Balittro's Soil Laboratory. The experiments were arranged in a randomized complete block design using four replications. Treatments consisted of six promising numbers and one landrace making of seven treatments per location. Unit experiments were plots with the size of 4 m x 3.75 m each. Plant spacing was 0.75 m x 0.50 m, each plot can accommodate 40 plants. Interplot spacing was 1 m and inter replication spacing was 1.5 m. Thus total of 1,000 m^2 land was needed per location to carry out the experiments. Lateral rhizome originated from mother rhizome has been used. The homogenous rhizomes were selected and planted one rhizome per hill. Plants were fertilized with dung manure (20 ton/ha) and 200 kg/ha urea, 200 kg/ha SP-36 and 200 kg/ha KCl. The dung manure, SP-36 and KCl fertilizers were given at the same time when planting, while urea was given three times one-third dosage each at one, two, and three months after planting. The growth data of two months old plants indicated that the promising genotypes A, D, and E had broad adaptation ability and grown well both in low and medium altitude, and showed medium growth when grown in high altitude. Genotype F seemed adaptive specifically in the land with medium altitude. The growth variations indicated that the tested genotypes showed the possibility to obtain adaptive varieties.

217 WAHYUNI, S.

[Selection and evaluation of *Andrographis paniculata* to obtain high yielding clones]. ***Seleksi dan evaluasi sambiloto untuk mendapatkan nomor unggul***/Wahyuni, S.; Hobir; Rusmin, D.; Supriyadi; Taufik, E.; Gumelar, W.; Soenardi (Balai Penelitian Tanaman Rempah dan Obat, Bogor (Indonesia)). [Technical report on research of Indonesian Spices and Medicinal Crops Research Institute year 2005. Book 2]/Laba, I W.; Hobir; Trisilawati, O.; Rosman, R.; Wahyuno, D.; Wulandari, S.; Hermanto; Taufik, E. (eds.). Bogor (Indonesia): Balittro, 2006: p. 58-75, 1 ill., 9 tables; 13 ref. 633.8/BAL/l bk2

DRUG PLANTS; HIGH YIELDING VARIETIES; SELECTION; AGRONOMIC CHARACTERS; PLANT PHYSIOLOGY; DISEASE RESISTANCE.

The use of medicinal plants for traditional medicine is wider recently. POM has declared nine medicinal plants as a priority for phytophamaceutical industry. King bitter (*Andrographis paniculata*) is one of the priorities. The major chemical content of king bitter is andrographolide which can be found in the whole

plants, but the highest one is in leaves. To support development of king bitter as phytopharmacy the availability of good variety with high herbage yield and andrographolide content are needed. The available varieties collection of king bitter from West and Central Java was obtained uncultivated 11 accession numbers except the accession from Sukoharjo and Jumantono. Characterization or evaluation of the collected numbers such of morphological characters, sclerotium resistance, herbage yield and andrographolide content is needed. The data can predict the relationship among accession numbers and to select the best accession. The research was carried out at Cimanggu garden. Materials for characterization are 11 numbers of accessions which was planted 100 plants for each accession. Observation was done for qualitative and quantitative characters. Moreover, for herbage yield evaluation the plant was planted and arrange in randomized block design, with three replications. Result showed that morphological characters of 11 king bitter accessions were quite similar in leaves color, stem, flower, and fruit. The characters could not distinguish among the accessions. Observation of quantitative characters showed that variation coefficient is up to 40% for plant height, stem numbers and stem girth characters. It was more various than leaves length and leave width characters. Plant height and stem numbers could be used for selection base for obtaining plants with higher herbage yield. The group characters of fruit weight, fruit length and width, fruit thickness, numbers of seed per fruit and seed weight had low variation coefficient (less than 20%). Cluster analysis based on quantitative characters showed that the accessions were clustered into two groups. The first group consisted of Wng-2, Kr-3, Skh and Sms. While in the second group consisted of Blali, Kr-2, Kr-4, Wng-1, Kr-1, Cmg-3, Cmg-2 and Cmg-1. There was no clearly pattern in this cluster. The accession from the same location was not clustered in the same root, except for Cmg accession. Herbage yield of the accessions ranged from 30.433-94.67 g each plant with the proportion of leaves and stem around 40-50%. Whole herb rendement from wet to dry was 29%-34%, on the leaves part only 31%-37%, and stem only 25%-32%. The herb quality such extract soluble in alcohol was 12.46%-19.40%, extract soluble in water 22.28-25.82%, and the andrographolide content of whole plant is 0.43%-1.24%. Evaluation of *Sclerotium* sp. disease resistance showed that in the first week after inoculation, about 40%-80% of accessions were attacked. Longer observation was resulted all of the plants were attacked.

218 YUDARFIS

[Characterization and evaluation of cinnamon germplasm]. ***Karakterisasi dan evaluasi plasma nutfah kayumanis***/Yudarfis; Hasnam; Denian, A.; Zainuddin, M.; Jamaris (Balai Penelitian Tanaman Rempah dan Obat, Bogor (Indonesia)). [Technical report on research of Indonesian Spices and Medicinal Crops Research Institute year 2005. Book 3]/Laba, I W.; Hobir; Trisilawati, O.; Rosman, R.; Wahyuno, D.; Wulandari, S.; Hermanto; Taufik, E. (eds.). Bogor (Indonesia): Balittro, 2006: p. 48-57, 3 tables; 7 ref. 633.8/BAL/l bk3

CINNAMOMUM ZEYLANICUM; GERMPLASM; AGRONOMIC CHARACTERS; GENETIC VARIATION; EVALUATION.

Characterization and evaluation of cinnamon germplasm were carried out to obtain cinnamon accession from exploration and selection of characterized and evaluated crop. Research was conducted at the Laing Experimental Garden, Solok, West Sumatra since January to December 2005. The treatment consisted of 36 accessions of cinnamon. The research was arranged in randomized block design with 2 replications. Crop distance was 4 m between accession and 6 m between accessions in block. Observed parameters were increment of plant height, stem circle, primary branches number, secondary branches number, plush color, leaves color, length of leaves, length of petiole, and other morphological characters. The highest increment of plant height was showed by E10 and S17 accession achieving of 4 cm. Other accessions showed the increment of plant height between 0-3 cm. The increment of stem circle of E10 accession was 0.4 cm, while other accessions were 0-0.3 cm. The highest increment of primary branches number was found at E10 accession (3.5 pieces). The highest increment of secondary branches number was 2 pieces (E10, S12, S13, S15 and S17 accession), while quantitative morphological growth including length of petiole and leaves, width of leaves, leaves, and plush color were not different among the accessions.

F60 PLANT PHYSIOLOGY AND BIOCHEMSITRY

219 NOVARIANTO, H.

Lauric acid profile of various coconut varieties as raw material for VCO. ***Kandungan asam laurat pada berbagai varietas kelapa sebagai bahan baku VCO***/Novarianto, H.; Tulalo, M. (Balai Penelitian Tanaman kelapa dan Palma Lain, Manado (Indonesia)). *Jurnal Penelitian Tanaman Industri* (Indonesia) ISSN 0853-8212 (2007) v. 13(1) p. 27-32, 4 tables; 9 ref.

COCONUTS; VARIETIES; FATTY ACIDS; LAURIC ACID; COCONUT OIL; QUALITY; POSTHARVEST TECHNOLOGY.

Coconut agribusiness development has large opportunity to produce high value coconut product, such as Virgin Coconut Oil (VCO). The quality of VCO is determined by the content of medium chain fatty acid, MCFA (C6-C12) and lauric acid (C12:0). Analysis of fatty acid variation from coconut germplasm collection was done on 35 coconut varieties planted at Mapanget Experimental Garden, ICOPRI in 2005. Some of sample on processing technology of VCO followed step heating, and other samples used fermentation. The VCO sample of 35 coconut varieties was sent to Integrated Laboratory of IPB Bogor to find out fatty acids content. The purpose of the study was to find out the variability of fatty acid contents, especially for lauric acid content in various coconut varieties as raw materials for VCO. The research results showed that the content of MCFA and lauric acid was influenced by coconut varieties, altitude of coconut palm growth, processing technology and laboratories for analysis. The fatty acids analysis found that total MCFA content on tall coconut was higher than that on dwarf coconut. Total of MCFA content on tall coconut ranged 47.35-57.89%, whereas on dwarf coconut ranged of 45.45-55.68%. Ten accessions that had MCFA higher than 56% were Kinabuhutan Tall, Tontalete Tall, Kalasey Tall, Wusa Tall, Pungkol Tall, Mapanget 55 Tall and Mapanget 99 Tall from North Sulawesi. The others were Lubuk Pakam Tall from North Sumatra, Banyuwangi Tall from East Java, and Palu Tall from Central Sulawesi. Lauric acid content of VCO of tall coconut was higher 2-3% compared to dwarf coconut. Lauric acid content of 35 coconut accessions varied from the lowest 36.04% on Nias Green Dwarf from North Sumatra, up to the highest 44.19% on Kinabuhutan Tall from North Sulawesi. Coconut accessions having lauric acid content higher than 43% were Kinabuhutan Tall, Totalete Tall, Lubuk Pakam Tall, Wusa Tall and Mapanget 55 Tall. The same varieties of tall and hybrid coconut planting on two different altitudes showed the lauric acid content of copra on lowland plain (80 m asl) was higher, between 1.78-3.94% compared to the same varieties on upland plain (450 m asl). The fermentation technology of VCO resulted average lauric acid content which was higher between 2.03-3.48% on four tall coconut varieties of the five coconut varieties tested. In the future, it is necessary to develop protocol of VCO which is matched with Indonesian National Standarzation of VCO.

220 ROSITA S.M.D.

[Study on the utilization of N-isotope for secondary metabolite development of king bitter (*Andrographis paniculata*)]. ***Studi pemanfaatan N-isotop pada pembentukan metabolit sekunder sambiloto***/Rosita, S.M.D.; Januwati, M.; Djazuli, M.; Haryanto; Nurhayati, H.; Kosasih; Nursyamsiah, S. (Balai Penelitian Tanaman Rempah dan Obat, Bogor (Indonesia)). [Technical report on research of Indonesian Spices and Medicinal Crops Research Institute year 2005. Book 2]/Laba, I W.; Hobir; Trisilawati, O.; Rosman, R.; Wahyuno, D.; Wulandari, S.; Hermanto; Taufik, E. (eds.). Bogor (Indonesia): Balittro, 2006: p. 1-10, 6 tables; 22 ref. 633.8/BAL/l bk2

DRUG PLANTS; SOIL FERTILITY; NUTRIENTS; NITROGEN; ISOTOPES; PLANT PHYSIOLOGY; PLANT SOIL RELATIONS; SECONDARY METABOLITES; BIOMASS; GROWTH.

Cultivation technology is one factor that need more attention in developing phytochemical that medicine standard in Indonesia due to its active ingredient content. Nitrogen is one of macronutrients that needed by plant. N-isotope (15N) has used to learn the biological and chemical behavior of plant. Therefore, the research was conducted using two different levels of (15N) concentrations. The objective of this research was to obtain the N-isotope distribution pattern on secondary metabolite biosynthesis of king bitter. The complete randomized design with 15 replications was used. The treatments consisted of two levels of (15N) concentrations of 15 and 30 ppm. The result showed that 30 ppm N gave better growth and biomass accumulation than 15 ppm N. The highest total N content was found in leaves followed by root and stem. Total N content in 30 ppm N was higher than that in 15 ppm N. The role of N-isotope on secondary metabolite production has not yet known due to the analysis of N isotope was in progress.

F61 PLANT PHYSIOLOGY - NUTRITION

221 WIGENA, I G.P.

Effect of compacted compound slow release fertilizer to immature oil palm growth and yield on Xanthic hapludox, in Merangin, Jambi (Indonesia). ***Pengaruh pupuk pelepas lambat majemuk padat terhadap pertumbuhan dan produksi kelapa sawit muda pada Xanthic hapludox di Merangin, Jambi***/Wigena, I G.P.; Purnomo, J.; Tuherkih, E. (Balai Penelitian Tanah, Bogor (Indonesia)); Saleh, A. *Jurnal Tanah dan Iklim* (Indonesia) ISSN 1410-7244 (2006) (no. 24) p. 10-20, 7 tables; 15 ref.

ELAEIS GUINEENSIS; GROWTH; SLOW RELEASE FERTILIZERS; PLANT NUTRITION; SOIL CHEMICOPHYSICAL PROPERTIES; ECONOMIC ANALYSIS.

Oil palm is one of promoted plantation commodity that is developed intensively by the government. This phenomena need to be supported by an appropriate management mainly the fertilizing aspects to maintain its productivity at high level. Field experiment has been conducted to test the effect of the compacted compound slow release fertilizer, formulated in stick fertilizer, to immature oil palm growth and fruit bunches production on Xanthic hapludox from 2003 to 2005. Seven fertilizing treatments, namely farmer's practice (A); recommended fertilization (B); control (C); 1 fertilizer sticks/trunk (D); 2 fertilizer sticks/trunk (E); 3 fertilizer sticks/trunk (F); and 2 fertilizer sticks combined with foliar fertilizer (Fosfo N); (G) have been tested on the experiment. All treatments were arranged in randomized completely block design with three replications. The result showed that the tested fertilizer could improved oil palm growth and increased fruit bunches production significantly. The highest yield was provided by 3 fertilizer sticks/trunk (F) with growth scoring 90.30% and 31.43 kg of fruit bunches/trunk. This yield was significantly different with all others tested treatment, except recommended treatment (B) with growth scoring and fruit bunches were 87.30% and 30.57 kg/trunk/month, respectively. Compared to the recommended treatment, the application of the tested fertilizer could decrease the total fertilizers required by the farmers due to the increasing of fertilizing efficiency about 50-60%. Based on nutrients dynamic and number of fertilizers required by oil palm, the existing recommended fertilizing should be changed in order to maintain nutrient balance in the soil. The proposed changes of recommended fertilizing was by increasing of potassium dosage, because oil palm absorp potassium at the highest number from the soil. Besides, sulphur should be applied due to the higher absorption by the crop from the soil, whereas the highly weathered soil has lower capacity in supplying sulphur for crop growth so that sulphur was adsorbed extensively from the soil and caused inbalance nutrient in the soil.

F70 PLANT TAXONOMY AND GEOGRAPHY

222 KHAIRIAH

[Crops for cancer medication in North Sumatra (Indonesia)]. ***Jenis tanaman obat kanker yang terdapat di Sumatera Utara***/Khairiah (Balai Pengkajian Teknologi Pertanian Sumatera Utara, Medan (Indonesia)). [Proceedings of the national seminar on innovation and specific location technology transfer supporting agricultural revitalization. Book 2], Medan, 5 June 2007/Sudana, W.; Moudar, D.; Jamil, A.; Yufdy, P.; Napitupulu, B.; Daniel, M.; Simatupang, S.; Nainggolan, P.; Hayani; Haloho, L.; Darmawati; Suryani, S. (eds.). Bogor (Indonesia): BBP2TP, 2007: p. 574-580, 9 ref. 631/152/SEM/p bk2

DRUG PLANTS; BIODIVERSITY; GENETIC RESOURCES; TRADITIONAL MEDICINES; NEOPLASMS; MEDICINAL PROPERTIES; SUMATRA.

Interrelatedness of genetic resources with community daily life is highly close, particularly knowledge which is useful for utilization and conservation of genetic resources. Traditional knowledge on plant genetic resources reflects on exploitation pattern and its conservation which is still found in North Sumatra. There were 22 crops for cancer medicines which have studied by experts. Cancer case in North Sumatra is increasing from year to year and regarded as one of death causal, especially cervix and breast cancer. Highly number of cancer patients was caused by improper eating pattern and also less society awareness to check their health continuously, so that cancer case was often known and cured late. Efforts should be done to avoid factor of cancer and improve eating pattern and also consume medical plants for cancer. Those efforts were expected to make cancer patient healthy.

H01 PROTECTION OF PLANTS - GENERAL ASPECTS

223 WIDAYAT, W.

Study on conservation of natural enemy with *Arachis pintoi* as cover crop in tea plantation. ***Studi konservasi musuh alami dengan tanaman penutup tanah Arachis pintoi di pertanaman teh***/Widayat, W.; Sucherman, O.; Darana, S. (Pusat Penelitian Teh dan Kina, Gambung (Indonesia)). *Jurnal Penelitian Teh dan Kina* (Indonesia) ISSN 1410-6507 (2006) v. 9(3) p. 81-88, 4 tables; 8 ref.

CAMELLIA SINENSIS; ARACHIS PINTOI; COVER PLANTS; NATURAL ENEMIES.

An experiment to study conservation of natural enemy with *Arachis pintoi* as cover crop in tea plantation was conducted at Pasir Sarongge, Research Institute for Tea and Cinchona, Gambung. The experimental method used was comparing those plots with and without *A. pintoi*. Each plot was 400 square meter of young tea plant of GMB7 clone and replicated three times. *A pintoi* were planted at 20 cm x 20 cm of planting space. Observations were carried out on the number of species and population of insect pests as well as the natural enemy. Soil surface insect pests were observed by pit fall trap. The result showed that *A. pintoi* could increase the number of species as well as population of natural enemy of insect pests in tea plantation. The planting of *A. pintoi* could suppress the growth of weed in young tea plantation. *A. pintoi* could produce of organic matter 46-56 tones/ha/year.

H10 PESTS OF PLANTS

224 KARDINAN, A.

[Assessment of botanical attractants formula to control fruit flies in Tomo, Sumedang District (Indonesia)]. ***Pengkajian penggunaan formula atraktan nabati untuk pengendalian hama lalat buah di Kecamatan Tomo, Kabupaten Sumedang Jawa Barat***/Kardinan, A.; Momo, I.; Warsi R.A.; Diratmaja, A.; Sumantri, H. (Balai Penelitian Tanaman Rempah dan Obat, Bogor (Indonesia)). [Technical report on research of Indonesian Spices and Medicinal Crops Research Institute year 2005. Book 3]/Laba, I W.; Hobir; Trisilawati, O.; Rosman, R.; Wahyuno, D.; Wulandari, S.; Hermanto; Taufik, E. (eds.). Bogor (Indonesia): Balittro, 2006: p. 58-66, 2 tables; 9 ref. 633.8/BAL/l bk3

MANGIFERA INDICA; TEPHRITIDAE; ATTRACTANTS; PEST CONTROL; FORMULATIONS; EVALUATION; JAVA.

Research and assessment of the use of botanical attractant to control fruit flies was conducted in Tomo County, Sumedang District, West Java Province, as collaborative research among Indonesian Spices and Medicinal Crops Research Institute (ISMECRI), Agricultural Technology Research and Assessment Institute, West Java and Crop Protection Institute for Food and Horticultural Crops, West Java. Two botanical attractants resulted from ISMECRI (attractant made from *Ocimum minimum* and *Melaleuca bracteata*) were tested in the mango field compared to other attractant which has been trading in the market (Hogy). Observations were done on the number, species and sex of trapped fruit flies, and also fruit damage and yield compared to the farmers fruit garden (without attractant control). Result showed that attractant made from *Melaleuca bracteata* was the best attractant on trapping fruit flies (trapped about 21.192 fruit flies/6 months) compared to attractant made from *Ocimum minimum* (trapped about 11.173 fruit flies/6 months) and Hogy attractant which trapped about 6.495 fruit flies/6 months). Eventhough there was no significant different on the fruit damage and the yield among treatments and also between treatment and control because of the short of activity period, the farmers were satisfied since the number of fruit flies trapped was adequately high. The farmers realized that the fruit damage would decrease gradually following the decrease of fruit flies population in the area and finally hoped that the yield would increase as well. The impacts of this activity were that the research area was often visited by other farmers group as comparative study on controlling fruit flies and also the farmers have already developed basil crops in their field as raw material on making attractant. They have also made and modified distillation tools to produce essential oil from basil and the extension workers accompanying the farmers was often invited to be a speaker in the seminar or other meeting to discuss the strategy to control fruit flies.

