ISSN: 0216-3713

INDONESIAN AGRICULTURAL RESEARCH ABSTRACTS

Volume 25, No. 2, 2008

Ministry of Agriculture
INDONESIAN CENTER FOR AGRICULTURAL LIBRARY AND TECHNOLOGY DISSEMINATION
Jl. Ir. H. Juanda 20, Bogor 16122, Indonesia

ISSN: 0216-3713

INDONESIAN AGRICULTURAL RESEARCH ABSTRACTS

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PREFACE

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PIPER NIGRUM; LAND EVALUATION; LAND SUITABILITY; CLIMATE; SULAWESI.

To optimize the use of land, the soil characteristics should be evaluated. Pepper grown in Tomini and Moutong Subdistrict, Parigi Moutong Regency was evaluated because of its considerable economic value. The objective of the research was to evaluate the land suitability and potential at 1 : 50.000 scale land pepper. The work covered : preparation and production of basic map, terrain analysis, field experiment, analysis of soil samples and suitability evaluation. Results of this study indicated that the area consisted of suitable land about 24,346 ha (9.22% from the total area observed), with the limiting factors were rooting condition, water availability, and nutrition retention; marginally suitable land about 21,882 ha (8.29% from the total area), with the limiting factors of rooting condition, water availability, nutrition and terrain; and unsuitable land about 217,763 ha from the total area observed, with the limiting factors of rooting condition, water availability, nutrition retention and terrain.

152 NUR, M.I.
Optimalisasi pola pemanfaatan lahan usaha tani yang berwawasan lingkungan di daerah transmigrasi. **[Optimizing of land use farming pattern with environmentally perspective in transmigration area]**/Nur, M.I. (Universitas Tadulako, Palu (Indonesia). Fakultas Pertanian) 1 ill., 4 tables; 10 ref. Summaries (En, In). *Jurnal Agroland* (Indonesia) ISSN 0854-641X (2005) v. 12(4) p. 384-390.

SULAWESI; LAND USE; LAND SUITABILITY; FARMING SYSTEMS; FARM INCOME.

A survey was conducted with aim at: (i) determining suitable farming pattern in the transmigration area: (ii) determining combination of farming patterns that gives maximum production and income; (iii) finding out farming pattern that gives both optimum production and sustainable environment. The survey was carried out in Lalundu resettlement area in Donggala Regency. Data obtained were analysed by using (i) overlay method, (ii) linear program and (iii) leopold matrix. Based on the result, it was concluded that: (i) there were possible farming patterns adopted in Lolundu, namely: rice-rice, rice-rice-soybean, rice-rice-maize, coconut, cacao, coffee plants, coconut-coffee plants, cacao-coffee plants; (ii) the existing farming patterns were not the optimum ones. Income contribution to the amount of Rp 410,635,000 in 2004 was obtained from 8 commodities: rice, soybean, mungbean, peanut, maize, coconut, cacao, coffee; (iii) six farming patterns were found to be optimum ones giving maximum contribution of Rp 636,561,000, (iv) positive impacts (score 41) on the environment was greater than negative impacts (score 9) of the farming activities in the area.

153 PRATOMO, A.G.
Pengkajian pemanfaatan lahan berteras untuk penataan hijauan mendukung konservasi tanah dan ketersediaan pakan. **[Study on terrace land use for forage arrangement to support soil conservation and forage availability]**/Pratomo, A.G.; Yusran, M.A.; Kartono, G.; Sugiyarto, M.; Hardianto, R.; Martono, 4 tables; 10 ref. Summaries (En, In). *Buletin Teknologi dan Informasi Pertanian* (Indonesia) ISSN 1410-9876 (2004) v. 7 p. 34-39.

FLEMINGIA; LEUCAENA; GLIRICIDIA; CALLIANDRA; LAND USE; TERRACE CROPPING; FORAGE; EROSION CONTROL; SOIL FERTILITY; SOIL CONSERVATION; FEEDS.

Leguminosae or grass as a reinforcement terrace plant could give a real profit to the plantation, such as controlling erosion, improve land fertility and forages. In fact, only some farmers cultivate the reinforcement terrace plant but do not appropriate for the conservation and forages. It was needed to study

the proper terrace arrangement. The objective of this study was to obtain terrace arrangement models and fodder composition. Assessment was conducted at Malang Experimental Farm from January to December 2002 at the altitude of 500 m asl, on agroecology zone IV ax li. This research was directed at terrace arrangement and fodder composition to support land conservation and forages. Assessment was set in a randomized split plot design with 3 replications. Terrace type was the main plot, there were bench and ridge terrace. The submain plot was legumes as a reinforcement terrace, using Flemingia, Leucaena, Gliricidia and Calliandra, and control without reinforcement terrace plant. At the beginning, the Leucaena growth was better than others, especially on the ridge terrace, but on the conservation side, Gliricidia and Flemingia had the canopy and wide leaves, and could reduce the rainfall that caused erosion.

E14 DEVELOPMENT ECONOMICS AND POLICIES

154 MURTIYENI

Perilaku komunikasi dan persepsi peternak terhadap proses pengambilan keputusan inovasi teknologi ternak domba/kambing di Kabupaten Purwakarta dan Majalengka. **Communication behaviour and farmer's perception toward decision making of technology innovation at sheep/goat rearing in Purwakarta and Majalengka District**/Murtiyeni; Priyanto, D.; Yulistiani, D.; Isbandi (Balai Penelitian Ternak, Bogor (Indonesia)); Hanafiah, A. 6 tables; 17 ref. Summaries (En, In). [Proceedings of the national seminar on livestock and veterinary in 2004. Book 1]. Prosiding seminar nasional teknologi peternakan dan veteriner 2004. Buku 1/Thalib, A.; Sendow, I.; Purwadaria, T.; Tarmudji; Darmono; Triwulanningsih, E.; Beriajaya; Natalia, L.; Nurhayati; Ketaren, P.P.; Priyanto, D.; Iskandar, S.; Sani, Y. (eds.); Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2004: p. 323-334.

SHEEP; GOATS; TECHNOLOGY TRANSFER; INNOVATION; FARMERS; DIFFUSION OF INFORMATION; JAVA.

Agricultural communication is one of the important things on the outcome of adoption innovation process. The lack of technology innovation causes users doubt or refuse kind of innovation. The research was designed: (1) to compare communication behavior and farmer's perception toward innovation technologies at two research locations, (2) to explain adoption technologies processes which were introduced, and (3) to identify the factors which correlated with adoption of innovation and correlation among the factors. This research was conducted by survey methods in January 2003 at sheep/goat farmers which were introduced innovation technologies and guided for 6 months. Population sampling was observed using Mann Whitney methods and rank Spearman was used to analyze data. The result indicated that: (1) communication behavior (discussing information, meeting attendance, social participation) was not significantly different, (2) farmer's perception toward innovation technologies (profitability, compatability, complexity, triability and observability) were not significantly different, generally farmers had high score perception, (3) adoption of innovation processes (knowledge, persuasion, decision and confirmation) generally showed high score, except stable technology indicated low adoption, (4) behavior communication factors (cosmopolitant, mass media possesion and social participation) in Majalengka District significantly related with confirmation technologies, while in Purwakarta District, the mass media possesion related significantly with confirmation technologies. Farmer's perception (compatability and triability) in Purwakarta District related significantly with confirmation level of innovation technologies.

155 WAHYUDI, A.

Analisis keberlanjutan adopsi kapas transgenik di Sulawesi Selatan. **Analysis of sustainability of transgenic cotton adoption in South Sulawesi (Indonesia)**/Wahyudi, A.; Taher, S. (Pusat Penelitian dan Pengembangan Perkebunan, Bogor (Indonesia)); Wati, R. 1 ill., 2 tables; 9 ref. Summaries (En, In). *Jurnal Penelitian Tanaman Industri* (Indonesia) ISSN 0853-8212 (2003) v. 9(4) p. 135-140.

GOSSYPIUM HIRSUTUM; TRANSGENIC PLANTS; FARMING SYSTEMS; FARM INCOME; INNOVATION ADOPTION; SULAWESI.

The adoption of transgenic cotton introduced since 2000 in seven regencies of South Sulawesi need to be evaluated. The objective of study was to analyze factors influencing the adoption of transgenic cotton by the farmers in the introduction area. The research frame used is sustainability of adoption which depend on characteristics of subjects and innovation, and physical and social environment. Criteria used to determine research area were distribution and coverage of transgenic cotton farms, distribution pattern of rainfall, and harvest time. The area chosen were Regency of Bantaeng, Takalar, Gowa, and Bulukumba. The sampling method used was simple random sampling, since the population was relatively homogen. The results of the analysis indicated that more than 50% of the farmers had a change to stop adopting the transgenic cotton. It happened because the farmers were uncapable to take the risk of transgenic cotton farming which was very high, while the income from this farming was not stable. Howewer, the adoption of transgenic cotton is potential in the area where the climate is suitable and compatible with the seasons and existing farming system.

E16 PRODUCTION ECONOMICS

156 SAHARA, D.

Pengaruh faktor produksi pada usaha tani lada di Sulawesi Tenggara: Kasus integrasi lada-ternak di Kecamatan Landono, Kabupaten Kendari. **[Effect of production factors on pepper farming in Southeast Sulawesi (Indonesia): case on integrated pepper-livestock system in Landono, Kendari (Indonesia)]/** Sahara, D.; Yusuf; Sahardi (Balai Pengkajian Teknologi Pertanian Sulawesi Tenggara, Kendari (Indonesia)) 2 tables; 12 ref. Summaries (En, In). *Jurnal Pengkajian dan Pengembangan Teknologi Pertanian* (Indonesia) ISSN 1410-959x (2004) v. 7(2) p. 139-145.

PEPPER; PRODUCTION FACTORS; FARMING SYSTEMS; LIVESTOCK; INTEGRATED PLANT PRODUCTION; SULAWESI.

The assessment was conducted on June-July 2002 in Southeast Sulawesi. The objective was to assess the influence of some production factors on pepper farming by using survey and participatory appraisal. Structured interviews involved 31 farmers, i.e., 14 farmers implemented integration farming of pepper and goat, and 17 farmers conducted pepper monoculture farming. Data were analysed using ordinary least square regression. Results of the study indicated that pepper yielded by integrated farming and monoculture practice for the first year of production were significantly different. Expanding planted area was the main way of increasing yield on integrated farming. On the other hand, pepper yield of farmers practice could be improved through manure application. Labor increase will also expand pepper yield.

E20 ORGANIZATION, ADMINISTRATION AND MANAGEMENT OF AGRICULTURAL ENTERPRISES OR FARMS

157 DAMANIK, S.

Kajian usaha tani akar wangi rakyat berwawasan konservasi di Kabupaten Garut. **Study on vetiver farming system in conservation pattern at Garut District [Indonesia]/**Damanik, S. (Pusat Penelitian dan Pengembangan Perkebunan, Bogor (Indonesia)) 7 tables; 6 ref. Appendices Summaries (En, In). *Jurnal Penelitian Tanaman Industri* (Indonesia) ISSN 0853-8212 (2005) v. 11(1) p. 25-31.

VETIVERIA ZIZANIOIDES; FARM MANAGEMENT; CONSERVATION TILLAGE; FARM INCOME; JAVA.

The study of vetiver (*Vetiver zizanoides* Stapt) farming system was conducted from November 2003 to October 2004 in Samarang Subdistrict, Garut, West Java. The primary data were collected through the interview of 120 vetiver farmers and 22 vetiver oil processors, and from 3 hectares field trial. The study used a randomized block design with 3 cropping patterns and two replications. Parameters observed were root weight, oil content, erosion level, productivity level, and economic feasibility. The research result indicated that conservation pattern produced higher root weight, conservation pattern 0.74 kg, farmer pattern 0.60 kg and introduction pattern 0.50 kg. Result of oil analyses showed that the oil content of

conservation and farmer patterns were not significantly different, namely 2.60% and 2.25%, while the introduction pattern was only 1.25%. From the two parameters (root weight and oil content), it was indicated that the conservation pattern was better. The erosion level on vetiver farms at farmer, introduction and conservation patterns were 26.20 ton/ha, 19.40 ton/ha, and 17.80 ton/ha, respectively. The erosion level above was classified as TBE, while moderate level (30-60 ton/ha/year). The productivity levels at farmers, introduction and conservation patterns were 16,000 kg/ha/year, 15,000 kg/ha/year and 18,000 kg/ha/year, respectively. It was clear that conservation pattern gave the highest productivity, but the result of economic feasibility study showed: conservation pattern: B/C ratio 3.26, NPV Rp 7,852,000, and IRR 18.75%; introduction pattern: B/C ratio 2.03, NPV Rp 5,089,000, and IRR 18.75%; farmer pattern: B/C ratio 3.60, NPV Rp 7,130,000, and IRR 18.50%.

158 ISBANDI

Sumbangan subsektor usaha ternak domba dalam mendukung ekonomi rumah tangga di Desa Pasiripis dan Tegalsari, Jawa Barat. **Contribution of sheep farming to household's economy in Pasiripis and Tegalsari Villages, West Java (Indonesia)**/Isbandi; Priyanto, D. (Balai Penelitian Ternak, Bogor (Indonesia)) 9 tables; 6 ref. Summaries (En, In). [Proceedings of the national seminar on livestock and veterinary in 2004. Book 1]. Prosiding seminar nasional teknologi peternakan dan veteriner 2004. Buku 1/Thalib, A.; Sendow, I.; Purwadaria, T.; Tarmudji; Darmono; Triwulanningsih, E.; Beriajaya; Natalia, L.; Nurhayati; Ketaren, P.P.; Priyanto, D.; Iskandar, S.; Sani, Y. (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2004: p. 314-322.

SHEEP; FARMS; FARM SURVEYS; RAPID RURAL APPRAISAL; HOUSEHOLDS; FARM INCOME; FARMING SYSTEMS; ECONOMIC ANALYSIS; JAVA.

An investigation to know farmer's experiences in raising sheep was conducted in Pasiripis Village, Kertajati Subdistrict, Majalengka District, and Tegalsari Village, Tegalwaru Subdistrict, Purwakarta District. At the first step, a rapid rural appraisal (RRA) approach to determine sites of observation in the both selected villages was conducted with hoping to sustain a long term program. Activities were carried out using surveys technique with a structured questionnaire covered farmer characteristics, livestock resources and other incomes than livestock farming for a year period. Respondents which were thirty eight from Pasiripis and 27 from Tegalsari, were randomly interviewed which considered livestock ownership and their management technique. Data were analysed descriptively, while data of farmer's income from each subsector were analysed on gross margin basis. Results of the study showed that average livestock ownership in Pasiripis was 15.1 sheeps and 3 sheeps among them were held by sharing. Higher average numbers of sheep held in Tegalsari, i.e. 5.8 and 2.4 sheep. Production from other than farming activities contributed to people income in large portion, i.e. 73 % in Pasiripis, and 52.5 % in Tegalsari, followed by food crop farming, 23 % and 42.2 %, respectively. Sheep farming only contributed to the whole income at 10 % in Pasiripis and 5.3 % in Tegalsari.

159 LAPASERE, H.

Faktor-faktor yang mempengaruhi produksi kangkung air di Desa Tulo Kecamatan Dolo Kabupaten Donggala Provinsi Sulawesi Tengah. **[Analysis of factors influencing of *Ipomoea aquatica* production in Tulo Village, Dolo District, Donggala-Central Sulawesi (Indonesia)]**/Lapasere, H.; Lamusa, A. (Universitas Tadulako, Palu (Indonesia). Fakultas Pertanian) 2 tables; 5 ref. Summaries (En, In). *Jurnal Agroland* (Indonesia) ISSN 0854-641X (2005) v. 12(4) p. 412-417.

IPOMOEA AQUATICA; FARMING SYSTEMS; PRODUCTION FACTORS; LAND USE; AGRICULTURAL WORKERS; SEED; FERTILIZERS; ECONOMIC ANALYSIS; SULAWESI.

The analysis of production factors was conducted from May until July 2005 in Tulo Village of Dolo District. The objective of the research was to analyze some variables influencing *Ipomea aquatica* Forsk farm production. Based on analysis of F test, it could be concluded that all of variables to influenced production of water spinach. But based on analysis of t-test, there were three variables influence production of water spinach farm, namely: land area, labour, and seedlings.

160 SUHARYANTO

Analisis pendapatan dan distribusi pendapatan usaha tani tanaman perkebunan berbasis kelapa di Kabupaten Tabanan. **[Analysis of income and income distribution coconut-based perennial crops in Tabanan (Indonesia)]**/Suharyanto; Suprapto; Rubiyo (Balai Pengkajian Teknologi Pertanian Bali, Denpasar (Indonesia)) 2 ill., 4 tables; 12 ref. Summaries (En, In). *Jurnal Pengkajian dan Pengembangan Teknologi Pertanian* (Indonesia) ISSN 1410-959x (2004) v. 7(2) p. 146-154.

COCONUTS; COCOA BEANS; CLOVES; FARM INCOME; INCOME DISTRIBUTION; FARMING SYSTEMS; BALI.

Objective of this study was to assess income, income contribution, and income distribution of planting practices of perennial crops, i.e., coconut + cocoa, coconut + cloves, and coconut + cocoa + cloves in Tabanan Regency. The study was conducted for three months (July to September 2002) using cross-sectional data of 90 sample farmers which consisted of 30 farmers of each group planting practice. LSD (Least Significant Difference) test was used to compare average farmers' household income, off-farm income, and income contribution. Income distribution was analysed using Gini coefficient and Lorenz curve. The result showed that farming income per ha and income contribution of coconut + cocoa + clove were the highest among those of coconut + cocoa and coconut + clove planting practices. Income was more evenly distributed in coconut + cocoa planting practice with Gini coefficient of 0.19. Off-farm income and total household income were most evenly distributed in coconut + cocoa diversification pattern with Gini coefficiencts each of 0.20 and 0.23.

161 WAHYUDI, A.

Efektivitas penambahan lahan usaha tani mete dalam peningkatan pendapatan petani. **Effectiveness of farm land addition to additional income**/Wahyudi, A.; Wulandari, S. (Balai Penelitian Tanaman Rempah dan Obat, Bogor (Indonesia)); Ardana, I K. 3 ill.; 12 ref. Summaries (En, In). *Jurnal Penelitian Tanaman Industri* (Indonesia) ISSN 0853-8212 (2005) v. 11(1) p. 37-42.

ANACARDIUM OCCIDENTALE; LAND DIVERSION; EXTENSIFICATION; FARM MANAGEMENT; FARM INCOME.

Small farm is the main factor that causes poverty incidence in rural area. Land reform through land redistribution is often taken for granted as an effective way to alleviate poverty. However, experiences in some countries do not always prove it. Since cashew farm areas generally coincide with high poverty incidence, hence this research aimed at analyzing effectiveness of farm land addition to the additional income in two areas with different condition of agribusiness. The District of Buton is as representative of underdeveloped agribusiness and Kendari District represents the developed one, both districts have the largest cashew population in the Province of Southeast Sulawesi, as one of the main cashew area in Indonesia. Data were collected in June-July 2002. The simple random sampling was used to determine respondents and cashew farm as unit of sample, and the sample size was 156 and 136 units respectively for Buton and Kendari. Data were analysed with regression analysis, where cashew farm land size (L) was used as independent variable and farmer's income (I) as dependent variable. The derivative function to L obtained is θ IB/θ LB = 131.925 LB^2 - 502.858 LB - 510.069 (Buton) (additional income will be positive, larger than 4.6 ha); and θ IK/θ LK = -20.967 LK^2 + 21.0694 LK - 113.550 (Kendari) (additional income will be positive, larger than 0,6 ha). The result showed that the effectiveness of land addition to increase farmer's income was proved different in different agribusiness conditions. In underdeveloped area (Buton), the land addition was less effective to increase income over the poverty line and it would be effective if the addition was larger than 5 ha. While in the developed area (Kendari), the addition of land was effective by adding 1.5 ha. Developing agribusiness condition could be conducted by developing cropping system and forwarding home industry (processing). The development will be more effective if it is supported by improving market access through improvement of infrastructure.

E70 TRADE, MARKETING AND DISTRIBUTION

162 BACHREIN, S.
Pengkajian keragaan usaha tani dan sistem distribusi bibit kentang di Jawa Barat. **[Assessment of potato seed production performance and distribution system in West Java (Indonesia)]**/Bachrein, S. (Balai Pengkajian Teknologi Pertanian Jawa Barat, Lembang (Indonesia)) 7 ill., 7 tables; 15 ref. Summaries (En, In). *Jurnal Pengkajian dan Pengembangan Teknologi Pertanian* (Indonesia) ISSN 1410-959x (2004) v. 7(2) p. 125-138.

SOLANUM TUBEROSUM; SEED POTATOES; MARKETING MARGINS; PRODUCTIVITY; EFFICIENCY; FARMING SYSTEMS; ECONOMIC ANALYSIS.

The assessment was conducted in 2002 at Pangalengan, Rancabali, and Ciwidey Subdistricts, Bandung District, West Java. Objectives of this study were: (1) to identify and collect data on distribution system of potato seed (seedling), and (2) to arrange and present database on distribution system potato seed (seedling). Data were collected through desk study (literature/report review), and rapid rural appraisal (RRA) approaches. Results of the study indicated that the productivity and efficiency of potato/potato-seed production in West Java were relatively low. It is possible to enhance by intensification program focused on balanced fertilizer application rates, farm management, pest control, as well as harvesting and postharvest technology improvement. The production of high quality potato-seed during the period of 2002 only 1.6% (560.8 ton) of the province's need (35,787.6 ton) because of low productivity with unbalanced distribution of potato seed production. In 2002, about 60.8% of potato seed production in West Java (1,430.6 ton) was distributed to other provinces, namely Sumatra (32.2%), Central Java (14.3%), East Java (3.6%), and Sulawesi (10.7%). In general, market structure of potato seed in West Java was relatively competitive. Distribution of potato seed was relatively efficient with margin of 19.2-30.8% and the seed growers received about 76.5% of the retail price. To develop sustainable potato seed production in West Java, it is necessary to improve productivity and efficiency of farming system as well as to create conducive socio-economic conditions of the growers.

F01 CROP HUSBANDRY

163 RIAJAYA, P.D.
Kerapatan galur harapan kapas pada sistem tumpangsari dengan kedelai. **Density of new cotton lines under intercropping system with soybean**/Riajaya, P.D.; Kadarwati, F.T. (Balai Penelitian Tanaman Tembakau dan Serat, Malang (Indonesia)) 1 ill., 6 tables; 16 ref. Summaries (En, In). *Jurnal Penelitian Tanaman Industri* (Indonesia) ISSN 0853-8212 (2003) v. 9(1) p. 11-16.

GOSSYPIUM HIRSUTUM; GLYCINE MAX; SPACING; CROPPING SYSTEMS; GROWTH; YIELDS.

The field trial was conducted at Mojosari, East Java from May to October 2000 on the rice field after harvesting. The purpose of the study was to investigate the optimum population for new cotton lines under intercropping with soybean. The field experiment was arranged in a split plot design with three replications. Four new cotton lines were allocated to main plots: 92016/6, 91001/29/2 (okra leaf), 88003/16/2 and Kanesia 7. Three crop arrangements were allocated to subplots: 1(1): 3 [1 cotton row (1 plant/hole) between 3 rows of soybean]; 2(1): 4 [2 cotton rows (1 plant/hole) between 4 rows of soybean], and 1(2): 3 [1 cotton row (2 plants/hole) between 3 rows of soybean]. Two replications for sole crops of cotton and soybean were included in this experiment to compare both cropping systems. Research showed that by keeping one cotton plant/hole in arrangement of 1:3 [1 cotton row between 3 rows of soybean], increased the photosynthetic efficiency from 5.9×10^{-4} to 9.4×10^{-4} mg CO_2/mg H_2O, causing cotton yield increased from 1167.2 to 1251.6 kg/ha; however soybean yield did not differ between different proportions of cotton and soybean (846 kg/ha). Under arrangement of two cotton rows + four rows of soybean, the photosynthetic efficiency increased from 5.9×10^{-4} to 7.7×10^{-4} mg CO_2/mg H_2O resulted in increased cotton yield from 1 167.2 to 1 206.2 kg/ha. The yield of line 88003/16/2 (1 323.3 kg/ha) did not

differ with that on Kanesia 7 (1 365.2 kg/ha); both were higher than those on 92016/6 (1096.9 kg/ha) and 91001/29/2 (1 048.0 kg/ha).

164 SASTROSUPADI, A.

Pengaruh zat pengatur tumbuh dan pupuk pelengkap cair terhadap pertumbuhan dan produksi rami di Wonosobo. **Effect of growth regulators and liquid fertilizers on the growth and yield of ramie in Wonosobo (Indonesia)**/Sastrosupadi, A.; Santoso, B.; Djumali (Balai Penelitian Tanaman Tembakau dan Serat, Malang (Indonesia)) 5 tables; 23 ref. Summaries (En, In). *Jurnal Penelitian Tanaman Industri* (Indonesia) ISSN 0853-8212 (2003) v. 9(1) p. 4-10.

BOEHMERIA NIVEA; PLANT GROWTH SUBSTANCES; LIQUID FERTILIZERS; FARMYARD MANURE; GROWTH; YIELDS; JAVA.

Crop removal of ramie plant is very high, because it is harvested every 60 days. A field experiment was carried out at Sedayu, Sapuran, Wonosobo since April 2001. The type of soil was brown Latosols and climate was Bl. The objective of the experiment was to study effect of plant regulator, liquid fertilizer (PPC), and its combinations on accelerating vegetative growth on two clones of ramie. The experiment was arranged in split plot design with three replications. The main plots were two clones of ramie (Pujon 10 and Jawa Timur) and the subplots were nine treatments consisted of plant regulator, liquid fertilizer, and its combination as subtreatment: (1) 60 N + 20 P_2O_5 + 60 K_2O + 10 tons cow manure; (2) 60 N + 20 P_2O_5 + 60 K_2O + 10 tons cow manure + ZPT 1 (kons 1 ml/l); (3) 60 N + 20 P_2O_5 + 60 K_2O + 10 tons cow manure + ZPT 2 (0.5 ml/l); (4) 60 N + 20 P_2O_5 + 60 K_2O + 10 tons cow manure + PPC 1 (3 g/l); (5) 60 N + 20 P_2O_5 + 60 K_2O + 10 tons cow manure + PPC 2 (0.65 g/l); (6) 60 N + 20 P_2O_5 + 60 K_2O + 10 ton cow manure + ZPT 1 + PPC 1; (7) 60 N + 20 P_2O_5 + 60 K_2O + 10 tons cow manure + ZPT 1 + PPC 2; (8) 60 N + 20 P_2O_5 + 60 K_2O + 10 ton of cow + ZPT 2 + PPC 1, and (9) 60 N + 20 P_2O_5 + 60 K_2O + 10 ton cow manure + ZPT 2 + PPC 2. The plot size was 3.6 m x 6 m, with 60 cm x 40 cm of plant spacing, and one rhizome of 8 cm length per hole. Results showed that application of ZPT 1 + PPC 2, and ZPT 2 + PPC 2 with NPK fertilizers increased vegetative growth and yield of fiber. The total harvest II + III increased by 58% and 61% respectively. Potential yield of Pujon 10 was higher than that of Jawa Timur.

165 SUHARSIH

Emisi gas metan (CH_4) dan pertumbuhan varietas padi pada lahan sawah irigasi tanah Vertisols. **Methane emission and growth of rice varieties on Vertisols irrigated lowland**/Suharsih; Setyanto, P. (Loka Penelitian Pencemaran Lingkungan Pertanian, Jakenan (Indonesia)); Makarim, A.K. 2 ill., 8 tables; 12 ref. Summaries (En, In). *Penelitian Pertanian Tanaman Pangan* (Indonesia) ISSN 0216-9959 (2004) v. 23(2) p. 79-85.

ORYZA SATIVA; VARIETIES; METHANE; GROWTH; VERTISOLS; IRRIGATED LAND.

A study was conducted on two crop seasons in Pati District. Seven rice cultivars were used in this experiment, i.e. IR64, Tukad Unda, Tukad Balian, Tukad Petanu, Ciherang, Cisantana, and Way Apoburu. The trial was set up in a randomized completely block design with three replications. Objectives of the experiment were to find out rice cultivars that produce high yields and emitted less CH_4 (methane) gas on Vertisols irrigated lowland. Results showed that the lowest total methane emission during two rice crops was from Tukad Balian (229 kg CH_4/ha/year), while the highest was from IR64 (413 kg CH_4/ha/year). The highest rice yield was obtained by Ciherang (5.13 ton/ha), 7.9% higher than IR64 in the first season and (6.46 ton/ha) and 15.1% higher in the second season. Ciherang and Tukad Balian varieties produced higher yield than IR64 by 11.5% and 7.4%, respectively, and emitted less methane by 16.0% and 50.0%, respectively.

166 TEJASARWANA, R.

Pengaruh ZPT paclobutrazol dan komposisi media tanam mawar mini terhadap pertumbuhan dan hasil bunga. **Effect of paclobutrazol on mini rose growth and flower yield in several growing media composition**/Tejasarwana, R. (Balai Penelitian Tanaman Hias, Cianjur (Indonesia)) 3 tables; 14 ref. Summaries (En, In). [Proceedings of the national seminar of floriculture]. Prosiding seminar nasional florikultura: membangun industri florikultura yang berdaya saing melalui penerapan inovasi teknologi

berbasis potensi nasional/Balai Penelitian Tanaman Hias, Cianjur (Indonesia). Cianjur: Balithi, 2004: p. 334-340.

ROSA; PACLOBUTRAZOL; PLANT GROWTH SUBSTANCES; GROWING MEDIA; SOIL DENSITY; AGRONOMIC CHARACTERS; GROWTH; YIELDS.

Paclobutrazol as growth regulator and growing media composition could affect growth of mini rose and flower yield. The experiment was conducted at Segunung field station, IOPRI, Cipanas, Cianjur 1100 m asl in February to May 2004. This experiment aimed at finding out the effect of growing media composition and paclobutrazol concentration on mini rose cv. Red baby rose. Plots were arranged in a split-plot design with three replications. Main plot treatments were paclobutrazol concentration, i.e. 0, 500, and 1000 ppm given 2 times a week for 5 weeks. Subplot treatments were growing media composition which consisted of bamboo leaves compost, moss and fresh hull (1:1:1, 1:2:1, 1:3:1), bamboo leaves compost and carbonization hull (1:1), and carbonization hull and moss (1:4). The result indicated that paclobutrazol at 500 ppm significantly suppressed plant height, but at 1000 ppm the suppression was too high that caused lower plant. The best growing media was carbonization hull plus moss (1:4) that tend to increase the flower yield. Optimization of plant growth for potted mini rose was obtain at paclobutrazol concentration given lower than 500 ppm.

167 WASITO, A.
Respon tanaman induk klon unggul krisan terhadap ZPT dan frekuensi aplikasi fungisida dalam sistem budi daya lahan terbuka. **Response of chrysanthemum promising clones stock plant toward growth regulators and frequency of fungicides application**/Wasito, A. (Balai Penelitian Tanaman Hias, Pacet, Cianjur (Indonesia)), 2 tables; 14 ref. Summaries (En, In). *Jurnal Hortikultura* (Indonesia) ISSN 0853-7097 (2004) v. 14(4) p. 269-273.

CHRYSANTHEMUM; VARIETIES; CLONES; PLANTING STOCK; PLANT GROWTH SUBSTANCES; FUNGICIDES; CULTURAL METHODS.

The objective of this study was to find out the technology of cutting production on the chrysanthemum promising clones under outdoor condition. The experiment was conducted at the experimental garden of Indonesian Ornamental Crop Research Institute, Segunung at 1,100 m asl from July to December 2002. A split-split plot design was used consisted of three factors with three replications. The first factor was five chrysanthemum promising clones, the second factor was two levels of sodium nitroquaicol growth regulator application (with and without application), and the third factor was two levels of fungicide application (once a week and twice a week). The results showed that five promising clones of stock plant well grew and produced cutting eventhough under outdoor conditions. The promising clones significantly affected the number of cutting, cutting weight, cutting diameter, rooting capability and white rust resistance, but not by growth regulator and fungicide application.

168 WICAKSANA, N.
Pengaruh bokashi dan kalium terhadap pertumbuhan dan hasil tanaman bawang merah (Allium ascalonicum* L.*) kultivar Maja: laporan penelitian. **[Effect of bokashi and potassium on growth and yield of onion (*Allium ascalonicum* L.) Maja cultivar: research report]**/Wicaksana, N.; Carsono, N.; Kusumiyati (UNPAD Bandung (Indonesia)); Universitas Padjadjaran, Bandung (Indonesia). Fakultas Pertanian. 5 tables; 15 ref. Summaries (En, In). Bandung: UNPAD, 2000: 26 p.

ALLIUM ASCALONICUM; FERTILIZER APPLICATION; ORGANIC FERTILIZERS; POTASH FERTILIZERS; GROWTH; YIELDS.

This research aimed at getting information of bokashi and potassium effect on growth and yield of onion cultivar Maja. The research was carried out at experimental station Faculty of Agriculture Padjadjaran University, by using randomized block design with dosage of bokashi and potassium factors. Significance among treatments were tested by F-test and population mean for each treatment was compared by Duncan's Multiple Range Tests. Result showed that the highest fresh weight of onion bulb (30.44 g) was

found on 15 ton/ha bokashi dosage. The tallest onion plant (32.05 cm) was found on 150 kg/ha potassium dosage and the highest dry weight of onion bulb (30.68 g) was found on 90 kg/ha potassium dosage.

169 WURYANINGSIH, S.
Media dan kerapatan lindak untuk bibit tanaman mawar. **Media and bulk density for rose seedlings**/Wuryaningsih, S.; Tejasarwana, R.; Sutater, T.; Abdurachman, A. (Balai Penelitian Tanaman Hias, Cianjur (Indonesia)) 6 tables, 17 ref. Summaries (En, In). [Proceedings of the national seminar of floriculture]. Prosiding seminar nasional florikultura: membangun industri florikultura yang berdaya saing melalui penerapan inovasi teknologi berbasis potensi nasional/Balai Penelitian Tanaman Hias, Cianjur (Indonesia). Cianjur: Balithi, 2004: p. 324-333.

ROSA; SEEDLINGS; CULTURE MEDIA; COIR; RICE HUSKS; FARMYARD MANURE; ZEOLITES; SOIL DENSITY; SPROUTING.