225 PRAYOGO, Y.

Efforts in maintaining the effectiveness of entomopathogenic fungi to control insect pests on food crops. ***Upaya mempertahankan keefektifan cendawan entomopatogen untuk mengendalikan hama tanaman pangan***/Prayogo, Y. (Balai Penelitian Tanaman Kacang-kacangan dan Umbi-umbian, Malang (Indonesia)). *Jurnal Penelitian dan Pengembangan Pertanian* (Indonesia) ISSN 0216-4418 (2006) v. 25(2) p. 47-54, 8 ill., 2 tables; 57 ref.

FOOD CROPS; ENTOMOGENOUS FUNGI; PEST CONTROL; BIOLOGICAL CONTROL; TREATMENT DATE; APPLICATION RATES.

Entomopathogenic fungi is one of the most common bioinsecticides that can be used to control insect pests on crops. Species of fungi known to be effective as biopesticides are *Beauveria bassiana*, *Metarhizium anisopliae*, *Nomuraea rileyi*, *Paecilomyces fumosoroseus*, *Aspergillus parasiticus*, and *Verticillium lecanii*. However, there are several constraints in using entomopathogenic fungi as biopesticide, namely low experience of farmers in identifying main pest in the field and also effort to sustain viability and effectiveness of entomopathogenic fungi as a control agent, including mass

production and application methods. In food crops, effectiveness of the entomopathogenic fungi is commonly low. Increasing the effectiveness of entomopathogenic fungi can be conducted by: (1) identifying the targeted pest in the field before application, (2) applying the entomopathogenic fungi in the afternoon at least 10^7/ml, (3) applying the bioinsecticide three times, and (4) adding sticker and carrier or mild surfactant to the conidia suspension before it is applied to control the insect pests.

226 RAYATI, D. J.

[Pathogenicity of the entomopathogenic fungi *Beauveria bassiana*, *Metarhizium anisopliae*, and *Paecilomyces fumosoroseus* to termites of tea plant]. *Patogenisitas jamur Beauveria bassiana, Metarhizium anisopliae, dan Paecilomyces fumosoroseus terhadap rayap pada tanaman teh*/Rayati, D. J.; Widayat, W. (Pusat Penelitian Teh dan Kina, Gambung (Indonesia)). *Jurnal Penelitian Teh dan Kina* (Indonesia) ISSN 1410-6507 (2006) v. 9(3) p. 41-50, 3 ill., 2 tables; 17 ref.

CAMELLIA SINENSIS; PATHOGENICITY; ENTOMOGENOUS FUNGI; BEAUVERIA BASSIANA; METARHIZIUM ANISOPLIAE; PAECILOMYCES; ISOPTERA.

To know a potential of indigenous isolates of entomopathogenic fungi in controlling a destructive pest of tea, termites, a study on the pathogenicity of indigenous isolates of *Beauveria bassiana*, *Metarhizium anisopliae*, and *Paecilomyces fumosoroseus* against tea termites has been conducted in Plant Pathology Laboratory of Research Institute for Tea and Cinchona Gambung. The trial was designed in complete randomized design (CRD), with 8 treatments, replicated 3 times. The treatment tested covered *B. bassiana*, *M. anisopliae*, and *P. fumosoroseus*, each with 2 delivery methods, i.e. spreading and spraying, chemical termiticide, delivered by spraying, and control. For each treatment, 25 worker termites were placed in a plastic container filled with sterile soil medium and wood pieces in moits condition. The treated termites were incubated in darkness at 20-22 ^oC. Mortalily of termites was observed daily, and for fungi treatments, the dead termites were placed in moist petri dish, and the mortality was evaluated by observing the occurrence of fungus growth/development on and in the body of the termites, macroscopically as well as microscopiccally. The results showed that all of the 3 fungus were very effective against tea termites. The most effective was *P. furmosoroseus*, which comparable to the chemical termiticide (100% mortality), followed by *B. bassiana* and *M. anisopaliae* which showed similar pathogenicity against tea termites (approx 80% mortality). The effectiveness of the two delivery methods was not significantly different, yet the spreading methods gave more advantage, due to its residual effect. After spread, the fungus could continue grown/developed on the soil medium, enabled prolonged on-going control. The best performance of the growth/development on soil medium after spreading application was shown by *P. fumosoroseus*. The incubation period of the fungi infection on termites was in range of 2 or 4 days, the shortest period shown by *M. anisopliae* (2.2 days), followed by *B. bassiana* and *P. fumosoroseus*, which showed similar incubation period (3.5 days). The results indicated that *P. fumosoroseus* delivered by spreading method showed the best potential to be used in controlling termites on tea plant, which have to be tested further in the field.

H20 PLANT DISEASES

227 HASTUTI, U.S.

[Effect of interaction duration time and antagonistic activity of several antagonistic fungus on the *Fusarium* spp]. *Pengaruh lama waktu interaksi pada aktivitas antagonis beberapa spesies jamur antagonis terhadap jamur parasit Fusarium spp*/Hastuti, U.S. (Universitas Negeri Malang (Indonesia). Fakultas Matematika dan Ilmu Pengetahuan Alam). *Habitat* (Indonesia) ISSN 0853-5167 (2006) v. 17(4) p. 352-360, 2 ill., 5 tables; 12 ref.

FUSARIUM; MICROBIAL PESTICIDES; TRICHODERMA; DURATION.

There are fungi species in the soil ecosystem which is antagonistic to soil infection parasitic fungi. *Trichoderma* sp., *Penicillium* sp. and *Aspergillus* sp. are soil fungus which are antagonistic and potentially as biological control fungi species to soil infection parasitic fungi species. The interaction of duration between antagonistic fungi and parasitic fungi has an effective antagonistic influence which can be measured by the colony growth distance between those fungi. The growth of those fungi needed incubation duration and one of the measure methods was based on diameter of fungi colony. The influence of incubation duration between antagonistic fungi and parasitic fungi to the antagonistic activity can be examinated *in vitro*. This research has been done to know: (1) the effect of interaction duration to antagonistic activity of some antagonistic mold species to *Fusarium* spp parasitic fungi; (2) to know interaction of duration between antagonistic fungi and parasitic fungi which have the most effective in increasing antagonistic activity of antagonistic fungi to *Fusarium* spp. Antagonistic fungi and parasitic fungi were grown together in Potato Dextrose Agar medium and incubated in 0 x 24 hours; 1 x 24 hours; 2 x 24 hours; 3 x 24 hours and 4 x 24 hours at 25^{o}C. Then the distance of colony growth between antagonistic fungi and parasitic fungi was measured. This result showed that: (1) the more interaction duration between antagonistic fungi and parasitic fungi, the more antagonistic activity of some antagonistic fungi species to *Fusarium* spp. *in vitro*; (2) interaction duration between antagonistic fungi and parasitic fungi having the most effective increaseing antagonistic activity to *Fusarium* spp. parasitic fungi was 4 x 24 hours; and (3) *Trichoderma harsianum* vs *Fusarium solani* was fungi couple that have the highest antagonostic activity.

228 KORLINA, E.

Role of fungi *Trichoderma spp*. and bio controller of pathogen and decomposer. ***Peran cendawan Trichoderma spp. sebagai pengendali hayati patogen dan dekomposer***/Korlina, E. *Buletin Teknologi dan Informasi Pertanian. BPTP Jawa Timur* (Indonesia) ISSN 1410-8976 (2006) v. 9 p. 80-86, 2 ill., 33 ref.

TRICHODERMA; BIOLOGICAL CONTROL AGENTS; PATHOGENS; MICROBIAL PESTICIDES.

Improvement on people welfare and consumers knowledge towards healthness, resulted more demand towards free chemicals products, in this case a sustainable agriculture system was proposed. One element of sustainable agriculture was natural existing microorganism and could be used as biocontroller of plant pathogen or decomposer. Microorganisms meet those role and reported as widely used was fungi *Trichoderma spp*., that was widely known and easily to be isolated from soil, rotted wood, and its' organic compound. Mechanism of Trichoderma in controlling pathogen was as micro parasitism, antibiotic production, competition and production of enzyme. To provide effectiveness of *Trichoderma* spp., formulation and storage was an attempt to be done.

229 MULYAWANTI, I.

Aflatoxin on maize and its prevention. ***Aflatoksin pada jagung dan cara pencegahannya***/Mulyawanti, I.; Dewandari, K.T.; Kailaku, S.I. (Balai Besar Penelitian dan Pengembangan Pascapanen Pertanian, Bogor (Indonesia)). *Buletin Teknologi Pascapanen Pertanian* (Indonesia) ISSN 1858-3504 (2006) v. 2(1) p. 22-27, 3 ill., 4 tables; 18 ref.

MAIZE; AFLATOXINS; ASPERGILLUS FLAVUS.

Maize is the second most important crop after rice. The major problem of maize is aflatoxin content that produced by fungi, *Aspergillus flavus* and *Aspergillus parasiticus*. Although aflatoxins are not

automatically produced whenever grain become moldy, the risk of aflatoxin contamination is greater in damage. The key to preventing ear rot and storage mold problems is detecting them earlier, in the field and in the bin. Chemical, biological and physical treatment can be used to reduce aflatoxin in maize.

230 SATRIA-DARSA, J.

Growth components and their relationships of citrus RL (Rough Lemon) infected by CVPD treated with NAA (naphthalene acetic acid). ***Komponen tumbuh dan hubungan di antara komponen tumbuh jeruk Rough Lemon terinfeksi CVPD (Citrus Vein Phloem Degeneration) yang diberi zat pengatur tumbuh asam naftalen asetat***/Satria-Darsa, J. (Universitas Padjadjaran, Bandung (Indonesia). Fakultas Pertanian). *Jurnal Agrikultura* (Indonesia) ISSN 0858-2885 (2008) v. 16(3) p. 213-218, 6 tables; 7 ref.

CITRUS; GROWTH; VIROSES; PLANT GROWTH SUBSTANCES; NAA.

An experiment was carried out to improve the growth of citrus Rough Lemon (*Citrus jambhiri* Lush) infected by CVPD by application of plant growth regulator naphthalene acetic acid (NAA). The treatments were four NAA concentrations, i.e. 0 mg/l, 20 mg/l, 40 mg/l, and 60 mg/l, applied twice, firstly when the second cycle shoots (shoot-2) were in an active growing phase, and secondly when they reached maximum growth. The growth components observed were leaf dry weight, shoot dry weight, leaf size, and stem dry weight. The citrus plants of about 18 month old were cultivated in polybag under glass-house conditions. The results showed that all of growth components of shoot-2 were not affected by NAA application at various in concentrations. However, the coefficient of correlation and the coefficient of determination among growth components revealed that in general, NAA application increased the dependency of shoot-2 on shoot-1. The closest relationships were shown by the shoots received NAA 60 mg/l.

231 TAUFIK, E.

[Application technique of FoNP for resistance induction on mature vanilla plants]. ***Teknik aplikasi FoNP untuk induksi ketahanan pada tanaman vanili dewasa***/Taufik, E.; Tombe, M.; Sukamto; Hadipoentyanti, E.; Rosman, R.; Karyani, N.; Zulhisnain. [Technical report on research of Indonesian Spices and Medicinal Crops Research Institute year 2005. Book 1]/Laba, I W.; Hobir; Trisilawati, O.; Rosman, R.; Wahyuno, D.; Wulandari, S.; Hermanto; Taufik, E. (eds.). Bogor (Indonesia): Balittro, 2006: p. 209-217, 2 ill., 3 tables; 6 ref. 633.8/BAL/l bk1

VANILLA PLANIFOLIA; FUNGAL DISEASES; DISEASE RESISTANCE; FUSARIUM OXYSPORUM; PATHOGENS; BIOLOGICAL CONTROL AGENTS.

Vanilla is one of commodity that has important role in earning foreign devisa for Indonesia. The most important constraint in vanilla cultivation in Indonesia is stem rot disease, which decrease plant productivity per hectare. The current study was aimed to obtain optimal application technique of biological control agents (*Fusarium oxysporum* non-pathogenic, FoNP), botanical pesticide and organic matter to reduce the occurrence of stem rot disease on the mature vanilla plant in field condition. The study was conducted in Ciomas, Banten. The treatments were (1) wetable powder (WP) of FoNP and botanical pesticide were applicated on vanilla stem, (2) vanilla stems were dipped in FoNP emulsion concentrate (EC), and (3) vanilla stems were grown in organic FOB media. The experiment arranged in a randomized block design with three replications. The results indicated that the occurrence of stem rot disease on mature vanilla stems was lower on those three treatments than the control. However, the involved mechanism of those treatments seems locally and not systemically. Although application of formulated FoNP reduced the occurrence of stem rot disease, the treatment did not give significant impact,

since stem rot disease were also seen on many mature vanilla stems. Based on the observation, the application of FoNP did not give any negative effect on vanilla vegetative growth, such as number of leaf, stem diameter and length.

H60 WEEDS AND WEED CONTROL

232 DARANA, S.

Allelopathy activities of leaf extract of kirinyuh (*Chromolaena odorata*) and saliara (*Lantana camara*) on the weed in tea (*Camellia sinensis*). ***Aktivitas alelopati ekstrak daun kirinyuh (Chromolaena odorata) dan saliara (Lantana camara) terhadap gulma di pertanaman teh (Camellia sinensis)***/Darana, S. (Pusat Penelitian Teh dan Kina, Gambung (Indonesia)). *Jurnal Penelitian Teh dan Kina* (Indonesia) ISSN 1410-6507 (2006) v. 9(1-2) p. 15-20, 2 tables; 12 ref.

CAMELLIA SINENSIS; WEED CONTROL; ALLELOPATHY; PLANT EXTRACTS; CHROMOLAENA ODORATA; LANTANA CAMARA.

An experiment to evaluate the allelopathy activity of leaf extracts of *C. odorata* and *L. camara* had been conducted at Pasir Sarongge Experimental Garden, Research Institute for Tea and Cinchona, from June up to December 2005. The experiment was arranged in randomized completely block design (RCBD) with 10 treatments and three replications. Result showed that the leaf extracts of *C. odorata* and *L. camara* could suppress the growth of weed in tea plantation. The leaf extract of *C. odorata* of 20% concentration which was comparable to the leaf extracts of *L. camara* at 10% concentration obtained a better suppression and significantly different compared to check synthetic herbicide as well as mechanical weeding.

233 SASONGKO, D.

[Rate of Atrazine and Diuron residue in some soil types planted with resistant sugar cane]. ***Kecepatan berkurangnya residu herbisida Atrasin dan Diuron di beberapa jenis tanah yang di tanami varietas tebu rentan dan tahan***/Sasongko, D. (Pusat Penelitian Perkebunan Gula Indonesia, Pasuruan (Indonesia)). *Habitat* (Indonesia) ISSN 0853-5167 (2006) v. 17(4) p. 319-331, 3 tables; 27 ref.

SACCHARUM OFFICINARUM; VARIETIES; HERBICIDES; RESIDUES; ATRAZINE; DIURON; SOIL TYPES; RESISTANCE TO CHEMICALS.

The study was done to determine the rate of residue decrease of atrazine and diuron in clay soil texture (Vertisols soil type), sandy loam soil (Entisols soil type) and sandy clay loam (Ultisols soil type) planted with susceptible and tolerant sugarcane varieties. To obtain the data of the rate of residue decrease, atrazine and diuron herbicides were sprayed 1 day after planting (dap) or 1 dap and 4 weeks after planting (wap) at dose 3.0 kg a.i./ha. The experiment was conducted in the glasshouse at Indonesian Sugar Reseach Institute, Pasuruan. This experiment used split plot design with 4 replications. The parameters observed were herbicide residue, residue life 50% (RL50) and dry weight of cane root. Herbicide residues were analyzed using High Performace Liquid Chromatography (HPLC). The result showed that application of these herbicides reduced the cane root, and the effect of diuron on reducing cane root was greater than atrazine. The sugarcane plants tended to reduce Residue Life 50% (RL50) of atrazine and diuron fast. This study indicated that in the three soil types studied, by planting of sugarcane (susceptible or tolerant varieties), RL50 of atrazine and diuron was less than that of field without sugarcane. Planting tolerant sugarcane varieties could reduce RL50 of atrazine and diuron until 44%, while planting susceptible varieties could reach RL50 reduction only 30%. Moreover application of herbicides 2 times at 1 dap and 4 wap at dose 3.0 kg a.i./ha did not cause residue accumulation in the soil at 120 dap.

J11 HANDLING, TRANSPORT, STORAGE AND PROTECTION OF PLANT PRODUCTS

234 MAKMUN

[Improvement of standardized extraction method and extract storage on *Andrographis paniculata*]. *Perbaikan metode ekstraksi dan penyimpanan ekstrak terstandar sambiloto*/Makmun; Bagem S.; Manoi, F.; Suhirman, S.; Tritianingsih; Hayani, E.; Sukmasari, M.; Gani, A.; Fatimah, T. (Balai Penelitian Tanaman Rempah dan Obat, Bogor (Indonesia)). [Technical report on research of Indonesian Spices and Medicinal Crops Research Institute year 2005. Book 2]/Laba, I W.; Hobir; Trisilawati, O.; Rosman, R.; Wahyuno, D.; Wulandari, S.; Hermanto; Taufik, E. (eds.). Bogor (Indonesia): Balittro, 2006: p. 91-109, 3 ill., 9 tables; 9 ref. 633.8/BAL/l bk2

DRUG PLANTS; DRUGS; PLANT EXTRACTS; EXTRACTION; STORAGE; KEEPING QUALITY; QUALITY.

Extracts were concentrated form of natural substances obtained by treating crude materials with a solvent and removing the solvent completely or partially from the preparations. *Andrographis paniculata* extract is one of the natural ingredients that commonly used in traditional medicine industries. The aim of the experiment was to determine extraction method and the influence of storage to extract quality. The experiment was divided into two activities, namely extraction method and extract storage. The experimert was designed using randomized completely design with three replication. The treatments of first experiment were particle size, ratio of materials amount and solvent and duration of extraction process. The treatments of second experiment were room condition, packaging and storage duration. The particles size used was 40 and 60 meshes. The ratio of material and solvent were 1:6, 1:8, 1:10, and 1:12. Extraction was carried out for 4, 6 and 8 hours. Meanwhile, extract storage was carried out at room temperature (28^{o}C) and air condition room (20^{o}C). Extracts were packed in glass and plastic bottle and were stored for 2, 4 and 6 months. Parameter assessed were extract yield, residue of solvent, chemical component, andrographolide compound content, and pathogen contaminant at extract storage. The result showed that particle size, ratio between materials and solvent and duration of extract process were not affected extract yield and residue of solvent. Analysis by KLT showed the same number of chemical component in extract. The highest andrografolide content was 6.86% obtained of 60 mesh particle size with 1:10 ratio of materials and solvent and 6 hour of extraction process. Extract storage for 2-6 month did not affect the residue of solvent in extract and andrographolide content. Meanwhile, pathogen contaminant was negative of all storage time.

K10 FORESTRY PRODUCTION

235 BOERHENDHY, I.

Rubber wood potency in supporting replanting of rubber smallholdings. *Potensi pemanfaatan kayu karet untuk mendukung peremajaan perkebunan karet rakyat*/Boerhendhy, I.; Agustina, D.S. (Balai Penelitian Karet, Sembawa (Indonesia)). *Jurnal Penelitian dan Pengembangan Pertanian* (Indonesia) ISSN 0216-4418 (2006) v. 25(2) p. 61-67, 3 ill., 1 table; 29 ref.

RUBBER; WOOD; WOOD INDUSTRY; REPLANTING; SMALL FARMS.

Nowadays, the use of rubber wood for industry is very profitable because its availability is abundantly and would increase in the future in line with the replanting program of smallholdings. Rubber wood also has good characteristic in physics, chemical, and mechanic which is equal with other natural timber. Utilization of rubber wood should be supported with industrial processing. Partnership program between supplier of rubber wood and farmers is important to guarantee the continuous supply of raw material for whole year. The partnership will also increase wood price at farm level and support replanting program.

Some clones such as BPM 1, PB 330, PB 340, RRIC 100, AVROS 2037, IRR 5, IRR32, IRR 39, IRR 42, IRR 112, and IRR 118 were recommended in a large scale as latex and timber clones.

236 MIDAWATI, N.

Effect of tending frequency on growth of shorea sapling at field. *Pengaruh frekuensi pemeliharaan tanaman muda terhadap pertumbuhan meranti di lapangan*/Midawati, N.; Heryati, Y. (Pusat Penelitian dan Pengembangan Hutan Tanaman, Yogyakarta (Indonesia)). *Jurnal Penelitian Hutan Tanaman* (Indonesia) ISSN 1829-6327 (2006) v. 3(2) p. 63-71, 5 tables; 9 ref.

SHOREA; TREES; CULTIVATION; GROWTH; SOIL CHEMICOPHYSICAL PROPERTIES; FIELDS.

Meranti (*Shorea spp*.) is familiar in the international wood trading as an important tropical wood. The development program of the forest plantation of Tengkawang will not successful without tending process of sapling. The research of kind and frequency of tending to sapling was conducted in the Haurbentes Research Forest, Jasinga, West Java. Completely randomized design was used in this research, with two types of tending, i.e. intensive tending and less intensive tending until three years old. The results showed that the intensive tending significantly influenceD the mean of high growth and diameter of *S. stenoptera* of 3.19 m and 3.64 cm and *S. mecistopteryx* of 3.43 m and 3.76 cm. Work capability of the development of Shorea plantation, starting from land preparation, planting and intensive tending for three years were employed of 66 work man days/ha. Otherwise in less intensive tending were employed of 56 work man days/ha. Soil and cover crops condition within an areal of intensive tending had a good result, according to soil pH, N total, available P, cation exchange capacity (CEC) and important value index (IVI) compared to less intensive tending.

237 SUMADI, A

Estimation modelling of pulai darat (*Alstonia angustiloba*) tree volume. *Pemodelan penduga volume pohon pulai darat*/Sumadi, A.; Azwar, F.; Muara, J. (Balai Penelitian dan Pengembangan Hutan Tanaman, Palembang (Indonesia)). *Jurnal Penelitian Hutan Tanaman* (Indonesia) ISSN 1829-6327 (2006) v. 3(2) p. 73-81, 1 ill.; 6 tables; 10 ref.

ALSTONIA; DIAMETER; MODELS; VOLUME.

Pulai darat (*Alstonia angustiloba*) tree volume estimation model developed by PT. Xylo Indah Pratama which is located in Musi Rawas Regency, South Sumatra Province was compiled pursuant to one independent variable of tree diameter and two independent variables of tree diameter and tree height. Selection for the best model pursuant to the level gift on determination coefficient value (R^2), standard error (Se), mean deviation (MD), and aggregative deviation (AD). The best tree estimation model pursuant to one independent variable of diameter was the equation of V = 0.0795 - 0.0127 D + 0.000751 D2, with R^2 (94.80%), Se (3.11%), MD (1.91%), and AD (0.02%). The best tree estimation model pursuant to two independent variables of diameter and tree height was the equation of V = -0.0769 + 0.0093 H + 0.00885 D - 0.000102 D2 + 0.000045 D2H - 0.00100 DH with R^2 (96.30%), Se (2.69%), MD (1.49%), and AD (0.33%). The estimation of tree volume model with two independent variabels, had higher accurateness by increasing R^2 (1.5%), decreasing Se (0.42%), and decreasing MD (0.43%), but increasing AD (0.31%).

238 ULFA, M.

Effects of arbuscular mycorrhizae fungi inoculation to pulai (*Alstonia* sp.) at ex coal mining. ***Pengaruh inokulasi cendawan mikoriza arbuskula pada tanaman pulai di lahan bekas tambang batubara***/Ulfa, M.; Waluyo, E.A.; Martin, E. (Balai Penelitian dan Pengembangan Hutan Tanaman, Palembang (Indonesia)). *Jurnal Penelitian Hutan Tanaman* (Indonesia) ISSN 1829-6327 (2006) v. 3(2) p. 101-106, 1 ill.; 1 table; 20 ref.

ALSTONIA; VESICULAR ARBUSCULAR MYCORRHIZAE; INOCULATION; FIELDS; GLOMUS ETUNICATUM.

The effects of arbuscular mycorrhizae fungi (AMF) *Glomus etunicatum* inoculation to pulai (Alstonia sp.) at ex coal mining area was researched at Dumping Area Pit Tiga, Bangko Timur, PT. Bukit Asam, Tanjung Enim, South Sumatra, for 9 months. This research used aplicaded two treatments, *Glomus etunicatum* inoculation and varied seedling media, arranged in randomized block design with three replications. Growth parameters were height, diameter and survival percentage. The result showed that at the field, pulai (*Alstonia* sp.) growth relatively did not show a different between application, height and diameter. But at the other side, *Glomus etunicatum* inoculation influenced life survival at ex coal mining area that was shown by almost 100% survival percentage of pulai (*Alstonia* sp.). *Glomus etunicatum* did not influence growth of pulai too much at field. It was estimated that this was caused by plant biochemical process, such as nitrogen availability and accumulation of organic matter that was not well decomposed. It caused sporulation and colonization of CMA did not work well.

L01 ANIMAL HUSBANDRY

239 ABUBAKAR

Technology of slaughter, handling poultry meat and also applying HACCP (Hazard Analysis Critical Control Point) socializing in traditional RPA (Chicken Slaughterhouse). ***Teknologi pemotongan dan penanganan daging unggas serta sosialisasi penerapan HACCP (Hazard Analysis Critical Control Point) di RPA (Rumah Potong Ayam) tradisional***/Abubakar (Balai Besar Penelitian dan Pengembangan Pascapanen Pertanian, Bogor (Indonesia)). [Proceedings of the national seminar on innovation and specific location technology transfer supporting agricultural revitalization. Book 2], Medan, 5 June 2007/Sudana, W.; Moudar, D.; Jamil, A.; Yufdy, P.; Napitupulu, B.; Daniel, M.; Simatupang, S.; Nainggolan, P.; Hayani; Haloho, L.; Darmawati; Suryani, S. (eds.). Bogor (Indonesia): BBP2TP, 2007: p. 699-708, 1 ill., 18 ref. /631/152/SEM/p bk2

CHICKENS; SLAUGHTERING; HANDLING; POULTRY MEAT; TRADITIONAL TECHNOLOGY; CARCASSES; ABATTOIR BYPRODUCTS; HACCP; MEAT HYGIENE.

Food safety system of livestock products represents an integrated development network with the global, regional and also national policies. The increase demand of good food safety system of livestock for consumer stimulates the development of an applicable and relevant policy system by all market perpetrators. Poultry carcasses yielded by chicken slaughterhouse (traditional RPA) and during slaughtering process, handling, uncondusive environment might stimulate growth and contamination by pathogenic bacteria, representing products which have opportunity as medium in transmitting disease. In 2010 Indonesia government proclamis the meat self-sufficiency, therefore positive stages had been taken: provision of high yielding breed, high quality feed, and reliable management. The increase of chicken carcass product in meat self-sufficiency should be followed by improvement of quality and food safety and also guarantee for its lawful. Chicken carcasses have potential and strategic role in meat self-

sufficiency proclamation, because chicken meat is highly preferred by most societies, high nutritious, easy to digeste, easy to process and affordable price, but chicken meat is easy to decay because of inappropriate handling during slaughter until arrive at market. Most slaughtering of chicken these days was done traditionally in RPA (chicken slaughterhouse) with the simple equipments and technique and less hygiene. To improve chicken carcass quality and safety during slaughter until arrive at market, HACCP and CCP (Critical Control Point) should be applied at chicken slaughtering, blood draining, feather removal, bowels discarding, washing, packaging, chilled storage and transportation.

240 KHAIRIAH

Arab chicken characteristic and development technology in North Sumatra (Indonesia). ***Karakteristik ayam arab dan teknologi pengembangannya di Sumatera Utara***/Khairiah; Wasito (Balai Pengkajian Teknologi Pertanian Sumatera Utara, Medan (Indonesia)). [Proceedings of the national seminar on innovation and specific location technology transfer supporting agricultural revitalization. Book 2], Medan, 5 June 2007/Sudana, W.; Moudar, D.; Jamil, A.; Yufdy, P.; Napitupulu, B.; Daniel, M.; Simatupang, S.; Nainggolan, P.; Hayani; Haloho, L.; Darmawati; Suryani, S. (eds.). Bogor (Indonesia): BBP2TP, 2007: p. 661-668, 1 ill., 6 tables; 22 ref. 631/152/SEM/p bk2

CHICKENS; DOMESTIC ANIMALS; PHENOTYPES; BEHAVIOUR; REARING TECHNIQUES; LAYER CHICKENS; DOMINANT GENES; BATTERY HUSBANDRY; SUMATRA.

Requirement of poultry products in the form of meat and egg is continuously increasing, in line with community knowledge on the importance of animal protein. To fulfill protein, one of solution is raising arab chicken which is popular currently in North Sumatra. Arab chicken is potential as local layer chicken. Efforts which should be done for its development in North Sumatra were recognizing characterisitic, history, recommended technology and technology application.

241 PRASETYO, L.H.

Strategy and opportunity for the development of duck breeding farm. ***Strategi dan peluang pengembangan pembibitan ternak itik***/Prasetyo, L.H. (Balai Penelitian Ternak, Ciawi, Bogor (Indonesia)). *Wartazoa* (Indonesia) ISSN 0216-6461 (2006) v. 16(3) p. 109-115, 1 ill., 8 ref.

DUCKS; REARING TECHNIQUES; ANIMAL HUSBANDRY; ANIMAL BREEDING; AGRICULTURAL DEVELOPMENT; DEVELOPMENT POLICIES.

The recent development of duck farming requires the availability of good quality breeding stocks commercially in order to improve productivity and efficiency. Presently, there is no commercial duck breeding farm which can produce good quality breeding stocks. This article presents information on alternatives in developing duck breeding farm, particularly for layer ducks. There are two alternative approaches in duck breeding farms: (1) Group breeding farm, which belongs to duck farmers' group, as part of a group production system, and (2) Commercial breeding farm, by an individual private company/semi-government institution in a commercial scale and particularly for export market. A good breeding farm requires appropriate systems for selection and mating of the animals to guarantee the quality of the breeding stocks being produced. A breeding farm must be economically and technically feasible as an economic entity, so that economic analysis and marketing must be prepared seriously.

242 SARIMAN

Development of duck livestock at Prima Tani area of intensive irrigated field in Asahan District (Indonesia). ***Pengembangan ternak itik di kawasan Prima Tani lahan sawah intensif Kabupaten Asahan***/Sariman; Haloho, L. (Balai Pengkajian Teknologi Pertanian Sumatera Utara, Medan (Indonesia)). [Proceedings of the national seminar on innovation and specific location technology transfer supporting agricultural revitalization. Book 2], Medan, 5 June 2007/Sudana, W.; Moudar, D.; Jamil, A.; Yufdy, P.; Napitupulu, B.; Daniel, M.; Simatupang, S.; Nainggolan, P.; Hayani; Haloho, L.; Darmawati; Suryani, S. (eds.). Bogor (Indonesia): BBP2TP, 2007: p. 683-688, 4 tables; 9 ref /631/152/SEM/p bk 2

DUCKS; ANIMAL HUSBANDRY METHODS; INTENSIVE HUSBANDRY; STABLES; FEEDS; FARMERS ASSOCIATIONS; FARM INCOME; EGG PRODUCTION; IRRIGATED LAND; SUMATRA.

Generally, duck is raised by rural farmers in traditional manner in which ducks are grazed at one irrigated field to another after crop is harvested. This model is suitable to the condition in local area and environment, but it gradually changes into semi-intensive and intensive system. This is due to the reduction of irrigated land for agriculture and limited duck grazing. In effort to anticipate this problem and accelerate the introducing technological innovation to users, semi-intensive and intensive Alabio duck livestock has been developed in Prima Tani area of intensive irrigated field in Desa Siparepare, Air Putih District, Asahan Regency. Each of 5 farming cooperators received 40 ducks. Ratio male to female was 1:9. The purpose of this study was to socialize semi-intensive and intensive duck rearing technology (making stable + feed). The results showed that (1) technology of semi-intensive and intensive duck development was done well by farming cooperators at study location. Therefore, other farmers could directly observe the good way to rear duck, including making stable and good feeding; (2) Average duck egg production from January, February and March 2007 was 400, 471, 640 eggs/farmer, respectively.

243 SILALAHI, M.

Improvement of kacang goat management in dryland of Buana Sakti Village Batang Hari Subdistrict, Lampung Timur Regency (Indonesia). ***Perbaikan tatalaksana pemeliharaan ternak kambing kacang di lahan kering Desa Buana Sakti Kabupaten Lampung Timur***/Silalahi, M.; Tambunan, R.D.; Basri, E. (Balai Pengkajian Teknologi Pertanian Lampung, Bandar Lampung). [Proceedings of the national seminar on innovation and specific location technology transfer supporting agricultural revitalization. Book 2], Medan, 5 June 2007/Sudana, W.; Moudar, D.; Jamil, A.; Yufdy, P.; Napitupulu, B.; Daniel, M.; Simatupang, S.; Nainggolan, P.; Hayani; Haloho, L.; Darmawati; Suryani, S. (eds.). Bogor (Indonesia): BBP2TP, 2007: p. 610-616, 2 ill., 4 tables; 12 ref 631/152/SEM/p bk 2

GOATS; ANIMAL HUSBANDRY METHODS; ANIMAL HOUSING; FLUSHING; BIRTH RATE; LITTER SIZE; BIRTH WEIGHT; WEIGHT GAIN; ARID ZONES; DRY FARMING; SUMATRA.

Assessment on kacang goat management improvement was conducted in dryland of Buana Sakti Village, Batang Hari Subdistrict, Lampung Timur Regency. Eleven farmer's families were used as cooperators. Goat management techniques introducted were housing, flushing for pregnant and milking goats, introducing superior PE bucks, and regular medication. The assessment aimed at obtaining goat management technology that can be applied to improve goats productivity. Parameters observed were cooperator-farmers' characters, goat-owner scale, amount of new-born kids, new-born weight, and weight gain. Periodic observation was conducted every month and data gathered was analyzed descriptively. Results showed that farmers' knowledge on goats reproduction was very low, due to their low education level. Change from floor-stall system to stage-stall system affected goats' health (indicated by no scabies and pneumonia attact) until the end of the assessment. Goats exterior performance was well. Goats daily weight gains were low: 29.5 g/head/day for mature goats; 32.0 g/head/day for young goats; and 31.5

g/head/day for kids. Flushing on female goats was improved new-born weight and litter size. Utilization of superior PE bucks improved female goat's fertility.

244 YENNI-YUSRIANI

Characteristic of goat raising system on coastal area at Pidie District Nanggroe Aceh Darussalam Province (Indonesia). ***Karakteristik sistem pemeliharaan kambing di daerah pesisir Kabupaten Pidie Provinsi NAD***/Yenni-Yusriani; Iskandar-Mirza; Azis, A. (Balai Pengkajian Teknologi Pertanian Nanggroe Aceh Darusalam, Banda Aceh (Indonesia)). [Proceedings of the national seminar on innovation and specific location technology transfer supporting agricultural revitalization. Book 2], Medan, 5 June 2007/Sudana, W.; Moudar, D.; Jamil, A.; Yufdy, P.; Napitupulu, B.; Daniel, M.; Simatupang, S.; Nainggolan, P.; Hayani; Haloho, L.; Darmawati; Suryani, S. (eds.). Bogor (Indonesia): BBP2TP, 2007: p. 653-660, 7 tables; 11 ref 631/152/SEM/p bk2

GOATS; ANIMAL HUSBANDRY; REARING TECHNIQUES; ANIMAL BREEDERS; STALLS; TRADITIONAL TECHNOLOGY; SMALL FARMS; COASTS; SUMATRA.

The research was conducted at 6 villages on coastal area in Pidie District Nanggroe Aceh Darussalam Province, involving 55 respondents. Data collection used PRA method which is analyzed with descriptive statistics. The research showed that only 14.4% respondent had main occupation as goat raiser. Education level of respondents was elementary school (20.8%), junior high school (29.4%), senior high school (45.5%) and university (2.5%) and they were generally in productive age with experience in goat raising 1-14 years. Average number of goat owned by farmer was 5.4 goats and some of them applied sharing method between owner and raiser. Raising model as breeder and stall management was widely various. Farmer owned 1-3 goats usually did not use stall for their goats and let them find shelter by themselves.

L02 ANIMAL FEEDING

245 ALI, U.

Effect of use of onggok and cow rumen bowel in complete feed on the performance of etawah crossbreed goat. ***Pengaruh penggunaan onggok dan isi rumen sapi dalam pakan komplit terhadap penampilan kambing peranakan etawah***/Ali, U. (Universitas Islam Malang (Indonesia). Fakultas Peternakan). *Majalah Ilmiah Peternakan* (Indonesia) ISSN 0853-8999 (2006) v. 9(3) p. 69-72, 2 tables; 10 ref.

GOATS; BREEDS (ANIMALS); RUMEN; TAPIOCA; BYPRODUCTS; COMPLETE FEEDS; NUTRITIVE VALUE; ANIMAL PERFORMANCE.

The aim of this experiment was to analyze the effect of onggok and cow rumen bowel (OCRB) use in complete feed on the performance of etawah crossbreed goats (ECG), and was conducted at the Faculty of Animal Husbandry, Islamic University of Malang. The experiment used randomized block design, using 12 etawah crossbreed goats having body weight of 23.5-30.8 kg in 3 blocks. The goats were put in individual cages for 65 days and given complete feed. The treatment feed was arranged based on nutrient requirements for ruminants-crude protein max. 14% and crude fiber min. 12%. Formulations of OCRB in feed given were R0 = 0%, R10 = 10%, R20 = 20%, and R30 = 30%. The goat performances observed were feed intake, digestible nutrient and body weight gain, and the data obtained was analyzed by covariance and BNJ test. The result of statistical analysis showed that the use of OCRB in complete feed was significant ($P<0.05$) for IDM, DDM, DOM, IDOM and BWG. In daily intake rate: IDM = 1012.51 ± 8.04 g/head, DDM = 63.94 ± 0.77%, DOM = 65.69 ± 1.13%, IDOM = 613.041 ± 84.955 g/head, and

BWG = 75.88 ± 4.06 g/head. It was concluded that OCRB in complete feed can be used 30% for goats which was optimal and efficient with body weight gain of 71.92 g/head/day.

246 BATUBARA, A.

[Influence of bioplus on bali cattle fattening in oil palm plantation]. ***Pengaruh bioplus terhadap penggemukan sapi bali yang digembalakan di perkebunan kelapa sawit***/Batubara, A.; Agussalim S. (Balai Pengkajian Teknologi Pertanian Riau, Pekanbaru (Indonesia)). [Proceedings of the national seminar on socialization of research and assessment results], 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 (Indonesia): PSEKP, 2006: p. 496-501, 1 ill., 2 tables; 9 ref. 631.17.001.5/SEM/p

BEEF CATTLE; PROBIOTICS; FATTENING; GRAZING; OIL PALMS; PLANTATIONS; WEIGHT GAIN.