One of physical characters to be justified on seedling media was a bulk density. The value of bulk was bigger that showed on media texture which more solid, difficult for water drainage and difficult for root penetration. The objective of the research was to find out media formulation for rose seedlings which is lighter, easy to obtain, cheap, environmentally friendly, and suitable. Research was conducted at plastic-houses by using a factorial randomized block design consisted of two factors and three replications. The first factor was five combinations of media consisted of: (1) coir dust + rice husk charcoal + stable manure, (2) coir dust + bamboo leaves compost + rice husk charcoal + stable manure, (3) coir dust + rice husk charcoal + sand, (4) coir dust + rice husk + rice husk charcoal + stable manure + zeolite and (5) rice husk + stable manure + soil. The second one was three levels of bulk density (0.4; 0.6 and 0.8 g/cm^3. The research results showed that the best media for the percentage life of rose seedling and the number of sprouts was the mixed media consisted of coir dust + rice husk + rice husk charcoal + stable manure + zeolite with 0.6 g/cm^3 (combination 4) followed by mixed media consisted of coir dust + rice husk charcoal + sand (combination 3). Besides supporting environmentally friendly and natural resources conservation, the coir dust as waste product could be used for seedling media, therefore it had added value and good prospect.

F02 PLANT PROPAGATION

170 ADINUGRAHA, H.A.
Penggunaan trubusan setek akar tanaman sukun sebagai bahan setek pucuk. **Utilization of sprout from root cuttings of *Artocarpus altilis* for cutting materials**/Adinugraha, H.A.; Kartikawati, N.K.; Suwandi (Pusat Penelitian dan Pengembangan Bioteknologi dan Pemuliaan Tanaman Hutan, Bogor (Indonesia)) 1 ill., 4 tables; 10 ref. Summaries (En, In). *Jurnal Penelitian Hutan Tanaman* (Indonesia) ISSN 1829-6327 (2004) v. 1(1) p. 21-28.

ARTOCARPUS ALTILIS; ROOTS; CUTTINGS; SCIONS; SHOOTS; PROPAGATION MATERIALS; SPROUTING; PLANT GROWTH SUBSTANCES.

Artocarpus altilis is one of hardwood trees that has good prospect to be developed to supply food commodities. This species commonly propagated by root cuttings while leaf-cuttings technique did not yet develop. This experiment was done to know rooting ability of leaf-cutting where material was taken from coppice shoot of root-cuttings. The experiment was arranged in completely randomized designs (CRD) with 2 factors observed, i.e. 1) kind and concentration of hormone which consisted of 5 levels and 2) position of cutting of material (first part/top and second part/bottom). The result showed that coppice shoot from the root-cutting of *A. altilis* could be used as material for leaf-cutting. Rooting percentage were about 41.67-66.67%. Average of root number was 7 per cuttings. The shoots could be divided into 2 part: first part (top) with average rooting percentage 60% and second part/basal (51.67%).

171 DININGSIH, E.

***Perbanyakan cepat batang bawah mawar bebas virus secara in vitro.* Propagation of free virus rose rootstocks by *in vitro* culture**/Diningsih, E.; Sulyo, Y.; Darliah (Balai Penelitian Tanaman Hias, Cianjur (Indonesia)) 3 tables; 12 ref. Summaries (En, In). [Proceedings of the national seminar of floriculture]. Prosiding seminar nasional florikultura: membangun industri florikultura yang berdaya saing melalui penerapan inovasi teknologi berbasis potensi nasional/Balai Penelitian Tanaman Hias, Cianjur (Indonesia). Cianjur: Balithi, 2004: p. 341-345.

ROSA; PROPAGATION MATERIALS; ROOTSTOCKS; IN VITRO CULTURE; GROWING MEDIA; VITROPLANTS; CROP PERFORMANCE; VIRUSFREE PLANTS.

Rose is the ornamental plants which is given priority to develop in Indonesia. Most of roses are infected by PNRSV (prunus necrotic ringspot virus). The main source of transmission is *Rosa multiflora*, used as the rootstock. The purpose of this research was to obtain virus elimination method on rootstocks of roses by *in vitro* culture, conducted in the Laboratory of Virology, Indonesian Ornamental Crop Research Institute, Segunung, Cianjur, West Java (1,100 m above sea levels) from January to December 2002. The explants from roses rootstocks infected by PNRSV were used in this experiment. Elimination of virus was carried out by recurrent subculture on MS media + 1.0 ppm BAP + 0.01 ppm TDZ. Serological method (DAS ELISA) was used to test explants and plantlets. The results showed that after fourth subculture, virus infection was around 80% on *R. multiflora*, and 40% on Multic and Natal Brior cultivars. After sixth subcultures, virus infection was decreased around 20 % on all cultivars, then after eighth subcultures, virus infection became 0% on *R. multiflora* and Natal Brior cultivars, while Multic cultivar was still infected around 20%.

172 LISAN, S.E.

***Pengaruh pembelahan subang dan pemupukan fosfat terhadap pertumbuhan dan hasil Gladiol.* [Effect of corm division and phosphate fertilizer on growth and yields of gladiolus (*Gladiolus hybridus* Hort.)]**/Lisan, S.E. (Universitas Hasanuddin, Makassar (Indonesia). Fakultas Pertanian dan Kehutanan) 4 ill., 2 tables; 12 ref. Summaries (En, In). *Jurnal Agroland* (Indonesia) ISSN 0854-641X (2005) v. 12(4) p. 334-338.

GLADIOLUS; CORMS; VEGETATIVE PROPAGATION; PHOSPHATE FERTILIZERS; APPLICATION RATES; GROWTH; FLOWERING; YIELDS.

An experiment to study growth and production of gladiolus (*Gladiolus hybridus* Hort.) in response to phosphate fertilizer and corm division was done in Malino, Tinggi Moncong Gowa from May to September 2004. It was arranged in split plot design. The main plot was corm division, consisting of two levels, i.e. corm divided into 2 sections and whole-corm. The subplot was phosphate fertilizer dosage, consisting of three levels, i.e. 90, 120 and 150 kg/ha. Results showed that whole-corm gave the highest number of tiller and phosphate of 150 kg/ha gave the earliest time of flowering and the highest number of flowers per inflorescence.

173 PRIYONO

***Pengecambahan secara in vivo embrio somatik kopi robusta (Coffea canephora) pada tahap aklimatisasi. In vivo* germination of somatic embryos of robusta coffee (*Coffea canephora*) at acclimatization stage**/Priyono; Zaenudin (Pusat Penelitian Kopi dan Kakao, Jember (Indonesia)) 4 tables; 12 ref. Summaries (En, In). *Pelita Perkebunan* (Indonesia) ISSN 0215-0212 (2002) v. 18(3) p. 109-119.

COFFEA CANEPHORA; SOMATIC EMBRYOS; GERMINATION; IN VIVO EXPERIMENTATION; ADAPTATION.

The main problems in plantlet production are morphological abnormalities, asynchronous development and size heterogenecity of somatic embryo. To minimize this constraint, the acclimatization of Robusta coffee somatic embryos was studied with emphasis on *in vivo* germination in acclimatization stage. The treatment was designed in randomized complete block design with 3 factors (2 x 2 x 9). The first factor was clone of Robusta coffee consisted of 2 levels. The second factor was nutrient consisted of 2 levels.

The third factor was acclimatization media consisted of 9 levels. The results showed that clone, nutrient compound and acclimatization media affected the degree of successful direct sowing of mature embryos. Compared with foliar fertilizer, addition of liquid culture medium, which commonly used *in vitro* germination of coffee somatic embryo, positively increased the conversion of embryos to plantlets. The use of mixture of topsoil, sand and manure (1:1:1) mixed with cocopeat (1:1) gave the highest success in conversion of embryos to planlets. FR 03 clone showed higher success than OGA clone. The best result of conversion of embryos to planlets was obtained from mature somatic embryos of FR 03 clone (78%) and OGA clone (65%) which was directly sowed in mixture of topsoil sand and manure (1:1:1) combined with cocopeat (1:1), which were applied with liquid culture medium.

174 TRIATMININGSIH, R.

***Perbanyakan bibit jeruk Citromelo dan JC (Japanese Citroen) secara in vitro.* In vitro propagation of Citromelo dan JC [Japanese Citroen]**/Triatminingsih. R.; Karsinah (Balai Penelitian Tanaman Buah, Solok (Indonesia)) 2 ill., 5 tables; 13 ref. Summaries (En, In). *Jurnal Hortikultura* (Indonesia) ISSN 0853-7097 (2004) v. 14(4) p. 238-245.

CITRUS; SEED; IN VITRO REGENERATION; GROWING MEDIA; PLANT PROPAGATION; SEEDLINGS.

This research was conducted at Indonesian Fruit Research Institute, Solok, West Sumatra, from February until December 2002. The objective was to find out *in vitro* regeneration technology of citromelo and JC. The treatments were arranged in RCBD with nine replications. Results showed that the varieties tested indicated the same response to the media used and the cost was significantly reduced through the replacement of sucrose with sugarcane. Composition of media for citromelo regeneration is MT + 0.5 mg/l BAP + 0.02 mg/l NAA + 40 mg/l adenine sulphate + 30 g/l sugarcane with rate of sprouts production at 6.25 plantlets each explant, while for rooting media was MS + 1 mg/l NAA + 30 g/l sugarcane. Media for JC sprout regeneration was MT + 0.5 mg/l BAP + 0.02 mg/l NAA + 30 mg/l sugarcane. Protocol for understem seedling production of citromelo and JC was initiated by using B5 media enrich with BAP + 2.4-D for callus initiation and then subcultured to media of 0.1 - 0.5 mg/l BAP + 0.02 mg/l NAA. After the sprout reached 2-3 cm height then transferred to rooting media. After 3-4 weeks, the plantlets were acclimatized and transplanted to soil mixture media in polybag.

175 WINARSIH, S.

***Embriogenesis somatik dan regenerasi dari eksplan embrio zigotik kakao (Theobroma cacao* L.*). Somatic embryogenesis and regeneration from zygotic embryos of cacao (*Theobroma cacao* L.)**/Winarsih, S. (Pusat Penelitian Kopi dan Kakao, Jember (Indonesia)) Santoso, D.; Wardiyati, T. 4 ill., 2 tables; 17 ref. Summaries (En, In). *Pelita Perkebunan* (Indonesia) ISSN 0215-0212 (2002) v. 18(3) p. 99-108.

THEOBROMA CACAO; CLONES; SOMATIC EMBRYOGENESIS; TISSUE CULTURE; REGENERATION; ZYGOTES; PRODUCTION; CALLUS; IBA.

Some constraints in cacao tissue are excessive production of callus, phenolic compound and mucilage from vegetative tissue. This research aims to study a protocol of cocoa somatic embryogenesis and plant regeneration from zigotic embryos cultured on several IBA concentration. It was arranged in factorial randomized complete design. The first factor was plant growth regulator consisting of 5 levels of IBA concentration (0, 1, 2, 3, and 4 mg/l); second factor was cacao clones consisting of 5 clones, i.e. RCC 72, Sca 6, TSH 858, ICS 60 and DR 2. Each treatment was replicated three times. The result showed that there was interaction between IBA concentration and clones for all parameters except percentage of embryogenesis. Each clone showed different response to IBA concentration. The best response of callus initiation was obtained in Sca 6 clone taken from media containing IBA at concentrations of 2 and 3 mg/l, in ICS 60 clone was taken from IBA at concentration of 3 mg/l, in RCC 72 and DR 2 clones was taken from IBA at concentration of 2 mg/l and in TSH 858 was taken from IBA at concentration of 1 mg/l. The largest number of embryos in Sca 6, ICS 60 and RCC 72 clones was obtained from multiplication medium containing IBA at concentration of 4 mg/l, while in TSH 858 and DR 2 clones that was taken from IBA at concentration of 2 and 1 mg/l, respectively.

176 WINARTO, B.
Perbanyakan anyelir secara in vitro melalui induksi pembentukan tunas adventif. In vitro **propagation of carnation through induction of adventitious shoot formation**/Winarto, B. (Balai Penelitian Tanaman Hias, Cianjur (Indonesia)); Aziz, M.A.; Rashid, A.A.; Ismail, M.R. 5 ill., 4 tables; 25 ref. Summaries (En, In). *Jurnal Hortikultura* (Indonesia) ISSN 0853-7097 (2005) v. 15(1) p. 1-11.

DIANTHUS CARYOPHYLLUS; PLANT PROPAGATION; IN VITRO; ADVENTITIOUS ROOTS; BA; NAA.

The propagation technique has an important role in mass production of planting material. The objective of this study was to obtain suitable *in vitro* propagation of *D. caryophyllus* L. cv. Maldives through induction of adventitious shoot formation, followed by multiplication of shoots, rooting and acclimatization. The study was conducted at Tissue Culture Laboratory and Glasshouse of IPPT, UPM, Malaysia from May 2000 to November 2001. Three different types of explant (first and second young fully developed leaves and young internodus) and MS medium at five different concentrations of BA and NAA (2.0 mg/l+ 0.9 mg/l, 0.9 mg/l + 0.1 mg/l 3.0 mg/l+ 0.9 mg/l, 0.1 mg/l + 0.1 mg/I dan 0.1 mg/l + 0.01 mg/l were selected, shoots obtained from the system were multiplied, rooted and acclimatized in different media. Factorial experiment was arranged in randomized completely block design with four replications. Results of the experiment exhibited that the first young fully developed leaves and MS medium containing 0.1 mg/I BA and 0.01 mg/l NAA were the appropriate explant and concentration of BA and NAA to produce the highest numbers of adventitious shoot. The concentration of BA and NAA was also suitable for preparing rooted shoots. Shoots were easily rooted on half-strength of MS media. Plantlets were simply acclimatized in a mixture medium of kossas peat and paddy charcoal (l:l v/v) with 100% of survivability. Vigorous and healthy plantlets were also resulted in the medium. Abnormality of plants was 6% from total acclimatized-plantlets. The plantlets flowered at 4.5 to 5 months after acclimatization. The results expected can be use as a standard protocol in mass-production of carnation through adventitious shoot formation.

177 WINARTO, B.
Perbedaan botol kultur terhadap pertumbuhan eksplan anyelir hiperhidrisitas. **Culture vessels effect on growth of carnation hyperhydricity explant**/Winarto, B. (Balai Penelitian Tanaman Hias, Cianjur (Indonesia)) 3 tables; 25 ref. Summaries (En, In). *Jurnal Hortikultura* (Indonesia) ISSN 0853-7097 (2005) v. 15(1) p. 12-17.

DIANTHUS CARYOPHYLLUS; CULTURE MEDIA; GROWTH; PLANT PROPAGATION.

Hyperhydricity is an important problem in carnation tissue culture. Fail in overcoming the problem can influence the successful of plantlet acclimatization. Hyperhydricited-plantlets are normally difficult to be acclimatized and so that easy to become wilting and die. The aim of this study was to find out the effect of different types and sizes of culture vessel in reducing hyperhydricity. The experiment was conducted at Tissue Culture Laboratory, IPPT, Faculty of Agriculture, Universiti Putra Malaysia from June to November 2002. Six types different in size used in the study are tube vessel, erlenmeyer 100, 150, 250, 500 ml, and GA 7 vessel. Completely randomized design with four replications was applied in this research. Results of this study showed that tube was the most appropriate culture vessel to grow hyperhydritized-explants reverting to normal growth which was indicated by the lowest percentage of hyperhydricity (42%), the highest leaf chlorophyll content (0.1377 mg/mg), the lowest water content (89%), and the highest dry weight of biomass (11%) with good quality of shoots compared to others.

F03 SEED PRODUCTION AND PROCESSING

178 SALEH, M.S.
Pematahan dormansi benih aren secara kimia pada berbagai lama ekstraksi buah. **[Chemically dormancy breaking of sugar palm seeds on different time of extraction]**/Saleh, M.S. (Universitas Tadulako, Palu (Indonesia). Fakultas Pertanian), 3 tables; 17 ref. Summaries (En,In). *Jurnal Agroland* (Indonesia) ISSN 0854-641X (2005) v. 12(4) p. 357-361.

ARENGA PINNATA; POTASSIUM NITRATE; APPLICATION RATES; SEED EXTRACTION; DORMANCY BREAKING; GERMINABILITY; GROWTH.

The objective of this work was to find out the best methods to reduce the dormant time of sugar palm seeds. Experiment was done from January to April 2004 in experiment plot of Agriculture Faculty, Tadulako University. Different concentration of KNO_3 (0.0, 0.3, 0.5 and 0.7%) were tested as dormancy breaker. This factor was combined with fruit extraction time (10, 20, and 30 days). No significant differences were detected in germinated, embryonic axial length, root length, root volume and sprout dry weight as the result of KNO_3 treatment and fruit extraction. However, germination rate was improved with 0.5% KNO_3 and considerably better after 30 days of extraction.

F04 FERTILIZING

179 ABDURACHMAN, S.
Efisiensi penggunaan pupuk pada tanaman padi selama dua musim berturut-turut. **Efficiency of fertilizer usage on rice in two consecutive seasons**/Abdurachman, S.; Susanti, Z.; Suhana (Balai Penelitian Tanaman Padi, Sukamandi (Indonesia)) 2 ill., 6 tables; 19 ref. Summaries (En, In). *Penelitian Pertanian Tanaman Pangan* (Indonesia) ISSN 0216-9959 (2004) v. 23(2) p. 65-72.

ORYZA SATIVA; FERTILIZER APPLICATION; NPK FERTILIZERS; SOIL FERTILITY; HYDROMORPHIC SOILS; GROWTH; YIELD COMPONENTS.

An experiment was carried out to evaluate change of soil nutrient status and the response of rice variety IR64 to NPK fertilizer application on Sukamandi Brown Hydromorphic soil in 2002. Soil samples were taken for soil analysis, immediately after land preparation. Twenty one day old seedlings were transplanted in a randomized completely block design with three replications. Different rates of N, P and K fertilizers and their combination were used as the treatments. The variable measured were NPK, the grain or plant biomass, plant growth, yield, and yield components. The effect of the treatments was statistically analysed using ANOVA and a difference between the treatments was evaluated by the DMRT. The results showed that tiller number was a better character to evaluate the response of rice plants to fertilizer application than plant height measurement, especially for N fertilizer. Nitrogen was the main constraint in plant growth and yield production. Phosphorus deficiency caused not only decrease in yield, but also delaying rice maturity. The response of rice to K fertilizer was shown during the dry season with symptoms clearly shown under complete NPK fertilizers. Indigenous nutrient supplies in situ were around 66-83 kg for N, 13-14 kg P and 90-91 kg K/ha/season, respectively. Commonly, nutrients status will decrease after harvest, except P that tends to increase due to P accumulation from phosphate fertilization. Returning rice straw response on grain yield and yield component appeared of improvement in soil properties, and number of grains is one of yield components that was increased by using rice straw application.

180 AIYEN
Akuisisi P dan Zn oleh tanaman jagung manis (Zea mays saccharata Sturt.) akibat pemberian pupuk hayati (biofertilizer) dengan amelioran bahan organik. **[Effects of biofertilizer with organic matter amendment on phosphorus and zinc acquisition by sweet corn]**/Aiyen; Fathurrahman (Universitas Tadulako, Palu (Indonesia). Fakultas Pertanian) 7 ill., 10 ref. Summaries (En, In). *Jurnal Agroland* (Indonesia) ISSN 0854-641X (2005) v. 12(2) p. 165-170.

ZEA MAYS; ORGANIC FERTILIZERS; FERTILIZER COMBINATIONS; BIOFERTILIZERS; SWEET CORN; GROWTH.

The experiment done from October to December 2004 aimed at examining the ability of different biofertilizers in utilizing organic matter. The results showed that the ability of biofertilizers to utilize organic matter were not similar between the products, because M-Bio tend need more organic matter than EM-4 to increase plant growth. However, the ability of sweet corn to acquire phosphorous and zinc was not statistically different between the treatments. Shoot phosphor concentration in this experiment was

lower than the critical level because of high concentration of calcium availability in the soils. This experiment convinced that biofertilizer was able to reduce the need of inorganic phosphate fertilizer due to the increasing almost 100% the available soil phosphorus.

181 ANWAR, A.
***Respon pertumbuhan bibit mahoni (Swietenia sp.) terhadap pemberian kompos dan PPC supervit.* Response of Mahoni (*Swietenia* sp.) growth by the application of compost and PPC Supervit**/Anwar, A. (Universitas Islam Sumatera Utara, Medan (Indonesia). Fakultas Pertanian) 4 ill., 10 ref. Summaries (En, In). *Jurnal Penelitian Bidang Ilmu Pertanian* (Indonesia) ISSN 1693-7368 (2004) v. 2(2) p. 40-46.

SWIETENIA; VEGETATIVE PERIOD; COMPOSTS; ORGANIC FERTILIZERS; FOLIAR APPLICATION; LIQUID FERTILIZERS; APPLICATION RATES; PLANT RESPONSE; AGRONOMIC CHARACTERS; GROWTH.

The research was done at the field experiment of the Agriculture Faculty of UISU Medan with purpose to study the response of mahoni seed to the compost and supervit PPC. The experiment used randomized design factorial consisted of two factors. The first factor was compost with three levels: 100, 200 and 300 g/polybag and the second was Supervit PPC consisting of four levels, i.e: 0; 2; 4 and 6 cc/liters. The treatment had three replications. The parameters were plant height, the stem diameter, leaf total, dry weight and fresh weight. The result indicated that compost influenced significantly to the height of plant, while other parameters were not affected. PPC supervit influenced significantly only to plant height and dry weight of the plant. The interaction of treatments did not influence to all parameters.

182 ERWIYONO, R.
***Dampak jangka panjang pemupukan NaCl sebagai pengganti KCl pada kakao terhadap sifat fisik tanah dan perakaran.* Long term impact of NaCl fertilization to substitute KCl on cocoa on soil physical condition and plant roots**/Erwiyono, R.; Baon, J.B. (Pusat Penelitian Kopi dan Kakao Indonesia, Jember (Indonesia)); Kaspani, U.; Sulistyaningsih, N.; Sukarno, G. 2 ill., 4 tables; 9 ref. Summaries (En, In). *Pelita Perkebunan* (Indonesia) ISSN 0215-0212 (2002) v. 18(1) p. 22-30.

THEOBROMA CACAO; POTASSIUM CHLORIDE; SODIUM CHLORIDE; FERTILIZER APPLICATION; APPLICATION RATES; CHEMICAL COMPOSITION; ELECTRICAL CONDUCTIVITY; ROOTS; LENGTH; SOIL CHEMICOPHYSICAL PROPERTIES.

Observation had been conducted at Kaliwining Experimental Station, Indonesian Coffee and Cocoa Research Institute in Jember. The use of NaCl fertilizer at present is still contradictory, either its benefit as a source of nutrient or its impact on the soil physical condition. The aim of the research was to study the long-term impact of NaCl application on soil physical condition and the roots of cocoa and its prospect as a fertilizer. The experiment was set up in randomized completely block design with 8 combination treatments of NaCl/KCl, replicated three times. NaCl application at full dosage (75 g NaCl/tree/semester) did not inhibit plant roots, but half dosage (38 g NaCl/tree/semester) just improved the roots. The best condition of the roots was found at the application of NaCl/KCl combination at equal amount (38 g each). Na+ was stronger dispersed soil aggregates than K+ so that in the long-term application it may destroy soil structure. However, at low rate of NaCL application or combined with KCl, its negative impact on the soil structure may be ignored.

183 HADID, A.
***Pengaruh dosis kalium dan interval pemberian air terhadap pertumbuhan dan hasil tanaman bawang merah (Allium ascalonicum* L.) [Effect of potassium dosage and watering interval on growth and yield of shallots (*Allium ascalonicum* L.)]**/Hadid, A.; Lapanjang, I. (Universitas Tadulako, Palu (Indonesia). Fakultas Pertanian) 6 tables; 11 ref. Summaries (En, In). *Jurnal Agroland* (Indonesia) ISSN 0854-641X (2005) v. 12(4) p. 367-371.

ALLIUM ASCALONICUM; POTASH FERTILIZERS; APPLICATION RATES; IRRIGATION RATES; AGRONOMIC CHARACTERS.

This study aimed at investigating optimal potassium level and watering interval for shallots (*Allium ascalonicum* L.) growth and yield. The experiment was conducted at the plastic house belonging to Plant Pests and Disease Department of Tadulako University, from January to March 2004. The levels of potassium evaluated were 100, 200, and 300 kg KCl/ha. The watering included 3 intervals: once every day, once every four days and once every six days. Randomized block design in factorial scheme was used in the experiment. The interaction between potassium levels and watering intervals was found only affect plant height. Watering once every two days resulted in maximum growth, i.e. plant height, leaves number, fresh and dry weight of shallots.

184 HARAHAP, R.
***Pengaruh pupuk terhadap pertumbuhan jagung yang ditanam di antara cendana (Santalum album* L.) [Effect of fertilizer application on the growth of maize planted among sandalwood (*Santalum album* L.)]**/Harahap, R. (Pusat Penelitian dan Pengembangan Biologi, Bogor (Indonesia)) 2 tables; 13 ref. Summaries (En, In). *Jurnal Agroland* (Indonesia) ISSN 0854-641X (2005) v. 12(1) p. 1-6.

ZEA MAYS; GROWTH; FERTILIZER APPLICATION; SANTALUM ALBUM; INTERCROPPING; PRODUCTION.

The study was conducted from November 2002 to February 2003 at Kalela Subvillage, Makamenggit Village, East Sumba 400 m above sea level with of climate D according to Oldeman which was purposed to find out the effect of fertilizer application on the growth and productivity of corn planted among sandalwood (*Santalum album* L.) plant. The experiment was designed in randomized block with 5 replications. The treatments were (1) application of 40 kg Urea/ha, 40 kg TSP/ha and 20 kg KCl/ha, (2) application of liquid fertilezer Supra (0.64% N, 0.05% P and 0.26% K) with foliar fertilizer, and (3) without fertilization. The results showed that foliar fertilization with liquid fertilizer had significant effect on the vegetative growth of corn var. Bisma until 4 weeks after planting and significant different on 0.05 DMRT than the other treatments. But ear weight of corn (280 g/ear) and weight of dry grain (254 g/ear) was higher on the fertilization with Urea, TSP and KCl and significant different on 0.05 DMRT with foliar fertilization. The weight of 1000 dry grain (380.10 g) was higher on the foliar fertilizer and significant different on 0.05 DMRT with other treatment.

185 LAUDE, S.
***Pertumbuhan dan hasil bunga (Chrysanthemum sp.) pada berbagai dosis pupuk NPK dan pemangkasan pucuk.* [Growth and yield of *Chrysanthemum* sp. on the various dosage of NPK fertilizers and pruning]**/Laude, S. (Universitas Tadulako, Palu (Indonesia). Fakultas Pertanian) 2 ill., 2 tables; 18 ref. Summaries (En, In). *Jurnal Agroland* (Indonesia) ISSN 0854-641X (2005) v. 12(4) p. 346-350.

CHRYSANTHEMUM; NPK FERTILIZERS; APPLICATION RATES; PRUNING; TOPPING; GROWTH; FLOWERING.

This field experiment was carried out at Kapiroe Village, Palolo, Donggala Regency. The experiment was laid out in factorial randomized block design. The dosage of fertilizers studied were 5.0, 7.5, 10.0, and 12.5 g NPK/plant. No pruning treatment was able to give longer flower stem than pruning treatment.

186 MUHIDIN
***Pengaruh pemberian fosfor dan kalium terhadap produksi dan mutu minyak pada dua klon menta (Mentha piperita* L.) [Effects of phosphorus and potash fertilizers on the yield and quality of essential oil of peppermint]**/Muhidin (Universitas Haluoleo, Kendari (Indonesia). Fakultas Pertanian) 4 tables; 10 ref. Summaries (En, In). *Jurnal Agroland* (Indonesia) ISSN 0854-641X (2005) v. 12(2) p. 139-144.

MENTHA PIPERITA; VARIETIES; PHOSPHATE FERTILIZERS; POTASH FERTILIZERS; YIELDS; QUALITY; ESSENTIAL OILS.

The field experiment was carried out as two factorial experiments, arranged in split plot design. The main plot was the different cultivar of *Mentha piperita*, while the subplot was the rate of phosphorous and potassium fertilizer. The result showed that (1) the phosphorous fertilizer had significant effect on yield that of mint; (2) the yield and content of menta oil on NZ clone were higher than of MK clone; (3) the phosphorous and potassium did not have consistent effect on the quality of the peppermint essential oil.

187 RAMLI

***Respon fisiologis dan agronomis pupuk cair pada tanaman tomat (Lycopersicum esculentum* Mill.*)* [Effect of liquid fertilizers on physiological and agronomic responses of tomatoes (*Lycopersicum esculentum* Mill.)**/Ramli (Universitas Tadulako, Palu (Indonesia). Fakultas Pertanian) 3 ill., 1 table; 17 ref. Summaries (En, In). *Jurnal Agroland* (Indonesia) ISSN 0854-641X (2005) v. 12(4) p. 378-383.

LYCOPERSICON ESCULENTUM; LIQUID FERTILIZERS; APPLICATION RATES; PLANT PHYSIOLOGY; AGRONOMIC CHARACTERS.

Response of plant on fertilizers depending on the species. The current work was to investigate the effect of liquid fertilizers on various physiological as well as agronomic responses of the plant. The experiment was done on October-December 2004 in Plant Biotechnology Laboratory and experimental plot of Agriculture Faculty of Tadulako University. Liquid fertilizers applied at 0.3 ml/l was discovered to give the highest value of measurement of both physiological and agronomic plant responses.

188 ROSITA S.M.D.

***Pola pertumbuhan dan serapan hara N, P, K tanaman bangle (Zingiber purpureum* Roxb.*)*. Growth pattern and N, P, and K nutrient uptake on purple ginger (*Zingiber purpureum* Roxb.)**/Rosita S.M.D.; Rahardjo, M.; Kosasih (Balai Penelitian Tanaman Rempah dan Obat, Bogor (Indonesia)) 4 ill., 7 tables; 11 ref. Summaries (En, In). *Jurnal Penelitian Tanaman Industri* (Indonesia) ISSN 0853-8212 (2005) v. 11(1) p. 32-36.

ZINGIBER; FERTILIZER APPLICATION; NPK FERTILIZERS; GROWTH RATE; AGRONOMIC CHARACTERS; YIELDS.

One of the problems in cultivation of purple ginger (*Zingiber purpureum* Roxb.) is limited cultivation technology. Therefore, the study on its growth pattern and N, P, and K nutrient uptake is very important to support its cultivation technology. The objective of the research was to find out data on growth pattern, growth rate, nutrient uptake, and simplisia quality. Field trial was conducted in farmers land in Bogor from May 2001 to March 2002. The soil is Latosol and the altitude is 250 m asl. Plot size was 6 m x 1.5 m, and plant spacing was 50 cm x 40 cm. Observation on the growth pattern and nutrient uptake were carried out at different ages of: 2, 3, 4, 5, 6, 7, 8, 9, and 10 months after planting. Six samples were taken at every growth stage of the plant. The results showed that the growth rate and N, P, and K nutriet uptake linearly increased in line with the increase of plant ages. Yield of essential oil at 10 MAP was 12.10 ml/plant. The amount of dry weight accumulation was 701.0 g/plant, to produce 417.97 g simplisia/plants, it was needed N, P, and K nutrient uptake about 8.48, 1.72 and 4.02 g/plant, respectively.

189 ROSLIANI, R.

***Respon pertumbuhan cabai dan selada terhadap pemberian pupuk kotoran kuda dan pupuk hayati.* Response of horse manure and biofertilizer on hot pepper and lettuce growth**/Rosliani, R.; Hidayat, A.; Asandhi, A.A. (Balai Penelitian Tanaman Sayuran, Lembang (Indonesia)) 2 ill., 8 tables; 19 ref. Summaries (En, In). *Jurnal Hortikultura* (Indonesia) ISSN 0853-7097 (2004) v. 14(4) p. 258-268.

CAPSICUM ANNUUM; LACTUCA SATIVA; FERTILIZER APPLICATION; APPLICATION RATES; FARMYARD MANURE; ORGANIC FERTILIZERS; MICROORGANISMS; BIOFERTILIZERS; SOIL FERTILITY; PLANT RESPONSE; GROWTH; YIELDS.

Experiment was conducted in a screenhouse of Indonesian Vegetables Research Insitute, 1,250 m asl, from July 2001 until January 2002. The objective of the experiment was to find out the performance of organic matter and biofertilizer input on the growth and the yield of hot pepper and lettuce planted in pot.

The experimental design used was completely randomized design with three replications. The treatments consisted of application of 0.7 kg horse manure + 33 g NPK per pot (content of 10 kg) or about 20 t/ha organic matter + 1 t/ha NPK, five kind applications of horse manure without synthetic inorganic fertilizer (NPK), and five kinds application of horse manure + biofertilizer (beneficial microbe: lactobacillus, mycorrhiza, and saccharomyces) without synthetic inorganic fertilizer (NPK). Dosage of horse manure was 1, 2, 3, 4, and 5 kg per pot or about 30, 60, 90, 120, and 150 t/ha. The results showed that application of horse manure and biofertilizer increased plant height and yield of lettuce and increased plant height, leaf area, plant biomass, yield of hot pepper, its nutrient uptake, and soil nutrient content. Horse manure solely at 3 kg per pot (90 t/ha) or 2 kg per pot (60 t/ha) + biofertilizer were the best treatment in terms of yield of hot pepper. These two dosages could increase hot pepper yield by 1,316 and 1,194%, respectively, compared to control (0.7 kg horse manure per pot + 33 g NPK per pot or about 20 t/ha horse manure + 1 t/ha NPK). The best treatment for lettuce yield was 1 kg/pot horse manure or 30 t/ha horse manure. The yield increase was 69% compared to control.

190 SUBHAN

***Penggunaan pupuk NP cair dan NPK (15-15-15) untuk meningkatkan hasil dan kualitas buah tomat varietas oval.* Utilization of liquid NP and NPK (15-15-15) fertilizers for increasing yield and quality of oval variety tomato fruit**/Subhan; Nurtika, N. (Balai Penelitian Tanaman Sayuran, Lembang (Indonesia)) 5 tables; 13 ref. Summaries (En, In). *Jurnal Hortikultura* (Indonesia) ISSN 0853-7097 (2004) v. 14(4) p. 253-257.

LYCOPERSICON ESCULENTUM; VARIETIES; NITROGEN PHOSPHORUS FERTILIZERS; LIQUID FERTILIZERS; NPK FERTILIZERS; APPLICATION RATES; DIMENSIONS; YIELDS; FRUIT VEGETABLES; QUALITY.