The objective of this study was to know probiotic Bioplus treatment effect on bali cattle growth which grazing in the palm oil plantation area in Bagan Batu Village, Bagan Sinembah Subdistrict, Rokan Hilir District, Riau. Animals used were 15 head bali cattle with average 1.5-2 years old. Animals were divided into 3 treatments, namely: T1=Bioplus + rice bran; T2=Bioplus; and T0=without Bioplus (as a control). The parameters observed were body growth rates and average daily gain. The experiment was designed in a simple randomized design. Data was analysed by analysis of variance (Duncan test). The result showed that T1 (ADG=0.61 kg/day) was highly significantly different ($P<0.01$) compare to T0 (ADG=0.31 kg/day), T2 (ADG=0.52 kg/day) and significantly different compare to T0. It is concluded that Bioplus treatment can increase average daily gain about 0.51-0.6/kg/day on bali cattle which grazing under oil palm trees in the plantation area.

247 CANDRAWATI, D.P.M.A.

Effect of supplementation of phylazim in 30% rice bran based diets on performance of broilers. ***Pengaruh suplementasi enzim phylazim dalam ransum yang menggunakan 30 persen dedak padi terhadap penampilan broiler***/Candrawati, D.P.M.A.; Witariadi, N.M.; Bidura, I G.N.G.; Dewantari, M. (Universitas Udayana, Denpasar (Indonesia). Fakultas Peternakan). *Majalah Ilmiah Peternakan* (Indonesia) ISSN 0853-8999 (2006) v. 9(3) p. 73-77, 2 tables; 16 ref.

BROILER CHICKENS; RICE HUSKS; SUPPLEMENTARY FEEDING; ENZYMES; FEEDS; ANIMAL PERFORMANCE.

This research was carried out to study the effect of supplementation of phylazim enzyme in rice brand based diets on performance of broiler aged 2-6 weeks, at Denpasar, Bali. A completely randomized design (CRD) with three treatments in six replications was used in this experiment. There were four birds in each replicate with a homogenuous body weight (473.94 ± 13.70 g). The experimental diets for the finishing period (aged 2-6 weeks) were formulated with 20% crude protein and 2900 kCal ME/kg with 15% rice bran as a control diet (A), diets with 30% rice bran (B), and diets with used 30% rice bran + 0.20% phylazim enzyme (C), respectively. Experimental diets and drinking water were provided *ad libitum* during the entire experimental period. The variables observed were feed consumption, water consumption, final body weight, body weight gain, and feed conversion ratio (FCR). The result of this experiment showed that rice bran based diets (diets with 30% rice bran) had no significant effect ($P>0.05$) on feed and drinking water consumption, but decreased significantly ($P<0.05$) on body weight gain, and feed efficiency compared to control group. An addition of 0.20% phylazim enzymes in rice bran based diets (30% rice bran) showed the same effect ($P>0.05$) as the control. It was concluded that broilers aged 2-6

weeks offered rice bran based diets (diets with 30% rice bran) were decreased body weight gain and feed efficiency compared to the control (diets with content 15% rice bran). But, supplementation of 0.20% phylazim in rice bran based diets had the same effect as the control (diets with 15% rice bran).

248 GINTING, S.P.

[Productivity of *Paspalum gluenoarum* and *Brachiaria ruziziensis* in the citrus plantation and estimation of carrying capacity for goats]. *Produktivitas Paspalum guenoarum dan Brachiaria ruziziensis pada lahan jeruk dan estimasi daya dukung terhadap ternak kambing*/Ginting, S.P. (Loka Penelitian Kambing Potong, Medan (Indonesia)). [Proceedings of the national seminar on innovation and specific location technology transfer supporting agricultural revitalization. Book 2], Medan, 5 June 2007/Sudana, W.; Moudar, D.; Jamil, A.; Yufdy, P.; Napitupulu, B.; Daniel, M.; Simatupang, S.; Nainggolan, P.; Hayani; Haloho, L.; Darmawati; Suryani, S. (eds.). Bogor (Indonesia): BBP2TP, 2007: p. 617-622, 4 tables; 11 ref. 631/152/SEM/p bk2

GOATS; CITRUS; PLANTATIONS; AGROPASTORAL SYSTEMS; FORAGE; PASPALUM; BRACHIARIA RUZIZIENSIS; PRODUCTIVITY; FARMYARD MANURE; PRODUCTION POSSIBILITIES.

A study was conducted to analyze the productivity of two forage species planted in the citrus plantation and based on the level of dry matter productivity, the potential size of carrying capacity for goats and the production of manure were calculated. The forage species namely *Paspalum guenoarum* and *Brachiaria ruziziensis* were planted around citrus plantation of 2.0 ha. The forages were cut after being established at 6 weeks interval during the wet season and 8 weeks interval during dry season. The production of *Paspalum guenoarum* and *Brachiaria ruziziensis* were 163 and 122 t/ha/year equivalent to 40.8 and 36.6 t/ha/year (dry matter basis), respectively. The effective land size of citrus plantation that could be planted for forages was 49-96%. Based on dry matter production of forages and effective land size that could be planted, the dry matter production of forages was 20.3-39.5 t/ha/year for *P. guenoarum* and 18.2-35.4 t/ha/year for *B. ruziziensis*. With the assumption of dry matter intake of 4% body weight, it was calculated that carrying capacity of citrus plantation when planted with *Paspalum guenoarum* and *Brachiaria ruziziensis* were 63-123 head/ha/year and 58-113 head/ha/year, respectively. The potential manure production was calculated to be 230%-360% of the manure requirement when goats were raised in the citrus plantation of 0-3 years old. The manure production decreased to 65% of the requirement when the age of citrus plant was more than 3 years. It was concluded that introduction of exotic forage species into the citrus plantation could support a significant population of goats. This production system would improve the efficiency of farming through supplying manure as well as goat production.

249 GINTING, S.P.

[Utilization of horticultural processed byproducts as an alternative ruminant feeds]. *Pemanfaatan limbah industri pengolahan hortikultura sebagai pakan alternatif ternak ruminansia*/Ginting, S.P. (Loka Penelitian Kambing Potong, Medan (Indonesia)). [Proceedings of the national seminar on innovation and specific location technology transfer supporting agricultural revitalization. Book 2], Medan, 5 June 2007/Sudana, W.; Moudar, D.; Jamil, A.; Yufdy, P.; Napitupulu, B.; Daniel, M.; Simatupang, S.; Nainggolan, P.; Hayani; Haloho, L.; Darmawati; Suryani, S. (eds.). Bogor (Indonesia): BBP2TP, 2007: p. 623-629, 3 ill., 4 tables; 8 ref. 631/152/SEM/p bk2

RUMINANTS; CONCENTRATES; COMPLETE FEEDS; INDUSTRIAL WASTES; HORTICULTURE; BYPRODUCTS; WASTE UTILIZATION; SILAGE MAKING; FEED CONVERSION EFFICIENCY; PROXIMATE COMPOSITION.

Industrial processing of various horticulture into main products produces various byproducts or wastes in huge amount, continuously and logistically concentrated. Processing of passion fruits (*Passiflora edulis*) yields byproducts such as fruit shells and seeds. Processing of pineapple (*Ananas comosuss*) yields fruit shell, while radish root (*Raphanus sativa*) processing yields wasted root. The fruit shell and seed of passion fruit contains high energy and moderate crude protein, pineapple fruit shell has very low crude protein but high energy content, while raddish root has high digestible energy content. Utilization of fruit shell or seed of passion fruit in concentrate for goats 15%-40% resulted in moderate to high daily gains (54-105 g) and feed conversion ratio (FCR) of 7.5-10.6. Shell fruit of pineapple utilization at the levels of 15%-30% in concentrate of complete feed resulted in moderate daily gains of 62-62 g and FCR of 8.5-12.2. Fermentation of pineapple wastes to produce silages could preserve the product and used as basal feeds to substitute forages. The radish root meal could be used up to 40 % in concentrate and resulted in 54-66 g daily gains and 12.0-14.0 FCR in growing goats. The principle methods used in processing those byproducts to animal feeds included drying, grinding and blending or fermentations. It was concluded that various horticulture processing byproducts provide alternative feeds that could be used to support animal production in an integrated system with horticulture crops.

250 HASNELLY, Z.

[Effect of decreasing protein energy level of morning feed on growth performance of merawang chicken]. ***Pengaruh penurunan tingkat protein-energi ransum pada pagi hari terhadap kinerja ayam merawang masa pertumbuhan***/Hasnelly, Z.; Riyanto, A.; Nuraini (Balai Pengkajian Teknologi Pertanian, Bangka Belitung (Indonesia)). [Proceedings of the national seminar on innovation and specific location technology transfer supporting agricultural revitalization. Book 2], Medan, 5 June 2007/Sudana, W.; Moudar, D.; Jamil, A.; Yufdy, P.; Napitupulu, B.; Daniel, M.; Simatupang, S.; Nainggolan, P.; Hayani; Haloho, L.; Darmawati; Suryani, S. (eds.). Bogor (Indonesia): BBP2TP, 2007: p. 588-596, 2 ill., 7 tables; 11 ref 631/152/SEM/p bk 2

CHICKENS; GROWTH PERIOD; FEEDING LEVEL; ENERGY CONSUMPTION; NUTRITIVE VALUE; FEED INTAKE; WEIGHT GAIN; FEED CONVERSION EFFICIENCY; FEED CONSUMPTION.

The aim of this research was to study merawang chicken performance based on feeding. Sixtyseven one week old merawang chickens grouped into two feeding groups. Research was executed in poultry Laboratory, Gadjah Mada University. First treatment was feeding consisted of harsh protein 17.63%, metabolic energy 2678.52 kcal/kg given in the morning 06.00 to 12.00 and also evening 12.00 to 18.00, while second treatment was feeding consisted of harsh protein 20.95%, metabolic energy 3143.40 kcal/kg given in the morning 06.00 to 12.00 and continued with feed A (harsh protein 17.63%, metabolic energy 2678.52 kcal/kg) in evening 12.00 to 18.00. Each group consisted of 3 replications. Weekly data of feed consumption and gain weight was analyzed by using split plot with age as subplot. It was then continued with calculation of IOFC. Result showed that feeding with two kind feeds on merawang chicken did not affect total feed consumption, gain weight, feed conversion, protein consumption and energy, but gave different value of IOFC of Rp 2,552 for the first treatment, and Rp 4,400 for second treatment.

251 ISKANDAR-MIRZA

Utilization of fermented hay as feeding cattle in crop-livestock system of Nanggroe Aceh Darussalam Province (Indonesia). ***Pemanfaatan jerami fermentasi sebagai pakan sapi pada lahan sawah di Provinsi Nanggroe Aceh Darussalam***/Iskandar-Mirza; Yenni-Yusriani; Azis, A. (Balai Pengkajian Teknologi Pertanian Nanggroe Aceh Darusalam, Banda Aceh (Indonesia)). [Proceedings of the national seminar on innovation and specific location technology transfer supporting agricultural revitalization. Book 2], Medan, 5 June 2007/Sudana, W.; Moudar, D.; Jamil, A.; Yufdy, P.; Napitupulu,

B.; Daniel, M.; Simatupang, S.; Nainggolan, P.; Hayani; Haloho, L.; Darmawati; Suryani, S. (eds.). Bogor (Indonesia): BBP2TP, 2007: p. 645-652, 4 tables; 9 ref. 631/152/SEM/p bk2

BEEF CATTLE; FEEDS; RICE STRAW; FERMENTATION; RATIONS; NUTRITIVE VALUE; PROXIMATE COMPOSITION; FEED CONVERSION EFFICIENCY; WEIGHT GAIN; SUMATRA.

Animal husbandry system in urban area still applied traditional way and usage of local resources is under optimum level. Beef cattle development in rice area is potentially applicable, since rice straw wastes are available in abundance. Usage of rice straw as feed are still limited for its low nutrition quality. Probiotic addition can improve rice straw digestibility up to 50%. The assessment aimed at assembling technological package for integrated crop-livestock farming system. The assessment was used 15 Aceh-native beef cattles with age range 2-2.5 years old and relatively have homogeneous body weight. This assessment tested 5 applications of feed, T1 = 0% fermented straw + 100% pasture grass, T2 = 25% fermented straw + 75% pasture grass, T3 = 50% fermented straw + 50% pasture grass, T4 = 75% fermented straw + 25% pasture grass, T5 = 100% fermented straw + 0% pasture grass. Each application was added rice bran of 1% of body weight. Drinking water was given *ad libitum*. Before the applications started, all animal were weighed and repeated every 14 days. Before entering adaptation phase, the animals were drenched with anthelmintic. Digestion rate measurement was conducted during applications for all animals. The parameters measured were average daily gain and digestion rate. Data collected were analyzed using ANOVA and economic analyses (R/C Ratio). Fermentation process could increase protein up to 72.12% and reduce crude fiber up to 25.68%. Fermented rice straw intake ranged 0.467-1.643 kg/day/head. Dried matter intake of fermented rice straw among applications were significantly different ($P<0.05$), but rate of total dried matter of fermented straw intake among applications was undifferent ($P>0.05$). Dried matter digestion for each application was significantly different ($P<0.05$). There was no differences on total intake of both dried matter and organic matter ($P>0.05$). The daily gain for each application showed no differences ($P>0.05$). The highest daily gain was found on application T3 (0.955 kg/day/head) and the lowest application T5 (0.438 kg/day/head). Feed conversion value ranged 6.05-15.26. Economic analysis gave R/C ratio of 1.235 on this assesment.

252 ISKANDAR-MIRZA

Utilization of various types of food as feeding goats in Nanggroe Aceh Darussalam Province (Indonesia). ***Pemanfaatan berbagai jenis pakan kambing potong di Provinsi Nanggroe Aceh Darussalam***/Iskandar-Mirza; Yenni-Yusriani; Azis, A. (Balai Pengkajian Teknologi Pertanian Nanggroe Aceh Darussalam, Banda Aceh). [Proceedings of the national seminar on innovation and specific location technology transfer supporting agricultural revitalization. Book 2], Medan, 5 June 2007/Sudana, W.; Moudar, D.; Jamil, A.; Yufdy, M.P.; Napitupulu, B.; Daniel, M.; Simatupang, S.; Nainggolan, P.; Hayani; Haloho, L.; Darmawati; Suryani, S. (eds.). Bogor (Indonesia): BBP2TP, 2007: p. 639-644, 4 tables; 11 ref. 631/152/SEM/p bk2

GOATS; FEEDS; FEEDING PREFERENCES; FEED CONVERSION EFFICIENCY; FEED INTAKE; WEIGHT GAIN; SUMATRA.

Goat is livestock commodity which has not yet been raised optimally in Nanggroe Aceh Darussalam Province and currently the population was decreasing up to 0.32%. Goat has not yet had comparative advantage for Nanggroe Aceh Darussalam Province. A study was conducted in visitor plot of AIAT NAD using 10 local goats, age 10-12 months divided into 2 groups that namely group T1 (castrated) and T2 (not castrated). Before feed treatment all animals were drench with anthelmintic of albendazole group. Feed type given were elephant grass, banana peel, gliricidia, lamtoro and soybean cake dregs of 5%, 5%, 2.5% and 2.5% of body weight, respectively. Soybean cake dregs was given by 1.5 kg/head/day/. Weighing of body weight was done with interval 7 days. Parameters measured were daily gain and feed intake. Data were analysed statistically. Result showed that total feed intake of group T1 was 3.72 kg/head/day and T2 was 3.42 kg/head/day. Feed consumption ability of each group was significantly different ($P<0.05$). The

daily gain of group T1 was 0.35 kg/head/day and T2 0.30 kg/head/day. The daily gain at each group was not significantly different (P>0.05).

253 KARDA, I W.

Methods to increase intake of gliricidia leaves (*Gliricidia sepium*) by sheep. ***Metode untuk meningkatkan konsumsi daun gamal (Gliricidia sepium) kering oven oleh ternak domba***/Karda, I W. (Universitas Mataram (Indonesia). Fakultas Peternakan). *Majalah Ilmiah Peternakan* (Indonesia) ISSN 0853-8999 (2006) v. 9(3) p. 102-107, 4 tables; Bibliography: p. 106-107

SHEEP; FEEDS; GLIRICIDIA SEPIUM; LEAVES; HAY; DRYING; FEED INTAKE; FEED CONSUMPTION.

Three trials were conducted to investigate the intake of oven-dried gliricidia by sheep: namely, trial 1, addition of polyethylene glycol (PEG); trial 2, pretreatments; and trial 3, addition of additives. In the first trial, six rumen fistulated sheep were used to compare two dietary treatments in a change over design to study whether infusion of polyethylene glycol (PEG) into the rumen might increase intakes of gliricidia leaf as tannin in the leaf was believed to limit its intake. In the second trial, four sheep were used to compare four dietary treatments in a latin square design to study whether reheating or freezing the already oven-dried gliricidia leaf might increase its intake by the animals. On the other hand, the third trial was aimed at supplementing the sheep with various supplements which are believed to be able to increase the taste of the leaf by animals. These supplements were wheat millrun, molasses, grass hay, cottonseed meal, palm kernel meal, or barley grain. For this reason, ten sheep were used to compare seven dietary treatments in a randomized completely block design. Differences between means were examined by analysis of variance using the General Linear Model Procedure of the Statistical Analysis System. The results showed that neither administration of PEG into the rumen nor pretreatments (reheating or freezing) increased intake of gliricidia leaf by sheep. However, only mixing gliricidia with molasses increased the intake of the leaf by sheep, which over the control diet (gliricidia alone) after the six hours feeding period (43 vs 74 g DM).

254 LAKSMIWATI, N.M.

Effect of starbio and effective microorganism-4 (EM-4) as probiotic on the performance of male duckling. ***Pengaruh pemberian starbio dan effective microorganism-4 (EM-4) sebagai probiotik terhadap penampilan itik jantan umur 0-8 minggu***/Laksmiwati, N.M. (Universitas Udayana, Denpasar (Indonesia). Fakultas Peternakan). *Majalah Ilmiah Peternakan* (Indonesia) ISSN 0853-8999 (2006) v. 9(3) p. 84-88, 3 tables; 16 ref.

DUCKS; YOUNG ANIMALS; FEEDS; PROBIOTICS; SUPPLEMENTARY FEEDING; ANIMAL PERFORMANCE.

An experiment was conducted at Denpasar to study the effect of starbio and effective microorganisms as probiotic on the performance of male ducklings. A randomized block design (RBD) with seven treatments was used in this experiment. The treatment consisted of a control group, three levels of starbio and three levels of effective microorganisms-4 (EM-4), namely, diets with 0.5 g starbio/kg diet (S1), with 1 g starbio/kg diet (S2), with 1.5 g starbio/kg diet (S3), 1 ml EM-4/l (E1), 2 ml EM-4/l (E2), 3 ml EM-4/l (E3) drinking water and control (K). Each treatment consisted of four replications of 8 ducklings each. The diet given from 0-4 weeks of age contained 20.06% CP and 2847 kcal/kg ME, while during 4-8 weeks contained 17% CP and 2807 kcal/kg ME. Diet and water were provided *ad libitum*. The results of this experiment showed that supplementation of probiotic in diet and EM-4 in drinking water significantly

increased growth and feed efficiency (P<0.05), but there was no significant difference of feed consumption. There was no significant difference of 0.5-1.5 g/kg starbio and 1.5 ml-3 ml EM-4 on growth, feed efficiency, and feed consumption.

255 PUTRA, S.

Supplementing effects of some mineral sources in the ration on the apparent absorption, retention, net utilization of nitrogen and blood protein of the etawah crossbreed goat fed grass based diet. ***Pengaruh suplementasi beberapa sumber mineral dalam konsentrat terhadap serapan, retensi, utilisasi nitrogen, dan protein darah kambing peranakan etawah yang diberi pakan dasar rumput***/Putra, S. (Universitas Udayana, Denpasar (Indonesia). Fakultas Peternakan). *Majalah Ilmiah Peternakan* (Indonesia) ISSN 0853-8999 (2006) v. 9(3) p. 94-101, 1 ill., 4 tables; 31 ref.