A split plot design with three replications was used to study on the effect of liquid NP and NPK (15-15-15) fertilizer in farmers land at 650 m asl at Garut. A main plot factor consisted of liquid NP fertilizer concentrations: control, concentration of 2.5 ml/l and 5.0 ml/l. Subplot factor consisted of dosages of NPK (15-15-15) fertilizer: 200, 400, 600, 800, and 1,000 kg/ha. Results indicated that there were interaction effects between liquid NP and NPK compound fertilizer on total fruit weight, plant height, and fruit hardness at harvest. Application of liquid NP fertilizer 2.5 ml/l combined with NPK (15-15-15) 1,000 kg/ha significantly increased fruit weight, while fruit hardness increase was achieved by treatment of liquid NP fertilizer 2.5 ml/l combined with NPK (15-15-15) 800 kg/ha. A strong tendency was that the higher the liquid NP concentrations use the higher the NPK compound use.

191 SUMARWOTO

***Pengaruh pemberian kapur dan pupuk kandang terhadap pertumbuhan dan hasil iles-iles (Amorphophallus muelleri* Blume). [Effect of lime and farmyard manure application on growth and yield of iles-iles (*Amorphophallus muelleri* Blume)]**/Sumarwoto (Universitas Pembangunan Nasional Veteran, Yogyakarta (Indonesia). Fakultas Pertanian) 5 ill., 4 tables., 19 ref. Summaries (En, In). *Jurnal Agroland* (Indonesia) ISSN 0854-641X (2005) v. 12 (4) p. 323-329.

AMORPHOPHALLUS; SOIL CHEMICOPHYSICAL PROPERTIES; FERTILIZER APPLICATION; LIMING; FARMYARD MANURE; APPLICATION RATES; GROWTH; YIELDS; QUALITY.

A field experiment was conducted from April 2001 to April 2002 to determine the best level of lime and organic matter application for the growth and yield of iles-iles. Three levels of lime application studied were 0; 4 ; and 8 ton lime/ha each of which was combined with four levels of organic matter application (0.0, 2.5, 5.0 and 7.5 ton organic matter/ha) in a split plot design. The result suggested that liming significantly affected the responses of iles-iles to the application of organic matter. The application of 4 ton lime/ha (0.5 SMP. pH 6.0) and 8 ton lime/ha (1 SMP. pH 6,5) resulted in the linear increase of tuber weight at all levels of organic matter applications.

192 WASITO, A.

***Jenis pupuk N, P, dan K untuk peningkatan pertumbuhan dan produksi tanaman krisan.* Kind of N, P, and K fertilizers to increase growth and yield of chrysanthemum**/Wasito, A.; Komas, D. (Balai

Penelitian Tanaman Hias, Cianjur (Indonesia)) 3 tables; 15 ref. Summaries (En, In). *Jurnal Hortikultura* (Indonesia) ISSN 0853-7097 (2004) v. 14(3) p. 172-177.

CHRYSANTHEMUM; FERTILIZER APPLICATION; NPK FERTILIZERS; GROWTH; YIELDS.

N, P and K fertilizers applications were evaluated on the growth and yield of chrysanthemum varieties planted under plastichouse at Indonesian Ornamental Crops Research Institute, Segunung at elevation 1,100 m asl. The experiment was conducted from August to December 2001, using a split plot design with three replications. The main plot was N, P, and K fertilizers application and subplot consisted of 15 chrysanthemum varieties. The objective of this study was to find out the effect of the three kind fertilizers in relation to increase growth and yield of chrysanthemum varieties. The results showed that all kinds of N, P, and K fertilizers that especially slow released compound fertilizers were applicable to improve on growth and yield of chrysanthemum varieties. The decision to choose the kind of fertilizers application for chrysanthemum plantation depends on the practical ability in usage, labour cost, and fertilizer cost.

193 WIHARDJAKA, A.
***Tanggap padi walik jerami terhadap penggunaan pupuk hijau dan KCl pada tanah sawah tadah hujan bertekstur ringan.* [Effect of green manure and KCl on transplanted rice in light textural rainfed lowland areas]**/ Wihardjaka, A. (Loka Penelitian Pencemaran Lingkungan Pertanian, Jakenan (Indonesia)) 2 ill., 4 tables; 18 ref. Summaries (En, In). *Jurnal Agroland* (Indonesia) ISSN 0854-641X (2005) v. 12(2) p. 108-114.

ORYZA SATIVA; GREEN MANURES; POTASH FERTILIZERS; UPLAND RICE; ORGANIC FERTILIZERS; SOIL CHEMICOPHYSICAL PROPERTIES; NUTRIENT UPTAKE; GROWTH; YIELDS.

Incorporation of legume crop biomass into soil is aimed to improve soil and plant productivities, and also to provide certain nutrients. Potassium deficiency of light-textural rainfed lowland soil could be improved by using organic matter and potassium fertilization. A field experiment was conducted in rainfed lowland areas of Jakenan, Central Java to study the response of transplanted rice on incorporation of legume crops biomass as green manure and KCl fertilization in light-textural rainfed lowland rice soil. The experiment was arranged in the block randomized design with three replications and six treatments of green manure and KCl rate combination. Incorporation of legume crops biomass as green manure into soil and KCl fertilization in Inceptisols significantly improved grain yield and potassium uptake of transplanted rice crop. Application of 50 kg K_2O tended to give grains and K uptake higher than application of 30 kg K_2O/ha. Grain yield obtained by application of green manure of *Sesbania rostrata* was lower than that of soybean and cowpea.

F06 IRRIGATION

194 ABDOELLAH, S.
***Aplikasi zeolit untuk meningkatkan efisiensi penggunaan air pada bibit kakao di tanah pasiran.* Application of zeolite to increase water use efficiency of cocoa seedlings at sandy soil**/Abdoellah, S. (Pusat Penelitian Kopi dan Kakao Indonesia, Jember (Indonesia)); Fitri, M.Z. 4 ill., 10 ref. Summaries (En, In). *Pelita Perkebunan* (Indonesia) ISSN 0215-0212 (2004) v. 20(3) p. 123-131.

THEOBROMA CACAO; SEEDLINGS; ZEOLITES; APPLICATION RATES; WATER USE; SANDY SOILS.

An experiment was conducted in a glasshouse of Indonesian Coffee and Cocoa Research Institute, Jember, on altitude 45 m above sea level and D type of climate (Schmidt-Ferguson). Materials used were cocoa seedlings derived from ICS 60 seeds, zeolite powder, and sandy soil. The experiment was arranged in factorial randomized completely block design in three blocks. Zeolite dose factor consisted of five levels, i.e. Z0: no zeolite sandy soil (control), and by weight of zeolite were Z1: sandy soil with 5%, Z2: sandy soil with 10%, Z3: sandy soil with 15%, and Z4: sandy soil with 20%. Watering factor consisted of three

levels, those were A1: 60 ml/plant/2 days, A2: 120 ml/plant/4 days, and A3: 180 ml/plant/6 days. Observed parameters were soil field capacity, soil permanent wilting point, soil available water, stem diameter, leaf number, fresh weight, plant dry weight, and water use efficiency. Data were analysed by variance analysis and polynomial regression. The results showed that application of zeolite up to 15% (w/w) caused increase of soil field capacity, whereas the soil permanent wilting point was increased until 20% (w/w) of zeolite dose. The effect of zeolite application formed quadratic regression equation to cocoa growth and water use efficiency, with optimum dose in the range of 11-15%. Water use efficiency was raised from 0.25 g of biomass/cm^3 to 0.32 g of biomass/cm^3 when zeolite was applied as much as optimum dose. There was a tendency that the longer the watering frequency, the slower the growth of cocoa, although more water volume were applied. Up to 20% of zeolite application and watering of 180 ml/plant/6 days, there was no interaction among them.

F07 SOIL CULTIVATION

195 AVIVI, S.
Fumigasi tanah dan perlakuan benih dengan NaClO untuk menghambat Aspergillus flavus pada budi daya kacang tanah. **[Soil fumigation and seed treatment using NaClO to inhibit *Aspergillus flavus* in peanut cultivation]**/Avivi, S.; Hidayat, B. (Universitas Jember (Indonesia). Fakultas Pertanian); Trisnawati, T. 2 tables; 14 ref. Summaries (En, In). *Jurnal Agroland* (Indonesia) ISSN 0854-641X (2005) v. 12(1) p. 15-19.

ARACHIS HYPOGAEA; CULTIVATION; SEED; ASPERGILLUS FLAVUS; SOIL FUMIGATION.

The objectives of this work were to find out the best soil fumigation or seed treatment that could reduce infection of *Aspergillus flavus* on peanut crops, and to determine the effects of those treatments on the growth and production parameters of peanuts. Soil fumigation was done at various dosages (0.50, 0.75, and 1.00 g/l/40 kg) while NaClO for seed treatments were applied in different concentrations (0.0, 1.25, and 2.5%) The both treatments were applied in combinations with factorial experiment. There were indications that no interaction effects of the treatments, either fumigation or seed treatment had a significant influence on most of the parameters measured. It was concluded that the best results were given by either fumigation at the dosage of 0.75 g/l/40 kg or seed treatment with 2.5% NaClO.

F08 CROPPING PATTERNS AND SYSTEMS

196 MARIO, M.D. F08
Tingkat erosi pada berbagai usaha tani tanaman sela di antara kelapa di Sulawesi Utara (Studi kasus Kabupaten Minahasa). **[Erosion intensity in various intercropping under coconut plantation in Minahasa Regency (Indonesia)]**/Mario, M.D. (Balai Pengkajian Teknologi Pertanian Sulawesi Tengah, Palu (Indonesia)); Syamsiar 4 tables; 10 ref. Summaries (En, In). *Jurnal Agroland* (Indonesia) ISSN 0854-641X (2005) v. 12(1) p. 20-26 .

COCOS NUCIFERA; INTERCROPPING; ZEA MAYS; ORYZA SATIVA; EROSION; CLOVES; VANILLA PLANIFOLIA; LYCOPERSICON ESCULENTUM; MUSA PARADISIACA; LAND USE; CLIMATE; SULAWESI.

Coconut plants are still regarded as local economic commodity in the North Sulawesi region, particularly in Minahasa Regency. Empty spaces between coconut plants are often used for growing other plants but there have been problems with the suitability pather of intercroppings and decrease in soil fertility owing to erosion. A study was carried out to investigate the intensity of erosion in various intercroppings. Data obtained indicated that the intercroppings in Tombatu District was lower (16.90%) than that in Wori District (25.74%). Light erosion was found in Tombatu District in coconut + vanilla intercropping (22.06%) and coconut + clove (16.15%). Medium intensity erosion was found in coconut + tomato intercroppings. In Wori, coconut + banana intercropping showed light erosion (22.02%), while medium erosion intensity was recorded in coconut + maize (37.28%) and coconut + dryland rice (37.28%).

197 SUBHAN

Pengaruh tumpangsari tomat dan kubis terhadap perkembangan hama dan hasil. **[Effect of tomato and cabbage intercropping on pests development and yield]**/Subhan; Setiawati, W.; Nurtika, N. (Balai Penelitian Tanaman Sayuran, Lembang (Indonesia)) 2 ill., 6 tables; 13 ref. Summaries (En, In). *Jurnal Hortikultura* (Indonesia) ISSN 0853-7097 (2005) v. 15(1) p. 22-28.

LYCOPERSICON ESCULENTUM; BRASSICA OLERACEA; INTERCROPPING; PRODUCTIVITY; PLUTELLA XYLOSTELLA; CROCIDOLOMIA BINOTALIS; YIELDS.

The objectives were to evaluate the total yield of tomato, cabbage, and land equivalent ratio in tomato and cabbage intercropping system. Treatments consisted of monoculture of tomato and cabbage; intercropping of tomato + cabbage; tomato + cabbage + cabbage + tomato; and tomato + tomato + cabbage + tomato + tomato. Randomized block design with five replications was used. The result indicated that intercropping system of tomato + tomato + cabbage + tomato + tomato was the best combination to reduce population of *Plutella xylostella* (97%) and *Crocidolomia binotalis* (76.2%). Quantitatively, the production of tomato and cabbage in intercropping system was higher than in monoculture system. Intercropping system of tomato + cabbage + cabbage + tomato gave the highest profit about Rp 44,420,000 per hectare.

198 TARIGAN, D.D.

Produksi kelapa pada beberapa pola tanam dan hubungannya dengan kandungan unsur hara tanah dan daun kelapa. **Coconut production under various cropping patterns and its correlation to the soil and leaf nutrient element**/Tarigan, D.D. (Pusat Penelitian dan Pengembangan Perkebunan, Bogor (Indonesia)) 6 tables; 19 ref. Summaries (En, In). *Jurnal Penelitian Tanaman Industri* (Indonesia) ISSN 0853-8212 (2003) v. 9(3) p. 81-90.

COCOS NUCIFERA; CROP MANAGEMENT; GROWTH; PRODUCTION; SOIL CHEMICOPHYSICAL PROPERTIES; LEAVES; NUTRIENTS.

Low productivity of coconut farm is the main problem of coconut industry. The fact that intercropped palms were more productive than solely one. The most suitable way to increase productivity is by multiple cropping. To cope with the existing cropping pattern, various cropping patterns with four perennial crop species as intercrops were studied. The objectives of the study were (1) to reveal the effect of cropping patterns on the growth, nut production and farm productivity of farmer coconut, soil chemical properties and leaf nutrient element and (2) to study the correlation between growth and production parameter with soil chemical properties and leaf nutrient elements. Various cropping patterns studied were (1) coconut monoculture (control), (2) coconut + pineapple, (3) coconut + coffee, (4) coconut + papaya + pineapple, (5) coconut + banana + coffee, and (6) coconut + banana + papaya + coffee + pineapple. Total area for each pattern was 0.5 ha with planting distance 8 m x 10 m and the palms of 35-40 years old. The site of the experiment conducted was at Silang, Cavite. Data on coconut growth and production, soil chemical properties and leaf nutrient parameters were statistically analysed in a randomized completely block design (RCDB) with three replications. Correlation analyses were performed on the following (1) Growth and production parameters with soil chemical properties, and leaf nutrient elements, (2) Relationship among nutrient elements in the coconut leaves under various cropping patterns. Results of the study showed that the effect of cropping patterns on the number of full-grown nut increased significantly more nut and higher amounts of copra per tree were produced in intercropped farms than in the mono-cropped one. These increase ranged from 64% to 98% for nuts and 70% to 105% for copra. Positive correlation was observed between nitrogen at the top soil with weight of copra and nut production. The exchangeable potassium at top soil was positively correlated with nut production. Meanwhile, the organic matter content in the soil were positively correlated with copra weight, nut production but negatively correlated with percentage of nut shedding. These results implied that the increase organic matter content in the soil will increase coconut production including fruit set. Nitrogen concentration in the leaf was positively and high significantly correlated with number of nut shedding. These findings suggested that the increased nitrogen concentration in the leaf greatly promotes nut production and fruit set of the palms under various cropping patterns. The potassium in the leaf was significantly correlated with nut production but negatively correlated with percentage of nut shedding.

199 WAHYUDI, I.
***Kajian perubahan beberapa sifat kimia tanah akibat penanaman secara monokultur dan tumpangsari antara jagung (Zea mays* L.*) dan kacang tanah (Arachis hypogaea* L.*) disertai pemberian fosfor pada Ultisol Wanga.* [Effect of monoculture and multiple cropping systems between maize and peanut plants added with phosphorus fertilization on some soil chemical characteristics changes in Ultisol of Wanga Village (Indonesia)**/**Wahyudi, I.; Adrianton (Universitas Tadulako, Palu (Indonesia). Fakultas Pertanian) 3 ill., 2 tables; 15 ref. Summaries (En, In). *Jurnal Agroland* (Indonesia) ISSN 0854-641X (2005) v. 12(1) p. 62-67.

ZEA MAYS; ARACHIS HYPOGAEA; PHOSPHORUS; MULTIPLE CROPPING; MONOCULTURE; PHOSPHATE FERTILIZERS; SOIL CHEMICOPHYSICAL PROPERTIES; ACRISOLS; SULAWESI.

The experiment was arranged in randomized block design with six treatments: Al: soil without plant and added P; A2: soil without plant with added P; A3: corn planted as monoculture without P; A4: corn planted as monoculture with added P; A5: corn multiple cropped with peanut without P; and A6: corn multiple cropped with peanut with added P. The result showed that corn planted as monoculture with added P (A4) increased soil pH, exchangeable Ca, Mg, and K, and available P, and reduced exchangeable Al and Fe in soil solution. The increase in total P was given by A2 treatment.

F30 PLANT GENETICS AND BREEDING

200 ADIE, M.M.
Ketahanan beberapa genotipe kedelai terhadap ulat grayak. **Resistance of several soybean genotypes to the armyworms (*Spodoptera litura* F.)**/Adie, M.M.; Susanto, G.W.A. (Balai Penelitian Tanaman Kacang-kacangan dan Umbi-umbian, Malang (Indonesia)); Kesumawaty, R. 2 ill., 3 tables; 20 ref. Summaries (En, In). *Penelitian Pertanian Tanaman Pangan* (Indonesia) ISSN 0216-9959 (2003) v. 22(1) p. 1-5.

GLYCINE MAX; SPODOPTERA LITURA; LARVAE; GENOTYPES; PEST RESISTANCE; GENETIC RESISTANCE; VARIETY TRIALS.

Soybean armyworm is one of the major soybean defoliator in Indonesia. Six soybean genotypes/varieties (Himeshirazu, IAC 100, 100H, S100H, Tanggamus, and Wilis) were identified from their degree of resistance and their effects on the biology of armyworm at the laboratory of plant breeding of ILETRI, from June to September 2002. The degree of the soybean genotype resistance toward the armyworms was evaluated by using petridish (diameter 18 cm) contained a piece of trifoliate leave from the soybean age of 27 days after planting. Each petridish was infested by five neonate larvae. Evaluation of the soybean genotype effect on the biology of armyworms in each petridish was infested with one neonate larvae. The larval weight at seven days after infestation was used as a resistant criterion, and the degree of the soybean resistant to armyworm was identified by using the method of Chiang and Talekar. The experiments were arranged in a completely randomized design with 10 replications. Six soybean genotypes were used as treatments, each treatment was replicated 10 times. The average armyworms larvae weight at seven days after infestation ranges from 0.038 to 0.120 g/larvae. The genotype of 100H had the lowest larvae weight (0.038 g/larvae), which indicates that the genotype was resistant to armyworms, otherwise Wilis (0.091 g/larvae) and Tanggamus (0.120 g/larvae) were identified as susceptible varieties. The leaf consumption of the larvae in the soybean resistant genotypes was consistently lower compared to the susceptible genotypes. The resistant genotype of 100H affected the longer larval age (19 days) and the lower pupal weight (0.273 g/ pupae), while the larval duration of the Wilis variety was 15 days and the pupal weight was 0.304 g/pupae. The genotype 100H was identified as an antibiosis and antixenosis resistance to armyworms which suggests that the genotype possible to be used as a gene source in the improvement of the soybean resistance to armyworms.

201 AZRAI, M.
Analisis varians dan heritabilitas ketahanan galur jagung rekombinan terhadap penyakit bulai. **Analysis of variance and heritability of the resistance of the recombinant maize varieties toward the**

downy mildew disease/Azrai, M.; Kasim, F. (Balai Penelitian Tanaman Serealia, Maros (Indonesia)) 3 tables; 17 ref. Summaries (En, In). *Penelitian Pertanian Tanaman Pangan* (Indonesia) ISSN 0216-9959 (2003) v. 22(1) p.31-35.

ZEA MAYS; SELECTION; HIGH YIELDING VARIETIES; DISEASE RESISTANCE; PERONOSCLEROSPORA; GENETIC VARIATION; HERITABILITY.

The downy mildew in maize, caused by *Peronosclerospora maydis*, is the most destructive maize disease in Indonesia. This fungus has been reported to cause an economic loss of 100% in the susceptible varieties. The success to release a new superior maize variety with a downy mildew resistance is definitely determined by a genetic and phenotypic variability, and the heritability which is estimated from the genotype test. The genotype materials used in the experiment were 134 recombinant inbred lines (RILs) CML 139 x Ki 3 progenies. The experiment were carried out to determine genetic and phenotypic variance, the genetic and environment interaction variance, and the heritability estimates. The semi artificial inoculation activities was conducted in Maros and Bogor from May to July 2002. The research was arranged in an alpha lattice design with two replications. The results of the data analysis showed that the genotype test population and its interaction of test genotype and environment were significant. The genetic variance, phenotypic variance, and the genetic and environment interaction variance for downy mildew resistance were broad. The heritability estimates were considerate as moderate based on combined two locations (20% ≤ H ≤ 50%).

202 BAIHAKI, A.

Interaksi genotip x lingkungan, adaptabilitas, dan stabilitas hasil, dalam pengembangan tanaman varietas unggul di Indonesia. **Genotype x environment interaction, adaptability, and stability of yield in development of new high yielding plant varieties in Indonesia**/Baihaki, A.; Wicaksana, N. (Universitas Padjadjaran, Bandung (Indonesia). Fakultas Pertanian) 3 tables; 14 ref. Summaries (En, In). *Zuriat* (Indonesia) ISSN 0853-0808 (2005) v. 16(1) p. 1-8.

GLYCINE MAX; GENOTYPE ENVIRONMENT INTERACTION; ADAPTATION; HIGH YIELDING VARIETIES; QUALITY; YIELDS; INDONESIA.

Six soybean genotypes were tested in eight different locations scattered around the country (Indonesia) with the objectives to evaluate genotype x environment interaction for yield, adaptability, and stability of yield performance in relation to the development and release of new varieties. A randomized completely design with three replications was used in each location to evaluate yield performance. A combined analysis of variance for yield was performed following a standard method. Stability and adaptability analysis were performed following Eberhart-Russell method. Result of the experiment indicated that genotype x environment interaction for yield in soybean, field corn, and rice plants was a real and significant phenomena in Indonesia. Genotypes with wide adaptability performances relatively were few in number for yield compared to the total number of genotypes involved in a multilocation testing. Genotype or genotypes with good performance for yield in spesific environment (narrow adaptability) should be considered to be released to improve efficiency and effectivity of variety release process, and if so they will be able to perform a regional buffering for disease and pest expansion.

203 DARLIAH

Evaluasi beberapa karakter fenotipik klon-klon harapan mawar mini. **Evaluation of some phenotipic characters of new mini rose clones**/Darliah; Handayani, W. (Balai Penelitian Tanaman Hias, Cianjur (Indonesia)) 1 ill., 2 tables; 6 ref. Summary (En, In). [Proceedings of the national seminar of floriculture]. Prosiding seminar nasional florikultura: membangun industri florikultura yang berdaya saing melalui penerapan inovasi teknologi berbasis potensi nasional/Balai Penelitian Tanaman Hias, Cianjur (Indonesia). Cianjur: Balithi, 2004: p. 346-350.

ROSA; HYBRIDS; CROSSING OVER; CLONES; PHENOTYPES; AGRONOMIC CHARACTERS; COROLLA; KEEPING QUALITY.

Mini rose is one of pot plants prefered by consumers which some clones of it have been produced from crossing. The experiment to evaluate some phenotypic characters of mini rose clones was conducted at Cipanas Research Station in Cianjur (1100 m above sea level) from January to December 2003. Randomized block design with 4 replications was used. The experiment used selected clones (no. 1, 2, 4, 5 and 53) and one introducing variety (control). Plant number per treatment unit was six. The result showed that clones no. 1, 4 dan 5 were choose because of attractive color. The center petal color of clone no. 1 was red group 49 C and its margin petal was red group 54 B. Its flower diameter was longer and petal number was greater than the control. The center of petal color of clone no 4. was yellow group 11 C and its margin petal was red group 54 C. The center petal of no. 5 was yellow 8 C and its margin petal was red group 49 B. Flower diameter of no. 4 and 5 were longer, their petal number were greater, and their vaselife were longer than control.

204 HADIATI, S.
Parameter genetik karakter komponen buah pada beberapa aksesi nanas. **Genetic parameters of fruit component characters on some pineapple accessions**/Hadiati, S. (Balai Penelitian Tanaman Buah, Solok (Indonesia)); Murdaningsih H.K.; Baihaki, A.; Rostini, N. 3 tables; 14 ref. Summaries (En, In). *Zuriat* (Indonesia) ISSN 0853-0808 (2003) v. 14(2) p. 53-58.

ANANAS COMOSUS; GENETIC PARAMETERS; GENETIC VARIATION; FRUIT; PHENOTYPES; HERITABILITY; GENETIC GAIN; AGRONOMIC CHARACTERS; ASCORBIC ACID.

The objectives of this research were to know genetic and phenotypic variabilities, heritabilities and genetics gain of fruit component characters on some pineapple accessions. This research was conducted at SORIF, from January 2001 to February 2002 with a completely randomized block design, 24 treatments (accessions), and two replications. The results showed that the characters of peduncle length, fruit weight, number of spiral, fruit diameter, fruit length, flesh thickness, core diameter, depth eyes. Total soluble solid (TSS), total acid, vitamin C, and fibre content had broad genetic, phenotypic variabilities and high heritabilities. The characters which had high genetics gain were peduncle length, fruit weight, fruit length, and vitamin C.

205 KARUNIAWAN, A.
Analisis multivariat karakter-karakter morfologi pada bengkuang (Pachyrhizus erosus). **Multivariate analysis of morphological traits in yam bean (*Pachyrhizus erosus*)**/Karuniawan, A. (Universitas Padjadjaran, Bandung (Indonesia). Fakultas Pertanian) 2 ill., 4 tables; 20 ref. Summaries (En, In). *Zuriat* (Indonesia) ISSN 0853-0808 (2005) v. 16(1) p. 44-51.

PACHYRHIZUS; GENETIC VARIATION; PLANT ANATOMY.

The objective of this study was to estimate the genetic diversity among yam bean landraces collected from different islands of Indonesia based on morphological traits. Thirty-six selected yam beans accessions from diverse ecological regions of Indonesia and six accessions from South and Central America were examined. Field trials were performed at two locations in Bogor, Indonesia, in a randomized block design with two replications. Genetic diversity between accessions based on morphological traits was determined by multivariate analysis. Time to flowering, first pod development, leaf length, leaf width, and internodes length played essential role in classification of the yam beans. A clear separation among the yam bean accessions collected from Indonesia, i.e., Sumatra landraces and the landraces collected from eastern Indonesia was detected. Furthermore, American accessions are not obviously separated from Indonesian yam bean materials.

206 KUSMANA
Produksi dan mutu umbi klon kentang dan kesesuaiannya sebagai bahan baku kentang goreng dan keripik kentang. **Yield and quality of potato clones tubers and meets as raw material for chips and french fries**/Kusmana; Basuki, R.S. (Balai Penelitian Tanaman Sayuran, Lembang (Indonesia)) 3 tables; 15 ref. Summaries (En, In). *Jurnal Hortikultura* (Indonesia) ISSN 0853-7097 (2004) v. 14(4) p. 246-252.

SOLANUM TUBEROSUM; VARIETIES; VARIETY TRIALS; YIELDS; QUALITY; CLONES; TUBERS; SEED POTATOES; PROCESSED PLANT PRODUCTS.

The experiment was conducted at Pangalengan at elevation of 1,300 m asl. Objectives of the research were to obtain promissing clones for raw material of chips and french fries. Planting was done on August and harvesting was on November 2002. The experimental design was randomized completely block design with three replications. Numbers of plant per plot were 20 hills. Number of clones tested were 16 included 3 control varieties. The results proved that the highest yielding clones were obtained from clones Merbabu-17 (57.9) followed by 380584.3 (44.4), AGB 69.1 (41.8) and MF-11 (41.1) t/ha and significantly different from control varieties of Atlantic (28.5) and Panda (25.2) t/ha. The highest marketable yield were obtained from clones I-1085 (87%), CFQ 69.1 (84%), and TS-2 (83%) significantly different to Atlantic (60%) and Panda (64%). The highest of specific gravity were obtained from clones TS-2 (1.095), FBA-4 (1.084), 378501.3 (1.084), I-1085 (1.084), Panda (1.082), Atlantic (1.080), and MF-II (1.072). The best clones for chip were TS -2 and MF-II. Whereas, the best clones for french fries were TS-2 and I-1085. The impact of the research was the information on advanced processing clones provided for releasing the varieties.

207 KUSWANTO

Evaluasi daya waris sifat ketahanan kacang panjang terhadap CABMV berdasarkan struktur kekerabatan. **Evaluating the inheritability characteristic of the Hindu pea (kacang panjang) resistance to CABMV based on genetic relationship**/Kuswanto; Kasno, A.; Soetopo, L.; Hadiastono, T. (Universitas Brawijaya, Malang (Indonesia). Fakultas Pertanian) 23 ref. Appendices Summaries (En, In). *Jurnal Ilmu-Ilmu Hayati* (Indonesia) ISSN 1410-413X (2004) v. 16(2) p. 182-189.

COWPEAS; VARIETIES; HIGH YIELDING VARIETIES; HERITABILITY; DISEASE RESISTANCE; COWPEA MOSAIC COCOMOVIRUS.

The objective of this research was to obtain high yielding varieties of the cowpea were resistant to cowpea aphid born mosaic virus (CABMV). This is important to Indonesia as the cowpea as a cheap source of diet protein and fibre. The trials were conducted in the green house and Brawijaya University Experimental Farm from November 2002 to October 2003. The materials used were 4 segregated groups of plants of 2 resistant varieties (MLG 15151 and MLG 15167) crossed with 2 high yielding varieties (HS and PS), respectively. Inheritance potential was estimated through a narrow heritability analysis based on genetic relationship arrangement. Results indicated that all crossed groups of HS/MLG 15151, HS/MLG 15167, PS/MLG 15151 and PS/MLG 15167 need further improvement to their resistance. The HS/MLG 15151, HS/MLG 15167 and PS/MLG 15167 groups resistance could be improved through back crossing, whereas PS/MLG 15151 resistance could be improved via a modified bulk method.

208 MULAWARMAN

Daya silang pada hibridisasi interspesifik antara Eucalyptus pellita dan E. urophylla. **Cross ability in interspecific hybrid between *Eucalyptus pellita* and *E. urophylla***/Mulawarman; Sastrosumarto, S.; Naiem, M. 5 tables; 32 ref. Summaries (En, In). *Zuriat* (Indonesia) ISSN 0853-0808 (2003) v. 14(2) p. 12-20.

EUCALYPTUS PELLITA; EUCALYPTUS UROPHYLLA; ARTIFICIAL POLLINATION; INTERSPECIFIC HYBRIDIZATION; GENETIC CONTROL; GENETIC VARIATION; SEED PRODUCTION; GERMINABILITY.

A controlled crossing experiment using a factorial mating design, involving female parents of *E. pellita* and male parents of *E. urophylla* that randomly sampled from the breeding population of both species, was conducted to assess the degree of genetic control on interspecific crossability for hybrid between *E. pellita* and *E. urophylla*. As measures of crossability, number of seeds per capsule and percentage of germinated seed were determined for each individual cross. The effect of female, male and female x male was significant on number of seed per capsule and percentage of germination. There was a slight tendency that the family produced more seeds might produce less viable seed. Additive and dominance genetic varians were estimated as measures of the genetic control. The dominance variance had the major contributon to

the genetic control of seed production and seed germination. Female source of variation has the major contribution to the additive genetic influence. Therefore, to maximize the production of viable seed, parent trees with desired traits should be selected on specific croses.

209 NURYANI, W.
***Seleksi ketahanan klon-klon harapan gladiol terhadap Fusarium oxysporum f. sp. gladioli*. [Resistance of gladiolus promising clones to *Fusarium oxysporum f. sp. gladioli*]**/Nuryani, W.; Badriah, D.S.; Sutater, T.; Silvia, E.; Muhidin (Balai Penelitian Tanaman Hias, Segunung, Cianjur (Indonesia)) 3 tables; 13 ref. Summaries (En, In). *Jurnal Hortikultura* (Indonesia) ISSN 0853-7097 (2005) v. 15(1) p. 37-42.

GLADIOLUS; CLONES; SELECTION; DISEASE RESISTANCE; FUSARIUM OXYSPORUM; VARIETIES.

The aim of the experiment was to test the resistance of gladiolus clones on fusarium wilt. Factorial randomized block design was used in the experiment. The first factor was gladiolus promising clones, consisted of 96212/168; 96210.2/20; 96215/49; 96203.2/14; 9607.2/129; 96215/202; 96215/122; 96204/69; 96213/109; 96210.1/170; red holland ; 621-1. The second factor was density of inoculum *Fusarium oxysporum*, consisted of nill conidia/g soil; 10^4 cells conidia/g soil; and 10^8 cells conidia/g soil. The results showed that the gladiolus clone number 96215/49 and 96213/109 were the most resistant to *F. oxysporum f. sp. gladioli* and clone number 96212/168 was the most susceptible.

210 PRIJONO
***Kultur in vitro daun kopi untuk mengetahui kemampuan embriogenesis somatik beberapa spesies kopi*. *In vitro* culture of coffee leaves for evaluating the capability of somatic embryogenesis of some coffee species**/Priyono (Pusat Penelitian Kopi dan Kakao Indonesia, Jember (Indonesia)) 4 tables; 31 ref. Summaries (En, In). *Pelita Perkebunan* (Indonesia) ISSN 0215-0212 (2004) v. 20(3) p. 110-122.

COFFEA; LEAVES; SPECIES; IN VITRO CULTURE; EVALUATION; SOMATIC EMBRYOS; EMBRYONIC DEVELOPMENT.

The main constraint of *ex situ* germplasm conservation in coffee is infection of parasite nematode. Based on this reason, *in situ* germplasm conservation is necessary to be applied. This research was conducted to study the potentials of somatic embryogenesis of 17 coffee species. Young leaf explants were cultured on solid medium under light condition for embryoid induction and maintained for 3 months after somatic embryo induction for somatic embryo maturation. Pre-germinated somatic embryos were transplanted into the acclimatization medium for *ex vitro* germination. The result showed that direct somatic embryogenesis occurred on 8 coffee species. Furthermore, indirect somatic embryogenesis occurred on *C. arnoldiana*. The most rapid of somatic embryos induction (4 weeks after culture), was found at *C. rasemusa*. The highest somatic embryogenesis frequency (75%) and number of somatic embryos (16 somatic embryos per explant) were obtained from *C. canephora*. Somatic embryo formation of 9 coffee species was asynchronous so that different stages of embryo development could be found at the same time. In the long period culture of leaves, the pre-germinated somatic embryos can be obtained from 5 coffee species, namely*: C. arnoldiana*, *C. canephora*, *C. capakata*, *C. laurientii* and *C. rasemusa.*

211 QOSIM, W.A.
***Korelasi antara karakter kerapatan trikoma dan stomata dengan ketahanan penyakit karat pada beberapa kultivar krisan pot*. Correlation between trichome and stomata density with resistance to rust disease characters on several pot Chrysanthemum cultivars**/Qosim, W.A.; Rachmadi, M.; Hersanti (Universitas Padjadjaran, Bandung (Indonesia). Fakultas Pertanian); Suwarti, A. 1 ill., 5 tables; 18 ref. Summaries (En, In). *Zuriat* (Indonesia) ISSN 0853-0808 (2005) v. 16(1) p. 52-59 .