GOATS; BREEDS (ANIMALS); FEED GRASSES; FEEDS; SUPPLEMENTARY FEEDING; MINERAL RESOURCES; BLOOD PROTEINS; NITROGEN.

A (station) research was carried out to study the supplementing effects of some mineral sources in the ration on the nitrogen apparent absorption, blood protein, nitrogen retention, and net nitrogen utilization of the etawah crossbreed goat (PE) fed by a grass based diet. A latin square design consisting of four diet treatments, four of PE goats, and four of periods was used in this research. The four diet treatments were: diet A (natural grass + concentrate without source of mineral supplementation); diet B (natural grass + concentrate which supplemented MINERAL 10); diet C (diet of B supplemented with ammonium sulfate); and diet D (diet of C supplemented with PIGNOX). The ratio of natural grass/concentrate was 68% to 32%. Each period was allocated into 3 weeks, the first two weeks for observation and the last week for total collection of faeces and urine. Between two periods, there was 7 days was given for adaptation or rest time. The results of this research showed that supplementation of some mineral sources in the ration did not affect (P>0.05) the consumption, apparent absorption, retention of N, blood protein, BV, and NNU, but affected (P<0.05) the blood urea N. Quantitatively, the consumption, apparent absorption, retention of N, BV, and NNU on goat in diet D was the highest due to the higher digestibility of CP and metabolism of diet D compared to the other experimental diets. Urea and protein of blood in goat D were second highest (P>0.05) after goat C, quantitatively. It is concluded that supplementation of MINERAL 10, ammonium sulfate, and PIGNOX on the treatment D were the best combination to increase N apparent absorption, retention of N, net nitrogen utilization (NNU), and blood protein, quantitatively.

256 WASITO

[Role of cattle fattening in improving small farmer income: case in Jatikesuma Village, Celawan, Kotapari, North Sumatra (Indonesia)]. ***Peran penggemukan sapi dalam meningkatkan pendapatan petani kecil: kasus Desa Jatikesuma, Celawan, Kotapari di Sumatera Utara***/Wasito; Khairiah (Balai Pengkajian Teknologi Pertanian Sumatera Utara, Medan (Indonesia)). [Proceedings of the national seminar on socialization of research and assessment results], 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 (Indonesia): PSEKP, 2006: p. 556-565, 2 ill., 4 tables; 9 ref. 631.17.001.5/SEM/p

BEEF CATTLE; FATTENING; FARM INCOME; JAVA.

Cow fattening pattern adopted by small farmers varied, individually or group. The use of feed concentrates depended on capital and raw material price of concentrates. The use of native grasses or agricultural wastes, such as corn leaf and bar as major feed have been conducted by many farmers in North Sumatra. To understand more completely, a study was conducted at villages of cow fattening

centers for increasing income of small farmers. Those areas were Jatikesuma Village, of Namorambe Subdistrict, Deli Serdang Regency at October 2003, March 2004, and May 2005, and also Celawan and Kotapari Villages, Pantai Cermin Subdistrict, Serdang Bedagai Regency at May 2005, by involving breeder of pioneer cow and exponent (innovator and adopter) of 15 people and 30 people, at the same time as key informant. Result of study indicated that 78% farmers in Jatikesuma were cow breeder, owned 2-40 cows; in Celawan 50% (2-50 cattle); and 45% in Kotapari (2-100 cattle); degree of theft of livestock (0%). Cattle small farming farmers (2 < x < 15 cattle) in Jatikesuma was ± 74%, Celawan (± 46%), and Kotapari (± 32%). Since in the middle of the 2004 major feed used by small breeder (<10 cow) (85%) was corn wastes for cattle fattening on Jatikesuma, or field grass for the fattening in Celawan. The availability of corn waste was good, because the cooperation hadd been performed with merchant of young corn "braise or burn" (barter of harvesting labor), or with small corn farmer (barter of farmyard manure) in Pancur Batu (± 10 km, corn wastes ± 90%), Namorambe (± 10%). Income from cow fattening (< 15 cattle/breeder), as unfundamental living was used to the expense of making of house (100%), buying television or motorbike (100%), land (40%), school expense (40%). Result of vegetable farming, food crop and non agriculture was used for daily expense (100%). At cow fattening of 10 < x < 100 (15%), farmers remained to use cassava dregs concentrate feed, or preeminent grass. Fattening of Brahman or Simental for 7 months in Jatikesuma feeding corn waste + complete concentrate (A) (5%), corn wastes + simple concentrate (B) (10%), and corn wastes (C) (85%), resulted in B/C ratio values of 1.34 (A), 1.24 (B), and 1.14 (C), respectively.

L10 ANIMAL GENETICS AND BREEDING

257 HASNELLY, Z.

[Heritability estimation of merawang chicken in growth periods]. ***Estimasi heritabilitas ayam merawang pada masa pertumbuhan***/Hasnelly, Z. (Balai Pengkajian Teknologi Pertanian Bangka Belitung (Indonesia)). [Proceedings of the national seminar on innovation and specific location technology transfer supporting agricultural revitalization. Book 2], Medan, 5 June 2007/Sudana, W.; Moudar, D.; Jamil, A.; Yufdy, P.; Napitupulu, B.; Daniel, M.; Simatupang, S.; Nainggolan, P.; Hayani; Haloho, L.; Darmawati; Suryani, S. (eds.). Bogor (Indonesia): BBP2TP, 2007: p. 581-587, 2 ill., 3 tables; 9 ref. 631/152/SEM/p bk2

CHICKENS; COPULATION; HERITABILITY; GENETIC CORRELATION; GENETIC COVARIANCE; GROWTH PERIOD.

The research was conducted to investigate the heritability traits of growth of merawang chicken. The chickens were produced from mating group of 5 males and 20 females, which each group ratio consisted of 1 male and 5 female producing 113 chickens (55 males and 58 females). Research was executed Poultry of Gadjah Mada University. Analysis of genotype traits (the heritability value) were body weight and gain weight. The data were analyzed by variance analysis of nested design (hierarchy structure). The variance and covariance component was applied to estimate the heritability and genetic correlation of growth trait of Merawang chicken. The results indicated that the heritability of growth based on male (h'2s) was higher at 6-12 weeks age ranged 0.30-0.85. The phenotype and genotype correlation at 8-10 weeks age were 0.76 and 0.92, respectively. Therefore, selection to increase similarity of merawang chicken can be done at 6 weeks age.

L53 ANIMAL PHYSIOLOGY - REPRODUCTION

258 ARIFIANTINI, R.I.

[Effectiveness of using three type extenders in two kinds of packaging on semen cryopreservation process of Frisien Holstein]. ***Keberhasilan penggunaan tiga pengencer dalam dua jenis kemasan pada proses pembekuan semen sapi Frisien Holstein***/Arifiantini, R.I.; Yusuf, T.L. (Institut Pertanian Bogor (Indonesia). Fakultas Kedokteran Hewan). *Majalah Ilmiah Peternakan* (Indonesia) ISSN 0853-8999 (2006) v. 9(3) p. 89-93, 3 ill., 2 tables; 26 ref.

DAIRY CATTLE; BREEDS (ANIMALS); SEMEN PRESERVATION; BIOLOGICAL PRESERVATION; FREEZING; THAWING; MOVEMENT.

Motility and the percentage of live sperm in thawed frozen semen was used as criterion to evaluate methods of three types of semen cryopreservation. Fifteen ejaculates from three Frisien Holstein (FH) were diluted in three extenders, namely TEY (Tris egg yolk), home made triladyl (HMT) and AndroMed containing soya lecithin (KK). Each semen sample was packed using two techniques (0.3 ml minitub and 0.25 ml Cassou straw). The samples were equilibrated (5°C) for four hours and frozen in the vapor of liquid nitrogen for 10 minutes. The percentages of postthawed of motility and live sperm were 56.28 and 74.22 for KK which were greater than HMT (47.60; 65.93) and TEY (48.74; 69.63) ($P<0.05$). There were no significant differences in the percentages of the progressive motile and live sperm freezing in 0.3 ml (52.16; 69.4) or 0.25 ml (49.59; 70.44). The percentages of live sperm at KK minitub (72.76 ± 10.83) and KK Cassou (75.67 ± 8.1) were greater than any other combinations. The percentages of progressive motile sperm in KK minitub (57.9 ± 7.81) were greater than KK Cassou or any other combinations.

259 DEWANTARI, M.

Phenotypic plasticity in reproductive character of mojosari, tegal, and tegal-mojosari ducks as a response to aflatoxin in diets. ***Kelenturan fenotipik sifat-sifat reproduksi itik mojosari, tegal dan persilangan tegal-mojosari sebagai respon terhadap aflatoksin dalam ransum***/Dewantari, M. (Universitas Udayana, Denpasar (Indonesia). Fakultas Peternakan). *Majalah Ilmiah Peternakan* (Indonesia) ISSN 0853-8999 (2006) v. 9(3) p. 78-83, 6 tables; 16 ref.

DUCKS; BREEDS (ANIMALS); FEEDS; RATIONS; AFLATOXINS; PHENOTYPES; REPRODUCTIVE PERFORMANCE.

The objective of this research was to study the phenotypic plasticity in reproductive character of mojosari, tegal, and tegal-mojosari ducks as a response to aflatoxin addition in diets. The experiment was conducted at The Animal Research Station in Ciawi, Bogor. Three ducks population (mojosari, tegal, and tegal-mojosari ducks) were grown administered four different aflatoxin levels, namely R0 (control diet, without aflatoxin), R1 (control diet + 50 ppb aflatoxin), R2 (control diet + 100 ppb aflatoxin), and R3 (control diet + 150 ppb aflatoxin) for one month period (aged 3-7 weeks). After the aflatoxin treatment period, all populations were maintained with R0 diet until laying egg production commenced. Each population was consited of 80 female ducks and 20 male ducks. Diets and water were offered *ad libitum*. A completely randomized design (CRD) with factorial arrangement (3x4) was used. The first factor was a population of ducks (mojosari, tegal, and tegal-mojosari ducks) and the second factor was aflatoxin levels (diets with 0 ppb, 50 ppb, 100 ppb, and 150 ppb of aflatoxin as treatment R0, R1, R2, and R3, respectively). Two ways analysis of variance was used to analyse phenotypic plasticity differences between populations. Variable observed were feed consumption, sexual maturity, body weight maturity, and the first weight of egg. The results showed that there were no significantly differences ($P>0.05$) on phenotypic plasticity in reproductive behaviour of mojosari, tegal, and tegal-mojosari ducks as a response to aflatoxin addition up to 150 ppb in diets.

260 DRADJAT, A.S.

Reproductive performance of chital deer (Axis axis): a tropical species in temperate areas. ***Penampilan reproduksi rusa chital (Axis axis): hewan tropika dipelihara di daerah subtropik***/Dradjat, A.S. (Universitas Mataram (Indonesia). Fakultas Peternakan). *Jurnal Veteriner* (Indonesia) ISSN 1411-8327 (2006) v. 7(1) p. 9-15, 2 tables; 33 ref.

CERVIDAE; PREGNANCY; BIRTH WEIGHT; REPRODUCTIVE PERFORMANCE; FOETAL DEATH; MORTALITY.

The objective of the present study was to evaluate reproductive performance of chital deer under subtropical condition in Australia. Two chital stags, and 48 mature hinds were used in this study. The hinds were synchronized by inserting CIDR's intravaginally and the CIDR's for 11 days. Then the hinds were joined with two stags following CIDR removal until 50 days and examine of their pregnancy status using ultrasonograph device. Each morning between 7.00 to 8.00 am, a present of the new born fawn was cought, sexed, weighed and ear tagged. Weaning was performed at 3 months old, by placing them at the separate paddocks. The results of the study indicated that pregnancy rate detected 6 weeks following insemination and natural mating was 56.2%. The incidence of embryonic death, dystocia, mortality of premature but breathed, anteparturient death with no birth trauma, mortality of predation and mortality caused by mismothering were 14.5%, 2%, 2%, 4%, 4.1% and 4.1%, respectively. Finally, the reproductive success was only 25% until weaning.

261 SURETNO, N.D.

[Assessment of cihateup duck semen quality]. ***Kajian kualitas sperma itik cihateup***/Suretno, N.D. (Balai Pengkajian Teknologi Pertanian Lampung, Bandar Lampung (Indonesia)). [Proceedings of the national seminar on innovation and specific location technology transfer supporting agricultural revitalization. Book 2], Medan, 5 June 2007/Sudana, W.; Moudar, D.; Jamil, A.; Yufdy, P.; Napitupulu, B.; Daniel, M.; Simatupang, S.; Nainggolan, P.; Hayani; Haloho, L.; Darmawati; Suryani, S. (eds.). Bogor (Indonesia): BBP2TP, 2007: p. 606-609, 2 tables; 5 ref. 631/152/SEM/p bk2

DUCKS; SEMEN; SEMEN COLLECTION; MOVEMENT; REPRODUCTIVE DISORDERS; REPRODUCTIVE PERFORMANCE; MICROSCOPY.

Cihateup duck is a local duck of Indonesia that needs to be conserved and improved its genetic. Understanding its biological characteristic would in support achieving this purpose. The aim of this research was to obtain information on reproductive performance of especially semen quality. Fifteen Cihateup duck males taken from Tasikmalaya and Garut Regencies were used in this research. At twenty-eight weeks old, their semen was collected by massage technique. The data on reproductive characteristics was analyzed descriptively. Results of macroscopic evaluation showed that pH 7.8; colour: milk white-off white; and consistency: middle. Whereas microscopic evaluation showed that its motility was 46%; concentration 690 millions/ml, live sperm 61.63% and abnormality 20.19%.

262 ZURRIYATI, Y.

Response of bali cow reproductivity at rearing pattern of integrated crop livestock system in Rokan Hulu Regency, Riau (Indonesia). ***Respon produktivitas sapi Bali pada pola pemeliharaan sistem integrasi dengan tanaman pangan di Kabupaten Rokan Hulu Riau***/Zurriyati, Y.; Irfan; Hidayat, D. (Balai Pengkajian Teknologi Pertanian Riau, Pekanbaru (Indonesia)). [Proceedings of the national seminar on innovation and specific location technology transfer supporting agricultural revitalization. Book 2],

Medan, 5 June 2007/Sudana, W.; Moudar, D.; Jamil, A.; Yufdy, P.; Napitupulu, B.; Daniel, M.; Simatupang, S.; Nainggolan, P.; Hayani; Haloho, L.; Darmawati; Suryani, S. (eds.). Bogor (Indonesia): BBP2TP, 2007: p. 676-682, 1 ill., 5 tables; 7 ref 631/152/SEM/p bk 2

BEEF CATTLE; FOOD CROPS; AGROPASTORAL SYSTEMS; REARING TECHNIQUES; PREGNANCY; BODY WEIGHT; BIRTH WEIGHT; REPRODUCTIVE PERFORMANCE; WEIGHT GAIN.

The assessment was conducted at Masda Makmur Village, Rambah Samo District, Rokan Hulu Regency in 2006. The objective of this assessment was to study reproductivity response of bali cow at rearing pattern of integrated crop livestock system. The cow used belonged to farmer cooperator, which had got pregnancy and aged about two years old. Technology packages assessed were Introducted technology I (T1), Introducted technology II (T2) and existing technology (T3). Introduced technology component were: cow selection, collective/communal cage, using feed additives, block mineral, and composting. Difference of T1 and T2 treatments was comparison of basal feed, that are T1= 50% fermented rice straw : 50% native grass, T2= 40% fermented rice straw : 60% native grass, T3= farmer's technology as control. Parameters observed were change of body weight according to physiological status, birth weight and conception percentage. The results showed that the highest body weight according to physiological status was pregnancy cow 0.3 kg/head/day at treatment T2, while at dry cow found at T1 0.2 kg/head/day and lactating cow 0.2 kg/head/day found at T2. Average birth weight at introduced technology was better 12.25-12.50 kg/head/day at male kids and 11.50-11.75 kg/head/day at female kids. At T3, birth weight of male kids was 12.00 kg/head/day and at female kids 10.75 kg/head/day.

L73 ANIMAL DISEASES

263 ANDRIANI

Relationship between milk potassium ion concentration and bacterial cell count, somatic cell count and californian mastitis test score in lactating ewes. ***Hubungan konsentrasi ion kalium dengan jumlah bakteri dan sel somatik dalam susu serta skor california mastitis test pada domba***/Andriani (Universitas Jambi (Indonesia). Fakultas Peternakan)); Manalu, W. *Jurnal Veteriner* (Indonesia) ISSN 1411-8327 (2006) v. 7(1) p. 39-46, 3 ill., 3 tables; 17 ref.

EWES; POTASSIUM; MILK; SOMATIC CELL COUNT; BACTERIA; CELL COUNTING; MASTITIS.

Thirty two lactating ewes were observed for 12 weeks to study the relationship between the concentration of milk potassium ion and the total bacterial count, somatic cell count and the scores of californian mastitis test (CMT) in an effort to design an alternative method of detecting subclinical mastitis. Milk samples were collected weekly in the morning and tested for 12 weeks during lactation period. Parameters used in the study were the concentration of milk potassium ion, total bacterial cell count, somatic cell count, and CMT scores. The result showed that the increase in bacterial cell count and somatic cell count was closely related with the increase in the concentration of milk potassium ion ($P<0.01$). When CMT score was positive, a dramatic increase in the concentration of milk potassium ion was detected as compared to that when the CMT score were negative. The variation in the concentration of milk potassium ion detected prior to the occurrence of clinical mastitis was greater than the total bacterial cell count and somatic cell count. In the conclusion, the concentration of milk potassium ion can be used as an alternative indicator for the occurrence of subclinical mastitis.

264 BATAN, I W.

Detection of *Escherichia coli* K99 attachment on mouse embryos zona pellucida by means enzym linked immunosorbent assay (ELISA) and scanning electron microscopy (SEM). ***Pelacakan perlekatan bakteri Escherichia coli K99 pada zona pelusida embrio mencit dengan metode enzym linked immunosorbent assay (ELISA) dan scanning electron microscopy (SEM)***/Batan, I W. (Institut Pertanian Bogor (Indonesia). Sekolah Pascasarjana); Boediono, A.; Djuwita, I.; Lay, B.W. *Jurnal Veteriner* (Indonesia) ISSN 1411-8327 (2006) v. 7(1) p. 21-38, 2 ill., 1 table; 29 ref.

MICE; ELISA; ESCHERICHIA COLI; OVA; ANIMAL EMBRYOS; MYCOPLASMA BOVIS; MYCOPLASMA BOVIGENITALIUM; MICROSCOPY.

A laboratory study on the attachment of *Escherichia coli* K99 on the zona pellucida of mouse embryos was carried out by enzyme-linked immunosorbent assay (ELISA) and scanning electron microscopy (SEM). The zona pellucida of mouse embryo was separated from embryo by embryo hatching and sonification. The separated zona pellucida was then used as antigen for ELISA. Suspension of several different *Escherichia coli* isolates with or without K99 antigen was prepared in PBS. K99 villous antigen was prepared by heating of the bacterial suspension at 60°C for 1 hour, and followed by centrifugation. Embryos with an intact zona pelucida were inoculated with *E. coli* at the dose of 10 x 10^5 cell/ml and incubated for 1 hour at 37°C. After 3 times washes with PBS, the embryos were examined by scanning electron microscope. The result showed that the ELISA reading (optical density) of samples with K99 antigen was significantly higher than those without K99 antigen (K88 and F41). The attachment of *E. coli* to the plate coated with zona pellucida was observed only in the well containing K99 antigen, but not in the well containing K88 or F41 antigen. The attachment of K99 bacterial cells was also observed by SEM. This study provided a clear evidence for the specific attachment between *E. coli* K99 and the zona pellucida of mouse embryo.