CHRYSANTHEMUM; VARIETIES; PUCCINIA; LEAVES; RUSTS; STOMATA; DISEASE RESISTANCE.

The decreasing flower quality of Chrysanthemum caused by leaf rust disease. The research was conducted to evaluate resistance character to leaf rust disease on 22 cultivars pot Chrysanthemum and correlation

between density of trichome and stomata with resistance to rust disease. The experiment was arranged in randomized block design with 22 cultivars pot Chrysanthemum as a treatment and replicated three times. The results showed that resistance to leaf rust disease character of 22 cultivars were found in nine cultivars that categorized immune, i.e. Tawn Falk, Tiger, Reagen Rossy, Pink Mambo, Yellow Boaldi, Autumn Glory, and Yellow Kettay, Stroika and White Boaldi and only one cultivar resistance namely White Reagen. Four cultivars categorized moderatly susceptible were Mike, Pink Davis, Pink Regol and Redding cultivars, while eight cultivars categorized susceptible were White Cherry Papilon, Fiji Yellow, Red Cherry Papilon, Pink Violet, Fiji White, Puma Sunny, Pink Arola and Fiji. There was negative correlation between characters of trichome and stomata density with resistance to rust disease.

212 ROOSTIKA, I.

Penerapan teknik vitrifikasi pada penyimpanan ubi jalar secara kriopreservasi. **Application of vitrification technique in cryopreservation of sweet potato (Ipomoea batatas (L) Lam.)**/Roostika, I.; Sunarlim, N.; Adil, W.H.H. (Balai Besar Penelitian dan Pengembangan Bioteknologi dan Sumberdaya Genetik Pertanian, Bogor (Indonesia)) 3 ill., 4 tables; 16 ref. Summaries (En, In). *Penelitian Pertanian Tanaman Pangan* (Indonesia) ISSN 0216-9959 (2004) v. 23(2) p. 117-122.

IPOMOEA BATATAS; VITRIFICATION; BIOLOGICAL PRESERVATION; FREEZING.

Cryopreservation is a potential method for long-term preservation of plant germplasm which is useful on recalsitrant seeds and vegetatively propagated plants such as sweet potato. The encapsulation-vitrification technique was applied, since it was more practical and easier to be manipulated when the cultures were encapsulated in alginate beads. To dehydrate the encapsulated cultures was not easy because of the high content of water that caused damage to the cell. Thus, it was suggested to apply other techniques such as vitrification. Research was conducted to obtain cryopreservation method by using the vitrification technique for long-term preservation of sweet potato culture. Four steps were done in the experiment, i.e. 1) optimization of preculture, 2) optimization of loading, 3) optimization of cryoprotectant exposure, and 4) optimization of thawing and washing. The results showed that explants from shoot tips were better to be used than those from axillary buds. The optimum condition in each experiment was preculturing on MSC2 + 0.3M sucrose for one day, loading on LS solution (MSC2 + 2M glycerol + 0.4M sucrose) for 60 minutes, cryoprotectant exposure on PVS2 solution (MSC2 + glycerol 30% + ethylene glycol 15% + DMSO 15% + 0.4M sucrose) for 10 minutes, thawing at 22^0C washing on MSC2 + 1.2M sucrose for 10 minutes. Several cultures remained green for one week, but they could not grow well.

213 RUSWANDI, D.

Heritabilitas dan heterosis hasil pada galur-galur DMR dan QPM serta hibrida silang tunggalnya. **Heritability and heterosis of grain yield on downy mildew resistance (DMR) and quality protein maize (QPM) inbreds and their single cross hybrids**/Ruswandi, D.; Rachmadi, M.; Wicaksana, N.; Ismail, A.; Arief, D. (Universitas Padjadjaran, Bandung (Indonesia). Fakultas Pertanian); Kasim, F. 3 tables; 11 ref. Summaries (En, In). *Zuriat* (Indonesia) ISSN 0853-0808 (2005) v. 16(1) p. 37-43 .

ZEA MAYS; HERITABILITY; HETEROSIS; GENETIC VARIATION; HYBRIDS; DISEASE RESISTANCE.

Improvement of high yielding maize cultivars possessing high quality of seed as showed by high lysine and tryptophan content must be fulfilled with resistance againts downy mildew pathogen in any maize breeding program. A set of experiment to study genetic variability and to estimate both heritability and heterosis of important characters of grain yield on DMR and QPM lines has been conducted. Four downy mildew resistance (DMR) lines, i.e. Nei 9008, P 345, Ki 3, and MR 10; three quality protein maize (QPM) lines, including CML 161, CML 163, and CML 172; and their single cross hybrids formed based on line x tester mating design were used in the experiment. The following characters: height of the first ear, seeds number per row, seed weight per ear, and grain yield per plot showed broad genetic variability. Narrow sense heritability (hns) of grain yield and its components ranged from 0.01 to 0.71. Broad sense heritability (hbs), on the other hand, ranged from 0.20 to 0.74. It was found that hybrid derived from crossing between parental inbred lines possessing broad genetic background would express high heterosis.

214 RUSWANDI, D.
***Karakterisasi molekuler galur jagung protein berkualitas dan galur tahan bulai berdasarkan penanda SSRs.* Molecular characterization of quality protein maize and downy mildew resistance lines based on simple sequence repeats (SSRs) marker**/Ruswandi, D.; Rachmadi, M.; Carsono, N.; Damayanti, F. (Universitas Padjadjaran, Bandung (Indonesia). Fakultas Pertanian); Wicaksana, N.; Pabendon, M.B.; Azrai, M.; Ismail, A.; Kasim, F. 2 ill., 4 tables; 2 ref. Summaries (En, In). *Zuriat* (Indonesia) ISSN 0853-0808 (2005) v. 16(1) p. 21-36.

ZEA MAYS; GENETIC MARKERS; GENOTYPES; VARIETIES; PROGENY; DISEASE RESISTANCE.

The information on germplasm diversity and genetic relationship among elite breeding materials is an important element in maize breeding. Molecular characterization and genetic relationship of 11 QPM-DMR lines were analysed using thirty three SSRs markers. Genetic relationship was determined using Jaccard's similarity coefficient, and dendogram was then constructed based on the unweighted pair-group method with arithmetical averages (UPGMA). The result showed that (i) all SSRs loci were informative for describing the genotypic variation as showed by their PIC, which ranged from 0.19 for umc1304 to 0.93 for π 112; (ii) the eleven maize inbred lines were clustered into one major group A and small groups B and C that corresponds well with the breeding programs adopted at different institutes of release, and (iii) thus, SSRs marker system is a valuable marker for varieties identification and for genetic diversity study of elite breeding materials.

215 SAMUDDIN, S.
***Daya gabung pada tembakau madura.* [Combining ability of Madura tobacco]**/Samuddin, S. (Universitas Tadulako, Palu (Indonesia). Fakultas Pertanian) 2 tables; 16 ref. Summaries (En, In). *Jurnal Agroland* (Indonesia) ISSN 0854-641X (2005) v. 12(1) p. 27-32.

NICOTIANA TABACUM; COMBINING ABILITY; LEAF AREA INDEX.

The demand for madura tobacco increases every year, but the yield and quality were still low. The objectives of this study were to evaluate the general and spesific combining ability on several tobacco plant genotypes. The experiment was conducted from April to September 2001, at Palalang, Pakong, Pamekasan, Madura, East Java. Randomized block design with three replications was used in diallel cross experiment, consisting of nine genotypes and thirty-six F 1 generations. The experimental parameters observed were plant height, leaf number, leaf area, date of flowering, fresh leaf yield, dried leaf yield, grade index and crop index. The results indicated that general and specific combining ability had significant effect on all the parameters. Prancak-95, Cangkring, FB14 and FA31 were genotypes showing high general combining ability on crop index. High specific combining ability and mean value on crop index were shown by FBlO x Cangkring, FB14 x Cangkring and FB12 x FB27.

216 SAMUDDIN, S.
***Penentuan indikator seleksi untuk perbaikan hasil dan mutu tembakau madura.* [Determination of selection indicator to improve of quality and yield of madura tobacco]**/Samuddin, S. (Universitas Tadulako, Palu (Indonesia). Fakultas Pertanian), 1 ill., 3 tables; 12 ref. Summaries (En, In). *Jurnal Agroland* (Indonesia) ISSN 0854-641X (2005) v. 12(4) p. 339-345.

NICOTIANA TABACUM; SELECTION CRITERIA; AGRONOMIC CHARACTERS; YIELDS; QUALITY.

Plant character to be improved correlates with other characters. Consequently a selection indicator needs to be determined to improve the effectivity and efficiency of selection process. This research which was conducted in Palalang, Pakong District, Pamekasan Madura, East Java, from April to September 2001 aimed at investigating characters that could be used as selection indicators for improving the yield and quality of madura tobacco. The experiment used 45 genotypes and was designed in randomized block design with three replications. Observed variables included plant height, leaf number, leaf area, date of flowering, fresh leaf yield, dried leaf yield, quality index and crop index. The results of simple correlation

analysis showed that plant height, leaf number, leaf area, and fresh leaf yield could be used as indirect selection indicators to improve dried leaf yield which with quality index separatelly could be used as a selection indicator to improve crop index. The results of path coefficient analysis showed that dried leaf yield had a strong direct effect on crop index, followed by quality index. The both could be used as direct selection indicators to improve crop index of tobacco.

217 SETIYO, I.E.
***Aplikasi teknik RAPD untuk analisis diversitas genetik tanaman kelapa sawit (Elaeis guineensis* Jacq.). [Application of RAPD technique to analyze the genetic diversity of oil palm (Elaeis guineensis Jacq.)]**/Setiyo, I.E.; Sudarsono (Institut Pertanian Bogor (Indonesia). Program Pascasarjana); Asmono, D. 3 ill., 2 tables; 15 ref.: Summaries (En, In). *Jurnal Penelitian Kelapa Sawit* (Indonesia) ISSN 0853-196X (2001) v. 9(2-3) p. 91-102.

ELAEIS GUINEENSIS; RAPD; BIODIVERSITY; GENETIC RESOURCES.

Technique of molecular biology based on RAPD markers was applied on oil palm for studying the genetic diversity of population through estimation of allelic frequency, heterozygosity and gene similarity. Laboratory experiment was carried out in Bogor Biotechnology Research Unit for Estates Crops and in Indonesian Oil Palm Research Institute. Seventy palms derived from crosses of two elite parent palms (PA 131 D x RS 3 T) were analysed using 19 oligonucleotide primers that showed polymorphism in both parents. Binary data of RAPD bands were analysed following the concept of population genetics and facilitated by NTSYSpc version 2.01 software. The results indicated that observed heterozygosity of dura group (0.631) was relatively lower than that of tenera group (0.647). Deviation of Hardy-Weinberg that commonly called by coefficient of inbreeding indicated heterozygote excess. On the 75% level of genetic similarity, the population could be categorized into 7 groups and 5 ungrouped single individuals. Several groups were composed of only type of dura and/or tenera, and the remaining was mixed groups between dura and tenera in balanced composition. Five individual ungrouped palms were showed by oil palm type dura. In such level of genetic similarity, the population size could be reduced up to 70%.

218 SINAGA, P.H.
***Penyaringan genotipe jagung yang dapat berasosiasi dengan bakteri Azospirillum* sp. Screening of associative maize genotypes with *Azospirillum* sp.**/Sinaga, P.H. (Balai Pengkajian Teknologi Pertanian Riau, Pekanbaru (Indonesia)); Baihaki, A.; Setiamihardja, R.; Suprihatno, B. 1 ill., 2 tables; 24 ref. Summaries (En, In). *Zuriat* (Indonesia) ISSN 0853-0808 (2003) v. 14(2) p. 28-38.

ZEA MAYS; GENOTYPES; SELECTION; INOCULATION; AZOSPIRILLUM; GENETIC RESISTANCE; NITROGEN FERTILIZERS; DOSAGE.

An experiment to evaluate association of 54 genotypes of maize with *Azospirillum* sp. was conducted at the Research Station of the Faculty of Agriculture, Padjadjaran University at Jatinangor and Arjasari from December 2001 until January 2002. The objectives of this research were to determine genotypes that response positively to the inoculation of *Azospirillum* sp, and to draw information on the potential of parents in developing maize hybrid tolerant to low N-Urea application. The screening of responsive genotypes to *Azospirillum* sp. was arranged in an augmented design by using genotype Wisanggeni as a check. Eight genotypes, i.e.: G23, G25, 626, 627, 638, 641, 650, and 652 performed better than the check (Wisanggeni) in some characters. The eight genotypes had potential to save N fertilizer.

219 SUSILO, A.W.
***Ragam genetik kerentanan tanaman kakao terhadap Phytophthora palmivora (Butl.)*. Genetic variance of pod rot susceptibility on cocoa**/Susilo, A.W.; Suhendi, D.; Sri-Sukamto (Pusat Penelitian Kopi dan Kakao Indonesia, Jember (Indonesia)) 2 tables; 14 ref. Summaries (En, In). *Pelita Perkebunan* (Indonesia) ISSN 0215-0212 (2002) v. 18(1) p. 1-9.

THEOBROMA CACAO; PHYTOPHTHORA PALMIVORA; GENOTYPES; DISEASE RESISTANCE; SELECTION.

Pod rot disease caused by *Phytophthora palmivora* is the most serious pest on cocoa. Genetic variance is a variable to detect genetic gain on selection. The genetic variance of pod rot susceptibility was studied using artificial inoculation on detached pods. Experiment was arranged by randomized completely design with 5 replications, and the experimental unit was pod. The evaluated-genotypes comprised of 33 selected-genotypes from Jatirono estate resistant genotype of Sca 12, and susceptible genotype of GC 7 were used in this study. *Phytophthora palmivora* used in this study was isolated from infected pods and inoculated to each pod with 100 zoospores. The pods were incubated at the chamber with 80-90% of air humidity. Data recorded covered lession size at the 3rd and 5th day after inoculation and velocity of the lession enlargement. All of the variables showed moderately broad sense heritability. The lession enlargement increased linearly. Covariance genetic of all variables showed more than two times of its genetic variance performing broadly variability of pod rot susceptibility. At 22.86 % of selection intensity, the expected genetic gain was moderate. There were 25 genotypes showing smaller of lession size than Sca 12 in which KW 235, KW 236, KW 233, and KW 256 are the promising clones.

220 WAHYUNI, T.S.
Pendugaan parameter genetik dan hubungan beberapa karakter kuantitatif dengan hasil beberapa klon harapan ubi jalar. **Estimation of genetic parameters and correlation between some quantitative characters and tuber yield of sweet potato promising clones**/Wahyuni, T.S.; Rahayuningsih, S.A.; Hartojo H., K. (Balai Penelitian Tanaman Kacang-kacangan dan Umbi-umbian, Malang (Indonesia)). *Penelitian Pertanian Tanaman Pangan* (Indonesia) ISSN 0216-9959 (2004) v. 23(2) p. 109-116.

IPOMOEA BATATAS; GENETIC PARAMETERS; GENETIC CORRELATION; HERITABILITY; GENETIC VARIATION; YIELDS; CLONES.

Information of phenotypic and genetic variabilities, heritability, and correlation between quantitative characters with tuber yield are important in selection program of sweet potato. A field experiment was conducted at Kendalpayak Experiment Station, during the 2002 dry season which was arranged in a randomized block design with two replications. A total of 45 sweet potato clones consisted of 40 promising clones and 5 improved and local varieties were evaluated, Sukuh and Sari (superior sweet potato cultivars) were used as checks in Least Significant Increase (LSI) test. Quantitative characters observed were: vine length, shoot dry weight, tuber number, average tuber weight, tuber length, tuber diameter, harvest index, percentage of dry matter and reduction sugar fresh tuber, and tuber yield. Results indicated that performances of the 45 promising sweet potato clones, varied with tuber yields ranged from 0.5 kg to 10.35 kg/5 m^2. Except for tuber length, all characters observed showed wide genetic variation, phenotypic variation and broad rangest of heritability. Only the tuber length showed narrow genetic variation and low heritability. The sweet potato tuber yield was affected by several quantitative characters, that were intercorrelated. Results of path analysis indicated that the number of tuber, average tuber weight, and harvest index played important roles on tuber yield. There were two promising clones (MIS 505-7 and MIS 559-3) that have high tuber yield potentials (10.35 and 9.55 kg/m^2), and significantly higher than Sari (6.7 kg/m^2). These clones were recommended for further yield trial evaluation.

221 ZAINAL, A.
Pengelompokan tetua padi hibrida berdasarkan sifat-sifat morfologi dan RAPD-PCR. **Cluster analysis of hybrid rice parental lines based on morphological traits and RAPD-PCR**/Zainal, A. (Universitas Andalas, Padang (Indonesia). Fakultas Pertanian); Amirhusin, B. 2 ill., 5 tables; 22 ref. Summaries (En, In). *Zuriat* (Indonesia) ISSN 0853-0808 (2005) v. 16(1) p. 9-21.

ORYZA SATIVA; HYBRIDS; VARIETIES; PLANT ANATOMY; GENETIC DISTANCE; RAPD.

The objective of this study was to grouping several hybrid rice parental lines based on cluster analysis of some morphological traits and DNA pattern resulted from RAPD-PCR. Using UPGMA method, ten selected polymorphic primers RAPD were used to analyze the genetic diversity of 28 hybrid rice parental lines. Morphological traits analysis was carried out on ten quantitative traits and analysed by using the average linkage method. Using 76 % level of similarity based on RAPD markers by hybrid rice parental lines can be classified into 5 groups i.e. (I): IR58025A, IR58025B, IR62829A, IR62829B, IR68885A, C 20; (II): IR68886B, S4124F, Cisokan, IR65515-47-2-1-1-9, B10277-MR-1-4-3, B10373E-MR-1-3-4-1-6,

RHS 412-ICX-20X-OZH, IR30176-B-1-2-MR-2, IR53942, Maros, IR68897B, IR68886A, Dodokan, RCN-B-94-19, IR68; (III): MTU 992, B9154E-PN-1-1-4; (IV): IR68885B; and (V): IR68888A, BR827-35, IR68888B, IR68897A. Based on morphological traits the hybrid rice parental lines can be classified into 5 groups i.e. (I): IR68897A, IR68888A, IR68885A, IR58025A, IR62829A; (II): Cisokan, B10277-MR-1-4-3, MTU 9992, IR58025B, Dodokan, IR68897B, IR68888B, IR68886B, IR62829B; (III): BR827-35; (IV): IR65515-47-2-1-1-9, C20, Maros, IR30176-B-1-2-MR-2, RCN-B-94-19, RHS 412-ICX-20X-OZH, B9154E-PN-1-1-4, IR68, S4124F, IR53942; and (V): B10373E-MR-1-3-4-1-6. Some of parental lines that showed relatively high genetic distance such as IR58025A and BR827-35; IR58025A and IR53942; IR58025A and Maros; IR58025A and IR68 also showed relatively a good hybrid vigor on other previous studies. The cluster analysis indicated that the cluster based on morphological traits was not similar to the RAPD-PCR. However, in general most of the CMS and restorer lines were grouped in different cluster.

F61 PLANT PHYSIOLOGY – NUTRITION

222 ANDYANTORO, S.

Hara dan arsitektur tanaman pada budi daya mawar potong. **Nutrient and plant architecture of rose (*Rosa hybrida*) cultural practices**/Andyantoro, S.; Tejasarwana, R.; Ginting, B. (Balai Penelitian Tanaman Hias, Cianjur (Indonesia)) 5 tables; 9 ref. Summaries (En, In). [Proceedings of the national seminar of floriculture]. Prosiding seminar nasional florikultura: membangun industri florikultura yang berdaya saing melalui penerapan inovasi teknologi berbasis potensi nasional/Balai Penelitian Tanaman Hias, Cianjur (Indonesia). Cianjur: Balithi, 2004: p. 319-323.

ROSA; CUT FLOWERS; HYBRIDS; PLANT NUTRITION; LANDSCAPING; ELECTRICAL CONDUCTIVITY; LIQUID FERTILIZERS; CUT FLOWER PRODUCTION; QUALITY.

The experiment was carried out from September 2001 to April 2002 at Segunung Experimental Station of Indonesian Ornamental Crops Research Institute (IOCRI) Segunung, Cianjur located at 1100 m above sea level, Andosols loamy clay soil, moderately acid (pH 4.5 - 5.5). Soil was mixed with bamboo humus 1:4 (v/v) and covered by plastic mulch. Pertiwi new rose variety released by IOCRI in 2000 was used in this experiment. Liquid fertilizer modified from Handreck and Black formula (1994) combined with plant architecture were applied. Split plot design with 3 levels of electrical conductivity (EC) as main plot and 4 systems of plant architectures as subplot were applied with 3 replications. All of the experimental plots (36) were placed under plastic roof. The three levels of EC were: 110-1.30 dS/m^2, 1.40-1.60 dS/m^2 and 1.70-1.90 dS/m^2 and 4 systems of plant architecture were: Indonesian traditional, Dutch architecture with hard pinching, Dutch architecture with soft pinching and Japan architecture. Diameter of flower stalk at Dutch archicture with soft pinching was affected by EC level of liquid fertilizer. The greatest diameter of rose flower stalk was produced on application of 1.40-1.60 dS/m^2 EC level in this plant architecture. The results indicated that Dutch architecture with soft pinching produced the best quality of flower compared to other architectures.

F62 PLANT PHYSIOLOGY – GROWTH AND DEVELOPMENT

223 MUAS, I.

Efek inokulasi cendawan mikoriza arbuscular terhadap kolonisasi akar dan pertumbuhan bibit pepaya. **Inoculation effect of arbuscular mycorrhizal fungus on root colonization and growth of papaya seedlings**/Muas, I.; Meldia, Y. (Balai Penelitian Tanaman Buah, Solok (Indonesia)) 5 ill., 1 table; 21 ref. Summaries (En, In). *Jurnal Hortikultura* (Indonesia) ISSN 0853-7097 (2004) v. 14(3) p. 152-160.

CARICA PAPAYA; SEEDS; VESICULAR ARBUSCULAR MYCORRHIZAE; INOCULATION; GROWTH; ROOTS; COLONIZING ABILITY.

Five arbuscular mycorrhizal fungal (AMF) species were used to study their effects on root colonization and growth of papaya seedlings. The research was conducted at a screenhouse of Agriculture Faculty,

Padjadjaran University, Bandung from August until November 2001 by using randomized block design of factorial with three replications. The first factor was the kind of AMF isolates (control, *Glomus etunicatum*, *Glomus manihotis*, *Gigaspora margarita*, *Acaulospora tuberculata*, and *Scutellospora heterogama*), and the second factor was papaya cultivars (Dampit and Sarirona). The results showed that *A. tuberculata*, *G. etunicatum*, and *G. margarita* isolates had faster root colonization, and the highest fungal infectivity, which was higher than 76% from both papaya cultivars. *Acaulospora tuberculata* and *G. etunicatum* isolates significantly increased stem diameter on two cultivars of papaya seedling and increased total dry weight higher than other treatments. The AMF application for papaya had positive impact, such as fertilizer efficiency, increase quantity and quality of yield.

224 WIDIASTOETY, D.
Pengaruh pH media terhadap pertumbuhan planlet anggrek dendrobium. **Effect of media pH on the growth of dendrobium orchid plantlet**/Widiastoety, D.; Kartikaningrum, S.; Purbadi (Balai Penelitian Tanaman Hias, Cianjur (Indonesia)) 2 tables; 13 ref. Summaries (En, In). *Jurnal Hortikultura* (Indonesia) ISSN 0853-7097 (2005) v. 15(1) p. 18-21.

ORCHIDACEAE; PH; CULTURE MEDIA; GROWTH; PLANT ANATOMY; SEEDLINGS.

Media plays a critical role on the growth and development of orchid. Basic media commonly used in in vitro culture contains macro and micro nutrients, sucrose, vitamin, amino acid, growth regulator and other organic compound. Absorption of nutrients is affected by concentration and media pH. The aim of this experiment was to find out the effect of media pH on the growth of dendrobium orchid plantlet. The treatments were laid in randomized block design with eight treatments and four replications. The treatments were media pH, i.e. 4.6; 4.8; 5.0; 5.2; 5.4; 5.6; 5.8; and 6.0. The results showed that media pH between 4.8-5.2 was the best for the performance of plantlet in term of plant height, leaf size, leaf number, shoot number, root length, and root number. The results of this experiment would improve the mass production of dendrobium orchid planting material.

H10 PESTS OF PLANTS

225 ASRUL, L.
Karakterisasi tanaman kakao (Theobroma cacao L.) harapan tahan penggerek buah kakao (Conopomorpha cramerella Snellen) di Sulawesi Selatan. **[Characterization of cacao resistant to cocoa pod borer (*Conopomorpha cramerella* Snellen) in South Sulawesi (Indonesia)]**/Asrul, L. (Universitas Hasanuddin, Makassar (Indonesia). Fakultas Pertanian) 5 tables; 9 ref. Summaries (En, In). *Jurnal Agroland* (Indonesia) ISSN 0854-641X (2005) v. 12(2) p. 133-138.

THEOBROMA CACAO; CONOPOMORPHA CRAMERELLA; PEST RESISTANCE; SULAWESI.

A study by using survey with purposive sampling method was conducted in South Sulawesi from September 2003 to January 2004 to select varieties of resistant cacao to cocoa pod borer. Cacao plants assumed to have resistance againts the pest were characterised by measuring the percentage of pod damage, vegetative growth, productivity components, and plant characteristics. Other components observed were: (1) Main stem; including jorquette level, habitues on stem; (2) leaf; including flush colour, mature leaves shape, mature leaves tip, mature leaves base, mature leaves edges, leaves surface, back leaves; (3) pod; consisting pod of shape, base, tip, skin, pattern, and young pod colour, ripe pod colour, pulp thickness, sclerocarp density, number of seeds per pod unit, weight of dried seed, pod index, weight of 1000 dried seeds and net yield. The study found that 15 varieties of cacao were resistant to cocoa pod borer. Those varieties were found in five regencies: Mamuju, Majene, Polewali, Bone and Luwu. Four of the varieties showed the best scores for growth and productivity components.

226 LABA, I W.
Hubungan antara kerapatan populasi kepik renda Diconocoris hewetti (Dist) (Hemiptera : Tingidae) dan kehilangan hasil pada tanaman lada. **Relationship between the population densities of blossom sucking lace bug *Diconocoris hewetti* (Dist) (Hemiptera : Tingidae) and yield losses on pepper**

plantation/Laba, I W. (Balai Penelitian Tanaman Rempah dan Obat, Bogor (Indonesia)); Rauf, A.; Kartosuwondo, U.; Soehardjan, M. 6 ill., 4 tables; 10 ref. Summaries (En, In). *Jurnal Penelitian Tanaman Industri* (Indonesia) ISSN 0853-8212 (2005) v. 11(1) p. 1-6.

PIPER NIGRUM; TINGIDAE; ANIMAL POPULATION; CROP LOSSES.

Blossom sucking lace bug, *Diconocoris hewetti* (Dist) (Hemiptera : Tingidae) is one of the pest insect attacking pepper in Indonesia. This pest insect sucks pepper blossom liquid and disturbs fruit formation. The objective of this experiment was to find out the relationship between the population densities of blossom sucking lace bug, *D. hewetti* and flower damage, number of fruits formed and yield losses of pepper at various flower phases. These studies were conducted in a green house and pepper plantations in the Assessment Institute of Agricultural Technology, Bangka Belitung Island during rainy season (November 2003 to February 2004). The green house research used bushy pepper about 1 year old. The lace bug of the last instar or fifth instar nymph and adult were used at population density: 0, 1, and 2 insects/bunch in 3 blossom phases respectively. Feeding period of lace bug was 24 hours. This experiment used completely randomized with factorial design and 5 replications. Field study used LDL pepper variety with aged ± 6 years. The population densities of adult lace bug were: 0, 1, 2, 3, and 4 per 4 bunches on 3 types of pepper blossom phases respectively. Feeding period of lace bug was 72 hours. Field study also used last instar nymph with population density: 0, 1, 2, and 3/bunch. Feeding period was 24 hours. Randomized block design with factorial and 5 replications were used on instar nymph, while on the adult stadium randomized block design with factorial and 6 replications were also used. The intensity of flower damage, fruits formed, fruits unformed and yield losses were counted. The result revealed that the number of fruits formed and yield losses were significantly different among population density of lace bug. The population densities of two lace bug caused higher flower damage and yield losses than other population density. Flower damage, fruits formation and yield losses caused by nymph and adult were not significantly different. The level of flower damage in green house observation was between 67.00-87.89%, while in the field was between 61.10-85.30% caused by adult, and 71.00-93.30% caused by nymph. Yield loss of pepper was 55.07-83.04% in the green house, while in the field was 35.30-82.89% due to the attack of adult, and caused by nymph was 73.24-89.05%. The level of flower damage on phase 1 and 2 were higher than that of phase 3. This research indicated that the attack of one adult or one nymph of lace bug, *D. hewetti* caused flower damage minimun 61.10% and yield loss minimum 35.30%.

227 MURYATI

Preferensi ngengat Citripestis sagitiferella terhadap minyak atsiri tiga varietas jeruk. **[Preference of *Citripestis sagitiferella* moths on volatile compounds of three citrus varieties]**/Muryati (Balai Penelitian Tanaman Buah, Solok (Indonesia)); Trisyono, Y.A.; Witjaksono, 3 ill. 3 tables; 20 ref. Summaries (En, In). *Jurnal Hortikultura* (Indonesia) ISSN 0853-7097 (2005) v. 15(1) p. 43-49.

CITRUS; LEPIDOPTERA; BOTANICAL INSECTICIDES; ESSENTIAL OILS; EXTRACTS; VARIETIES; VOLATILE COMPOUNDS.

The objective of this research was to determine the preference of *C. sagitiferella* moths to volatile compounds extracted from three citrus varieties (pacitan sweet orange, nambangan pomelo, and siem orange). Citrus fruits were taken from Batu, Malang (sweet orange and siem orange) and Magetan (pomelo) in July 2001. The volatile compounds were obtained through a steam distillation method. The larvae of *C. sagitiferella* were collected from damaged sweet orange (Batu, Malang) in October 2001, and brought to the laboratory for subsequent development. Newly emerged moths were used in this study. The preference tests were carried out using a Y shape olfactometer. The gas chromatography (GC) and gas chromatography - mass spectrophotometry (GC-MS) were used to detect the components of volatile compounds. The results showed that *C. sagitiferella* moths attracted to volatile compounds extracted from all citrus varieties tested, with sweet orange was the most preferable, followed by pomelo and siem orange. Furthermore, the volatile compounds extracted from 6 months (after fruit setting) sweet orange was more attractive for *C. sagitiferella* moths than that of 2 months (after fruit setting) sweet orange.

228 ROSMINI
Kajian adaptif pengendalian hayati pada usaha tani bawang merah di Kabupaten Donggala. **[Study of adaptive biological control on shallot in Donggala (Indonesia)]**/Rosmini (Universitas Tadulako, Palu (Indonesia). Fakultas Pertanian); Lasmini, S.A., 3 tables; 14 ref. Summaries (En, In). *Jurnal Agroland* (Indonesia) ISSN 0854-641X (2005) v. 12(2) p. 152-158.

ALLIUM ASCALONICUM; BIOLOGICAL CONTROL AGENTS; SPODOPTERA EXIGUA; BACILLUS THURINGIENSIS; BEAUVERIA BASSIANA; SULAWESI.

This study which aimed at investigating the kind of adaptive biological control agent for the *S. exigua* was arranged in randomized completely block design with 4 treatments and each treatment was repeated 5 times, consisted of APH0 (control), APH1 (*Bacillus thuringiensis* bacteria), APH2 (*Beauveria bassiana* fungus), APH3 (NPV virus). The results showed that the kind of biological control agent affected pest population density, leaf damage, fresh and eskip weights of shallot bulb. *B. thuringiensis* appeared to be the most effective in controlling *S. exigua* than other biological control agents giving shallot eskip yield 10.3 t/ha. Development of a bioinsecticide with active ingredient of *B. thuringiensis* may be therefore recommended to be used for controlling *S. exigua* in shallot crops.

229 YUNUS, M.
Kemampuan memarasit dan ciri-ciri kebugaran Trichogramma japonicum Ashmead pada kondisi laboratorium. **[Parasitic ability and functional response of *Trichogramma japonicum* in laboratory condition]**/Yunus, M.; Shahabuddin (Universitas Tadulako, Palu (Indonesia). Fakultas Pertanian); Buchori, D.; Hidayat, P. 5 ill., 1 table; 20 ref. Summaries (En, In). *Jurnal Agroland* (Indonesia) ISSN 0854-641X (2005) v. 12(2) p. 145-151.

TRICHOGRAMMA; BIOLOGICAL CONTROL AGENTS; PARASITOIDS; SCIRPOPHAGA; CORCYRA CEPHALONICA; LABORATORIES.

Trichogramma japonicum Ashmead was an egg parasitoid which had prospect as biological control agent to pest of rice plant *Scirpophaga innotata* Wlk. Laboratory test was conducted to know how long wasp to handle the host eggs, functional response, and fitness characters of *T. japonicum*. The experiment used alternate host eggs, namely *Corcyra cephalonica*'s eggs. The investigation was conducted under dissecting microscope which used lens 10 x 4. Result of this research indicated that handling-time (orientation-time + oviposition-time) for parasite to host egg about 84.86 to 106.66 second per egg. Functional response tend to tipe-4 (inversed curve), which was the lowest parasitization in consequence of the highest density of host eggs (69.9% on 50 eggs per pias to become 18.7% on 150 eggs per pias). The fitness characters of individual female were: mean fecundity was 34.8 plus minus 9.01 eggs female, percentage of survival was 51.9 plus minus 18.60%, sex ratio was female biased 77.7 plus minus 21.19% females. The size of female did not have the relation with fecundity.