265 NATAAMIJAYA, A.G.

[Integrated local chicken farming system for controlling avian influenza]. ***Integrasi sistem usaha ternak ayam lokal untuk mencegah penularan penyakit flu burung***/Nataamijaya, A.G. (Balai Besar Pengkajian dan Pengembangan Teknologi Pertanian, Bogor (Indonesia)); Haloho, L. [Proceedings of the national seminar on innovation and specific location technology transfer supporting agricultural revitalization. Book 2], Medan , 5 June 2007/Sudana, W.; Moudar, D.; Jamil, A.; Yufdy, P.; Napitupulu, B.; Daniel, M.; Simatupang, S.; Nainggolan, P.; Hayani; Haloho, L.; Darmawati; Suryani, S. (eds.). Bogor (Indonesia): BBP2TP, 2007: p. 597-601, 1 ill., 17 ref. 631/152/SEM/p bk2

CHICKENS; ANIMAL HUSBANDRY METHODS; INTEGRATION; ORYZA SATIVA; DISEASE CONTROL; AVIAN INFLUENZA VIRUS; INFECTION; CONTROL METHODS.

The outbreak of avian influenza (AI) in Indonesia becomes a very serious problem, which attract international attention due to its possibility to develop to a human pandemic of deadly influenza. The government of Indonesia has been trying to alleviate the disease, yet the results so far is not satisfactory, the country is still has the highest human cases and fatality, out of 81 cases, 63 are fatal. Among the big commercial poultry farms there is no longer threat because they have been implementing "good farming practice", however the smallholders are not able to do so because they lack of knowledge and funds to support it, so they let their local chicken scavenge around vicinity. This traditional rearing method of local chicken creates a difficult situation for the government to control the contagious diseases such as AI. An integrated model of local chicken farming might be able to substantially reduce the possibility of AI outbreak and improve the small holder welfare as well.

266 SUARTHA, I N.

Production of specific immunoglobulin Y (Ig Y) antitetanus in chicken. ***Produksi imunoglobulin Y spesifik antitetanus pada ayam***/Suartha, I N. (Universitas Udayana, Denpasar (Indonesia). Fakultas Kedokteran Hewan); Wibawan, I W.T.; Darmono, I.B.P. *Jurnal Veteriner* (Indonesia) ISSN 1411-8327 (2006) v. 7(1) p. 21-28, 2 ill., 2 tables; 28 ref.

CHICKENS; IMMUNOGLOBULINS; IMMUNODIFFUSION TESTS; ANTIBODIES; TETANUS; ELISA; CLOSTRIDIUM TETANI.

A study on the production of Y immunoglobulin (Ig Y) specific to tetanus toxin was carried out in the yolk of chicken eggs. Five 20 week-old hens of commercial layers were injected seven times intraperitoneally with various concentrations (15, 100, 200, and 300 Lf) of tetanus toxoid at one week interval. One week following the immunization, the antibody against tetanus toxoid was examined by immunodiffusion technique. Antibody specific to tetanus toxoid was detected in serum one week after the last vaccination. In egg yolk, antibody specific to tetanus toxoid was detected two week after the last injection. The antibody in serum and in the yolk was also examined by ELISA. There was a close relation between the mean titer of antibody specific to tetanus toxoid detected in serum (12.568 ± 5.537 IU) and that detected in yolk (32.289 ± 13.220 IU). In conclusion, chicken egg yolk was a potential mean for the production of anti-tetanus serum in the future.

267 SUBEKTI, D.T.

Immunopathogenicity of different types of ***Toxoplasma gondii. Imunopatogenesis Toxoplasma gondii berdasarkan perbedaan galur***/Subekti, D.T. (Balai Penelitian Veteriner, Bogor (Indonesia)); Arrasyid, N.K. *Wartazoa* (Indonesia) ISSN 0216-6461 (2006) v. 16(3) p. 128-145, 2 ill., Bibliography: p. 141-145

ANIMALS; ANIMAL HEALTH; TOXOPLASMA GONDII; PATHOGENICITY; IMMUNOLOGY; BREEDS (ANIMALS).

Toxoplasmosis is a zoonotic disease caused by *Toxoplasma gondii*. The disease was widely found in high prevalence around the world. Seroprevalence of human toxoplasmosis in Indonesia was 43%-88%, while toxoplasmosis in animals was reported 6%-70%. In the past, clinically manifestation of toxoplasmosis only occurred in individu which has immunodeficient or immunosuppression. Recently, more evident showed that individu which has immunocompetent was also able to develop clinical signs when infected by pathogenic *T. gondii* (type I of *T. gondii*). In fact, the pathogenicity of *T. gondii* depends on the type or clonet which originated from their clonal population. Each type has different implication on clinical immunopathogenesis. In this paper, the differences of biological character, immunopathogenicity and their clinical implication of *T. gondii* clonal population structure are reviewed.

268 UTAMA, I.H.

Response of mice polymorphonuclear (PMN) and peritoneal macrophage cells to ***Streptococcus equi subsp. zooepidemicus. Respon sel polimorfonuklear (PMN) dan makrofag peritoneal mencit terhadap Streptococcus equi subsp. zooepidemicus***/Utama, I.H.; Rompis, A.L.T. (Universitas Udayana, Denpasar (Indonesia). Fakultas Kedokteran Hewan); Girindra, A.; Pasaribu, F.H.; Wibawan, I W.T.; Setiawan, E.D. *Jurnal Veteriner* (Indonesia) ISSN 1411-8327 (2006) v. 7(1) p. 16-20, 2 ill., 1 table; 13 ref.

MICE; PERITONEUM; MACROPHAGES; PHAGOCYTOSIS; STREPTOCOCCUS EQUI.

A study on the response of mice peritoneal macrophages and polymorphonuclea (PMN) cells against *Streptococcus equi subsp. zooepidemicus* infection was conducted to determine the virulence of the bacteria. Encapsulated and uncapsulated bacterial cells were inoculated intraperitoneally at the dose of 10 x 10^7 cell/mouse. The phagocytic activities and capacities of PMN and macrophage cells were assayed one and two hours after inoculation. The result showed an increase in the phagocytic activities of capsulated and uncapsulated bacteria. Their phagocytic capacity declined significantly within 2 hours postinoculation.

269 WAHYUNI, A.E.T.H.

Distribution of serotype of *Streptococcus agalactiae* caused subclinical mastitis on dairy cattle in East Java, Central Java and West Java (Indonesia). *Distribusi serotipe Streptococcus agalactiae penyebab mastitis subklinis pada sapi perah di Jawa Timur, Jawa Tengah dan Jawa Barat*/Wahyuni, A.E.T.H. (Universitas Gadjah Mada, Yogyakarta (Indonesia). Fakultas Kedokteran Hewan); Wibawan, I W.T.; Pasaribu, F.H.; Priosoeryanto, B.P. *Jurnal Veteriner* (Indonesia) ISSN 1411-8327 (2006) v. 7(1) p. 1-8, 2 tables; 23 ref.

DAIRY CATTLE; STREPTOCOCCUS AGALACTIAE; SEROTYPES; BACTERIA; MASTITIS; JAVA.

Mastistis is still a serious problem among dairy cattle industries in Indonesia. Group B streptococci (*Streptococcus agalactiae*) have been identified as the main causes of subclinical mastitis in dairy cattle and is an obligatory parasite in the udder. In human, this bacteria is the main cause of postparturition and neonatal infection. The bacteria causing the infection is usually identified and characterized by serotyping. Although the incidence rate of mastitis in Indonesia is very high, the report on the characterization of bacteria causing the mastitis is still very limited. A research was therefore carried out to find out the distribution of *S. agalactiae* serotypes isolated from West Java (Bogor), Central Java (Boyolali), and East Java (Malang). The subclinical mastitis was firstly screened by IPB-1 reagent, and then pre-identified based on the presence of Christie, Atkins and Muence Peterson phenomena. The presence of Group B streptococci was determined by agar gel precipitation test (AGPT) using group B-specific antisera and serotyping was also carried out by AGPT using reference sera specific to *S. agalactiae*. The result showed that the incidence of subclinical mastitis in Bogor were 76%, Boyolali 91%, and Malang 81%. The percentages of subclinical mastitis caused by *S. agalactiae* infection in Bogor were 64%, Boyolali 22%, and Malang 22%. The distributions of *S. agalactiae* serotypes in Bogor were serotype II (31.4%), serotype V (8.5%), serotype II/V (8.5%) and nontypeable (NT) (51.4%). In Boyolali were serotype V (61%), and NT (39%). In Malang were serotype II (34%), and NT (66%). NT serotype on *S. agalactiae* was the most frequent bacteria detected in subclinical mastitis. Protein X was the most detected frequent protein antigen (35%). No *S. agalactiae* of serotype Ia, Ib, III, IV, VI, VII, and VIII were detected in this study.

270 WARDHANA, A.H.

Chrysomya bezziana*, the cause of myiasis on animal and human: problem and control. *Chrysomya bezziana penyebab myiasis pada hewan dan manusia: permasalahan dan penanggulangannya/Wardhana, A.H. (Balai Penelitian Veteriner, Bogor (Indonesia)). *Wartazoa* (Indonesia) ISSN 0216-6461 (2006) v. 16(3) p. 146-159, 4 ill., Bibliography: p. 156-159

ANIMALS; ANIMAL HEALTH; ANIMAL DISEASES; CHRYSOMYA; WOUNDS; PESTS OF ANIMALS; ZOONOSES; DISEASE CONTROL.

Myiasis is an infestation of larvae (Diptera) into the live host tissue of warm-blooded animals including humans. This disease is often found in tropical countries, particularly in the community with low socio-economic level. From many flies causing myiasis, *Chrysomya bezziana* is medically the most important agent due to its obligate parasite property and causing economic losses. Some myiasis cases on humans and animals in Indonesia are caused by *C. bezziana* larvae infestation or mixed infestation with Sarcophaga sp. Sulawesi, East Sumba, Lombok, Sumbawa, Papua and Java islands were reported as myiasis endemic areas. Myiasis cases on animals occurred after parturition (vulval myiasis) then is followed by umbilical myiasis on their calf or traumatic wounds, while myiasis on humans are caused by untreated fresh wounds or chronic wounds such as leprosy, diabetes, etc. Besides, nature holes like nose, eyes, ears or mouth are also reported as entry port for those larvae. Clinical signs of myiasis are various and non-specific depends on location of infested part of body, i.e. fever, inflammation, pruritus, headache, vertigo, swelling and hipereosinophilia. There would be serious conditions with secondary infection by bacteria. Myiasis treatment on animals is simpler than humans. Surgical operation is often carried out on infested human part of bodies. Insecticides were used to treat animal myiasis, but had raised resistant. Myiasis treatment on humans may be done locally or systemically. Antibiotic broad spectrum or which is suitable with culture and resistance status of bacteria was given for systemic treatment. Chloroform and turpentine with ratio 1:4 were used for local treatment. Some of essential oils have also been tested in laboratory as an alternative medicine for both humans and animals myiasis.

271 WIDIASTUTI, R.

Mycotoxin: its effect on animal health and its residues in animal products and its control. ***Mikotoksin: pengaruh terhadap kesehatan ternak dan residunya dalam produk ternak serta pengendaliannya***/Widiastuti, R. (Balai Penelitian Veteriner, Bogor (Indonesia)). *Wartazoa* (Indonesia) ISSN 0216-6461 (2006) v. 16(3) p. 116-127, 5 tables; Bibliography: p. 123-127

ANIMAL PRODUCTS; ANIMAL HEALTH; MYCOTOXINS; RESIDUES; CONTROL METHODS; BIOLOGICAL CONTAMINATION.

Mycotoxins are the toxic metabolites of certain fungi which is able to influence animal health. Five types of the most important mycotoxins are aflatoxins, ochratoksin A, zearalenone, trichotecenes and fumonisin. The effect of mycotoxin on animal health depends on the type and amount of the mycotoxins consumed. The occurrence of mycotoxin causes animal health problem and also leads to the arised of mycotoxin residues in food derived from animal products such as meat, eggs and milk which causes human health problem. Controlling the occurrence of mycotoxins in animal feed and food products through some treatments and prevention is important to avoid further negative effects of mycotoxins.

N20 AGRICULTURAL MACHINERY AND EQUIPMENT

272 HARSONO

Design and evaluation of wet system corn degerminator. ***Desain dan uji kinerja mesin pemisah lembaga biji jagung (degerminator) sistem basah***/Harsono; Suparlan; Triwahyudi, S. (Balai Besar Pengembangan Mekanisasi Pertanian, Serpong (Indonesia)). *Jurnal Enjiniring Pertanian* (Indonesia) ISSN 1693-2900 (2006) v. 4(1) p. 9-16, 8 ill., 3 tables; 10 ref.

MAIZE; FOOD TECHNOLOGY; MILLING; DESIGN; MILLS; EQUIPMENT; EQUIPMENT PERFORMANCE.

Corn degerminator is strongly needed to support corn processing in order to produce many kind of corn based food such as corn starch (maizena), corn oil, and feed. The germ has to remove from the kernels to produce good quality of starch. If the germ still existing, the rancidity or other damaged germs would be occur in corn flour. Objective of this study was to create corn degerminator and evaluate its performance. Result showed that capacity of the machine with regard to separation of the germ that was designed was 49.2 kg/hour. The cleaning level at the first outlet (corn without germ) was 92% and 8% of the mixed of germ and corn skin (hull and fiber). The cleaning level at the second outlet (the mixed of corn skin and germ) was 83% and 15% of the milled corn without germ.

273 HIDAYAT, M.

Performance evaluation of paddy straw chopper machinery. ***Evaluasi kinerja teknis mesin pencacah hijauan pakan ternak***/Hidayat, M.; Harjono; Marsudi; Gunanto, A. (Balai Besar Penelitian dan Pengembangan Mekanisasi Pertanian, Serpong (Indonesia)). *Jurnal Enjiniring Pertanian* (Indonesia) ISSN 1693-2900 (2006) v. 4(2) p. 61-64, 1 ill., 2 tables; 10 ref.

FEEDS; RICE STRAW; EQUIPMENTPERFORMANCE.

Stability of livestock business activity depend on availability of animal source feed that base on quality, quantity and continuity. In dry season, availability of animal feed generally is difficult to be found because of conversion of agricultural land for grassing to infrastructure development. Paddy straw is one of animal feed source, which its availability is abundant. It could be processed into a high content nutrition feed after nutrition enrichment process as ordinarily done by farmer. Before feed processing, paddy straw should be chopped with length 2 - 5 cm, to give good media for microorganism on nutrition enrichment of the feed rapidly and homogenously. Nowadays farmers do shredding process manually with 5-6 kg/hr capacity of fresh straw. In order to increase the shredding capacity, power shredder has been designed and developed. It could work either for fresh as well as for dried straw. Result of design the rice straw chopper consisted of main components, that were frame, feeding, chopper, delivery chute and transmission units. The objective of the research was to evaluate the machine performance in terms of shredding straw for animal feed. Method of the research started with preparation of testing materials, instrumentation, and to test the machine performance and then result analysis. The performance test result used fresh straw having 55% moisture content and dried straw 23% moisture content were done with 5 replications each. The capacity was 401.13 kg/hr for dried straw and 1,126.06 kg/hr for wet straw with fuel consumption of 1.34 l/hr, the average chopping efficiency was 9.33% and noise level 84 dB.

274 SULISTIADJI, K.

Evaluation on economic and technical aspect of chandue paddy stripper type 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* (Indonesia) 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) initially was modified become riding type machine and has a similar operation capability from its original. It also easy to operate in several soil field conditions. The modified machine was popular in South Sulawesi Province, esspecially in Kabupaten Pinrang known as "Chandue". The two types of the modified

machine tested during the field test are: (a) Chandue walking type (DP 4000), and (b) Chandue riding type (DP 6000). The principle performance of paddy stripper machine is to harvest the paddy by gathering the standing paddy in the field, combing the kemel from the stalks, and let the stalks crops settled in the field. The operational cost of the two type modified machines viewed from the economic aspect would give a benefit among 8.6 million to 10.4 million rupiahs under some estimation and assumption, i.e.: (a) 60 ha field area should be covered by one machine on one season (two season annually), (b) 90 million rupiahs as an income, (c) 79.6 million rupiahs as operational cost of walking type machine (DP 4000), and 81.4 million rupiahs as operational cost of riding type machine (DP 6000). "Chandue" stripper harvester and the other modified IRRI stripper (SG 800) machine is the one alternative of paddy harvester machines. It can be introduced and developed in Indonesia region where manpower was a lack during harvesting season, such as in the swamp and peat soil area out of Java Island.

275 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* (Indonesia) ISSN 1693-2900 (2006) v. 4(2) p. 53-60, 4 ill., 1 table; 10 ref.

MANGOES; HARVESTING; EQUIPMENT; DESIGN; PROTOTYPES; EQUIPMENT PERFORMANCE.

Commonly harvesting of mango is 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 concluded 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.

P06 RENEWABLE ENERGY RESOURCES

276 WIDODO, T.W.

Design and development of biogas reactor for farmer group scale. ***Rekayasa dan pengujian reaktor biogas skala kelompok tani ternak***/Widodo, T.W.; Asari, A.; Ana N.; Elita R. (Balai Besar Pengembangan Mekanisasi Pertanian, Serpong (Indonesia)). *Jurnal Enjiniring Pertanian* (Indonesia) ISSN 1693-2900 (2006) v. 4(1) p. 41-52, 6 ill., 2 tables; 15 ref.

BIOGAS; FARMYARD MANURE; RENEWABLE ENERGY; BIOREACTORS; DESIGN; EQUIPMENT PERFORMANCE.

Biogas technology has been introduced and developed for long time in Indonesia, however application as alternative energy did not spread widely. There were several constraints such as lack of technical expertise, misfunction of the reactor, nonuser friendly design, manually handling and highly investment for construction. For that reason, there was strongly objective of this activity to develop biogas reactor in a

farmer group scale. Reactor was designed with holding capacity of cattle dung from 10-12 heads or about 18 m^3 dung. Based on design calculation, digester was predicted to produce biogas up to 6 m^3/day. Production of methane gas depended on C/N ratio of input material, hydraulic residence time, pH, temperature and toxicity. Temperature of slurry inside digester was around 25-27^{0}C and pH 7-7.8, reactor produced biogas containing methane gas content of 77%. Utilization for mantle lamp required biogas 0.23 m^3/hour with pressure 45 mm H_2O and gas stove required biogas 0.30 m^3/hour with pressure 75 mm H_2O. Analysis of environmental impact of effluent indicated that COD has decreased about 90% comparing to fresh dung condition. Moreover, BOD/COD ratio was 0.37, it was less than normal waste water (BOD/COD=0.5). Analysis of effluent components (N, P and K contents) exhibited that there was no difference to compost (reference).

P10 WATER RESOURCES AND MANAGEMENT

277 NUGROHO, K.

Tidal flood characteristics in Telang South Sumatra (Indonesia) coastal area. ***Karakteristik banjir pasang di daerah pantai Telang Sumatera Selatan***/Nugroho, K. (Balai Penelitian Agroklimat dan Hidrologi, Bogor (Indonesia)). *Jurnal Tanah dan Iklim* (Indonesia) ISSN 1410-7244 (2006) (no. 24) p. 54-68, 11 ill., 3 tables; 23 ref.

SUMATRA; COASTAL SOILS; TIDES; HYDROLOGY; DATA ANALYSIS; FLOODPLAINS.

The tidal flood as hydrological aspect has a significant role in tidal water management. The objective of this research is to reach a better understanding of tidal flood characteristics in sequential observation. The tidal flood research focused on observation of actual ground water level in the field, of different places and time. The observation data of the spatial distribution of submerged/flooded area were collected by using sequential data analysis from a set of piezometers. The research results showed that ground water fluctuation pattern varied for each location. Each piezometer showed specific pattern. The ground water level in the land fluctuated very slowly (one cycle in three days). The amplitude generally was reached not more than 60 centimeters far less than the canal water level that could reach more than 150 cm. The tidal flood or ground water fluctuation pattern can not be classified within a block. The change in land use or land management affected the pattern. The procedures showed that application of geographical information system will facilitate the interpolation of the ground water spatial pattern. The tidal flooded patterns or classes had a specific affect to land use or land utilization type.