H20 PLANT DISEASES

230 AKIN, H.M.
Ketahanan lima varietas kedelai terhadap PStV (Peanut Stripe Virus) yang diinokulasi pada fase pertumbuhan vegetatif dan generatif. **[The resistance to PStv (Peanut stripe virus) infection of five soybean varieties inoculated at vegetative and generative growth]**/Akin, H.M.; Nurdin, M.; Rednika (Universitas Lampung, Bandar Lampung (Indonesia). Fakultas Pertanian) 3 tables; 7 ref. Summaries (En, In). *Jurnal Agroland* (Indonesia) ISSN 0854-641X (2005) v. 12(4) p. 330-333.

GLYCINE MAX; DISEASE CONTROL; INOCULATION; PLANT VIRUSES; VARIETIES; DISEASE RESISTANCE.

This experiment was conducted in green house of Agriculture Faculty, Lampung University during May-August, 2002, and was arranged in a factorial experiment in randomized block design with three replications. The first factor was five soybean varieties: Taichung, Slamet, B3570, Mlg252 1, and

Yellowbean. The second factor was PStV inoculation at vegetative-1, vegetative-2, and generative phase of soybean growth. The results showed that Taichung was the most resistant to PStV infection at every stage of its growth. Four soybean varieties, namely Slamet, B3570, MIg252 1, and Yellowbean showed susceptible reaction to PStV infection at vegetative stages, but resistant reaction at generative stage of plant growth. Loss of soybean yield was more severe when soybean was infected at vegetative stages.

231 CICU

***Penekanan penyakit akar gada pada tanaman kubis melalui perlakuan tanah pembibitan.* [Suppression of clubroot disease on cabbage by seedbed treatments]**/Cicu (Balai Pengkajian Teknologi Pertanian Sulawesi Selatan, Maros (Indonesia)) 1 ill., 4 tables; 33 ref. Summaries (En, In). *Jurnal Hortikultura* (Indonesia) ISSN 0853-7097 (2005) v. 15(1) p. 58-66.

BRASSICA OLERACEA; PLASMODIOPHORA BRASSICAE; SEED TREATMENT; SEEDBEDS; YIELDS.

The experiment was conducted at Cipanas Ornamental Plants Research Station (at elevation 1,100 m asl) and Laboratory of Mycology, Department of Plant and Diseases, Bogor Agricultural University from September 2001 to March 2002. The objective was to evaluate the effect of seedbed treatments on clubroot disease of cabbage caused by *Plasmodiophora brassicae* Wor. This experiment was laid in a randomized block design with three replications and DMR test at level 5%. The treatments were: seedbed without chicken manure and solarization, seedbed with solarization, seedbed with chicken manure, and seedbed with solarization and chicken manure. The results showed that seedbed treatments with chicken manure only and seedbed treatment with chicken manure and solarization could decreased the infestation of clubroot disease about 12.4-20.5% and increased cabbage production about 58.6-85.8% related to the changes of soil microflora populations on cabbage seedling rhizosphere due to organic amendment (chicken manure) and soil solarization.

232 HANUDIN

***Pemanfaatan mikroba antagonis Xanthomonas maltophilia untuk mengendalikan penyakit embun tepung pada mawar.* Antagonist microbes of *Xanthomonas maltophilia* use to control powdery mildew on rose**/Hanudin; Suhardi; Saefullah, A.; Omoy, T.R. (Balai Penelitian tanaman Hias, Cianjur (Indonesia)) 4 tables; 26 ref. Summaries (En, In). [Proceedings of the national seminar of floriculture]. Prosiding seminar nasional florikultura: membangun industri florikultura yang berdaya saing melalui penerapan inovasi teknologi berbasis potensi nasional/Balai Penelitian Tanaman Hias, Cianjur (Indonesia). Cianjur: Balithi, 2004: p. 359-365.

ROSA; OIDIUM; BIOLOGICAL CONTROL AGENTS; XANTHOMONAS; MICROBIAL PESTICIDES; ISOLATION TECHNIQUES; DISEASE TRANSMISSION.

Powdery mildew caused by *Oidium* sp. is serious problem on rose cultivated under greenhouse and field at dry season. Synthetic chemical fungicides is used to control the disease but the effect is not satisfy. It is necessary to find out the other alternatives among others by using *X. maltophilia*. The research was carried out at laboratory and under UV plastic at Segunung Research Institute for Ornamental Plants (1,100 m asl), from April to December 2001. The laboratory activities included isolation and identification of *X. maltophilia*, while in the field tested of the *X. maltophilia* effectiveness by using bioassay method. For field experiment, rose cv. Holland at 2-3 leaf stage was used. Each treatment consisted of 20 plants, and was designed using randomized block design with three replications. The treatments were Xm.1 3 ml/1; Xm.3 3 ml/l; Benomyl 2 g/l; Xm.1 + Tween 0.01%; Xm.3 + Tween 0.01%, applied in the morning and afternoon, respectively. The tap water (no treatment) was used as control. The results indicated that 10 isolates of *X. maltophilia* were yellow in color, two of them having peak absorbent at λ = 445 nm i.e.: Xm.1 and Xm.3 isolated from rose at Segunung. It is supposed that they were *X. maltophilia*, similar with isolate Q E cl in case of color as well as peak absorbent. Peak absorbent of other isolates ranging from 439-459 mm. Xm.1 applied in the afternoon was able to suppress *Oidium* sp. as much as 67.95% equally as effective as Benomyl synthetics chemical fungicide.

233 NASIR, N.

Deteksi dan pemetaan distribusi Fusarium oxysporum f. sp. cubense pada daerah potensial pengembangan agribisnis pisang di Indonesia. **[Detection and mapping of *Fusarium oxysporum f. sp. cubense* on the potential area for banana agribusiness development in Indonesia]**/Nasir, N.; Jumjunidang; Riska (Balai Penelitian Tanaman Buah, Solok (Indonesia)) 4 ill., 23 ref. Appendices Summaries (En, In). *Jurnal Hortikultura* (Indonesia) ISSN 0853-7097 (2005) v. 15(1) p. 50-57.

MUSA PARADISIACA; FUSARIUM OXYSPORUM; GENETIC MAPS; AGROINDUSTRIAL SECTOR; FARM SURVEYS; INDONESIA.

Fusarium oxysporum f. sp. cubense (Foc) is the most dangerous pathogen on banana in the world. In Indonesia, about 8 million mats of banana traditional plantation and more than 5,000 hectares of commercial plantation have been destroyed by this pathogen in the periode of 1995/1996-2000/2001. The pathogen caused enormous economic damage in the country. There was no appropriate method to control the pathogen or the effectiveness way in combating the pathogen. This study purposed to detect and to map the existing of Foc to avoid the banana agribusiness development program from the devastation caused by the pathogen. Mappings were conducted on the selected locations which were potential for banana agribusiness development in Sumatra, or the targeted areas to be used for banana estate program. Studies were held in the Provinces of Riau, Jambi, West Sumatra and Lampung. Detection was carried out by collecting sample of diseased plants from the locations which were clarified above. Isolates were characterized by VOT technique at the Plant Pathology Laboratory of the Research Institute for Fruits, Solok. From 67 isolates collected which derived from 28 banana cultivars, 60 of them were race 4 of Foc, so the banana agribusiness program in these areas is not recommended, unless resistant cultivars or a method which has been successfully tested to control Foc race 4 were available.

234 NASRUN

Pengendalian penyakit layu bakteri nilam menggunakan Pseudomonas fluorescens. **Controlling bacterial wilt disease on patchouli plant with *Pseudomonas fluorescens***/Nasrun (Kebun Percobaan Balai Penelitian Tanaman Rempah dan Obat, Laing-Solok (Indonesia)); Christanti; Arwiyanto, T.; Mariska, I. 1 ill., 3 tables; 22 ref. Summaries (En, In). *Jurnal Penelitian Tanaman Industri* (Indonesia) ISSN 0853-8212 (2005) v. 11(1) p. 19-24.

POGOSTEMON CABLIN; WILTS; BACTERIOSES; DISEASE CONTROL; PSEUDOMONAS FLUORESCENS; GROWTH; YIELDS.

The study of controlling bacterial wilt disease (*Ralstonia solanacearum*) on patchouli plant with *Pseudomonas fluorescens* was carried out at a farmer's field in Situak Village, West Pasaman, West Sumatra from October 2003 to June 2004. The aims of the study were to find out the effectiveness of *Pseudomonas fluorescens* for controlling bacterial wilt disease, increasing plant growth and production. Isolates of *Pseudomonas fluorescens* Pf 63, Pf 90, Pf 91, Pf 147, and Pf 180 as treatments were isolated from the rhizosphere of healthy patchouli plant, and selected based on antagonistic activity on *R. solanacearum in vitro* at the Laboratory of Plant Bacteriology, Faculty of Agriculture, UGM. The isolates were inoculated on patchouli plant and adapted for one week before planting. The plants treated with *Pseudomonas fluorescens* isolates were planted in the field infected with pathogen on October 2003. The experiment was arranged in a randomized block design (RBD) with six replications. The assessment parameters were incubation period, disease intensity, plant growth and production of patchouli plants. The results showed that *Pseudomonas fluorescens* isolates could control the bacterial wilt disease and delay the incubation period 6-52 days and decrease the disease intensity 31.11-50.56%. In addition, *Pseudomonas fluorescens* isolates could affect the increases of plant growth, i.e. plant height (6.7-26.3 cm), leaf numbers (4.6-30.1 leaves/plant) and dry weight of leaves (24.5-154.3 g/plant), and plant production, especially oil content (4.8-22.3 ml/plant). The result of the experiment showed that Pf 91 isolate had the highest antagonistic activity on controlling the bacterial wilt disease on field.

235 SAHLAN

***Media dan suhu untuk pertumbuhan dan sporulasi Cladosporium musae Mason*. Media and temperature on the growth and sporulation of *Cladosporium musae* Mason**/Sahlan (Balai Penelitian Tanaman Buah, Solok (Indonesia)) 2 ill., 3 tables; 14 ref. Summaries (En, In). *Jurnal Hortikultura* (Indonesia) ISSN 0853-7097 (2004) v. 14(3) p. 210-216.

CLADOSPORIUM; GROWING MEDIA; TEMPERATURE; GROWTH; SPORULATION.

The experiments were conducted in Phytopathology Laboratory of Faculty of Agriculture, Universiti Putra Malaysia from January-June 2002. The aims of this experiment were to study the effect of kind of media and temperature on the growth and sporulation of *Cladosporium musae*. Completely randomized design with 15 replications was used. The kind of medium tested were malt extract agar, vegetables juice agar, potato dextrose agar, banana leaf extract agar, and czapek agar, while temperature tested were 18^0C, 22^0C, 26^0C, 30^0C, and 34^0C ± 1^0C, respectively. The results showed that there were variations on the colony color of *C. musae* depend on the media used. The best media for growth of *C. musae* was banana leaf extract agar (BLEA), while the best media for sporulation were malt extract agar and potato dextrose agar. In the culture, *C. musae* was able to grow at temperature 18^0C -30^0C and optimum temperature for growth and sporulation were 22.05^0C and 25^0C, respectively. It was concluded that the disease in the field could be controlled by minimizing leaves overlapping, reducing suckers, and weed control that reduced temperature level in the leaves canopy.

236 SRI-SUKAMTO

Keefektifan beberapa bahan pengendali penyakit busuk buah kakao Phytophthora palmivora*. Effectiveness of selected eradication materials for cocoa black pod disease *Phytophthora palmivora/Sri-Sukamto (Pusat Penelitian Kopi dan Kakao Indonesia, Jember (Indonesia)); Pujiastuti 1 ill., 3 tables; 18 ref. Summaries (En, In). *Pelita Perkebunan* (Indonesia) ISSN 0215-0212 (2004) v. 20(3) p. 132-142.

THEOBROMA CACAO; COCOA BEANS; PHYTOPHTHORA PALMIVORA; DISEASE CONTROL; UREA; TRICHODERMA; FARMYARD MANURE; FUNGICIDES.

In approriate handling of managing cocoa pod husk could be an agent of pest and diseases spreading. Cocoa pod husk contributes about 60% of total pod mass. The proper handling is that the husk must be burried into cocoa plantation soil and it could be as organic matter sources, although it shell also frequently becomes a potential agent of the spreading cocoa black pod disease. *Phytophthora palmivora*, pathogen of the black pod disease is easily infested in buried cocoa pod husk during composting process. The control of *P. palmivora* growth in soil is currently carried out by fungicides, which is expensive and the application for a long time is environmentally detrimental. This research attempted to find an effective material for inhibiting *P. palmivora* during the composting period. Experiment was carried out in the laboratory by completely randomized design (CRD), and at the field by randomized completetly block design (RCBD). Both experiments used two factors, which were the materials and its rate. The first factor consisted of *Trichoderma harzianum*, *T. koningii*, urea, cow manure, chicken manure, and copper fungicide. The rate of materials in the laboratory study were 10, 20 and 30 g/l, whereas in the field were 20, 40 and 60 g/l. The replication was 3 times. The result showed that urea was the most effective eradicant for *P. palmivora* growth. This was due to ammonia production during ammonification process which was toxic for *P. palmivora*. Application of 10 g/l urea in the laboratory inhibited the pathogen growth to 0%, while in the field study the treatment caused the smallest spot of *P. palmivora* by bioassay method.

237 SUPARYONO

***Komposisi patotipe patogen hawar daun bakteri pada tanaman padi stadium tumbuh berbeda*. Composition of pathotype of *Xanthomonas oryzae pv. oryzae*, the pathogen of rice bacterial leaf blight at different plant growth stages**/Suparyono; Sudir; Suprihanto (Balai Penelitian Tanaman Padi, Sukamandi (Indonesia)) 8 tables; 14 ref. Summaries (En, In). *Penelitian Pertanian Tanaman Pangan* (Indonesia) ISSN 0216-9959 (2003) v. 22(1) p. 45-50.

ORYZA SATIVA; VARIETIES; XANTHOMONAS ORYZAE; INOCULATION; PATHOTYPES; GROWTH PERIOD; DISEASE RESISTANCE.

One hundred and fifty bacterial isolates of *Xanthomonas oryzae pv. oryzae* (Xoo) were collected from naturally infected rice in West Java, Central Java, Yogyakarta, and East Java. The isolates consisted of 44 isolates collected from the rice plants at tillering stage, 65 isolates at panicle initiation, and 41 isolates at maturing stages were evaluated for their virulence on five differential varieties from Japan in Sukamandi during the dry season (DS) of 2001 and the wet season (WS) of 2001/2002. Ten leaves each hill of the 45 days old plants were inoculated with the Xoo isolates by clipping method. Disease severity was evaluated at 15 days after inoculation. Results indicated that in the DS of 2001, out of 150 Xoo isolates, 64 isolates (42.7%) were identified as group III, 23 isolates (15.3%) as group IV, and 63 isolates (42.0%) as group VIII. In the WS of 2001/2002, results indicated that 14 isolates (9 %) were identified as group III, 43 isolates (29%) as group IV, and 93 isolates (62%) as group VIII. Forty four bacterial isolates collected from the rice plants at tillering stage consisted of 15 isolates (34.1%) identified as bacterial pathotypes group III, 10 isolates (22.7%) as group IV, and 19 isolates (43.2%) as group VIII, in DS of 2001. While, in WS 2001/2002, 4 isolates (9%) were identified as group III, 15 isolates (34%) as group IV, and 25 isolates (59%) as group VIII. In DS 2001 sixty five isolates were collected from the rice plants at panicle initiation stage, consisted of 24 isolates (36.92%) were identified as group III, 12 isolates (18.46%) as group IV, and 29 isolates (44.62%) as group VIII, while in WS of 2001/2002, they consisted of 6 isolates (9%) as group III, 16 isolates (25%) as group IV, and 43 isolates (66%) group VIII. Out of 41 isolates collected from the rice plants at maturity stage, 25 isolates (61.0%), as group III, one isolate (2.44%) as group IV, and 15 isolates (36.59%) as group VIII, in DS of 2001. In WS 2001/2002, 4 isolates (10%) identified as pathotypes group III, 12 isolates (29%) as group IV, and 25 isolates (62%) as group VIII. This study indicated that the rice plant stages significantly affected the composition of bacterial Xoo pathotypes. At tillering and panicle initiation rice stages, the bacterial pathotypes group VIII is the most dominant in both seasons, while at maturing stage were the bacterial group III and group VIII in DS and WS, respectively.

238 SUSANTO, A.
***Keragaman genetik agens biokontrol Trichoderma dengan Random Amplified Polymorphic DNA (RAPD).* [Study on genetic diversity of biological control agent Trichoderma by using Random Amplified Polymorphic DNA (RAPD)]**/Susanto, A.; Utomo, C. 2 ill., 1 table; 24 ref.: Summaries (En, In). *Jurnal Penelitian Kelapa Sawit* (Indonesia) ISSN 0853-196X (2001) v. 9(2-3) p. 111-119.

OIL PALMS; GANODERMA; RAPD; BIODIVERSITY; GENETIC RESOURCES; BIOLOGICAL CONTROL; GENETIC VARIATION; BIOLOGICAL CONTROL AGENTS.

Biological control is one of control agents that has a good prospect for controlling basal stem rot disease that caused by *Ganoderma boninense*. Genus Trichoderma and Gliocladium have a potential as biocontrol agents. The capability of each isolate from both of the biocontrol agents is very variable. The selection of biocontrol agents will be important for the success of biological control agents to control basal stem rot disease. The aim of this research was to study the genetic diversity of biocontrol agents by using random amplified polymorphic DNA (RAPD) marker. Result showed that biocontrol agents fungus i.e. *T. harzianum*, *T. viride*, *G. viride* had low index diversity; otherwise they could be clustered into three groups based on RAPD marker with high genetic variation.

H50 MISCELLANEOUS PLANT DISORDERS

239 SHAHABUDDIN
***Toksisitas ekstrak akar tuba (Derris elliptica (Roxb.) Benth) terhadap larva nyamuk Aedes sp. vektor penyakit demam berdarah.* [Toxicity of tuba root ekstract of *Derris elliptica* on mortality of *Aedes* sp. larvae]**/Shahabuddin; Panggeso, J. (Universitas Tadulako, Palu (Indonesia). Fakultas Pertanian); Elijonnahdi 1 ill., 2 tables; 15 ref. Summaries (En, In). *Jurnal Agroland* (Indonesia) ISSN 0854-641X (2005) v. 12(1) p.39-44.

DERRIS; EXTRACTS; BOTANICAL INSECTICIDES; TOXICITY; MORTALITY; AEDES.

The study was conducted to evaluate the possibility of derris roots extracts (*Derris elliptica* (Roxb.) Benth) to be used as botanical insecticide by measuring effects of varied concentrations of its ethanol root extract (5%, 4%, 3%, 2% and 1% and 0% as control) on mortality of the fourth-instar of *Aedes* sp. larvae (n=30). The experiment employed a randomized completely design and five replications. The data were analysed with ANOVA, HSD and Linear regression ($\alpha = 0.01$). The results showed that there was a highly significant effect of treatment on the mortality of *Aedes* sp. There was a tendency that higher concentrations of extracts was followed by higher mortality of *Aedes* sp. ($Y = -7.40 + 15.89 X$; $r = 0.94$). The 4% concentration was considered to be the most effective as they could kill more than 50% (68.2%) of larvae. The data also showed that the application of higher concentration of extracts was associated with shorter time to kill the larvae. There was an indication that the root extracts of *Derris elliptica* had a strong toxicity and a high potential to be used as botanical insecticides against *Aedes* sp. larvae.

H60 WEEDS AND WEED CONTROL

240 LAUDE, S.
***Pertumbuhan gulma dan hasil tanaman bawang merah yang ditumpangsarikan dengan jagung manis.* [Effects of planting rows of shallot multiple cropped with sweet corn on the growth of weeds and yield of shallot]**/Laude, S. (Universitas Tadulako, Palu (Indonesia). Fakultas Pertanian); Panjang, I.L. 4 tables; 17 ref. Summaries (En, In). *Jurnal Agroland* (Indonesia) ISSN 0854-641X (2005) v. 12(2) p. 159-164.

ALLIUM ASCALONICUM; ZEA MAYS; CROPPING SYSTEMS; WEEDS; GROWTH; SWEET CORN; SPACING; YIELDS.

The research aimed at investigating the effects of the number of shallot planting rows which multiple cropped with sweet corn on the suppression of weeds. The study was carried out in Lolu Village, Donggala Regency from April to July 2003. Planting in 5, 6 and 7 rows of shallots significantly reduced dry weight as well as dominance value (SDR) of weeds. The highest dry weight of shallot was given by 3 rows of shallot. Growth and yield of sweet corn were not affected by the planting row number of shallot.

J13 HANDLING, TRANSPORT, STORAGE AND PROTECTION OF ANIMAL PRODUCTS

241 SUNARLIM, R.
***Penggunaan stimulasi listrik pada kambing lokal terhadap mutu daging selama penyimpanan suhu kamar.* Using electric stimulation of local goat on meat quality during stored at room temperature**/Sunarlim, R.; Triyantini (Balai Besar Penelitian dan Pengembangan Pascapanen Pertanian, Bogor (Indonesia)); Setiadi, B. 2 tables; 10 ref. Summaries (En, In). [Proceedings of the national seminar on livestock and veterinary in 2004. Book 1]. Prosiding seminar nasional teknologi peternakan dan veteriner 2004. Buku 1/Thalib, A.; Sendow, I.; Purwadaria, T.; Tarmudji; Darmono; Triwulanningsih, E.; Beriajaya; Natalia, L.; Nurhayati; Ketaren, P.P.; Priyanto, D.; Iskandar, S.; Sani, Y. (eds.); Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2004: p. 427-432.

GOAT MEAT; STORAGE; STIMULI; QUALITY.

The electric stimulation accelerates rigormortis and avoid muscle contraction and the meat becomes tender and flavoring. This research used six male local goats of two years age. Carcass of the goat was divided in two parts, the right portion was stimulated with 45 volt 4 A for two minutes and the left portion as control without being stimulated. The carcass was stored in room temperature during 12 hours and the other as control (fresh carcass). Randomized completely design with three replications and two treatments, i.e. electric stimulation and no electric stimulation. The parameter observed were aging loss, pH, water holding capacity, cooking loss, tenderness, total plate count, spoil test and panel test. The result showed that no significant effect ($P > 0.05$) of electric stimulation on aging loss, pH, cooking loss, total plate count and panel test during stored at room temperature for 12 hours and without stored (fresh carcass). The

electric stimulation reduced cooking loss and water holding capacity was lower in significant different of meat stored in room temperature. The color and flavor were more prefered. Carcass stored in room temperature with and without electric stimulation was not spoiled, but TPC was relatively higher (0.0808-18.08 x 10^6).

K10 FORESTRY PRODUCTION

242 PAMUNGKAS, Y.T.
Pengaruh inang primer dan media sapih terhadap kualitas bibit cendana. **Effect of primary host plant and transplanting media on the quality of sandalwood seedlings**/Pamungkas, Y.T.; Fiani, A. (Pusat Penelitian dan Pengembangan Bioteknolgi dan Pemuliaan Tanaman Hutan, Bogor (Indonesia)) 1 ill., 1 table; 5 ref. Summaries (En, In). *Jurnal Penelitian Hutan Tanaman* (Indonesia) ISSN 1829-6327 (2004) v. 1(1) p. 29-34.

SANTALUM ALBUM; ALTERNANTHERA; HOST PLANTS; TRANSPLANTING; SEEDLINGS; GROWTH.

Interaction between silviculture and utilization of good genetic material play an important role for establishing a high-productivity forest. This research was aimed at obtaining information on the effect of primary host plant *Alternanthera* sp. and replanting media on quality of seedlings of sandalwood (*Santalum album* Linn.). The research was conducted at Green House and Nursery of CBFTI in Yogyakarta for three months. This activity was laid in completely randomized design with 2 factors. The first factor was replanting media divided into 5 levels. Whereas, the second factor namely primary host plant divided into 2 levels, thus there were ten treatments. Each treatment consisted of 5 seedlings. Totally, there were 250 seedlings. The results showed that only treatment of primary host plant gave significant effect on the observed traits. The average value of rising the height, number of leaves and hardening the stem of *S. album* seedlings with or without primary host plant in succession were 10.86 cm; 10.76 leaves; 5.22 cm and 3.86 cm; 4.78 leaves; 2.04 cm. The efficient enforcement of seedlings production of *S. album* can be achieved through utilization of soil around CBFTI nursery as replanting media.

L01 ANIMAL HUSBANDRY

243 AHMAD, S.N.
Kajian sistem usaha ternak sapi potong di Kalimantan Tengah. **[Assessment of beef cattle rearing system in Central Kalimantan (Indonesia)]**/Ahmad, S.N.; Siswansyah, D.D. (Balai Pengkajian Teknologi Pertanian Kalimantan Tengah, Palangkaraya (Indonesia)); Swastika, D.K.S. 2 ill., 7 tables; 35 ref. Summaries (En, In). *Jurnal Pengkajian dan Pengembangan Teknologi Pertanian* (Indonesia) ISSN 1410-959x (2004) v. 7(2) p. 155-170.

BEEF CATTLE; FATTENING; RATIONS; ANIMAL BREEDING; ARID ZONES; KALIMANTAN.

The assessment was conducted in Sumber Rejo Village, South Barito District, Central Kalimantan in 2002 which aimed at developing a package of improved technology of beef fattening and cows breeding by improvement of feed and diseases control. It was collaborated with farmers, involved 32 cooperators and consisted of 16 farmers used existing introduced technology and the other 16 farmers used technology. Components of introduced technology were fed with green forage, concentrate and feed supplement. For animal diseases control were anthelminthic drugs for nematode worm (Monil R) and trematode worm (Dovenix R), antibiotic drug and multivitamin-mineral, and improved the sanitation of housing and cattle. While the farmers' technology which was fed with native grass, without animal diseases control. Parameters observed for 5 months were average daily gain (ADG) of cattle and farmer's income. Steers with introduced technology was significantly higher compared to that of control. ADG of bali steers was improved from 296 to 528 g/head/day and PO steers from 381 to 697 g/head/day. ADG of pregnant cows 3-4 months before calves with introduced technology was significantly higher compared to farmers'

technology. ADG of bali cows improved from 398 to 625 g/head/day and PO cows from 525 to 801 g/head/day. The average natal body weight of calves with introduced technology was higher than those of farmers' technology.

244 HANDARINI, R.
***Lama tahap pertumbuhan ranggah dalam satu siklus ranggah rusa pada rusa Timor jantan (Cervus timorensis).* Antler development stages in one antler cycle of the Timor deer stag (*Cervus timorensis*)**/Handarini, R. (Universitas Sumatera Utara, Medan (Indonesia). Fakultas Pertanian); Nalley, W.M.M.; Semiadi, G.; Agungpriyono, S.; Subandriyo; Purwantara, B.; Toelihere, M.R. 2 ill., 2 tables; 16 ref. Summaries (En, In). [Proceedings of the national seminar on livestock and veterinary in 2004. Book 1]. Prosiding seminar nasional teknologi peternakan dan veteriner 2004. Buku 1/Thalib, A.; Sendow, I.; Purwadaria, T.; Tarmudji; Darmono; Triwulanningsih, E.; Beriajaya; Natalia, L.; Nurhayati; Ketaren, P.P.; Priyanto, D.; Iskandar, S.; Sani, Y. (eds.); Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2004: p. 459-465.

CERVUS; GROWTH PERIOD; DEVELOPMENTAL STAGES; ANTLERS; WEIGHT GAIN.

Antler development stages period is the most important part to determine one antler cycle due to the characteristic, and the highest reproductive activities of Timor deer stag (*Cervus timorensis*) did not occur at each antler development stage. The deer stag has antler development as follows: pedicle (place where a new set of antler develops), velvet (young thin hairy antler) and hard antler which will be casted eventually. This research was aimed at recognizing each antler development stage period in the antler cycle which could be used to determine the active reproductive period of the stag, particularly at the hard antler stage. The research method was conducted by analyzing each natural antler development stage, i.e. the velvet, hard antler and casting stage periods for 16 months (started from June 2002 until September 2003) on five adult deer stags. Results of this research showed that those stags had individual variation on each antler development stage. The mean of velvet antler period was 148.8 ± 11.44 days, hard antler period was 208.8 ± 3.44 days and casting stage was 16 ± 0.8 days. The mean of antler cycle was 33.6 ± 11.52 days. It was concluded that the hard antler developmental stage was the longest stage of the antler cycle in which the stag had active reproductive phase, started from June to February.

245 YUSRAN, M.A.
***Pengaruh kualitas individu sapi perah terhadap nilai ekonomi produksi susu dalam kondisi peternakan sapi perah rakyat di Jawa Timur.* Influence of the individual quality of a dairy cow on the economic value of milk produced on smallholder dairy farms condition in East Java (Indonesia)**/Yusran, M.A. (Balai Pengkajian Teknologi Pertanian Jawa Timur, Malang (Indonesia)) 4 tables; 17 ref. Summaries (En, In). [Proceedings of the national seminar on livestock and veterinary in 2004. Book 1]. Prosiding seminar nasional teknologi peternakan dan veteriner 2004. Buku 1/Thalib, A.; Sendow, I.; Purwadaria, T.; Tarmudji; Darmono; Triwulanningsih, E.; Beriajaya; Natalia, L.; Nurhayati; Ketaren, P.P.; Priyanto, D.; Iskandar, S.; Sani, Y. (eds.); Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2004: p. 268-276.

DAIRY CATTLE; MILK PRODUCTION; DAIRY FARMS; LIVESTOCK; QUALITY; RATIONS; FEED CONVERSION EFFICIENCY; ECONOMIC ANALYSIS; PROFITABILITY; JAVA.

This study was carried out by using survey method in Tutur-Pasuruan Subdistrict and Ngantang-Malang Subdistrict both are in upland area which are famous as the center of the smallholder dairy farms in East Java. The evaluation was made on 146 cows that were distributed in 2 stages of individual quality, and in each stage was divided into 3 months of lactation period, namely the first 3 months (early lactation), the second 3 months lactation (mid lactation), and the third 3 months lactation (late lactation). The difference of the cows individual quality was determined based on the peak level of milk yielded (liter/day) during the first 3 month lactation period. Feed intake, milk production and feed cost were measured on each animal for 3 days consecutively. The main parameter of the economic value of milk production which was statistically analysed with nested analysis of variance was feed conversion ratio (FCR) and break event Point (BEP) of the price milk produced. Results showed that in the smallholder dairy farms condition the good individual quality of cow significantly improve FCR ($P < 0.05$), in the early lactation, mid lactation,

and late lactation were 35 %, 32 %, and 19 %, respectively, and it significantly could reduce BEP ($P < 0.05$), in those lactation periods were 26 %, 23 % and 9 % respectively. The result that selection of individual cow according to the performance of the peak level of milk yielded during the first 3 months lactation period could be guaranteed technically and economically as long as the daily recording of milk production was not available.

L02 ANIMAL FEEDING

246 ABDULLAH, S.
Pengaruh berbagai tingkat isi rumen sapi potong dalam konsentrat terhadap efisiensi penggunaan ransum kambing peranakan etawah (PE). **[Effect of beef cattle rumen content rates in the concentrates on the ration efficiency of etawah hybrid goats]**/Abdullah, S.; Mirajuddin (Universitas Tadulako, Palu (Indonesia). Fakultas Pertanian) 5 tables; 10 ref. Summaries (En, In). *Jurnal Agroland* (Indonesia) ISSN 0854-641X (2005) v. 12(2) p. 181-186.

GOATS; CONCENTRATES; RUMEN; FEED CONVERSION EFFICIENCY; RATIONS; BEEF CATTLE; WEIGHT GAIN; CONSUMPTION; PROXIMATE COMPOSITION; PRODUCTION.

This study had been done at the Research Stall at Animal Husbandry Faculty of Tadulako University Palu for 14 weeks, started from 2 November 2003 to 8 February 2004. Twenty four PE male goats aged 10-12 months with the range of weight 10-16 kg were used and placed on an individual stall which each had the size of 75 cm x 75 cm x 75 cm. The experiment was set up in randomized block design, with 4 treatments of beef cattle rumen content in concentrate of 0%, 5%, 10% and 15%. It was found that application of rumen content of beef cattle in the concentrate gave insignificant influence ($P > 0.05$) on the increasing of body weight, consumption of dry matter and feed efficiency of etawah hybrid goats (PE).

247 AMAR, A.L.
Upaya perbaikan produktivitas ternak domba rakyat yang dipelihara pada penggembalaan lahan kering di Lembah Palu. **[Improvement of local sheep productivity grazed in dryland of Lembah Palu (Indonesia)]**/ Amar, A.L.; Tantu, R.; Hamsun, M. (Universitas Tadulako, Palu (Indonesia). Fakultas Pertanian) 2 tables; 17 ref. Summaries (En, In). *Jurnal Agroland* (Indonesia) ISSN 0854-641X (2005) v. 12(4) p. 396-401.

SHEEP; FEED ADDITIVES; GENOTYPES; SEX; GROWTH; GRAZING; DRY FARMING; SULAWESI.

A study on body weight gain of local sheep was conducted for 12 weeks at 4 villages in East Palu, and 3 villages in South Palu which aimed at examining the effect of additional feeding with rice bran on the region rangelands. There were 2 genotypes of sheep studied, that is local sheep (fat tail sheep), and crossbred sheep (local x merbas sheep). A total of 300 heads were studied out of the whole sheep population at the 7 villages. Randomly, the sheeps were divided into 15 groups of 20 heads each. Within each of these groups, 10 heads were treated with no rice bran feeding (control), whilst the other 10 were given rice bran (250 g/animal daily) in the morning before grazing. Before the observation period, all the sheeps were treated with worm medicine (piperazine, 2 capsule/head). By the end of the study there were only 292 sheeps left under observation due to death, loosing of tag numbers, or being sold by the owner. Each of the sheep was weighed every week, in the morning prior to feeding by rice bran, with the purpose enable to calculate the body weight gain. Statistical analyses were done using body weight gain as 'the dependent variable'; and feeding treatments, genotype factor, and animal sex as the 'independent variables'. Body weight at the day-1 of the 12 weeks-study period was used as 'co-factor'. The results showed that rice bran treatment increased body weight gain of the sheep grazing on dry communal grazing land, whilst animal genotype had no significant effect. It was concluded that offering additional feed, such as rice bran was an alternative method for improving sheep condition and productivity in the region. On the other hand, sheep improvement by crossbreeding the local sheep with merbas sheep should be reconsidered.

248 BATUBARA, L.P.

Pengaruh kombinasi bungkil inti sawit dengan lumpur sawit serta suplementasi molasses terhadap pertumbuhan kambing potong. **Effect of the combining palm kernel cake and oil palm mud with molasses supplementation on growth of local goats**/Batubara, L.P.; Ginting, S.P.; Doloksaribu, M.; Junjungan (Loka Penelitian Kambing Potong, Galang, Deli Serdang (Indonesia)) 4 tables; 9 ref. Summaries (En, In). [Proceedings of the national seminar on livestock and veterinary in 2004. Book 1]. Prosiding seminar nasional teknologi peternakan dan veteriner 2004. Buku 1/Thalib, A.; Sendow, I.; Purwadaria, T.; Tarmudji; Darmono; Triwulanningsih, E.; Beriajaya; Natalia, L.; Nurhayati; Ketaren, P.P.; Priyanto, D.; Iskandar, S.; Sani, Y. (eds.); Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2004: p. 402-406.

GOATS; RATIONS; FEEDS; PALM KERNELS; SUPPLEMENTS; MOLASSES; WEIGHT GAIN.

A study was carried out to investigate the utilization of some oil palm byproducts such as palm oil leaf (POL); palm kernel cake (PKC) and solid ex-decanter (SED) oil palm mud as basis for feeding goats. Three combinations of PKC:SED 60%:10%; 50%:20%; 40%:30% and supplemented by 0%, 10%, 20% of molasses in ration based on 29% of POL and 1% of mineral mixture were fed to 27 young male goats individually. The results indicated that the recommended ration for goats feeding was palm kernel cake (50%); solid ex-decanter (20%); palm oil leaf (29%); mineral mixture 1% and supplemented by 20% of molasses. The daily weight gain was 57 g/head/day and feed conversion of 10.8.

249 GINTING, S.P.

Komposisi kimiawi, konsumsi dan kecernaan kulit buah dan biji markisa (Passiflora edulis) yang diberikan pada kambing. **Chemical composition, intake and digestibility of passion fruit (*Passiflora edulis*) shell and seed fed by goats**/Ginting, S.P.; Batubara, L.P.; Tarigan, A.; Krisnan, R.; Junjungan (Loka Penelitian Kambing Potong, Galang, Deli Serdang (Indonesia)) 4 tables; 12 ref. Summaries (En, In). [Proceedings of the national seminar on livestock and veterinary in 2004. Book 1]. Prosiding seminar nasional teknologi peternakan dan veteriner 2004. Buku 1/Thalib, A.; Sendow, I.; Purwadaria, T.; Tarmudji; Darmono; Triwulanningsih, E.; Beriajaya; Natalia, L.; Nurhayati; Ketaren, P.P.; Priyanto, D.; Iskandar, S.; Sani, Y. (eds.); Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2004: p. 396-401.

GOATS; RATIONS; FEEDS; PASSIFLORA EDULIS; DIGESTIBILITY; NUTRITIVE VALUE; SUPPLEMENTS; PROXIMATE COMPOSITION; CHEMICAL COMPOSITION; FEED CONSUMPTION.

A competitive feed source plays role in supporting an efficient goat production system. The diversity of feedstuffs that could be utilized economically for ruminant animals including goats should be encouraged. The processing of passion fruits (*Passiflora edulis*) produced considerable byproducts or waste materials such as shells and seeds that were not utilized for any purpose. The purpose of this study was to examine the nutritional potentials (chemical composition, digestibility, feed intake) of passion fruit shells and seeds as feed supplement either as supplements or a component of concentrate supplement for goat production. Digestibility and intake study was carried out in a digestion trial using 24 mature-male goats divided into three groups (8 heads per group), and randomly allocated into feed treatments as follows: T0: solely chopped king grass (control); T1: chopped king grass supplemented with ground marquisa shell (GMSh); T2: offered chopped King grass supplemented with ground marquisa seeds (GMSd). Each head was confined in a metabolism cage and offered the feed *ad libitum*. Feed intake study was terminated until it was observed that the intake level was constant. Digestibility of feedstuffs was measured "by difference method". Chemical analyses showed that GMSh had relatively high NDF (54%) and ADF (44%), moderate crude protein (16%), high fat (10%) and high ash (24%). GMSd had very high fat content (39%), moderate crude protein (18%), moderate NDF (44%) and ADF (35%) and high ash (16%) content. When fed as sole supplement the intake of GMSh and GMSd were relatively low about 0.42% and 0.49% of body weight, respectively. The coefficient of digestion was moderat, being 54% and 59% for GMSh and GMSd, respectively.

250 HATTA, U.

Pengaruh penggunaan ubi kayu fermentasi dan penambahan lysine terhadap sifat fisik hati dan ginjal ayam broiler. **[Effect of fermented cassava and lysine supplemented on ren and hepar performance of broiler chicken]**/Hatta, U. (Universitas Tadulako, Palu (Indonesia). Fakultas Pertanian) 4 tables; 16 ref. Summaries (En,In). *Jurnal Agroland* (Indonesia) ISSN 0854-641X (2005) v. 12(4) p. 407-411.

BROILER CHICKENS; RATIONS; CASSAVA; FERMENTATION; PROXIMATE COMPOSITION; LYSINE; APPLICATION RATES; LIVER; KIDNEYS.

The research purposed to study the effect of fermented cassava in various energy values without and with the supplemented of 0.3% lysine on ren and hepar performance of broiler chicken. The treatments applied to 150 chickens of 3 days old as folllows: E1L0 = 2800 energy without lysine supplement, E2L0 = 3000 energy without lysine supplement, E3L0 = 3200 energy without lysine supplement, E1L1 = 2800 energy with 0.3% lysine supplement, E2L1 = 3000 energy with 0.3 % lysine supplement, E3L1 = 3200 energy with 0.3% lysine supplement. The colour appearance, shape and weight of hepar and ren were observed of the treated chicken. Result of this experiment indicated that all individual treatments or their combination gave normal colour appearance, shape and weight of hepar and ren.

251 HAU, D.K.

Pengaruh probiotik terhadap retensi nitrogen dan energi serta pertumbuhan ternak sapi Bali Timor jantan. **Effect of probiotics in the ration on the nitrogen and energy retention, and the growth rate of Timor Bali cattle**/Hau, D.K.; Nulik, J.; Pohan, A.; Lailogo, O.T.; Liem, C. (Balai Pengkajian Teknologi Pertanian Nusa Tenggara Timur, Kupang (Indonesia)); Katipana, N.G.F. 3 ill. 2 tables; 12 ref. Summaries (En, In). [Proceedings of the national seminar on livestock and veterinary in 2004. Book 1]. Prosiding seminar nasional teknologi peternakan dan veteriner 2004. Buku 1/Thalib, A.; Sendow, I.; Purwadaria, T.; Tarmudji; Darmono; Triwulanningsih, E.; Beriajaya; Natalia, L.; Nurhayati; Ketaren, P.P.; Priyanto, D.; Iskandar, S.; Sani, Y. (eds.); Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2004: p. 91-96.

CATTLE; RATIONS; NITROGEN; ENERGY VALUE; PROBIOTICS; BODY WEIGHT; GROWTH RATE.

Bali cattle can adapt the climate and native feeder of Timor, but its growth has not yet reached its optimum genetic potential. There are opportunities to improve through proper feeding management, such as introduction of probiotic to improve the ability of the cattle to digest low nutritive value feeder, especially during the long dry season in Timor. An experiment was therefore carried out at the East Nusa Tenggara AIAT Subresearch Station at Lili during August-November 2003, with the aim at comparing the effectiveness of Starbio and Bioplus probiotics in improving nitrogen and energy retention as indicated by the daily weight gain (DWG) of bali cattle received ration that consisted of dry native grass, *Sesbania grandiflora* leaf and palm pith (*Corypha gebanga*). Twelve cattles aged 1.5 years with 158 ± 16 kg live weight in average were used in the experiment arranged in block randomized design with 6 replications. Data were analysed using ANOVA and regression analysis. The results indicated that: the average nitrogen retention was significantly affected by the treatment ($P < 0.05$), while energy retention was only tended to be significant ($P = 0.0789$), which indicated that cattle received Bioplus put more muscle (meat) than that of Starbio. The average DWG was highly significantly ($P < 0.01$) affected by the treatments with higher DWG in Bioplus with DWG 310 g/head/day on Bioplus treatment and 206.67 g/head/day on Starbio treatment. In the first and second period of observation, compensatory growth was observed in both treatments where there were individual animals with DWG 800 g/head/day.

252 HERNAMAN, I.

Pengaruh penggunaan berbagai tingkat kulit kopi dalam ransum penggemukan sapi potong terhadap fermentasi rumen dan kecernaan in vitro. **Effect of various coffee hull level in fattening cattle rations on rumen fermentation and digestibility *in vitro***/Hernaman, I.; Tanuwiria, U.H.; Wiyatna, M.F. (Universitas Padjadjaran, Bandung (Indonesia). Fakultas Peternakan) 4 ill., 4 tables; 23 ref. Summaries (En, In). *Bionatura* (Indonesia) ISSN 1411-0903 (2005) v. 7(1) p. 46-58.

BEEF CATTLE; COFFEA; BYPRODUCTS; RATIONS; FATTENING; FEEDING LEVEL; RUMEN DIGESTION; DIGESTIBILITY.

The experimental method used was completely randomized design with 5 treatments of coffee hull level in rations (R1 = 0%, R2 = 6%, R3 = 12%, R4 = 18%, R5 = 24%), and replicated 4 times. Parameters measured were N-NH_3, total volatile fatty acids, dry and organic matter digestibility, and pH rumen fluid. Results indicated that 6 % coffee hull in rations did not affect dry and organic matter digestibility, but decreased N-NH3 concentration. Increasing of coffee hull level over 6% reduced dry and organic matter digestibility and showed linear regression models ($P < 0.01$), respectively, $Y = 41.66 - 0.17X$, $R2 = 0.57$ and $Y = 43.02-0.23X$, $R2 = 0.70$, when, N-NH_3 response to coffee hull level can be demonstrated with quadratic regression model ($P < 0.01$), $Y = 7.431-0.252X + 0.008X2$, $R2 = 0.61$. Potential hydrogen (pH) rumen fluid had correlated to N-NH_3 concentration, and correlation model was linear regression, $Y = 5.60 + 0.12X$, $r = 0.77$ and $R2 = 0.58$.

253 KUSWANDI

Pertumbuhan sapi FH calon pejantan dengan konsentrat berbahan baku lokal. **Growth of young Friesian Holstein (FH) bulls fed a local feed resources-based concentrate**/Kuswandi; Talib, C.; Sugiarti, T. (Balai Penelitian Ternak, Bogor (Indonesia)) 3 tables; 12 ref. Summaries (En, In). [Proceedings of the national seminar on livestock and veterinary in 2004. Book 1]. Prosiding seminar nasional teknologi peternakan dan veteriner 2004. Buku 1/Thalib, A.; Sendow, I.; Purwadaria, T.; Tarmudji; Darmono; Triwulanningsih, E.; Beriajaya; Natalia, L.; Nurhayati; Ketaren, P.P.; Priyanto, D.; Iskandar, S.; Sani, Y. (eds.); Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2004: p. 232-237.

BULLS; FEEDS; CONCENTRATES; FEED CONSUMPTION; FEED CONVERSION EFFICIENCY; PROXIMATE COMPOSITION; BODY WEIGHT.

Dairy calves born by ex-imported bulls especially reared in tropical regions require sufficient high quality feeds. A study to learn growth potential of young Friesian Holstein bulls on local feed resources-based concentrate was conducted at the Research Institute for Animal Production, Ciawi, Bogor for 112 days. Ten young Friesian Holstein (FH) bulls, averaging live weight of 354.8 kg, were randomly divided into two groups to receive two concentrates (16% protein) as dietary treatments, i.e. commercial and local feed resources based (formulated) concentrate. Each concentrate was given at 4 kg/beast/day, while crossed napier grass was given *ad libitum*. Drinking water was available at any time. Measurements included feed consumption and conversion, and live weight gain. The results showed that dry matter and crude protein consumptions by the group given commercial concentrate were lower than those given formulated concentrate ($P < 0.05$), whereas energy consumption, live weight gain and feed conversion were not significantly different between treatments ($P > 0.05$). The average consumptions of dry matter were 2.0 and 2.16 kg/100 kg of body weight for the group given commercial and formulated concentrate, respectively. The values for crude protein and energy were 255 and 275 g/100 kg of body weight/day, and 4.928 and 4.873 Mcal/100 kg of body weight/day. Average live weight gain was 0.759 and 0.677 kg/day, and feed conversion ratio was 10.8 and 12.5, respectively. It concluded that FH bulls could be optimally developed in such (medium altitude) region either on commercial or local feed resources-based concentrates.

254 MARAWALI, H.H.

Analisis produksi penggemukan sapi potong dalam program sistem usaha pertanian di Kabupaten Kupang Nusa Tenggara Timur. **Productivity analysis of beef cattle fattening in the program of agricultural system in Kupang District, East Nusa Tenggara Province (Indonesia)**/Marawali, H.H.; Ratnawaty, S.; Nulik, J. (Balai Pengkajian Teknologi Pertanian Nusa Tenggara Timur, Kupang (Indonesia)) 2 tables; 13 ref. Summaries (En, In). [Proceedings of the national seminar on livestock and veterinary in 2004. Book 1]. Prosiding seminar nasional teknologi peternakan dan veteriner 2004. Buku 1/Thalib, A.; Sendow, I.; Purwadaria, T.; Tarmudji; Darmono; Triwulanningsih, E.; Beriajaya; Natalia, L.; Nurhayati; Ketaren, P.P.; Priyanto, D.; Iskandar, S.; Sani, Y. (eds.); Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2004: p. 148-154.

BEEF CATTLE; FATTENING; ANIMAL HUSBANDRY; PRODUCTIVITY; WEIGHT GAIN; FARMING SYSTEMS; NUSA TENGGARA.

Cattle fattening in the program of Agricultural Production System (APS) in Kupang was implemented to accelerate the cattle weight gain. The research intended to determine the differences of the production and factors affecting the income of both APS and non-APS farmers as well as the contribution to total income for farmers. The research was conducted from December 2001 to July 2002. Ninety samples were taken randomly out of 360 APS farmers and 114 out of 450 non-APS farmers. To determine the factors affecting the production and income, regression analysis using Cobb-Douglas function was done. It was shown that average daily gain for APS cattles were 0.55 kg/head/day while for Non-APS cattles were 0.27 kg/head/day. The factors affecting the production in APS and non-APS were business scale, feed quantity, family labor, and dummy variable of APS ($P \leq 0.01$), where as starbio quantity had negative effect ($P \leq 0.05$). The significant APS dummy variable indicated that the cattle weight gain for APS farmers was higher than that for non-APS farmers.

255 MARIYONO

Pengaruh pemberian ransum pemula dengan kadar protein berbeda terhadap kadar urea, glukosa dan VFA darah pedet pada kondisi penyapihan dini. **Effect of the crude protein content of calf starter on urea nitrogen, glucose and VFA plasma of early weaned heifer**/Mariyono (Loka Penelitian Sapi Potong, Grati, Pasuruan (Indonesia)); Suryahadi; Toharmat, T. 3 ill., 3 tables; 17 ref. Summaries (En, In). [Proceedings of the national seminar on livestock and veterinary in 2004. Book 1]. Prosiding seminar nasional teknologi peternakan dan veteriner 2004. Buku 1/Thalib, A.; Sendow, I.; Purwadaria, T.; Tarmudji; Darmono; Triwulanningsih, E.; Beriajaya; Natalia, L.; Nurhayati; Ketaren, P.P.; Priyanto, D.; Iskandar, S.; Sani, Y. (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2004: p. 238-245.

CALVES; CRUDE PROTEIN; PROTEIN CONTENT; RATIONS; UREA; GLUCOSE; BLOOD PLASMA; WEANING; PROXIMATE COMPOSITION; NUTRITIVE VALUE.

The present study was conducted to clarify the effect of crude protein content of calf starter on the urea, glucosa and VFA plasma of early weaning friesian holstein breed (FHB) heifer. Sixteen FHB heifer 4-7 d old and body weight 33-36 kg were used from d 14 to 98 of age. The heifers were randomly assigned to four dietary treatments and were housed in individual pens (1.2 m long x 1.0 m wide x 0.9 m high). The d 4 weaning calves were given fresh milk. Weaning occured at 42 d of age and then raised up to 98 d. Dietary treatments were starter differing in their crude protein (CP) contents as follows: 8%, 12%, 16%, and 20% CP on dry matter basis. The four experimental calf starters used in this study contained identical ingredients, varying only in the amounts of each ingredient so as to obtain the desires protein level. Calf starter, elephant grass and fresh water were offered *ad libitum* beginning on 8^{th} d of age. Urea, glucose and total VFA plasma were recorded. Individual samples of jugular blood were collected at 29, 57 and 85 days of age. Blood samples were collected 3 hours following the morning feeding using lithium heparin vacuette 10. Blood samples were placed immediately in an ice bath, and centrifuged at 12,000 rpm for 15 minutes. Plasma was separated from whole blood and used in the determination of glucose, urea nitrogen and VFA plasma total. Plasma was stored at -20^0C until glucose, urea and VFA determined. Plasma glucose and urea concentration were determined by the glucose reaction using photometer technique. VFA plasma was determined by distillation technique. Data were subjected to statistical analysis procedure of split-plot in time, where protein level of calf starter and the age of calves were the main plot and the subplot, respectively. Differences among means were tested for significance with Duncan test. Protein level of calf starter had no effect on level of glucose and total VFA. Calves fed calf starter diet containing 8% CP indicated less on urea nitrogen plasma ($P < 0.05$). Urea nitrogen plasma decreased with age of the calf. The interaction of protein content of calf starter and age of calves was significantly different in glucose plasma on 29 and 57 days old ($P < 0.05$).

256 MARIYONO

Pengaruh substitusi konsentrasi komersial dengan tumpi jagung terhadap performans sapi PO bunting muda. **Effect of substitution of commercial concentrate with corn tumpi on young pregnant PO cattle performance**/Mariyono; Umiyasih, U.; Anggraeny, Y.N. (Loka Penelitian Sapi Potong, Grati,

Pasuruan (Indonesia)); Zulbardi, M. 4 tables; 8 ref. Summaries (En, In). [Proceedings of the national seminar on livestock and veterinary in 2004. Book 1]. Prosiding seminar nasional teknologi peternakan dan veteriner 2004. Buku 1/Thalib, A.; Sendow, I.; Purwadaria, T.; Tarmudji; Darmono; Triwulanningsih, E.; Beriajaya; Natalia, L.; Nurhayati; Ketaren, P.P.; Priyanto, D.; Iskandar, S.; Sani, Y. (eds.); Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2004: p. 97-101.

BEEF CATTLE; RATIONS; MAIZE; CONCENTRATES; FEED CROPS; ANIMAL PERFORMANCE; NUTRITIVE VALUE; DIGESTIBILITY; COST BENEFIT ANALYSIS.

Tumpi is byproduct of corn industry and available anytime. This research was carried out at Beef Cattle Research Station which aimed at finding out effect of concentrate with corn tumpi on the performance of pregnant cow (3-5 age of pregnancy). Twenty five heads of Onggole Cross pregnant cow (2 years old), 220-260 kg of body weight were divided into 3 treatments, namely (P1) basal feed + *ad libitum* of concentrate, (P2) basal feed + *ad libitum* of tumpi, (P3) basal feed + 1.5 kg of concentrate + *ad libitum* of tumpi. The basal feed was elephant grass and rice straw feeding that offered as 2.5 % of body weight. Parameters observed were average daily gain (ADG), dry matter intake (DMI), crude protein (CP) and total digestible nutrient (TDN), feed conversion and BC ratio. Tumpi had significant effect ($P < 0.05$) to the intake of DM, CP and TDN. The DM intake of every feeding treatment consecutively were 8.12 (P2); 7.84 (P3); and 6.73 kg/day (P1). The CP intake were 0.79 (P2); 1.15 (P1); and 1.18 (P3) (kg/day). The TDN intake of every feeding treatment consecutively were 4.84 (P2); 4.62 (P3); and 3.98 kg/day (P1). The tumpi had significant effect ($P < 0.05$) to the feed conversion which were 9.38 (P1); 12.67 (P3); and 20.30 kg DM of feed/kg gain (P2), on BC ratio of every feeding treatment consecutively were 2.2 (P3); 1.2 (P2); and 1.70 (P1). It was concluded that tumpi and concentrate (P3) had optimal result to pregnant cow that gave adg as 0.4-0.6 kg/head/day.

257 MARSETYO

Pengaruh rasio energi:protein pakan terhadap bobot badan, konsumsi pakan dan konversi pakan ayam broiler pada ruangan bersuhu tinggi. **[Effect of energy:protein ratio on body weight gain, feed intake and feed conversion ratio of broilers in hot temperature]**/Marsetyo (Universitas Tadulako, Palu (Indonesia). Fakultas Pertanian) 3 tables; 14 ref. Summaries (En, In). *Jurnal Agroland* (Indonesia) ISSN 0854-641X (2005) v. 12(4) p. 418-421.

BROILER CHICKENS; RATIONS; FEED CONSUMPTION; FEED CONVERSION EFFICIENCY; TEMPERATURE; PROTEINS; BODY WEIGHT; PROXIMATE COMPOSITION.

An experiment was conducted to test the effect of different energy:protein (E/P) ratios of diet on body weight gain, feed intake and feed conversion ratio of broiler chicken. Fourty five Cobb x Cobb broilers grown in the growing period were allocated in five groups in nine small wire mash cages, three cages (replicates) for each treatment. The treatments were three diets having E/P ratios expressed as kilocalories of metabolisable energy (ME) per kilogram of diet per percent crude protein (CP) of 126, 147 and 167 which were given *ad libitum*. All cages were placed in hot temperature (28^0C) and continuously lighted-room. The drinking water was available *ad libitum* during eleven days of experimental period. The result showed that body weight gain of the chicken was significantly lower ($P < 0.05$) with ratio below or above 147. The E/P ratio had significant effect ($P < 0.05$) on feed consumption while it decreased with increasing E/P ratio of the diet. Although the E/P ratio 147 and 167 diets were resulted in the low feed conversion ratio ($P < 0.05$), the E/P ratio 147 diet was the most efficient utilized by the chickens.

258 MARTAWIDJAJA, M.

Pengaruh pemberian jerami padi fermentasi dalam ransum terhadap performa kambing peranakan etawah betina. **Effect of fermented rice straw in the ration on young crossed ewe etawah goat performance**/Martawidjaja, M.; Budiarsana, I G.M. (Balai Penelitian Ternak, Bogor (Indonesia)) 6 tables; 24 ref. Summaries (En, In). [Proceedings of the national seminar on livestock and veterinary in 2004. Book 1]. Prosiding seminar nasional teknologi peternakan dan veteriner 2004. Buku 1/Thalib, A.; Sendow, I.; Purwadaria, T.; Tarmudji; Darmono; Triwulanningsih, E.; Beriajaya; Natalia, L.; Nurhayati; Ketaren, P.P.; Priyanto, D.; Iskandar, S.; Sani, Y. (eds.); Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2004: p. 407-415.

GOATS; RATIONS; RICE STRAW; FERMENTATION; SILAGE; FEED CONSUMPTION; WEIGHT GAIN.

The experiment was carried out at the Research Institute for Animal Production Ciawi, Bogor for 12 weeks using 24 weaning Etawah crossed ewe. The goats were randomly divided into three groups, eight goats each which was given one of three dietary treatments of R1 = 37.1% dry matter (DM) of rice straw fermented (RSF) + 62.9% DM of concentrate C1; R2 = complete feed (37.1% DM of grinding RSF grinded + 62.9% DM of concentrate C1; and R3 = 37.1% DM of king grass + 62.9% DM of concentrate C2. The ration was given 3.5% of liveweight. Parameters measured were ration consumption, live weight changes and feed conversion. The result showed that dry matter intake among dietary treatment groups were not significantly different. Crude protein intake of R1 had 3.05% higher than R2. R2 had 3.52% higher than R3, while R1 and R3 were not different. The group receiving R1 had 2.5% and 4.64% higher gross energy intakes than the groups receiving R2 and R3, respectively and R2 was 2.6% higher than R3. The group receiving R1 had 8.09% and 9.87% lower average NDF intake than the groups receiving R2 and R3, while between the groups receiving R2 and R3 were not significantly different. The average daily gain (ADG) of the group receiving R1 was 29.8% significantly higher than R3 ($P < 0.05$) and 14.8% than R2 ($P > 0.05$), while R2 was 13.0% higher than R3 ($P > 0.05$). Feed conversion of the group receiving R1 had 11.86% and 24.35% more efficient than R2 and R3, and R2 had 14.17% more efficient than R3. The fermented rice straw could be used as the feed replacing king grass basal diet. Feeding unground fermented rice straw had better effects on daily gain and feed conversion efficiency.

259 MUNIER, F.F.

Pertambahan bobot badan domba ekor gemuk (DEG) yang dipelihara secara intensif. **Body weight gain of fat tail sheep in intensive rearing**/Munier, F.F.; Bulo, D.; Saidah; Syafruddin; Boy, R.; Femmi N.F.; Husain, S. (Balai Pengkajian Teknologi Pertanian Sulawesi Tengah, Palu (Indonesia)) 1 ill., 2 tables; 17 ref. Summaries (En, In). [Proceedings of the national seminar on livestock and veterinary in 2004. Book1]. Prosiding seminar nasional teknologi peternakan dan veteriner 2004. Buku 1/Thalib, A.; Sendow, I.; Purwadaria, T.; Tarmudji; Darmono; Triwulanningsih, E.; Beriajaya; Natalia, L.; Nurhayati; Ketaren, P.P.; Priyanto, D.; Iskandar, S.; Sani, Y. (eds.); Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2004: p. 341-347.

SHEEP; FEED CONSUMPTION; LEGUMINOSAE; RATIONS; WEIGHT GAIN; REARING TECHNIQUES.

Improving of rearing system for fat tail sheep (FTS) from semi intensive to intensive intends to increase body weight of the FTS. The assessment which was to observe the effect of feed supplement on body weight gain of FTS in intensive rearing (in pen) was conducted in Kawatuna Village, Subdistrict of South Palu, Palu City, Central Sulawesi from August-December 2003. Thirty two heads of fat tail ewes with 1.0 - 1.5 years old were used. The ewes were divided into four groups with eight heads each, one group in farmer pattern (control) and three groups for feed supplement treatment, i.e. P0 = 1.5 kg grass (without feed supplement), P1 = 1.5 kg grass + 0.5 kg *Gliricidia sepium* + 0.2 kg rice bran, P2 = 1.5 kg grass + 0.5 kg byproducts of peanut (*Arachis hypogaea*) + 0.2 kg rice bran, P3 = 1.5 kg grass + 0.5 kg *Desmanthus virgatus* + 0.2 kg rice bran. Feed was given twice, half portion in the morning and another half portion in the afternoon. Weighing was carried out every two weeks in the morning before feeding. The statistical analysis used Quadratic Regression by STATS VERSI 2.6 Program. Result showed that there was a significant different ($P < 0.01$) on body daily weight gain. Result of Quadratic Regression test of body daily weight gain between P0 and P1 was significantly different ($P < 0.01$), P0 and P2 was not significantly different ($P > 0.05$), P0 and P3 was significantly different ($P < 0.05$). The average of final body weight for P0 (17.94 kg/head), P1 (23.75 kg/head), P2 (21.38 kg/head), and P3 (22.50 kg/head), respectively.

260 NASER, A.

Pengaruh level energi dalam ransum terhadap status faali domba lokal yang dipelihara pada ketinggian tempat berbeda. **[Effect of energy level in rations on physiological status of local sheep reared at different altitude]**/Naser, A. (Universitas Tadulako, Palu (Indonesia). Fakultas Pertanian) 3 ill.,

5 tables; 18 ref. Summaries (En, In). *Jurnal Agroland* (Indonesia) ISSN 0854-641X (2005) v. 12(1) p. 87-93.

GOATS; ALTITUDE; ENERGY; TEMPERATURE; RESPIRATION; RATIONS; PROXIMATE COMPOSITION; CONCENTRATES.

An experiment was done from May 8th to July 27th 2003 in Nupabomba Village of Donggala Regency. The altitude was taken as the main plot and energy level as the subplot which was arranged in the split plot design. The altitude covered two elevations, namely: below 250 m and above 700 m above sea level. Five energy levels tested were 1.0, 1.25, 1.5, 1.75 and 2.0 times the basic energy requirement. The result showed that interaction of the altitude and energy levels was significantly affected body temperature and respiration as well as pulse frequencies.

261 NATSIR, M.H.

Nilai energi metabolis dan kecernaan protein tiga bahan pakan lokal pada ayam arab. **Testing metabolizable energy and protein digestibility of three local feeds on arab bred chickens**/Natsir, M.H. (Universitas Brawijaya, Malang (Indonesia). Fakultas Peternakan) 1 ill., 24 ref; Appendices Summaries (En, In). *Jurnal Ilmu-Ilmu Hayati* (Indonesia) ISSN 1410-413X (2004) v. 16(2) p. 155-164.

CHICKENS; FEEDS; ENERGY VALUE; PROTEINS; DIGESTIBILITY; RHIZOPUS OLIGOSPORUS; ENERGY METABOLISM.

The aim of this study was to assess the levels of apparent metabolizable energy (AME) and apparent metabolizable energy with nitrogen retention corrected (AMEn) and protein digestibility (DCPe) of fermented cassava waste mixed with dry poultry waste (P1), fermented banana skins mixed with dried poultry waste (P2) and fermented mixed west arrowroot waste mixed with dried poultry waste (P3), using *Rhizopus oligosporus* as the fermentation inoculum, and fed to arab bred local chickens. The study employed a crossover design in conjunction with a completely randomized design with 3 replications. The results showed all the feed types (P1, P2 and P3) gave significant effect, with $P < 0.05$ for AME and AMEn and the most significant effect ($P < 0.01$) on DCPe, and arab bred chicken fed P2 had better AME, AMEn and DCPe, giving 2053.04 kkal/kg, 2046.62 kkal/kg and 64.312%, respectively.

262 PUASTUTI, W.

Pengaruh substitusi protein by-pass hidrolisat bulu ayam terhadap ketersediaan nitrogen dan pertambahan bobot badan domba. **Effect of substitution protein feed with hydrolised feather meal as by-pass protein source on the nitrogen availability and weight gain of sheep**/Puastuti, W.; Yulistiani, D.; Mathius, I W. (Balai Penelitian Ternak, Bogor (Indonesia)) 3 tables; 19 ref. Summaries (En, In). [Proceedings of the national seminar on livestock and veterinary in 2004. Book1]. Prosiding seminar nasional teknologi peternakan dan veteriner 2004. Buku 1/Thalib, A.; Sendow, I.; Purwadaria, T.; Tarmudji; Darmono; Triwulanningsih, E.; Beriajaya; Natalia, L.; Nurhayati; Ketaren, P.P.; Priyanto, D.; Iskandar, S.; Sani, Y. (eds.); Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2004: p. 292-297.

SHEEP; FEEDS; RATIONS; PROTEIN CONCENTRATES; DIGESTIBILITY; FEATHER MEAL; NITROGEN RETENTION; WEIGHT GAIN; PROXIMATE COMPOSITION.

The study was conducted to know the effect of substitution protein feed with hydrolised feather meal as by-pass protein source in ration on protein digestibility and nitrogen retention and average daily gain of male sheep. The study used 25 male lambs with average weight 21.16 ± 2.47 kg. Sheep was grouped into 5 based on body weight. The ration consisted of 30% grass and 70% concentrate. Control ration (R0) contained total energy 72% TDN and total crude protein (CP) 15%, whereas R1-R4 was the improved ration that contained hydrolised feather meal (HBA) used to substitute protein feed and as by-pass protein source. The ration contained energy 75% TDN, crude protein 18%. The substitution of hydrolised feather meal (HBA) in the concentrate of treatmented ration was in different level i.e. R1 = grass + concentrate with 5% crude protein from HBA; R2 = grass + concentrate with 10% crude protein from HBA; R3 = grass + concentrate with 20% crude protein from HBA; R4 = grass + concentrate with 40% crude protein

from HBA. The study was conducted for 12 weeks. Parameters measured were feed consumption, protein digestibility, nitrogen retention, biological value and average daily gain (ADG). Result of the study showed that the increase of CP concentrate and HBA substitution were able to increase CP consumption ($P < 0.01$), however it did not affect on protein digestibility ($P > 0.05$) , on the other hand this substitution increased nitrogen (N) availability ($P < 0.01$) and had a tendency in improving N retention ($P < 0.10$), in contrast, though there had no effect on biological value ($P > 0.05$) which was able to increase ADG ($P < 0.01$). The effect of CP consumption on ADG followed the equation $Y = -0.008 X^2 + 3.2396x-161.74$ with value $r = 0.98$. The substitution protein feed with 10% HBA from total protein ration in R2 resulted in the highest level of N availability, and in the highest ADG (133.77 g/head/day).

263 PURNOMOADI, A.

Pengaruh ampas tahu dalam konsentrat terhadap perubahan komposisi tubuh domba garut. **Effect of tofu cake waste in concentrate feed on the changes of body composition of garut sheep**/Purnomoadi, A.; Sudarto, H.K.; Mawati, S. (Universitas Diponegoro, Semarang (Indonesia). Fakultas Peternakan) 1 table; 6 ref. Summaries (En, In). [Proceedings of the national seminar on livestock and veterinary in 2004. Book 1]. Prosiding seminar nasional teknologi peternakan dan veteriner 2004. Buku 1/Thalib, A.; Sendow, I.; Purwadaria, T.; Tarmudji; Darmono; Triwulanningsih, E.; Beriajaya; Natalia, L.; Nurhayati; Ketaren, P.P.; Priyanto, D.; Iskandar, S.; Sani, Y. (eds.); Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2004: p. 305-308.

SHEEP; SOYFOODS; BYPRODUCTS; RATIONS; CONCENTRATES; BODY WEIGHT.