P30 SOIL SCIENCE AND MANAGEMENT

278 PRASETYO, B.H.

Characteristics of Spodosols in relation to soil management for agriculture in Kutai Regency, East Kalimantan (Indonesia). ***Karakteristik Spodosol dalam kaitannya dengan pengelolaan tanah untuk pertanian di Kabupaten Kutai, Kalimantan Timur***/Prasetyo, B.H.; Sulaeman, Y.; Subardja, D.; Hikmatullah (Balai Besar Penelitian dan Pengembangan Sumberdaya Lahan Pertanian, Bogor (Indonesia)). *Jurnal Tanah dan Iklim* (Indonesia) ISSN 1410-7244 (2006) (no. 24) p. 69-79, 3 ill., 4 tables; 15 ref.

KALIMANTAN; SPODOSOLS; PODZOLS; SOIL CHEMICOPHYSICAL PROPERTIES; SOIL DEFICIENCIES; LAND MANAGEMENT.

Spodosols, which is also called as Podzols or white soil, is one of the problem soils and do not potential for agricultural development, so that early identification of the soil is needed to avoid error in land clearing. Three pedons from Kutai Regency, East Kalimantan were studied both in the field and in the laboratory. Twenty soil samples were analyzed for physical, chemical and mineralogical properties. Results showed that Spodosols had sand to sandy loam textured, with the color of albic horison is light gray to white, and the color of spodic horison is very dark brown to black. Podzolisation processes indicated by migration of clay, organic-C and exchangeable aluminum from the albic to spodic horizons. Nutrient and cation exchange capacity are low to very low. Although there is a tendency that the cation exchange capacity has positive relationship with organic-C, the addition of organic fertilizer can not be expected to increase cation exchange capacity of the soil. Sand mineral composition is dominated by quartz. While clay mineral composition in the A and albic-E horizons are mixed of kaolinite, illite, and vermiculite with unclear diffractograme pattern, clay mineral composition in the spodic-B horizon is dominated by kaolinite. The low water retention, very low nutrients content and dominated siliceous mineral indicate that this soil do not potential for food crop development, and recommended for forest only.

279 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 Sumber Daya Lahan Pertanian, Bogor (Indonesia)). *Jurnal Penelitian dan Pengembangan Pertanian* (Indonesia) ISSN 0216-4418 (2006) v. 25(2) p. 39-46, 1 ill., 4 tables; 49 ref.

INDONESIA; AGRICULTURAL DEVELOPMENT; 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 almunium saturation were 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 anorganic 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 the low economical condition and minimum knowledge.

P33 SOIL CHEMISTRY AND PHYSICS

280 JUMBERI, A.

[Correlation between soil chemical properties on the quality of citrus in tidal land]. ***Hubungan sifat kimia tanah terhadap kualitas buah jeruk di lahan pasang surut***/Jumberi, A.; Maftu'ah, E.; Annisa, W. (Balai Penelitian Pertanian Lahan Rawa, Banjarbaru (Indonesia)). *Habitat* (Indonesia) ISSN 0853-5167 (2006) v. 17(4) p. 269-278, 4 ill., 2 tables; 10 ref.

CITRUS; SOIL CHEMICOPHYSICAL PROPERTIES; QUALITY; TIDES; SWAMP SOILS; INTERTIDAL ENVIRONMENT.

The tidal swamp land has a high potency to develop agriculture land, especially to citrus plantation. Quality of citrus fruit on tidal swamp land is very heterogeneous and depends on characteristics of soil chemistry and land typology. The aim of the experiment was to study the correlation between characteristics of soil chemistry and quality of citrus fruit in several typology of tidal swamp land. The experiment was conducted from July until September 2005, in five villages, i.e. Sungai Madang, Tandipah (Banjar District), Sungai Kambat, Sungai Madang (Barito Kuala District) as the tidal swamp land with A typology, and Tarantang (Barito Kuala District) as the tidal swamp land with C typology. Characteristic of soil chemistry consisted of analysis of pH, concentration of Ca, Mg, K, Al, and Fe and SO_4, and water qualities consisted of sugar, acid, Vitamin C and ratio of sugar/acid content. Result showed that quality of fruits depent on land typology and characteristics of soil chemistry. Sugar content on citrus fruits have correlated with concentration of Ca and Mg in the soil.

281 SULAEMAN, Y.

Identification of predictors for soil water retention of Indonesian Inceptisols. ***Identifikasi penaksir retensi air tanah pada Inceptisols Indonesia***/Sulaeman, Y.; Hikmatullah (Balai Penelitian Tanah, Bogor (Indonesia)); Suganda, H. *Jurnal Tanah dan Iklim* (Indonesia) ISSN 1410-7244 (2006) (no. 24) p. 21-28, 4 tables; 16 ref.

INDONESIA; SOIL WATER; SOIL HYDRAULIC PROPERTIES; IDENTIFICATION; DATABASES.

This study aimed to build a soil hydraulic properties digital database and to identify predictors for soil water retention of Inceptisols using data from developed database. Soil survey reports were compiled and soil hydraulic properties were entried into a spreadsheet. As many as 230 datasets of Inceptisols were extracted from developed database to identify predictors for soil water retention using Banin-Amiel and Stepwise techniques. Currently, the Soil Hydraulic Properties Digital Database strores 832 datasets from Central Kalimantan, East Kalimantan, Flores Island, Lombok Island, and Gorontalo District. The dataset is dominated by Inceptisols and fine soils. The correlation between soil water retention and other soil properties, and the order of predicting effectiveness varies with matrix potensial (pF) which influenced by soil moisture regime and pedogenesis type. Total pores and cation exchange capacity are potential predictors for soil water retention of Inceptisols in addition to particle size distribution, organic carbon, and bulk density. The Soil Hydraulic Properties Digital Database stores research results and provides data for any study regarding soil hydraulic properties. The dataset selection for developing pedotransfer function of Inceptisols should consider both soil moisture regime and pedogenesis type.

P34 SOIL BIOLOGY

282 OMON, R.M.

Effect of temperature and storage duration of mycorrhizae tablet on growth of red meranti cuttings. ***Pengaruh suhu dan lama penyimpanan tablet mikoriza terhadap pertumbuhan setek meranti merah***/Omon, R.M. (Loka Penelitian dan Pengembangan Satwa Primata Samboja (Indonesia)). *Jurnal Penelitian Hutan Tanaman* (Indonesia) ISSN 1829-6327 (2006) v. 3(2) p. 129-138, 2 ill.; 5 tables; 26 ref.

SHOREA; CUTTINGS; MYCORRHIZAE; TEMPERATURE; STORAGE; DURATION; GROWTH.

The effect of temperature and storage duration of mycorrhizae tablet on the growth of red meranti (*Shorea parvifolia*) cuttings was investigated in the Laboratory and greenhouse of Primate Research and Development Institute, East Kalimantan. The objective of this experiment was to obtain information on temperature and storage duration of mycorrhizae tablet which is optimal to produce planting stock of cuttings quality in nursery. Two temperatures and six storage durations were tested in the experiment. The experiment was arranged as a factorial completely randomized design with three replications. The results showed that three months storage duration of mycorrhizae tablet has given significant effect on percentage of survival (90%), height growth (5 cm), number of leaves (5 pieces), dry weight (0.28 g) and percentage of root mycorrhizae colonization (88%), compared to other storage duration after 6 months observations. Temperature and interaction between temperature and storage duration did not give significant effect on percentage of survival, height growth, number of leaves, dry weight and percentage of root mycorrhizae colonization of *S. parvifolia* cuttings. As a plan and strategy in providing qualified *S. parvifolia* cuttings in nursery, it is recommended that mycorrhizae tablet which is optimally stored until 3 months under the temperature of 4^{o}C or 20^{o}C is still allowed to be inoculated to *S. parvifolia* cuttings.

283 YASSIR, I.

Relationship between arbuscular mycorrhizal fungi potency and soil properties in marginal land. ***Hubungan potensi antara cendawan mikoriza arbuskula dan sifat-sifat tanah di lahan kritis***/Yassir, I.; Omon, R.M. (Loka Penelitian dan Pengembangan Satwa Primata Samboja (Indonesia)). *Jurnal Penelitian Hutan Tanaman* (Indonesia) ISSN 1829-6327 (2006) v. 3(2) p. 107-115, 1 ill; 3 tables; 22 ref.

MARGINAL LAND; VESICULAR ARBUSCULAR MYCORRHIZAE; SOIL CHEMICOPHYSICAL PROPERTIES.

The research on relationship between arbuscular mycorrhizal fungi (AMF) with chemical and physical soil characteristics on marginal land were conducted in Samboja Lestari rehabilitation area at Km 35, East Kalimantan. The objective of the research was to know correlation between physical and chemical characteristics and AMF potential on marginal land. The experiment used a single method based on topography and floristic composition. Every condition of the topography (hill top, slope and valley) was sampled by provided of 5 sample plots, each 10 m x 10 m. Within these plots there were randomly smaller plot of 1 m x 1 m with three times replications. Therefore, the total number of observation plots was 3 x 5 x 3 = 45 plots. The results showed that the general soil condition in this area was poor with the soil pH (4.32), C-organic (2.15%), N total (0.13%), available P (498 ppm), available K (0.44 me/g) and CEC (8.99 me/100 g). The density of spore potency was good, with the number of spores 1288-2321/50 soil in dry season and during the wet season as many as 1274-2163 spores/50 g soil, from the genera Glomus, Acaulospora and Gigaspor. While, correlation between AMF potency and soil physical and chemical was depended on available P. There was a negative correlation between the number of spore and the P available, which was indicated by number of spores which tend to less by increase of available P in the soil.

P36 SOIL EROSION, CONSERVATION AND RECLAMATION

284 HARDIANTO, R.

Monitoring in soil erosion level at calcium rock mining region in Tuban (Indonesia). ***Pemantauan tingkat erosi tanah didaerah penambangan batu kapur di Tuban***/Hardianto, R. (Balai Pengkajian Teknologi Pertanian Jawa Timur, Malang (Indonesia)); Ernawanto, Q.D.; Sudaryanto, G.; Soetrisno. *Buletin Teknologi dan Informasi Pertanian. BPTP Jawa Timur* (Indonesia) ISSN 1410-8976 (2006) v. 9 p. 69-79, 1 ill., 6 tables; 12 ref.

JAVA; EROSION; CALCIUM; INFILTRATION; RUNOFF.

Monitoring on soil erosion level at calcium rock mining region was conducted at the location of PT Semen Gresik (Persero) Tbk in Tuban, taking 4 land use categories, namely: (1) original land, (2) active mining land, (3) crusher area, and (4) green belt. Original land is a natural vegetation ground with grass bushes and trees, while active mining land is an open land where mining process was conducted, happened by land clearing with no vegetation. Crusher area is open land used for road buildings, and storage of mining waste, while green belt is a border area between mining area and farmers, field, grown with varied plants. The aim of this assessment was to know soil erosion level and the factors influenced. Erosion counting was done by using observation standard box sized 22 m of length, 2 m of width and 9% sloppy. Erosion material was collected using plate piece of 30 cm soil depth and 30 cm above soil surface. Result showed that erosion on original land was 0.399 t/ha wet weight, on crusher area was (6.512 t/ha wet weight or 0.283 t/ha dried weight; on active mining land was 0.493 t/ha wet weight or 0.392 t/ha dried weight or 5.404 t/ha dried weight; and green belt area was 0.385 t/ha wet weight or 0.289 t/ha dried weight. The limit value of erosion rate based on similar soil characteristic and its' sub strata for rocky region was around 1.13-4.48 t/ha. It showed that erosion rate on original, active mining and green belt land were still under the limit rate of erosion, while on crusher area was above the limit.

P40 METEOROLOGY AND CLIMATOLOGY

285 SURMAINI, E.

Applying climate information for supporting farming system of food crop. ***Pemanfaatan informasi iklim untuk menunjang usahatani tanaman pangan***/Surmaini, E. (Balai Penelitian Agroklimat dan Hidrologi, Bogor (Indonesia)); Boer, R.; Siregar, H. *Jurnal Tanah dan Iklim* (Indonesia) ISSN 1410-7244 (2006) (no. 24) p. 40-53, 10 ill., 2 tables; 14 ref.

FOOD CROPS; FARMING SYSTEMS; CLIMATE; FARM INCOME.

The events of climate extreme that increase the crop yield uncertainty cause financial loss of farmers. To ensure economic profitability, farmers need to tailor their cropping pattern to the climate forecast. The study was conducted in Ciparay and Bojongsoang Subdistrict, the crop production centerof Bandung District from March to August 2005. Research aimed to analyze climate information value based on farming system strategy for increasing farmer income. Farming system in climate extreme events was determined by maximizing expected utility of wealth. Farming system in two subdistrict was assessed by Rapid Rural Appraisal. Climate information value was the difference between income with conventional farming and income using farming system strategy. Result of the survey indicated that dominant cropping pattern in the study area was rice-rice-fallow. The second rice was vulnerable to drought particularly in extreme years. Further analysis suggested that extreme climate events were mostly associated with ENSO (El-Nino Southern Oscillation) events. From farming system simulation model, it was found that in El-Nino years, to maximize income, farmers should plante all farm with maize. Planting non-rice crops can be done after April (early May) to obtain maximium income, they should plant all farm with soybean. Risk averter farmers might diversify their crops, by fallowing part of their lands and planting the remaining lands with maize and soybean. The use of climate information in El-Nino years will give higher economic benefit to farmers than in La-Nina years. The difference in economic benefit was determined by the proportion of land allocated for rice and non rice crops. In El-Nino years, farmers who plant all their lands for second planting with rice crop will get loss due to significant decrease in rice yield, while those who plant part or all of their land with non-rice crops will gain benefit as they will get yield. Therefore, farmers who are willing to take risks by planting part or all of their land with non-rice crops in years which were forecasted to be El-Nino years will get higher income than farmers who are not willing to change their rice crops.

Q02 FOOD PROCESSING AND PRESERVATION

286 ABUBAKAR

Processing technology innovation of duck livestock. ***Inovasi teknologi pengolahan hasil ternak itik***/Abubakar (Balai Besar Penelitian dan Pengembangan Pertanian, Bogor (Indonesia)). [Proceedings of the national seminar on innovation and specific location technology transfer supporting agricultural revitalization. Book 2], Medan, 5 June 2007/Sudana, W.; Moudar, D.; Jamil, A.; Yufdy, P.; Napitupulu, B.; Daniel, M.; Simatupang, S.; Nainggolan, P.; Hayani; Haloho, L.; Darmawati; Suryani, S. (eds.). Bogor (Indonesia): BBP2TP, 2007: p. 689-698, 4 tables; 23 ref. 631/152/SEM/p bk2

DUCKS; POSTHARVEST TECHNOLOGY; PROCESSED ANIMAL PRODUCTS; PROCESSING; NUTRITIVE VALUE; CARCASSES; ECONOMIC VALUE; FARM INCOME; INNOVATION; TECHNOLOGY TRANSFER.

One of livestock development in supporting agricultural revitalisation is acceleration of directional postharvest technology with agribusiness perspective. Technological innovation of postharvest/processing of livestock products has important role to improve society nutrition and also to extend employment in agricultural sector, and it is proven to cope the global economic distortion in stimulating national economy. Increasing of livestock products should follow by postharvest technology, this was required to increase added value of livestock products, and also to promote agribusiness growth especially in rural area. Duck is potential water fowl, which has opportunity to be developed as commodity export through processing industry livestock product, easy to raise, natural mating and AI technique, easy feed, no need the special farm and resistant to disease compared to other poultry. Duck can be raised intensively or grazed, especially on rice harvest. Ducks which formerly raised as layer ducks currently raised for its meat which have potential to yield high nutritive processed products such as sausage, shreded meat, nugget, smoked and fillet duck, and have other potential with high economic value, such as husk, fur and claw.

287 BUDIYANTO, A.

Optimation process of cassava sugar flour production from cassava starch at laboratory scale. ***Optimasi proses produksi tepung gula kasava dari pati ubi kayu skala laboratorium***/Budiyanto, A.; Martosuyono, P.; Richana, N. (Balai Besar Penelitian dan Pengembangan Pascapanen Pertanian, Bogor (Indonesia)). *Buletin Teknologi Pascapanen Pertanian* (Indonesia) ISSN 1858-3504 (2006) v. 2(1) p. 28-35, 5 ill., 5 tables; 16 ref.

CASSAVA; SUGAR; PRODUCTION; TAPIOCA; PROCESSING; LABORATORIES.

Cassava sugar flour is crystallized glucose syrup produced from hydrolysis of cassava starch. Research activity was conducted in Laboratory of Indonesian Center for Agricultural Postharvest Research and Development in Bogor. Optimation step of production process which was done were liquification, saccharification, fitration, evaporation and crystallization process. Research result showed that the best condition for liquification can be achieved at the enzyme level of 1.0 ml/kg of dried starch, processing time of 60 minutes and substrate concentration of 30%. Saccharification is very well done at enzyme concentration 1.2 ml/kg and saccharification time of 60 hours while neutralization step is sufficient with 0.5% of activated carbon. The best sieving stage was achieved by use of a jeans as a sieving material. Evaporation was carried out to concentrate the product and can be done by means of evaporator, bioreactor and cooking pan. The best result of crystallization of cassava sugar was achieved at room temperature. Acceptance level of cassava sugar flour was evaluated by producing jelly snack with cane sugar used as control. Organoleptic evaluation showed that the sweetness level of jelly snack made of cassava sugar flour is not significantly different than those of cane sugar.

288 HADIPERNATA, M.

Effect of temperature of far infrared drying on mushroom quality. ***Pengaruh suhu pengeringan pada teknologi far infrared (FIR) terhadap mutu jamur merang kering (Volvariella volvaceae)***/Hadipernata, M.; Rachmat, R.; Widaningrum (Balai Besar Penelitian dan Pengembangan Pascapanen Pertanian, Bogor (Indonesia)). *Buletin Teknologi Pascapanen Pertanian* (Indonesia) ISSN 1858-3504 (2006) v. 2(1) p. 62-69, 8 ill., 9 ref.

VOLVARIELLA; DRIED PRODUCTS; QUALITY; INFRARED RADIATION; DRYING; TEMPERATURE.

FIR radiation has some advantages to increase life storability and minimize perishability of vegetables, due to change of its physical and chemical characteristics. This research aimed at studying the effect of FIR drying temperature on mushroom quality. The quality component analyzed were water content, vitamin C, ash and yield of dried mushroom. The content of vitamin C which wase still detected was obtained as a result of drying at 41-50 ^{o}C, 51-60 ^{o}C and sun drying. The optimum water content at temperature 61-70^{o}C was 10.31% while in 71-81^{o}C, 81-90^{o}C, and in sun drying were 6.81%, 2.27%, and 5.89%, respectively. Protein concentration changes depend on temperature changes. Temperature increase caused decrease of water content and increase of protein concentration. Yield percentage was affected by water content in product.

289 HOERUDIN

Improvement of cashew nut processing and its kernel quality: a case study in Madura, East Java (Indonesia). ***Perbaikan proses pengolahan dan mutu kacang mete: studi kasus di Madura, Jawa Timur***/Hoerudin; Mulyono, E. (Balai Besar Penelitian dan Pengembangan Pascapanen Pertanian, Bogor (Indonesia)). *Jurnal Penelitian Pascapanen Pertanian* (Indonesia) ISSN 0216-1192 (2006) v. 3(2) p. 60-68, 3 ill., 7 tables; 25 ref.

CASHEWS; PROCESSING; DRYING; MOISTURE CONTENT; QUALITY.