Twelve garut sheep (aged 12 months, initial live weight 33.5 kg) were used to find out the effect of tofu cake waste on body composition. These sheeps were divided into three groups and were fed napier grass (*Pennisetum purpureum* sp.), concentrated feed and tofu cake waste. Napier grass was wilted for 7 days prior to feeding *ad libitu*m, while tofu cake was given in dried form. The ratio of concentrate feed and tofu cake were 100:0, 80:20 and 60:40 for TC0, TC20 and TC40, respectively to meet 50% of dry matter requirement at 4% body weight. The changes of body composition (empty body protein and empty body fat) were measured by urea space method at the first and twelveth week of treatment. The results showed that there was an increase of body protein from week 1 to 12 for TC0, TC20 and for TC40 about 0.26 kg (increased from 3.32 kg of body protein at first week), 0.39 kg (increased from 3.33 kg), and 0.68 kg (increased from 3.33 kg). The increase of empty body fat from week 1 to 12 for TC0, TC20 and TC40 were 0.46 kg (increased from 5.35 kg body fat at week 1), 0.61 kg (increased from 5.43 kg) and 1.12 kg (from 5.40 kg). This increasing of body protein for TC0, TC20 and TC40 was 0.07, 0.15 and 0.21 %, respectively, while body fat for TC0, TC20 and TC40 was 0.29%, 0.19% and 0.42%, respectively. The substitution of concentrate feed by tofu cake waste up to 40% could increase body protein and fat. Quantitatively body fat increased higher than of body protein, which supported that garut sheep is largerly used for figthing.

264 RIANTO, E.

Proporsi daging, tulang dan lemak karkas domba ekor tipis jantan akibat pemberian ampas tahu dengan aras yang berbeda. **Proportion of muscle, bone and fat of male thin tail sheep carcass fed by tofu waste**/Rianto, E.; Budiharto, M.; Arifin, M. (Universitas Diponegoro, Semarang (Indonesia). Fakultas Peternakan) 1 ill., 3 tables; 9 ref. Summaries (En, In). [Proceedings of the national seminar on livestock and veterinary in 2004. Book 1]. Prosiding seminar nasional teknologi peternakan dan veteriner 2004. Buku 1/Thalib, A.; Sendow, I.; Purwadaria, T.; Tarmudji; Darmono; Triwulanningsih, E.; Beriajaya; Natalia, L.; Nurhayati; Ketaren, P.P.; Priyanto, D.; Iskandar, S.; Sani, Y. (eds.); Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2004: p. 309-313.

SHEEP; RATIONS; SOYFOODS; BYPRODUCTS; CARCASSES; APPLICATION RATES; CARCASS COMPOSITION.

Materials used in this experiment were 12 TTS (thin tail sheep), aged 10-12 months, weighed 20.02 ± 0.95 kg (CV = 4.73%). The sheeps were fed by napier grass as the basal diet. They were allocated into a completely randomized design, consisted of 3 treatments with 4 replications. The treatments applied were level feeding of tofu waste (T1 = 0.6%, T2 = 1.2%, T3 = 1.8% of initial body weight). Parameters

measured were weight and proportion of muscle, bone and fat of carcass. The data were analysed by analysis of variance and polynomial orthogonal. The results showed that feeding of tofu waste for 12 weeks significantly ($P < 0.05$) affected the proportion of muscle, bone and fat of carcass. The proportions of meat : bone : fat were 65.11 %: 19.07% : 15.81% in T1; 60.16% : 17.72% : 22.12% in T2; and 61.25% : 15.66% : 23.08% in T3. The results concluded that feeding TTS with tofu waste at level of 0.6% - 1.8% of body weight increase the proportion of fat, but did not alter the proportion of meat and bone.

265 ROCHANA, A.
Pengaruh pemberian ransum yang mengandung berbagai tingkat bungkil kelapa sawit terhadap kecernaan ransum domba ekor gemuk dan domba merpal. **[Effect of ration containing several oil palm cake levels of feed digestibility of fat-tailed and merpal sheep]**/Rochana, A. (Universitas Padjajaran, Bandung (Indonesia). Fakultas Peternakan); Babay, S. 5 tables; 19 ref. Summaries (En, In). *Jurnal Agroland* (Indonesia) ISSN 0854-641X (2005) v. 12(1) p. 100-107.

SHEEP; DIGESTIBILITY; OIL PALMS; CRUDE PROTEIN; DRY MATTER CONTENT; CRUDE FIBRE; RATIONS.

This experiment was carried out at Experimental Station of Faculty of Agriculture, University of Tadulako from the January 2nd to February 2nd 2001. The experiment was designed with a 2 x 4 split plot randomized block design with 3 replications. The blocking was based on initial body weight of animals. The main plot was the animals (D1 = fat tailed sheep, D2 = merpal sheep), while the subplot was level of oil palm cake meal in the ration (R0 = 100% king grass; R1 = 80% king grass + 20% of the oil palm meal; R2 = 70% king grass + 30% oil palm meal; R3 = 60% king grass + 40% oil palm meal). The results of the analysis of variance showed that the main plot did not interact with the subplot to affect the ration digestibility. As a single treatment, the sheep and level of oil palm meal affected ($P < 0.01$) on the digestibility of dry matter, crude protein and crude fibre, respectively.

266 SULISTIAWATI, D.
Identifikasi bahan pakan dan pola makan belibis (Dendrocygna javanica). **[Identification of feedstuffs and consumption pattern of lesser tree ducks (*Dendrocygna javanica*)]**/Sulistiawati, D.; Marsetyo (Universitas Tadulako, Palu (Indonesia). Fakultas Pertanian) 2 tables; 14 ref. Summaries (En, In). *Jurnal Agroland* (Indonesia) ISSN 0854-641X (2005) v. 12(4) p. 427-430.

DUCKS; RATIONS; FEEDS; FEEDING HABITS; FEED CONSUMPTION.

A study on feedstuffs preference and the consumption pattern of lesser tree ducks was done in Tatura Village, Eastern Palu Subdistrict, District of Palu, from March to April, 2005, involved 10 lesser tree ducks with initial weight of 485.5 ± 14.3 g (SE). There were 10 different feedstuffs used for the experiment to examine the preference of lesser tree ducks. The ducks were collected from Sidondo Village, Sigi Biromaru Subdistrict, District of Donggala. It was revealed that the most preferred feed was rice grain (eaten at the rate of 69.37% of total feedstuffs consumption). Other some feed that consumed in very small quantity was fish meal, copra meal and soybean which were at the rate of 0.17, 0.15 and 0.02 % of total feedstuffs intake, respectively. It was also observed that they tended to consume in the morning (06.00-09.00 am) and at night (07.00-10.00 pm). The rest of time was used for standing or sitting in the cages.

267 SURYAHADI
Efek penambahan metan inhibitor, defaunating agent dan probiotik lokal dalam feed block supplement (FBS) terhadap produksi dan kualitas susu sapi perah. **Effect of methane inhibitor addition, defaunating agent and local probiotic into feed block supplement (FBS) on production and milk quality of dairy cattle**/Suryahadi (Institut Pertanian Bogor (Indonesia). Fakultas Peternakan); Bachtiar B.; Amrullah 3 ill., 5 tables; 20 ref. Summaries (En, In). [Proceedings of the national seminar on livestock and veterinary in 2004. Book 1]. Prosiding seminar nasional teknologi peternakan dan veteriner 2004. Buku 1/Thalib, A.; Sendow, I.; Purwadaria, T.; Tarmudji; Darmono; Triwulanningsih, E.; Beriajaya; Natalia, L.; Nurhayati; Ketaren, P.P.; Priyanto, D.; Iskandar, S.; Sani, Y. (eds.); Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2004: p. 221-231.

DAIRY CATTLE; SUPPLEMENTS; PROBIOTICS; METHANE; ANTIFEEDANTS; APPLICATION METHODS; MILK PRODUCTION; QUALITY; RUMEN.

The research was carried out on early May to September 2003, using 18 dairy cattles of Fries Holland (FH), lactation period 1 to 3 which be at month lactation 2 to 4 and had milk produce 8 to 20 kg/head/day. There were 3 treatments given: control (without supplementation FBS), feed block supplement-A (FBS-A) and feed block supplement-B (FBS-B). FBS-A formula was standard, while FBS-B represent new formula with active component which was exist in FBS-A and was enhanced by methane inhibitor, defaunating agent, and local probiotic. Data were analysed with the Analysis of Variances (ANOVA) and continued with Contrast Orthogonal by software SAS. The result showed that the treatments significantly increased ($P < 0.05$) milk production 4% FCM (fat corrected milk) than the control, FBS-A and FBS-B each 11.357, 13.228 and 12.118 kg/head/day. The supplementation of FBS did not influence dry matter, fat content, non fat dry matter (Solid Non Fat), specific gravity and reductace test of milk. However, there was a tendency on the improvement of the average value of those variables. In addition, the FBS increased the value of IOFC (Income Over Feed Cost) each treatment control, FBS-A and FBS-B is Rp 5393.55, Rp 9150.64 and Rp 8031.64/head/day, respectively. The study concluded that the FBS contributed to increase milk production, therefore it is suggested that it should be used.

268 UMIYASIH, U.

Penggunaan bahan pakan lokal sebagai upaya efisiensi pada usaha pembibitan sapi potong komersial: studi kasus di CV Bukit Indah, Lumajang. **Efficiency of commercial beef cattle production by using local feedstuffs: a case study on CV Bukit Indah, Lumajang [Java, Indonesia]**/Umiyasih, U.; Gunawan; Wahyono, D.E.; Anggraeny, Y.N. (Loka Penelitian Sapi Potong, Grati, Pasuruan (Indonesia)); Mathius, I W. 4 tables; 6 ref. Summaries (En, In). [Proceedings of the national seminar on livestock and veterinary in 2004. Book 1]. Prosiding seminar nasional teknologi peternakan dan veteriner 2004. Buku 1/Thalib, A.; Sendow, I.; Purwadaria, T.; Tarmudji; Darmono; Triwulanningsih, E.; Beriajaya; Natalia, L.; Nurhayati; Ketaren, P.P.; Priyanto, D.; Iskandar, S.; Sani, Y. (eds.); Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2004: p. 86-90.

BEEF CATTLE; FEEDS; FEED CROPS; RATIONS; ANIMAL HUSBANDRY; EFFICIENCY; COST BENEFIT ANALYSIS; JAVA.

This research was done with CV Bukit Indah commercial beef cattle at Lumajang Regency which purposed to find out an alternative model of efficient management by optimalization of local feedstuffs. Feed treatment was a modification feed that used 15 heads of beef cow (± 300 kg of average body weight) that divided into 3 groups of treatments that were (A) basal feed + 2.3 kg of rice bran; (B) basal feed + rice bran + probiotic; and (C) basal feed + rice bran + coffee hulls + probiotic. The basal feed consisted of 10 kg of rice straw + 7.5 kg of corn stover + 1.5 kg of gamblong. The ratio of rice bran and coffee hulls was 3:2. Probiotic was given consisted of vitamin A, with mineral Ca, Na and Cl. The gamblong and rice bran were suitable to meet the standard requirement for 0.6 kg/head/day of ADG. This research used randomized completely design and parameters observed were ADG, intake, feed efficiency, and BC ratio. The result showed that feed modification increased ADG, feed efficiency, and BC ratio. The ADG value was 0.47 (A), 0.63 (B), and 0.60 (C). Feed efficiency was from 3.67% (A) to 4.10% (B), and 4.00% (C). BC ratio was from 1.23 (A), to 1.41 (B), and 1.34 (C). It was concluded that the suitable feedstuffs could increase efficiency.

L10 ANIMAL GENETICS AND BREEDING

269 MAYLINDA, S.

Parameter genetik bobot badan dan lingkar dada pada sapi perah. **Genetic parameter of body weight and chest girth in dairy cattle**/Maylinda, S. (Universitas Brawijaya, Malang (Indonesia). Fakultas Peternakan)) Basori, H. 3 tables; 8 ref. Summaries (En, In). [Proceedings of the national seminar on livestock and veterinary in 2004. Book 1]. Prosiding seminar nasional teknologi peternakan dan veteriner 2004. Buku 1/Thalib, A.; Sendow, I.; Purwadaria, T.; Tarmudji; Darmono; Triwulanningsih, E.; Beriajaya;

Natalia, L.; Nurhayati; Ketaren, P.P.; Priyanto, D.; Iskandar, S.; Sani, Y. (eds.); Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2004: p. 170-174.

DAIRY CATTLE; HERITABILITY; GENETIC PARAMETERS; BODY WEIGHT; PRODUCTIVITY.

Genetic parameter has important role in designing selection program to improve productivity of dairy cattle. This research aimed at estimating the heritability value of body weight and chest girth of dairy cows in various ages. Research materials were body weight and chest girth records of 1, 30, 180, 365, 548 and 730 days of age, which were recorded by Progeny Testing Program of Artificial Insemination Center collaborated with JICA. A heritability value was estimated by using Interclass Correlation One Layout Model. Results of the research were: (1) heritabilities of body weight in 1, 30, 180, 365, 548 and 730 days were 0.136 ± 0.2838; 0.354 ± 0.4022; 0.8732 ± 0.6042; 0.0488 ± 0.232 ; 0.082 ± 0.2521 and 0.084 ± 0.2532, respectively; (2) heritabilities of chest girth in 1, 30, 180, 365, 548 and 730 days were 0.08 ± 0.2508; 0.3652 ± 0.4079; 0.0272 ± 0.2188; 0.0391 ± 0.226; 0.037 ± 0.221 and 0.024 ± 0.2168 respectively. The results showed that only body weight and chest girth in 30 days could be used in selection to gain cows with higher body weight in 2 years. Regression line to show the relationship between such variables were (1) $YBW7_{30\ days} = 79.6967 + 6.2665\ XBW_{30\ days}$ (2) $YBW7_{30\ days} = -35.8138 + 5.6159\ XCG_{30\ days}$. It was concluded that heritability of body weight and chest girth in 30 days of age could be used as a base in 2 years body weight selection.

270 SUMANTRI, C.

Frekuensi gen kappa kasein pada sapi perah FH berdasarkan produksi susu di BPTU Baturraden. **Frequency of the kappa-casein gene of holstein-friesian (HF) dairy cattle based on milk production in BPTU (Balai Penelitian Ternak Unggulan) Baturraden (Indonesia)**/Sumantri, C.; Maheswari, R.R.A. (Institut Pertanian Bogor (Indonesia)) Anggraeni, A.; Diwyanto, K.; Farajallah, A.; Brahmantiyo, B. 1 ill., 4 tables; 20 ref. Summaries (En, In). [Proceedings of the national seminar on livestock and veterinary in 2004. Book 1]. Prosiding seminar nasional teknologi peternakan dan veteriner 2004. Buku 1/Thalib, A.; Sendow, I.; Purwadaria, T.; Tarmudji; Darmono; Triwulanningsih, E.; Beriajaya; Natalia, L.; Nurhayati; Ketaren, P.P.; Priyanto, D.; Iskandar, S.; Sani, Y. (eds.); Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2004: p. 175-182.

DAIRY CATTLE; CASEINATES; MILK PRODUCTION; GENES; MILK YIELD; POLYMORPHISM; GENOTYPES; JAVA.

The objective of this research was to study the effect of kappa-casein polymorphism on milk yield of Holstein Friesian (HF) in Indonesia. The research used HF dairy cattle (heifers and cows) reared by BPTU Baturraden Purwokerto. Cows were selected proportionally based on the consideration for the three milk production classifications (high level for milk yield production more than 5000, moderate level between 4000-5000, and low level less than 4000 l/lactation). The research activities were carried out through: blood collecting for heifers and cows, amplifying DNA with PCR and PCR products which were digested by Pst 1 enzyme restriction, and identifying correlation between kappa-casein gene polymorphism on milk yield production. The frequency of genotype and allele or gene of kappa casein was calculated by Warwick and Legates, whereas the significant test of genotype frequency between observation and expectation was calculated by chi square test. The result showed that cows in BPT-HMT Baturraden had two alleles kappa-casein polymorphism, i.e. allele or gene A (0.47) and B (0.53), therefore, three genotypes existed including AA (0.21), AB (0.53), and BB (0.26). Friesian cows had the frequency of AA genotype almost the same as with BB and lower than genotype AB ratio of 0.20; 0.53; 0.26. The frequency genotype of AB in the moderate and high milk production classification were 0.65 and 0.44. It was higher than AA (0.16 and 0.34) and BB (0.19 and 0.22). The results showed that the genotype kappa-casein AA and AB had significantly affected the milk production.

271 SUSILAWATI, T.

Keberhasilan IB menggunakan semen sexing setelah dibekukan. **Artificial insemination using sexing of semen after freezing**/Susilawati, T. (Universitas Brawijaya, Malang (Indonesia). Fakultas Peternakan) 2 ill., 9 tables; 10 ref. Summaries (En, In). [Proceedings of the national seminar on livestock and veterinary in 2004. Book 1]. Prosiding seminar nasional teknologi peternakan dan veteriner 2004. Buku

1/Thalib, A.; Sendow, I.; Purwadaria, T.; Tarmudji; Darmono; Triwulanningsih, E.; Beriajaya; Natalia, L.; Nurhayati; Ketaren, P.P.; Priyanto, D.; Iskandar, S.; Sani, Y. (eds.); Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2004: p. 195-206.

CATTLE; ARTIFICIAL INSEMINATION; SPERMATOZOA; SEMEN; ANIMAL EMBRYOS; SEX DIAGNOSIS; EGG YOLK; PREGNANCY.

Alternative method for separating of X-Y spermatozoa should be cheap, easy and applicable for artificial insemination. Sexing using centrifugation Gradient Percoll, Sephadex Filtration and White Egg Yolk were the alternative methods. The purpose of this research were (1) to find out the best diluter for sexing; (2) to know the quality of frozen spermatozoa of sexing sperm using three methods; (3) to find the fertility of cow after insemination with sexing sperm produced from three methods. The products received were (1) TCM 119 + egg yolk is the best diluter for sexing; (2) quality of sexing sperm after frozen have motility 10%-20% and reversible for artificial insemination with double straw; (3) 80% of cows were pregnant after insemination using frozen sexing sperms obtained from those three methods.

L51 ANIMAL PHYSIOLOGY – NUTRITION

272 NATSIR, A.
Karakteristik degradasi rumen dari jerami barley yang diperoleh dari dua tingkat umur berbeda dan telah diberi perlakuan radiasi mikrowave. **Rumen degradation characteristics of microwave-treated barley straw cut at two different stages of maturity**/Natsir, A. (Universitas Hasanuddin, Makassar (Indonesia). Fakultas Peternakan) 4 tables; 24 ref. Summaries (En, In). *Buletin Ilmu Peternakan dan Perikanan* (Indonesia) ISSN 0853-3555 (2004) v. 8(2) p. 97-108.

BARLEY; STRAW; MICROWAVE RADIATION; BIODEGRADABILITY; RUMEN DIGESTION.

Research was carried out to investigate the effects of microwave radiation on the rumen degradation characteristics of barley straw obtained from two different stages of maturity. The experiment was arranged factorially based on completely randomized block design. The first factor was stage of maturity, straw cut during the soft elongation time (C1) and during the harvest time (C2). The second factor was levels of microwave radiation times (MWRT) T0 = control, without MWR; T1= MWR for 1 minute, and T2= MWR for 2 minutes. The results indicated that nutritive values of barley straw obtained from C1 sampling time were significantly better than that obtained from the C2 sampling time in terms of a higher rumen degradation rate and much greater total potential rumen degradability. In contrast, MWR did not have significant effects on the rate of degradation and total potential degradability of straw in the rumen.

L52 ANIMAL PHYSIOLOGY – GROWTH AND DEVELOPMENT

273 POHAN, A.
Tampilan produktivitas ternak sapi bali pada dua musim yang berbeda di Timor Barat. **Productivity performance of bali cattle during dry and wet seasons in West Timor (Indonesia)**/Pohan, A.; Liem, C.; Nulik, J. (Balai Pengkajian Teknologi Pertanian Nusa Tenggara Timur, Kupang (Indonesia)) 4 ill., 1 table; 5 ref. Summaries (En, In). [Proceedings of the national seminar on livestock and veterinary in 2004. Book 1]. Prosiding seminar nasional teknologi peternakan dan veteriner 2004. Buku 1/Thalib, A.; Sendow, I.; Purwadaria, T.; Tarmudji; Darmono; Triwulanningsih, E.; Beriajaya; Natalia, L.; Nurhayati; Ketaren, P.P.; Priyanto, D.; Iskandar, S.; Sani, Y. (eds.); Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2004: p. 155-161.

CATTLE; ANIMAL PERFORMANCE; PRODUCTIVITY; WET SEASON; DRY SEASON; MORTALITY; FARM SURVEYS; NUSA TENGGARA.

The study aimed at obtaining proper information on the productivity of bali cattle in the two seasons. The output expected was an appropriate technology of mating control for the region at which calves can be

born during the period of sufficient fodder to obtain a high survival rate. Methodology used in the study included survey and direct observations on 250 heads of Timor Bali cow and 50 Timor Bali calves during dry and wet seasons, involving 100 cooperators (farmers) in the cattle agribusiness program conducted by the Livestock Services. Parameters observed included birth weight, sex ratio, daily live weight gain, mortality rate, conception rate, and body score condition. The results indicated that there were significant differences in all parameter observed both in calves and cows between the two distinct seasons. Highly significant differences were obtained in daily live weight gain (DLWG) of cows especially the one with calf where its body weight was loss of 316 g/head/day, while on dry season only 75 g/head/day. Calf mortality rate during dry season was 6.6%.

L53 ANIMAL PHYSIOLOGY – REPRODUCTION

274 ANGGRAENY, Y.N.

Efektivitas substitusi pengencer tris-sitrat dan kolesterol menggunakan air kelapa dan kuning telur terhadap kualitas semen beku sapi potong. **Effectivity of diluter substitution of tris-citrat and cholesterol using coconut water and egg yolk to beef cattle frozen semen quality**/Anggraeny, Y.N.; Affandhy, L.; Rasyid, A. (Loka Penelitian Sapi Potong, Grati, Pasuruan (Indonesia)) 4 tables; 22 ref Summaries (En, In). [Proceedings of the national seminar on livestock and veterinary in 2004. Book 1]. Prosiding seminar nasional teknologi peternakan dan veteriner 2004. Buku 1/Thalib, A.; Sendow, I.; Purwadaria, T.; Tarmudji; Darmono; Triwulanningsih, E.; Beriajaya; Natalia, L.; Nurhayati; Ketaren, P.P.; Priyanto, D.; Iskandar, S.; Sani, Y. (eds.); Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2004: p. 49-56.

BEEF CATTLE; SEMEN; SEMEN PRESERVATION; FREEZING; QUALITY; EGG YOLK; COCONUT WATER; CHOLESTEROL; CITRATES.

The test of substitution effectiveness of tris-citrate and cholesterol was done by Beef Cattle Research Station that used three heads of Simmental Cross Bulls. This research used completely randomized design (CRD) with factorial pattern 2 x 2 x 2. The first factor was diluter (tris-citrate and cholesterol), the second factor was cholesterol level (0 and 0.5 mg/cc) and the third factor was egg yolk (10% and 20%), each treatment was repeated by six times. Test to fresh semen quality were conducted for volume, colour, consistency, spermatozoa concentration, motility (cluster and individually), mortality and morphology. Spermatozoa concentration of each straw was 50-100 billion/ml and it was stored at -196^0C. The parameters observed were motility, and viability of spermatozoa on diluent process, after equilibration process and postthawing process. The result showed that volume semen of Simmental Cross was 5.8 ± 0.8 ml/ejaculation. At diluent process, motility and viability were affected by diluter ($P < 0.01$). At equilibration process, motility was affected by diluter ($P < 0.01$); then viability was affected by interaction of cholesterol and egg yolk. At postthawing process, motility was affected by diluter ($P < 0.01$), while viability was affected by cholesterol, diluter, egg yolk, the interaction of diluter and glycerol and the interaction of diluter and egg yolk ($P < 0.01$). The cost of frozen semen using coconut water was Rp 300/6 ml, while using tris-citrate was Rp 800/6 ml. The substitution of coconut water to tris-citrate was less effective because of low motility (12.5% - 17.5%) than of tris-citrate (40%).

275 BATOSAMMA, J.T.

Penampilan reproduksi sapi perah Australia Friesian Sahiwal. **Reproductive performance of Australian Friesian Sahiwal dairy cattle**/Batosamma, J.T. (Universitas Hasanuddin, Makassar, (Indonesia). Fakultas Peternakan) 1 table; 20 ref. Summaries (En, In). *Buletin Ilmu Peternakan dan Perikanan* (Indonesia) ISSN 0853-3555 (2004) v. 8(2) p. 109-115.

DAIRY CATTLE; REPRODUCTIVE PERFORMANCE; ARTIFICIAL INSEMINATION; OESTROUS CYCLE.

The Australian Friesian Sahiwal (AFS) dairy cattle which are well known as Sahiwal Cross were sent from Australia to South Sulawesi in 1976. Nowadays, there are only found in Enrekang Regency. However, information on their reproductive performance is very limited. Therefore in a survey conducted

from January to March 2004, direct interviews to the farmers in Pinang Village, Cendana District, Enrekang Regency, were performed to gain information regarding the reproductive performance of the AFS dairy cattle compared with that of Friesian Holstein (FH) dairy cattle. The result indicated that the average first mating age using artificial insemination (AI) method and first calving on AFS dairy cattle were significantly earlier ($P < 0.05$) than that of FH dairy cattle (24.80 and 33.83 months vs 27.30 and 36.33 months). The average of estrous cycle and first mating after calving for AFS dairy cattle were 20.5 and 64.5 days respectively and were not different ($P > 0.05$) from FH dairy cattle which were 20.7 and 70.2 days, respectively. Based on this result, it was concluded that the reproductive performance of AFS cattle in Enrekang Regency was normal and reproductive efficiency was fairly high.

276 JUNIARTI, Y.

***Pengaruh jumlah produksi telur terhadap fertilitas dan daya tetas telur pada burung parkit (Melopsittacus undulatus).* Effect of egg production on parakeets (*Melopsittacus undulatus*) fertility and hatchability**/ Juniarti, Y. (Universitas Brawijaya, Malang (Indonesia). Fakultas Peternakan) 2 tables; 12 ref. Summaries (En, In). *Jurnal Ilmu-Ilmu Hayati* (Indonesia) ISSN 1410-413X (2004) v. 16(2) p. 150-154.

BUDGERIGARS; FERTILITY; EGG PRODUCTION; EGG HATCHABILITY.

The research was conducted at The Parakeet Breeding Farm located at Lowokwaru, Malang from October 2001 to January 2002 to find out the effect of egg production on parakeets' fertility and egg hatchability. The respondents included 15 pairs of birds in wire cages 40 cm x 40 cm x 30 cm. A randomized block design was used, the variables included fertility and hatchability that were measured with 3 treatments, P1 for high egg production, P2 for medium egg production, and P3 for low egg production. Each test was repeated 5 times. The research showed that egg production had a significant effect on fertility ($P < 0.01$). However, it did not have a significant effect on hatchability ($P > 0.05$) since it mainly affected by fertility. The mean fertility rates were P1: 40.17 ± 1.17, P2: 75.24 ± 13.19, P3 82.94 ± 5.70 %. And the mean hatchability rates were: P1: 38.41% ± 22.24%, P2: 62.33% ± 34.65%, and P3: 75.88% ± 19.35%.

277 KOSTAMAN, T.

***Karakteristik semen kambing peranakan Etawah (PE) dan Boer.* Semen characteristics of Etawah cross and Boer goats**/Kostaman, T.; Sutama, I K. (Balai Penelitian Ternak, Bogor (Indonesia)) 1 table; 12 ref. Summaries (En, In). [Proceedings of the national seminar on livestock and veterinary in 2004. Book 1]. Prosiding seminar nasional teknologi peternakan dan veteriner 2004. Buku 1/Thalib, A.; Sendow, I.; Purwadaria, T.; Tarmudji; Darmono; Triwulanningsih, E.; Beriajaya; Natalia, L.; Nurhayati; Ketaren, P.P.; Priyanto, D.; Iskandar, S.; Sani, Y. (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2004: p. 381-384.

GOATS; SEMEN; MOVEMENT; QUALITY.

A study was conducted to evaluate semen characteristic of Etawah crosses and Boer goats at Research Institute for Animal Production at Ciawi, Bogor. Semen was collected every week from 3 Etawah cross and Boer goats, for 4 weeks, and was evaluated for volume, motility, live sperm, abnormal sperm, and sperm concentration. Results showed that volume were 0.96 and 0.92 ml; motility 72.29% and 69.79%, live sperm 76.71% and 76.87%, sperm abnormalities 8.62% and 9.83%, and sperm concentration 2865 x 10^6/ml and 2675 x 10^6/ml, respectively for Etawah cross and Boer goats. There was no significant differences ($P > 0.05$) for all parameter evaluated between Etawah cross and Boer goats.

278 KUSUMANINGRUM, D.A.

***Pengaruh seminal plasma dan konsentrasi kuning telur terhadap kualitas semen cair yang disimpan pada suhu ruang.* Effect of the seminal plasma and egg yolk concentration on the quality of diluted semen stored at room temperature**/Kusumaningrum, D.A.; Triwulanningsih, E.; Situmorang, P.; Sugiarti, T.; Sianturi, R.G. (Balai Penelitian Ternak, Bogor (Indonesia)) 5 tables; 11 ref. Summaries (En, In). [Proceedings of the national seminar on livestock and veterinary in 2004. Book 1]. Prosiding seminar nasional teknologi peternakan dan veteriner 2004. Buku 1/Thalib, A.; Sendow, I.; Purwadaria, T.; Tarmudji; Darmono; Triwulanningsih, E.; Beriajaya; Natalia, L.; Nurhayati; Ketaren, P.P.; Priyanto, D.;

Iskandar, S.; Sani, Y. (eds.); Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2004: p. 207-213.

CATTLE; ARTIFICIAL INSEMINATION; EGG YOLK; SEMEN; SEMEN PRESERVATION; DOSAGE; QUALITY; VIABILITY; MOVEMENT.

The study was carried out to determine the effect of seminal plasma and egg yolk concentration on the viability of sperm stored at room temperature. Semen was collected from FH bull using artificial vagina. This research was designed with completely randomize with 2 x 4 factorial. The first factor was seminal plasma (NPS= without seminal plasma; PS= with seminal plasma) and the second factor was egg yolk (KT) concentration (0%, 1%, 2%, and 3% v/v). The collected semen was divided into two parts. One part was centrifuged (2400 rpm, 10 minutes) to remove the seminal plasma, the other was uncentrifuged. Both parts of semen were diluted with tris-citrat buffer contained 0%, 1%, 2% and 3% of KT. The diluted semen was stored at room temperature and observed. The parameters observed were sperm motility (percentage M), live sperm (percentage H) and intact apical ridge (percentage TAU) for five days or until all the spermatozoa died. The result of the research showed that there was no interaction between seminal plasma and egg yolk concentration. On day-0 and day-1, percentage M and percentage TAU of the semen with seminal plasma (PS) were higher ($P < 0.05$) than to the semen without seminal plasma (NPS), which were 69.5%, 35.7% vs 65.5%, 27.4% from M and 71.3%, 59.5% vs 65.7%, 55.84% for percentage TAU, respectively. In general, increasing egg yolk concentration up to 3% increased the viability of spermatozoa. Sperm of the semen with seminal plasma and 3% egg yolk (v/v) showed the best viability and could stand alive until day-3 with percentage M, percentage H and percentage TAU or 16.4%, 30.5% and 48.4%, respectively. It was concluded that seminal plasma and egg yolk were still needed in the medium of tris-citrat buffer to promote the viability of sperm at room temperature.

279 MUMU, M.I.

Pengamatan bobot badan sapi bali, peranakan Ongole dan lokal jantan dan betina di Kabupaten Donggala Sulawesi Tengah. **[Weight gain performance of Ongole breed, bali cattle and local bull and heifer cattle in Donggala District, Central Sulawesi (Indonesia)]**/Mumu, M.I. (Universitas Tadulako, Palu (Indonesia). Fakultas Pertanian) 1 ill., 3 tables; 15 ref. Summaries (En, In). *Jurnal Agroland* (Indonesia) ISSN 0854-641X (2005) v. 12(4) p. 402-406.

BEEF CATTLE; BULLS; HEIFERS; BREEDS (ANIMALS); AGE; WEIGHT GAIN; SULAWESI.

This study involved 392 heads of cattles consisting of 59 heads of bali cattle, 125 heads of Ongole breeds and 208 local cattles of which 187 heads were bulls and 205 were heifers. Data collected were on breed, sex, age and weight gain, and were statistically analysed using Minitab software. Regression analysis was done to the effect of age on weight gain. The aim of this experiment was to find out the effect of breed and sex on the daily weight performance of cows at Sigi Biromaru and Parigi Subdistrict. Analysis of variance results showed that the effect of sex was not significant ($P > 0.05$) on weight gain whereas age was significant ($P < 0.05$) on the weight gain of bali cattle, Ongole breeds and local cattle. Meanwhile, the analysis of variance of the effect of breed was also not significant ($P > 0.05$) either on weight gain.

280 PAMUNGKAS, D.

Kualitas spermatozoa sapi PO hasil sexing dengan teknik sentrifugasi menggunakan gradien putih telur dalam beberapa imbangan tris-buffer: semen. **Sexed sperm quality of PO cattle using centrifugation methods with albumin column in the different ratio of tris-buffer: semen**/Pamungkas, D.; Affandhy, L.; Wijono, D.B.; Rasyid, A. (Loka Penelitian Sapi Potong, Grati, Pasuruan (Indonesia)); Susilawati, T. 1 ill., 4 tables; 13 ref. Summaries (En, In). [Proceedings of the national seminar on livestock and veterinary in 2004. Book 1]. Prosiding seminar nasional teknologi peternakan dan veteriner 2004. Buku 1/Thalib, A.; Sendow, I.; Purwadaria, T.; Tarmudji; Darmono; Triwulanningsih, E.; Beriajaya; Natalia, L.; Nurhayati; Ketaren, P.P.; Priyanto, D.; Iskandar, S.; Sani, Y. (eds.); Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2004: p. 36-43.

CATTLE; SPERMATOZOA; SEMEN; QUALITY; SEX DIAGNOSIS; APPLICATION RATES; EGG WHITE.