The cashew nut processing commonly applied by Indonesian farmers, mainly in Madura, has produced relatively poor quality of whole kernels (yield 60-75%, brown/dark appearance, moisture content more than 5%, and poor hygiene). The objective of the research was to improve both cashew nut processing and its kernel quality. The research was carried out from October to December 2005 in Sampang District, Madura, East Java. The improvement of cashew nut processing was conducted by applying steam roasting process, modified sheller (MM-99 model), and cabinet dryer. The result showed that application of steam roasting increased considerably the yield of whole kernels up to 24.73%, MM-99 sheller could be operated easily by beginners and the shelling capacity achieved (23.92 kg/day) was slightly higher than that reached in many cashew kernel producing-countries (21 kg/day). In addition, it yielded obviously a high proportion of whole kernels, 90.64%. By means of cabinet dryer, moisture content of cashew kernels dried for four hours was reduced appreciably to 4.86%. Whole peeled kernels produced were 80-88% with brighter (14.51% higher in L value and 24.47% lower in browning index) and cleaner than traditionally processed kernels. It also met the first grade quality of National Standard and its proximate characteristics corresponded to those specified by FAO. This indicated that the proposed cashew nut processing was capable of improving quality of kernels and technically feasible to be developed in Madura.

290 KHAIRANI, C.

Innovation of coconut processing technology for home industry to increase quality of palm oil. ***Perbaikan teknologi minyak kelapa guna meningkatkan mutu minyak olahan industri rumah tangga***/Khairani, C.; Purna R., Y. (Balai Pengkajian Teknologi Pertanian Sulawesi Tengah, Palu (Indonesia)). [Proceedings of the national seminar on innovation and specific location technology transfer supporting agricultural revitalization. Book 2], Medan, 5 June 2007/Sudana, W.; Moudar, D.; Jamil, A.; Yufdy, P.; Napitupulu, B.; Daniel, M.; Simatupang, S.; Nainggolan, P.; Hayani; Haloho, L.; Darmawati; Suryani, S. (eds.). Bogor (Indonesia): BBP2TP, 2007: p. 568-573, 4 tables; 5 ref 631/152/SEM/p bk2

COCONUT OIL; PROCESSING; APPROPRIATE TECHNOLOGY; INNOVATION; TECHNOLOGY TRANSFER; QUALITY; CONSUMER BEHAVIOUR; COTTAGE INDUSTRY.

Innovation of coconut processing is inefficient due to big consumption of energy. A huge consumption of energy occurs on coconut flesh draining and pressure processes which need 5,000-10,000 psi. Home industry with limited capital made low coconut oil quality through easier process and lower cost. However, market penetration of coconut oil from farmer production was limited and not continued. Farmer profit from their activity was only Rp 13,300/day or Rp 300/bottle. Improvement of existing technology through excellence packaging and appropriate processing technique were needed to increase coconut oil quality. The technology should be suitable to social condition, economic ability and farmer culture. Vinegar method can improve oil quality but resulted smaller yields compared to farmers' oil. Every 10 fruit resulted 960 ml oil, whereas the farmers' method was 1,255 ml.

291 SANTOSA, B.A.S.

Characteristics of extrudate from four varieties of corn with aquadest addition. ***Karakteristik ekstrudat beberapa varietas jagung dengan penambahan akuades***/Santosa, B.A.S.; Sudaryono; Widowati, S. (Balai Besar Penelitian dan Pengembangan Pascapanen Pertanian, Bogor (Indonesia)). *Jurnal Penelitian Pascapanen Pertanian* (Indonesia) ISSN 0216-1192 (2006) v. 3(2) p. 96-108, 4 ill., 4 tables; 28 ref.

MAIZE; CORN STARCH; PROCESSING; EXTRUSION; WATER; PROXIMATE COMPOSITION.

Extrusion technology could be used on several commodities and its mixture such as corn. However, the influence of corn varieties and the use of water on the quality of extrudate have not been observed. The aims of the research were to evaluate and find out the characteristics of raw material and extrusion product of corn. Research was designed as split plot, with the main plot was corn varieties (Bima, Pioner, Bisma and Lamuru), and the subplot was the percentage of aquadest added to raw material (0%, 5%, 10% and 15%), with three replications. Parameter observed on raw material and its product were physical, chemical, functional and amylograph characteristics. The results showed thT ll corn Vrieties tested were able to be processed with extrusion technology. Extrudates showed varied characteristics on physical, functional, and chemical; except on amilography. Extrudates resulted from all corn varieties possessed relatively good characteristics, follow the order from the best was Bisma, Lamuru, Pioner and Bima. The addition of 5% water on all corn varieties produced better quality extrudates compare to other water concentrations. This research was expected to provide information on quality and characteristics of corn and extrudates for development of corn extrudates and its mixtures.

292 SETYAWAN, N.

Effects of extraction on quality of arrowroot (*Maranta arundinacea* L.) strach. *Pengaruh cara ekstraksi terhadap kualitas hasil pati garut (Maranta arundinacea* L.*)*/Setyawan, N.; Richana, N. (Balai Besar Penelitian dan Pengembangan Pascapanen Pertanian, Bogor (Indonesia)). *Buletin Teknologi Pascapanen Pertanian* (Indonesia) ISSN 1858-3504 (2006) v. 2(1) p. 56-61, 2 ill., 3 tables; 21 ref.

MARANTA ARUNDINACEA; STARCH; EXTRACTION; QUALITY.

Arrowroot has been recognized as source of starch. Arrowroot has been tried for substance of wheat mixture or wheat substitution of composite flour. The aim of the research was to characterize the characteristics of two arrowroot cultivars Banana and Creole as base for further study on the effect of extraction on starch quality. In this research, the production of arrowroot starch was conducted using three methods, namely (1) manual, (2) extraction by pilot plant machineries (grader and miller) type PGM3, and (3) extraction by small scale industry machineries (grader, centrifugal separator, and flour milling machine prototype II). Two cultivars of arrowroot starch have the same physicochemical characteristics. PGM-3 type machine produced the highest yield of starch compared to the others methods.

293 SUKASIH, E.

Determination of heat resistant and heat adequacy value to inactivate the microorganisms population in pasteurized single strength siam citrus juices. *Uji ketahanan dan kecukupan panas terhadap inaktivasi populasi mikroba pada pasteurisasi sari murni jeruk siam*/Sukasih, E.; Setyadjit (Balai Besar Penelitian dan Pengembangan Pascapanen Pertanian, Bogor (Indonesia)). *Jurnal Penelitian Pascapanen Pertanian* (Indonesia) ISSN 0216-1192 (2006) v. 3(2) p. 77-82, 1 ill., 5 tables; 15 ref.

CITRUS; ORANGE JUICE; PASTEURIZING; HEAT TOLERANCE; MICROORGANISMS; TIME.

The research was done to support citrus processing technology development program conducted by Indonesian Center for Agricultural Postharvest Research and Development at Tebas, West Kalimantan. One of activity as output was line process of single strength citrus juices. Pasteurization is a critical step of this process because of the minimum heat dosage that needed for inactivation of microbe population. The aim of research was to determine heat resistance and heat adequacy value of single strength juices. The method was heating the tubes which contained single strength citrus juices with combination of time and temperature pasteurization at 55, 60, 65, 70, 75 and 80^{o}C during 5, 10, 15 and 20 minutes. The results showed that bacteria population with z value equal to 46.30^{o}C has higher heat resistant value than yeast/mold population with z value equal to 17.24°C. P value for 3D pasteurization of single strength siam citrus juice was 11.26 minutes at T ref, for acid foods, which means that it will achieve heat adequacy treatment if it was pasteurized at time and temperature which have P value equal to 11.26 minutes. Implication of the research was for production of single strength citrus juices it was required pasteurization at temperature 85°C for 11.26 minutes.

294 WIDANINGRUM

Characterization and study of the effect of annealing and heat moisture treatment on corn starch physicochemical properties. *Karakterisasi serta studi pengaruh perlakuan panas annealing dan heat moisture treatment (HMT) terhadap sifat fisikokimia pati jagung*/Widaningrum; Purwani, E.Y. (Balai Besar Penelitian dan Pengembangan Pascapanen Pertanian, Bogor (Indonesia)). *Jurnal Penelitian Pascapanen Pertanian* (Indonesia) ISSN 0216-1192 (2006) v. 3(2) p. 109-118, 4 ill., 3 tables; 27 ref.

MAIZE; CORN STARCH; HEAT TREATMENT; MOISTURE CONTENT; CHEMICOPHYSICAL PROPERTIES; PROXIMATE COMPOSITION.

The aim of the research was at characterizing and applying two heating treatments (annealing and heat moisture treatment) on modifying corn starch physicochemical properties of some varieties. There was considerable interest in physical modification such as heat treatment, which considered safer compared to those of chemical modification. Some corn varieties (Waxy corn, Antasena, Bisma, Kalingga and C7) were fractinated to obtain fiber, germ, gluten and starch. Starch isolation were done to three selected varieties, then was given annealing and heat moisture treatments. Corn starch was then analyzed for its physicochemical properties and compared to commercial corn starch. It was observed that physicochemical properties of corn starch was significantly affected by the combination of both corn varieties and heat treatment methods. Moisture content, amylose, and fat were varied from 2-10%, 17-46% and 1-2%, respectively whereas water absorption capacity of starch was 0.4-3%. Physicochemical properties of the starch were equal to commercial starch. Heat treatment changed the starch pasting properties. It was shown that native starch from waxy corn and Bisma which had A type changed into C type after heating treatment.

Q03 FOOD CONTAMINATION AND TOXICOLOGY

295 PARAMAWATI, R.

Effort to minimize aflatoxin B1 contamination in peanut by postharvest technology: case study in Lampung (Indonesia). ***Upaya menurunkan kontaminasi aflatoksin B1 pada kacang tanah dengan teknologi pascapanen: studi kasus di Lampung***/Paramawati, R.; Triwahyudi, S. (Balai Besar Pengembangan Mekanisasi Pertanian, Serpong (Indonesia)) Arief, R.W. *Jurnal Enjiniring Pertanian* (Indonesia) ISSN 1693-2900 (2006) v. 4(1) p. 1-8, 4 ill., 2 tables; 10 ref.

GROUNDNUTS; AFLATOXINS; CONTAMINATION; ASPERGILLUS FLAVUS; ASPERGILLUS PARASITICUS; POSTHARVEST TECHNOLOGY.

Peanut is one of the important commodities in Lampung, which is commonly planted in dryland area. As crop at tropical countries with high temperature and RH, peanuts are highly susceptible to aflatoxin contamination caused by *Aspergillus flavus* and *A. parasiticus*. To minimize the aflatoxin contamination,, a quick postharvest process likely to be done. In this study, an experiment by using machineries on peanut postharvest processing was carried out to shorten the postharvest time in order to minimize the aflatoxin contamination. The experiment was compared to the traditional technology that commonly used by farmers. Results showed that traditional technology produced pods with low level aflatoxin B1 contamination, but kernel in high contamination. In contrast, quick postharvest produced low level aflatoxin B1 contamination both in pods and kernels. This research also preceeded with peanut sampling at selected markets in Lampung. Result of peanut sampling at several markets from 4 prefectures showed varies contamination of aflatoxin B1 from 4.4 to 205 ppb with 69.76 ppb in average. Kernel stored with hermeneutic package still showed high increasing contamination compare to that of pod.

Q04 FOOD COMPOSITION

296 MISKIYAH

Study on implementation of hazard analysis critical control point (HACCP) of snack food. ***Studi penerapan hazard analysis critical control point (HACCP) pada makanan jajanan***/Miskiyah (Balai

Besar Penelitian dan Pengembangan Pascapanen Pertanian, Bogor (Indonesia)). *Buletin Teknologi Pascapanen Pertanian* (Indonesia) ISSN 1858-3504 (2006) v. 2(1) p. 12-21, 2 ill., 3 tables.

FOODS; FOOD SAFETY; PACKAGING; PROCESSING; BIOLOGICAL CONTAMINATION.

Food safety had been a new paradigm for certain community, it is signed by higher concern about food safety and nutrition intake for their bodies. One of the food safety aspects is HACCP implementation at home, where it had not been implemented and practizied yet, including at street vendors who sale snack foods. First step of HACCP implementation is hazard identification, then make a flowchart of snack foods processing to identify critical control point. Processing, serving, and reheating of snack foods processing were important to be controlled continually.

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

297 MULYONO, E.

Isomerization eugenol to isoeugenol using microwave. ***Isomerisasi eugenol menjadi isoeugenol menggunakan radiasi gelombang mikro***/Mulyono, E.; Hidayat, T. (Balai Besar Penelitian dan Pengembangan Pascapanen Pertanian, Bogor (Indonesia)). *Jurnal Penelitian Pascapanen Pertanian* (Indonesia) ISSN 0216-1192 (2006) v. 3(2) p. 67-76, 2 ill., 5 tables; 19 ref.

CLOVES; LEAVES; ESSENTIAL OILS; EUGENOL; EXTRACTION; MICROWAVE RADIATION; CHEMICOPHYSICAL PROPERTIES.

Eugenol is isomerized to its corresponding alkenyl alkoxy benzene, namely isoeugenol, where the double bond in the alkenyl group migrates to a position conjugated with the benzene ring. This process represents the catalytic reaction which is require catalyst and heat. The aim of the research was to find out the concentration of rhodium chloride trihidrate ($RhCl3.3H_2O$) as catalyst and optimum time of isomerization in a microwave bath reactor. Design of the experiment used was randomized factorial design (3x3) with factors, (A) concentration of $RhCl3.3H_2O$ catalyst with has three levels: A1 = 0.08%, A2 = 0.16%, and A3 = 0.24%, and (B) heating time in the microwave with three levels: B1 = 10 minutes, B2 = 15 minutes, and B3 = 20 minutes. The results showed that the optimal treatment combination was obtained at catalyst concentration of 0.24% and heating time 15 minutes. Purity of isoeugenol yielded was 91.27% which is composed of isomer cis-isoeugenol 18.03% and trans-isoeugenol 73.24% which represent ratio of isomer cis and trans 1:4.1 (0.25). The amount of substance condensing at optimal treatment was 19.08% or similar to isoeugenol yielding 80.92%. The product still required to be purified to obtain the higher purity level of isomer trans-isoeugenol, and to improve the physicochemical properties of the product.

298 SUNANTYO

Preliminary study at home scale industry processing of bio ethanol from *Arenga pinnata* juice in North Maluku (Indonesia). ***Studi pendahuluan proses pembuatan bioetanol dari nira aren dalam skala industri rumah tangga di Maluku Utara***/Sunantyo (Pusat Penelitian Perkebunan Gula Indonesia, Pasuruan (Indonesia)). [Proceedings of the national seminar on innovation and specific location technology transfer supporting agricultural revitalization. Book 2], Medan, 5 June 2007/Sudana, W.; Moudar, D.; Jamil, A.; Yufdy, P.; Napitupulu, B.; Daniel, M.; Simatupang, S.; Nainggolan, P.; Hayani; Haloho, L.; Darmawati; Suryani, S. (eds.). Bogor (Indonesia): BBP2TP, 2007: p. 561-567, 2 tables; 6 ref. Appendix 631/152/SEM/p bk2

SUGAR PALMS; ARENGA PINNATA; TAPPING; SUGARCANE JUICE; PROCESSING; ETHANOL; DISTILLING; TRADITIONAL TECHNOLOGY; ENERGY SOURCES; MALUKU.

Indonesia goes into an energy crisis era, so this condition influences industrial sector, particularly the national industry performances become worsen. Therefore, others national energy should be developed, involving non energy fossil, alternative energy and renewable energy. One of alternatives as a substitute for fuel or energy is green energy generated from plants containing sugar, *viz*. *Arenga pinnata*. Stick flowers of *Arenga pinnata* produce juice as raw material of bio ethanol processing. One of effort to process bio ethanol at home industry scale is in the North Maluku. Bio ethanol processing from tapping *Arenga pinnata* juice resulted 5% of tapping juice with bio ethanol content around 6%. The result of bio ethanol processing is still low. To increase the yield, piping line of distillation, cooling with continuous water flowing and isolation of piping distillation line system and reduce the leakage of pipe distillation can be done.

Q70 PROCESSING OF AGRICULTURAL WASTES

299 HARYATI, T.

Biogas: animal waste that can be used as alternative energy source. ***Biogas: limbah peternakan yang menjadi sumber energi alternatif***/Haryati, T. (Balai Penelitian Ternak, Ciawi, Bogor (Indonesia)). *Wartazoa* (Indonesia) ISSN 0216-6461 (2006) v. 16(3) p. 160-169, 2 ill., 5 tables; 18 ref.

BIOFUELS; FARMYARD MANURE; WASTE MANAGEMENT; RENEWABLE RESOURCES.

Biogas is a renewable energy which can be used as alternative fuel to replace fossil fuel such as oil and natural gas. Recently, diversification on the use of energy has increasingly become an important issue because the oil sources are depleting. Utilization of agricultural wastes for biogas production can minimize the consumption of commercial energy source such as kerosene as well as the use of firewood. Biogas is generated by the process of organic material digestion by certain anaerob bacteria activity in aerobic digester. Anaerobic digestion process is basically carried out in three steps, i.e. hydrolysis, acidogenic and metanogenic. Digestion process needs certain condition such as C:N ratio, temperature, acidity and also digester design. Most anaerobic digestions perform best at 32-35°C or at 50-55°C, and pH 6.8-8. At these temperatures, the digestion process essentially converts organic matter in the present of water into gaseous energy. Generally, biogas consists of methane about 60-70% and yield about 1,000 British Thermal Unit/ft^3 or 252 Kcal/0.028 m^3 when burned. In several developing countries, as well as in Europe and the United States, biogas has been commonly used as a subtitute environmental friendly energy. Meanwhile, potentially Indonesia has abundant potential of biomass wastes, however biogas has not been maximally used.

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Extraction and characterization of solid tofu waste protein. ***Isolasi dan karakterisasi protein ampas tahu***/Nurdjannah, N.; Usmiati, S. (Balai Besar Penelitian dan Pengembangan Pascapanen Pertanian, Bogor (Indonesia)). *Jurnal Penelitian Pascapanen Pertanian* (Indonesia) ISSN 0216-1192 (2006) v. 3(2) p. 83-95, 6 ill., 11 tables; 27 ref.

SOYFOODS; BYPRODUCTS; PROTEIN CONTENT; PROTEIN ISOLATES; CHEMICOPHYSICAL PROPERTIES; MOISTURE CONTENT.

Solid tofu waste is a byproduct of tofu production. Its protein content is relatively high, about 6%. Generally it is used for feed or as a mixture in making "oncom" or "tempe gembus". Protein concentrate has an opportunity to be used as the raw material in producing flour rich in fiber and protein which can be applied in food products, and as a mushroom growth media. In this experiment, the protein of soybean waste was isolated using acid-base method and then the physicochemical and functional characteristics of the result were observed. Treatments of research consisted of extraction temperature (25° dan 50°C) and extraction pH (8.0; 8.5; 9.0; 9.5; 10). The experiment was designed as randomized block design, factorially with two replications as the blocks. The result showed that fresh solid tofu waste produced better quality protein than dried solid tofu waste. The yield, protein content and recovery value of protein concentrate were low. Temperature and pH extraction influenced the characteristics of protein concentrate. Weighed evaluation showed that 50°C extraction temperature with pH 10 were the best combination treatments with 11.68% yield, 25.85% protein recovery, 61.14% protein content, 6.66% water content, 2.74% ash content, 31.9% fat content, 4.26 total carbohydrate, 3.38g water/g protein water absorption capacity, 3.79g fat/g protein fat absorption capacity, 61.2% emulsion capacity, 69.60% emulsion stability, 15.71% foam capacity, 55.28% foam stability, highest solubility at pH 12 was 89.14%.

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