Recently, the separation of sperm X and Y is well developed which aims at reaching the expected sexed of the offspring such male or female. However, the result of sexing spermatozoa and pregnancy successed in the field was in wide range; so, optimalization of separation by using the efficient materials is still needed. An experiment of sperm sexing was done in Loka Penelitian Sapi Potong laboratory to attain the efficient ratios of semen and the diluter for high sexed sperm quality. The PO bulls (I1) were used for semen provision. The procedure allows semen collecting and evaluating, centrifugation, thawing and freezing. The experiment was arranged in completely randomized design. The treatments A (1:0.5) ml, B (1:1) ml and C (1:1.5) ml of tris buffer and semen. Each treatment included 10 replications. The quality of semen observed were: volume, consistency, color, pH, concentration, viability and motility; meanwhile the sexed sperm observed were motility, pH, and head size of sperm. Through four collections, the mean of volume obtained was 3.83 ± 0.29 ml, the consistency moderately, pH 7.0, concentration 2126.67 ± 513.16 million/ml, viability 81.33% ± 3.52%, motility 83.33% ± 2.89%, and progressive mass (+++). Result of sexed sperm after thawing 5^0C at 6 days, showed that motility on A (53.75%) of upper fraction higher ($P < 0.05$) than those on B (46.25%) and C (45.0%); while pH did not show significant difference (range 7.30 to 7.45); similarly to head size of sperm (ranged 34.05-34.92 micrometer). As of postthawing, the motility of sexed sperm on all treatments showed very low, ranged 1.67%-6.25% (upper fraction) and 0.00%-6.25% (lower fraction).

281 PRAJOGA, S.B.K.

Penggunaan model test day regresi tetap (FRTDM) dalam estimasi efisiensi relatif seleksi tidak langsung produksi susu pada sapi perah Fries Holland. **Estimation of relative efficiency of indirect selection for milk yield using fixed regression test days model (FRTDM) on Fries Holland dairy cattle**/Prajoga, S.B.K. (Universitas Padjadjaran, Bandung (Indonesia). Fakultas Peternakan) 1 ill., 4 tables; 14 ref. Summaries (En, In). *Zuriat* (Indonesia) ISSN 0853-0808 (2005) v. 16(1) p. 73-83.

DAIRY CATTLE; MILK PRODUCTION; SELECTION; PRODUCTION DATA; YIELDS.

This research was conducted at KPTM Pasir Salam, Sukabumi on October 2004. The objectives of this study were to estimate response to selection, correlated response to selection and relative efficiency of indirect selection on 305 days milk yield base on Test Day (TD). The data comprised 160 cumulative records (305 days records) and 2,400 TD records of 160 first lactation cows, which were progeny of 23 sires and 140 dams using Univariate Fixed Regression Test Days Model (UFRTDM). Variance component, heritability and genetic correlation were estimated by Restricted Maximum Likelihood (REML) using Bivariate Animal Model with The Program of VCE 4.2. Breeding values of milk yield were estimated by Best Linier Unbiased Prediction (BLUP). Fixed effect was lactation and season year. Response to selection was 53.565 kg, when selection intensity was used 131 dams and 16 sires. Either, for correlated response to selection was 53.489 kg for the same intensity. The relative efficiency of indirect selection for 305 days record base on test day's record milk yield was 1.033. According to this research, selection of milk yield 305 days could be carried out based on 49 days milking (TD3).

282 RIADY, G.

Pengaruh jenis hormon sinkronisasi terhadap rasio jenis kelamin anak kambing. **Effect of type of hormonal regimens for oestrous synchronization on sex ratio in local goats**/Riady, G.; Thasmi, C.N.; Hamdan (Universitas Syah Kuala Darussalam, Banda Aceh (Indonesia). Fakultas Kedokteran Hewan) 1 ill., 1 table; 15 ref. Summaries (En, In). [Proceedings of the national seminar on livestock and veterinary in 2004. Book 1]. Prosiding seminar nasional teknologi peternakan dan veteriner 2004. Buku 1/Thalib, A.; Sendow, I.; Purwadaria, T.; Tarmudji; Darmono; Triwulanningsih, E.; Beriajaya; Natalia, L.; Nurhayati; Ketaren, P.P.; Priyanto, D.; Iskandar, S.; Sani, Y. (eds.); Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2004: p. 389-395.

GOATS; OESTRUS SYNCHRONIZATION; PROSTAGLANDINS; SEX HORMONES; PROGESTERONE.

A study was conducted by using 24 ewes with the age between 2-4 years old weighing between 20-26 kg. All ewes sample were divided into 3 treatment groups which consisted of 8 ewes each. One potential buck, with the age of 3 years old and its body weight of 32 kg was used in this experiment. The first

treatment group was administered analogue prostaglandine, cloprostenol, with the dose of 31.25 microgram and injected intravulvosubmucosally. The second treatment group was given intravaginal progesterone implant for 17-18 days; whereas the control group was not treated with any hormonal regime. This study was designed using completely randomized design and data on sex ratio of the newborns were analysed using Analysis of Variance. The result showed that the number of male young goats in the first treatment group were more (9 heads) and differs significantly ($P < 0.05$) than those of the second treatment group (5 heads). Treatment group subjected with intravaginal progesterone implant produced more ewes young (11 heads) that differs significantly ($P < 0.05$) than those of the first treatment group (2 heads). It could be concluded that oestrous synchronization protocol using prostaglandine tended to produce more male newborns, whereas progesterone tended to result more female of local goats.

283 SUGIARTI, T.
Penggunaan katalase dalam produksi semen dingin sapi. **Use of catalase on cattle chilled semen production**/Sugiarti, T.; Triwulanningsih, E.; Situmorang, P.; Sianturi, R.G.; Kusumaningrum, D.A. (Balai Penelitian Ternak, Bogor (Indonesia)), 6 tables; 7 ref. Summaries (En, In). [Proceeding of the national seminar on livestock and veteriner in 2004. Book 1]. Prosiding seminar nasional teknologi peternakan dan veteriner 2004. Buku 1/Thalib, A.; Sendow, I.; Purwadaria, T.; Tarmudji; Darmono; Triwulanningsih, E.; Beriajaya; Natalia, L.; Nurhayati; Ketaren, P.P.; Priyanto, D.; Iskandar, S.; Sani, Y. (eds.); Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2004: p. 215-220.

CATTLE; SPERMATOZOA; SEMEN; CATALASE; DOSAGE; VIABILITY; SEMEN PRESERVATION.

A completely randomized design of experiment was conducted to study effect of catalase enzyme on the viability of sperm. Semen was collected from 2 FH bulls. The treatments were 0 (control), 0.025, and 0.050 g/ml enzyme added to extender. Semen was observed macroscopic and microscopically. The microscopic observation included percentage of motility (percentage M), live sperm (percentage H), intact aprical ridge (percentage TAU), and intact plasma membrane (percentage MPU) on day 0, 1, 4, and 8. Result showed that viability (percentage M, percentage H, percentage TAU, and percentage MPU) of the sperm was not significantly affected by the addition of catalase, although there was a tendency that enzyme addition of 0.05 g/ml addition improved the viability of the sperm.

284 TAGAMA, T.R.
Konservasi semen domba (Ovies aries) sebagai upaya peningkatan kualitas spermatozoa. **[Improving sheep spermatozoa quality through semen conservation]**/Tagama, T.R. (Universitas Jenderal Soedirman, Purwokerto (Indonesia). Fakultas Peternakan); Rusdin, 3 tables; 21 ref. Summaries (En, In). *Jurnal Agroland* (Indonesia) ISSN 0854-641X (2005) v. 12(2) p. 121-127.

SHEEP; SEMEN; QUALITY; SPERMATOZOA; GLYCEROL; VIABILITY.

Effects of glycerol as extender in semen diluter suspension on the quality of spermatozoa were examined in garut local sheep. Glycerol was added in various concentrations to the semen diluter (egg yolk sodium citrate). Motility, resistance, and viability of spermatozoa in the diluter were significantly affected by glycerol concentration. It was found that higher concentration of glycerol tend to increase the motility, resistance and viability of spermatozoa.

N20 AGRICULTURAL MACHINERY AND EQUIPMENT

285 MASSINAI, R.
Uji alat tanam dan pemupukan lahan kering di Kecamatan Cempaga Kabupaten Kotawaringin Timur, Kalimantan Tengah. **[Test of seed planting and fertilizing machinery and equipment in Cempaga, Kotawaringin Timur, Central Kalimantan (Indonesia)]**/Massinai, R. (Balai Pengkajian Teknologi Pertanian Kalimantan Tengah, Palangkaraya (Indonesia)) 4 tables; 9 ref. Appendices Summaries (En, In).

Jurnal Pengkajian dan Pengembangan Teknologi Pertanian (Indonesia) ISSN 1410-959x (2004) v. 7(2) p. 193-203.

ORYZA SATIVA; ZEA MAYS; GLYCINE MAX; PLANTING EQUIPMENT; FERTILIZATION; SOWING; DRY FARMING; KALIMANTAN.

The test was conducted in Pundu, Cempaga District, Kotawaringin Timur Regency on farm research area about one hectare each belonging to two cooperator farmers. Three crops were planted in wet season (October). Both equipment and machinery were operated using four wheel tractor of more than 40 Horse Power (HP) modified by Balai Besar Alat dan Mesin Pertanian, Serpong. The assessment aimed at determining performance of agricultural machinery for seed planting of rice, maize, and soybean. Seed planting machines were tested with three replications. Results showed that use of planting and fertilizing machines was equal to 2 hours/hectare with 2 operators. Human labour used in each crop was not equal and it depended on cropping spaces. Labour used for farming practice of rice, maize, and soybean was 450 hours/ha, 150 hours/ha, and 300 hours/ha, respectively. Performance of equipment and machinery for rice cultivation was 4 ha or 2 ha/1 man day (MD) per day using 2 operators. It was equal to 112.5 MD using human labour and it could save the labour cost up to Rp 536,938.

P06 RENEWABLE ENERGY RESOURCES

286 DARNOKO

Pemanfaatan pelepah kelapa sawit untuk pembuatan pulp dan kertas cetak. **[Utilization of oil palm fronds for pulp and paper processing]**/Darnoko; Guritno, P.; Erwinsyah; Pratiwi, W. (Balai Besar Selulosa, Bandung (Indonesia)) 2 tables; 34 ref.: Summaries (En, In). *Jurnal Penelitian Kelapa Sawit* (Indonesia) ISSN 0853-196X (2001) v. 9(2-3) p. 63-76.

OIL PALMS; STEMS; PULP; NEWSPRINT; PAPER; PROCESSING.

Indonesia produces pulp which contributes about 13% of the world production, while the supply of wood as the raw material decreases. It is needed to find alternative raw materials. On the other hand, Indonesian palm oil industry produces a large quantity of lignocellulosic wastes such as empty fruit bunches and oil palm fronds resulted from pruning or replanting which have a great potential to be used as a raw materials for pulp and paper production. The objective of this research was to find out the optimum condition for the production of pulp and paper from oil palm fronds. Pulping was done by sulphate process at various active alkali concentrations in a rotary globe digester. Pulp bleaching was done by conventional process applying bleaching order of CEHEH and HEHEH where C=Chlorination, E=Extraction, and H=Hypochlorination. The results showed that an active alkali of 18% and a ratio of raw material chips to the pulping liquor of 1:5 was found to be the optimum condition for pilot scale pulping of oil palm fronds. The yield obtained was 45.58 % with a kappa number of 29.16. For bleaching process the HEHEH order was found to be better than CEHEH one. The production of print paper from the pulp produced paper with a grammature of 70 g/m^2 and whiteness of 81.5%-83% GE with a yield of 47.88%.

P10 WATER RESOURCES AND MANAGEMENT

287 ZUSFAHAIR

Uji Escherichia coli pada air sumur yang digunakan sebagai sumber air minum di Kelurahan Grendeng dan Karangwangkal Kecamatan Purwokerto Utara. **[*Escherichia coli* testing from dug wells water used for drinking water in Purwokerto Utara Subdistrict (Indonesia))**/Zusfahair; Setyaningtyas, T. (Universitas Jenderal Soedirman, Purwokerto (Indonesia). Fakultas Matematika dan Ilmu Pengetahuan Alam) 2 tables; 10 ref. Summaries (En, In). *Majalah Ilmiah Universitas Jenderal Soedirman* (Indonesia) ISSN 0126-2475 (2004) v. 30(3) p. 79-87.

ESCHERICHIA COLI; DRINKING WATER; WELLS; QUALITY CONTROLS; JAVA.

The most efficient indicator for detecting the faeces contamination used *E. coli* bacteria. The aim of this experiment was to know the quality of drinking water used by people in Grendeng and Karangwangkal which observed microbiologically by the *E. coli* bacteria number. The samples were taken from dug wells and the huge number population of ten samples respectively. The methods used were the MPN with the LB and EC broth medium, and the incubation temperature at 37^0C and 44^0C. The result showed that the number of *E. coli* in sample water which was taken from the dug wells closed to the river in Karangwangkal >1,100 per ml, while in Grendeng was about 23 up to >1,100 per 100 ml. The quality of *E. Coli* from dug wells which was taken from the huge numbers population in Karangwangkal was 93 up to >1,100 per 100 ml, while in Grendeng was about 3.6 up to >1,100 per 100 ml. According to the quality of these bacteria, it could be concluded that the quality of dug wells which was used for drinking water resources that located closed to the river and the huge number population in Karangwangkal and Grendeng were not suitable and good to be consumed.

P33 SOIL CHEMISTRY AND PHYSICS

288 PRAHASTUTI, S.W.
Perubahan beberapa sifat kimia tanah dan serapan P jagung akibat pemberian bahan organik dan batuan fosfat alam pada Ultisol Jasinga. **[Effect of organic matter and rock phosphate on some soil chemical properties and P absorption of maize at Jasinga Ultisols (Indonesia)]**/Prahastuti, S.W. (Universitas Tadulako, Palu (Indonesia). Fakultas Pertanian) 3 ill., 2 tables; 10 ref. Summaries (En, In). *Jurnal Agroland* (Indonesia) ISSN 0854-641X (2005) v. 12(1) p. 68-74.

ZEA MAYS; ROCK PHOSPHATE; COMPOSTING; OLIGOCHAETA; COMPOSTS; FARMYARD MANURE; SOIL CHEMICOPHYSICAL PROPERTIES; ACRISOLS; JAVA.

An experiment was conducted in a green house at Kuningan Soil Science Laboratory of Faculty of Agriculture Gadjah Mada University for three months. The experiment used a factorial arrangement of a completely randomized design, with three replications. The first factor was phosphatic rock applied at 3 different rates: P0 = control, P1 = 100 kg P_20_5/ha, P2 = 200 kg P_20_5/ha, dan P3 = 300 kg P_20_5/ha. The second factor was organic matter added as four different types of organic matter: C0 = control, Cv = Vermicompost, Ck = Compost and Cp = Cow manure, all factors except control applied at a rate of 25 ton/ha. The result showed that the availability of phosphorus was strongly affected by phosphatic rock. However, its availability was even higher when it was combined with organic matter. Phosphatic rock at a rate of 300 kg P_20_5/ha produced the largest available phosphor. The interaction between cow manure and phosphatic rock 300 kg P_20_5/ha resulted the highest absorbtion of phosphor by plants.

P34 SOIL BIOLOGY

289 ROSLIANI, R.
Inokulasi mikoriza Glomus sp. dan penggunaan limbah cacing tanah untuk meningkatkan kesuburan tanah, serapan hara dan hasil tanaman mentimun. **Inoculation of mycorrhizal *Glomus* sp. and the use of vermicompost to improve soil fertility, nutrient uptake and cucumber yield**/Rosliani, R.; Hilman, Y. (Balai Penelitian Tanaman Sayuran, Lembang (Indonesia)) 2 ill., 4 tables; 20 ref. Summaries (En, In). *Jurnal Hortikultura* (Indonesia) ISSN 0853-7097 (2005) v. 15(1) p. 29-36.

CUCUMIS SATIVUS; MYCORRHIZAE; INOCULATION; COMPOSTING; NPK FERTILIZERS; SOIL FERTILITY; YIELDS.

The experiment was conducted at Wera Experimental Farm, Subang from August to November 2000. The objectives of the experiment were: (i) to study mycorrhiza *Glomus* sp. inoculation and vermicompost in improving soil chemical properties; NPK uptake and yield of cucumber, (ii) to find out the effect of mycorrhiza *Glomus* sp. inoculation on the reduction of NPK fertilizer usage, and (iii) to screen the most appropriate and efficient treatment combination of biofertilizers (mycorrhiza) and vermicompost + NPK fertilizer on cucumber. A split plot design with three replications was used. Treatments consisted of

inoculation of mycorrhiza (with and without inoculation) as a main plot and six combinations of vermicompost + NPK fertilizers as subplot. Results of the experiment indicated that mycorrhiza and vermicompost application could improve soil chemical and biological fertility. Application of vermicompost + NPK fertilizer significantly influenced P uptake in plant vegetative growth as well as N, P, and K uptake in fruits. In terms of fruit weight, application of vermicompost of 2.5 t/ha + 3/4 x NPK standard was the best.

290 SASTRO, Y.
Ketahanan hidup Aspergillus niger pada batuan fosfat yang dipeletkan serta kemampuan pelarutannya. **Survival of *Aspergillus niger* on pelleted rock phosphate and its phosphate solubilizing capability**/Sastro, Y. (Universitas Gadjah Mada, Yogyakarta (Indonesia)); Universitas Gadjah Mada, Yogyakarta (Indonesia). 3 ill., 12 tables; 33 ref. Appendices. Summaries (En, In).Yogyakarta: UGM, 2001: 50 p.

SOIL MICROORGANISMS; ASPERGILLUS NIGER; SURVIVAL; ROCK PHOSPHATE; PHOSPHATES; SOLUBILIZATION; PELLETING; PELLETS; INOCULATION; FUNGAL SPORES; FERTILIZERS.

Microorganism survivability is a prerequisite for the success of combining rock phosphate and phosphate-solubilizing microorganism. This study intended to examine the survival of *Aspergillus niger* when pelleted with rock phosphate, and determine its phosphate solubilizing ability. An *A. niger* YD 17 obtained from the Laboratory of Microbiology, Faculty of Agriculture, Gadjah Mada University was used. Culturing medium consisted of onggok (tapioca byproduct), rice bran, and starch. The composition of culturing medium was formulated based on the number of spore *A. niger* produced on the medium. The pellet was made by mixing 80% rock phosphate with 20% culturing medium and spores. The experimental design was the completely randomized design of factorial 5 x 4 with 3 replications. The first factor was rock-phosphates obtained from Madura, Ciamis, China, Yordania, and Christmast Island. The second factor was the number of inoculum: control without inoculum, 10^{-7}, 10^{-8}, and 10^{-9} cfu/g. The survival of fungus in pellet was assayed by plating the pellet suspension on potatoes dextrose agar (PDA). The number of fungus colony formed on the medium was used as parameter. Phosphate solubilizing ability was determined by incubating pellet samples in liquid Pikovskaya medium for 8 days, and the soluble phosphate was analysed according to Yoshida's method. The results indicated that it was possible to combine *A. niger* and rock phosphate. The best medium composition for microorganism propagation was 69.48% onggok, 30% rice bran, and 0.52% starch. Ninety days after being pelleted, the decrease of fungus number were 20.0%, 25.5%, and 16.8%, respectively for the three total inoculum initially intended, and a corresponding increase of soluble phosphate were 125.0%, 199.6% and 229.7%. The highest soluble phosphate was achieved by 10^{-7} inoculum. The rock phosphate from China gave the best support for fungus survival, whereas from Christmast Island was the best substrate for phosphate solubilization.

Q02 FOOD PROCESSING AND PRESERVATION

291 KUSBIANTORO, B.
Teknik pembuatan keripik simulasi labu jepang. **Study of processing on squash simulation chips**/ Kusbiantoro, B.; Histifarina, D. (Balai Pengkajian Teknologi Pertanian Jawa Barat, Lembang (Indonesia)); Ahza, A.B. 1 ill., 5 tables; 10 ref. Appendix Summaries (En, In). *Jurnal Hortikultura* (Indonesia) ISSN 0853-7097 (2005) v. 15(1) p. 67-74.

CUCURBITA MAXIMA; SIMULATED FOODS; FOOD TECHNOLOGY; FORMULATIONS; QUALITY; TAPIOCA; WHEAT FLOUR.

This research aimed at studying the optimum processing of squash simulation chips was conducted at Food Technology Laboratory, Faculty of Agriculture Technology, IPB and Pilot Plan Laboratory, PAU, IPB, Bogor from March until July 2003. A completely randomized design was used with three replications. The treatments were percentage ratio of steam squash and mixed flour (tapioca:wheat), i.e. 35:55 (1:1); 35:55 (1:2); 35:55 (2:1); 30:60 (1:1); 30:60 (1:2); 30:60 (2:1); 25:65 (1:1); 25:65 (1:2) and

25:65 (2:1). The results showed that 30% steamed squash and 60% mixed flour (tapioca:wheat=2:1) gave the best result based on the crispness and the taste, the highest ratio of advancement and rendement (163 and 70.09%); water content 5.27% wbb. and fat content 28.09% wbb.

292 MANAB, A.
***Pengaruh polisakarida ekstra sel dari Leuconostoc mesenteroides FNCC 0023 terhadap viskositas susu fermentasi.* Effect of the exopolysaccharides produced by *Leuconostoc mesenteroides* FNCC 0023 on fermented milk viscosity**/Manab, A.; Awwaly, K.U.A. (Universitas Brawijaya, Malang (Indonesia). Fakultas Peternakan) 1 ill., 11 ref; Appendices Summaries (En, In). *Jurnal Ilmu-Ilmu Hayati* (Indonesia) ISSN 1410-413X (2004) v. 16(2) p. 165-171.

LEUCONOSTOC MESENTEROIDES; MILK; CULTURED MILK; VISCOSITY; POLYSACCHARIDES.

The aim of this study was to discover the effect of exopolysaccharides (EPS) produced by *Leuconostoc mesenteroides* FNCC 0023 on fermented milk viscosity. *L. mesenteroides* FNCC 0023 M and R strains were grown in 2 media, namely a solution of 10% and skimmed milk and another of 10% skimmed milk with 5% sucrose, at 30^0C, 37^0C and 42^0C for 6 hours, and then incubated at 10^0C for 12 hours followed by stored at 4^0C for 3 days. The exopolysaccharides produced by *Leuconostoc mesenteroides* FNCC 0023 strain at 30^0C increased fermented milk viscosity from 20 m/pas/s after 6 hours (EPS = 17.49 mg/1000 g) to 62.5m/pas/s at 3 days (EPS = 2296,70 mg/1000 g). Whereas the *Leuconostoc mesenteroides* FNCC 0023 R strain at 37^0C increased fermented milk viscosity from 20 m/Pas/s at 6 hours (EPS = 322,43 mg/1000 g) to 75 m/Pas/s after 3 days (PES = 330.79 mg/1000 g). In conclusion, the increase EPS production by *Leuconostoc mesenteroides* FNCC 0023 raised fermented milk viscosity.

293 MASRUKHI
***Kajian teknik pengendalian mutu statistika pada proses pembuatan gula kelapa di Kabupaten Banyumas.* [Assessment of statistical quality control technique of palm sugar processing in Banyumas Regency (Indonesia)]**/Masrukhi; Arsil, P. (Universitas Jenderal Soedirman, Purwokerto (Indonesia). Fakultas Pertanian) 3 ill., 5 tables; 5 ref. Summaries (En, In). *Majalah Ilmiah Universitas Jenderal Soedirman* (Indonesia) ISSN 0126-2475 (2004) v. 30(3) p. 1-11.

SUGAR; COCONUTS; PROCESSING; QUALITY CONTROLS; JAVA.

Banyumas is known as potential area of palm sugar home industry with simply and traditional processing, so that the palm sugar quality is varied. The objective of the research was to know the variety of palm sugar quality, distribution and the factors affecting quality which was analysed by histogram, control chart, fishbone diagram and brainstorming. The research was done by survey and laboratory analysis. Sampling was conducted with multistage cluster random sampling. Parameters observed consisted of moisture content and reducing sugar content. Histogram analysis indicated that only Wangon subdistrict showed 1,157 process capability index for water content. It means process capable to comply with specification. For reducting sugar content no residence had Cp above 1.00 (process not capable comply with specification). Control chart showed that water content was handled statistically but reducing sugar content was not for Cilongok and Somagede subdistricts. They had poor performance for reducing sugar ($Cp < 1$). For all subdistricts that had statistically handled showed very good process capability index ($Cp > 1.33$). Primary factor caused various quality based on fishbone diagram was processing and secondary factors were equipment, raw material and human resources.

294 SAWITRI, M.E.
***Kajian penambahan gelatin terhadap kualitas produk kefirjell rendah lemak.* Study on the addition of gelatine on the quality of low fat kefirjell**/Sawitri, M.E. (Universitas Brawijaya, Malang (Indonesia). Fakultas Peternakan) 1 ill., 2 tables; 9 ref. Summaries (En, In). *Jurnal Ilmu-Ilmu Hayati* (Indonesia) ISSN 1410-413X (2004) v. 16(2) p. 125-129.

GELATIN; KEFIR; QUALITY; FATS; PROTEINS; ALCOHOLS; PH; ACIDITY.

The objective of this study was to study the effect of gelatine addition on the chemical (fat, protein, alcohol content) and physical quality (pH and acidity) of low fat kefirjell. The material used in this study was low fat kefirjell made from low fat kefir with a gelatine additive. The research method was a randomized block design with four treatments of gelatine factors, i.e.: 1% (G1), 1.5% (G2), 2% (G3), and 2.5% (G4). Results showed that addition of gelatine had a highly significant effect ($P < 0.01$) on pH, a significant effect ($P < 0.05$) on both protein and acid content of low fat kefirjell, but no significant effect ($P > 0.05$) on the fat and alcohol content. In conclusion, the addition of gelatine influenced the chemical and physical quality of low fat kefirjell products, and the addition of 2.5% gelatine resulted in a low fat kefirjell with the same quality as that for fermented milk.

295 SISRIYENNI, D.
***Kajian kualitas dadih susu kerbau di dalam tabung bambu dan tabung plastik.* [Assessment of fermented buffalo's milk quality within bamboo and propylene tubes]**/Sisriyenni, D.; Zurriyati, Y. (Balai Pengkajian Teknologi Pertanian Riau (Indonesia)), 2 ill., 5 tables; 16 ref. Summaries (En, In). *Jurnal Pengkajian dan Pengembangan Teknologi Pertanian* (Indonesia) ISSN 1410-959x (2004) v. 7(2) p. 171-179.

BUFFALO MILK; QUALITY; CULTURED MILK; STORAGE; ORGANOLEPTIC ANALYSIS.

Assessment on fermented buffalo's milk (dadih) was conducted in Muaro Jalai Village, Kampar Regency in 2001. Objective of the study was to assess the influence of storage time period to the dadih quality processed and stored in bamboo and propylene tubes. Completely randomized design with 10 replications and two treatments were used in this assessment: (A) processed in bamboo tube, and (B) processed in propylene tube. Each treatment was stored for 3, 6, 9 and 12 days. Data collected through organoleptic test consisting of 10 sample panelists covered taste, aroma, color, preference and thickness of the dadih. Result showed that the dadih quality processed in the propylene tube was relatively better than that in the bamboo tube. Storage period for the still palatable dadih was 9 days processed and stored in propylene tube and 6 days processed and stored in the bamboo tube. Protein and fat contents of the dadih were decreasing along with length of storage time period. On the other hand, total of bacteria colony and acidity of the dadih were increasing.

Q04 FOOD COMPOSITION

296 ARDHANA, M.M.
***Pengaruh bioaktif dari Aspergillus niger, EM-4 dan Lactobacillus plantarum terhadap kecepatan pembentukan wastelase dan mutu organoleptiknya.* Bioactive influence of *Aspergillus niger*, EM-4 and *Lactobacillus plantarum* in fastening the formation of wastelase and organoleptic quality**/Ardhana, M.M. (Universitas Brawijaya, Malang (Indonesia). Fakultas Peternakan) 6 tables; 12 ref. Summaries (En, In). *Jurnal Ilmu-Ilmu Hayati* (Indonesia) ISSN 1410-413X (2004) v. 16(2) p. 202-206.

ASPERGILLUS NIGER; EXCRETA; FERMENTATION; ASPERGILLUS NIGER; LACTOBACILLUS PLANTARUM; ORGANOLEPTIC PROPERTIES.

This research aimed at accelerating the ensilage process and at understanding the organoleptic characteristics of the wastelase produced. To fulfill this objective each of the 5 kg of 30% onggok (cassava pulp) and 70% excreta were fermented with 0.3% cell/g *Aspergillus niger* after 1, 3, 5 and 7 days, and replicated 6 times. The data were analysed with a fully randomized design and the Duncan Multiple Range test. The 7 days fermented onggok showed the fastest ensilage formation. Then, the 30% of this onggok was mixed with 70% excreta and was also ensilaged with the addition of 0.1% and 3% molasses. The starter used was 0.1% EM-4 or 10^8 cell/g *Lactobacillus plantarum*. These treatments were coded ET3, ET1, ET0, LT3, LT1 and LT0. Each treatment was 5 kg and the experiment was replicated 6 times. The data were analysed with a factorial design 2 x 3 and Duncan Multiple Range test. The results showed that the wastelase formed over 7 days from 30% fermented onggok mixed with 70% excreta, 3% molasses and 0.1% EM-4 only needed 5½ days of fermentation process. The wastelase was coded ET3 and was the fastest process in the making of wastelase during these experiments. The organoleptic test was done by

using 15 panelists to examine the colour, smell, and texture of the wastelase from all treatments. The data were calculated by using the Hedonic Scale Scoring test and the Duncan Multiple Range test. The results showed that the ET3 wastelase had the most acceptable colour, with a value of 7.07. Every panelist also preferred its smell and the texture. The storage of this wastelase for 4 months indicated that it could keep quite well.

297 KHUSNIATI, T.

Sifat fisik dan kimiawi keju dengan koagulan litsusu, keju tradisional khas daerah Nusa Tenggara Timur. **Physical and chemical characteristics of cheese with "litsusu" coagulant, specific traditional cheese from East Nusa Tenggara (Indonesia)**/Khusniati, T.; Naiola, E. (Pusat Penelitian Biologi-LIPI, Bogor (Indonesia)); Wijayanti, E. 5 tables; 11 ref. Summaries (En, In). [Proceedings of the national seminar on livestock and veterinary in 2004. Book 1]. Prosiding seminar nasional teknologi peternakan dan veteriner 2004. Buku 1/ Thalib, A.; Sendow, I.; Purwadaria, T.; Tarmudji; Darmono; Triwulanningsih, E.; Beriajaya; Natalia, L.; Nurhayati; Ketaren, P.P.; Priyanto, D.; Iskandar, S.; Sani, Y. (eds.); Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2004: p. 256-261.

CHEESE; MILK PRODUCTS; COAGULATION; PROXIMATE COMPOSITION; NUTRITIVE VALUE; CHEMICOPHYSICAL PROPERTIES; NUSA TENGGARA.

The "litsusu" in various concentrations (1, 2, 3, 4, 5 g/50 ml pasteurised milks) was used in making "litsusu" cheese. Physical characteristics of "litsusu" cheese were observed covered physical performances, and weight of curd and whey; while its chemical characteristics consisted of coagulation activity and lactic acid contents of curd and whey. Physical performances of "litsusu" cheese (colour, coagulant forming and flavour) were visually observed, while the weight of curd and whey were measured. Coagulation activities on "litsusu" cheese were detected by using coagulation method, while lactic acid content of its curd and whey was detected with titration method. The results showed that physical performances (colour, coagulant forming, and flavour) of cheese with various concentrations of "litsusu" on curd were different from that on whey. The weight of curd increased by increasing "litsusu" concentrations, on the other hand the weight of whey decreased by increasing "litsusu" concentrations. Coagulation activities of "litsusu" cheese decreased by increasing "litsusu" concentrations added. "Litsusu" cheese 1 g/50 ml pasteurised milks had the highest coagulation activity with value 1.6181 RU/g, than the others. Lactic acid contents of curd and whey were not linear with storage time and "litsusu" concentration added, and lactic acid contents of control (pasteurised milks without "litsusu") were not also linear with storage time. Lactic acid contents of curd (580.60-811.20 mg/l) and whey (727.70-1155.70 mg/ml) "litsusu" cheese 1 g/50 mL had the lowest range values than the others. It concluded that based on physical and chemical characteristics of cheese with various concentration of "litsusu", "litsusu" cheese 1 g/50 ml was the best "litsusu" cheese than the others.

298 TARIGAN, A.

Pengaruh penggunaan asam cuka nira aren terhadap daging sapi asam. **Effect of acetic acid fermented from nira-aren palm for acidified beef**/Tarigan, A. (Loka Penelitian Kambing Potong, Galang (Indonesia)) 1 ill., 3 tables; 12 ref. Summaries (En, In). [Proceedings of the national seminar on livestock and veterinary in 2004. Book 1]. Prosiding seminar nasional teknologi peternakan dan veteriner 2004. Buku 1/Thalib, A.; Sendow, I.; Purwadaria, T.; Tarmudji; Darmono; Triwulanningsih, E.; Beriajaya; Natalia, L.; Nurhayati; Ketaren, P.P.; Priyanto, D.; Iskandar, S.; Sani, Y. (eds.); Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2004: p. 116-122.

BEEF; MEAT; FERMENTATION; ACETIC ACID; CHEMICOPHYSICAL PROPERTIES; PROCESSING; SUGAR; SUGAR PALMS.

Acidified beef is one of some diversification of meat products. About 4200 g beef of back thigh was divided into 21 pieces, which each were 200 g/pack. Sample of 21 pieces was divided into 3 treated groups which were contained 7 samples in each treatment. Meat group 1, 2 and 3 (P1, P2 and P3) were dipped by 20, 30 and 40 ml/1400 g of nira aren vinegar for 24 hours, respectively. All samples were kept in the oven at 60^0C for 10 hours and then were analysed for pH, water content and shrink shrinkage after cooking. Results showed that the use of nira aren vinegar significantly ($P < 0.01$) affect pH value (P1 =

5.70, P2 = 5.64 and P3 = 5.57) water content (P1 = 50.72%, P2 = 48.10%, and P3 = 45.81%). It could be concluded that dipping of 20 ml nira aren vinegar decreased pH, increased water content and also reduced shrinkage after cooking.

Q52 FEED PROCESSING AND PRESERVATION

299 HARYANTO, B.
Pemanfaatan probiotik dalam bio-proses untuk meningkatkan nilai nutrisi jerami padi untuk pakan domba. **Use of the probiotics in the bio-process to increase the nutritive value of rice straws for sheep**/Haryanto, B.; Supriyati; Jarmani, S.N. (Balai Penelitian Ternak, Bogor (Indonesia)) 2 ill., 3 tables; 13 ref. Summaries (En, In). [Proceedings of the national seminar on livestock and veterinary in 2004. Book 1]. Prosiding seminar nasional teknologi peternakan dan veteriner 2004. Buku 1/Thalib, A.; Sendow, I.; Purwadaria, T.; Tarmudji; Darmono; Triwulanningsih, E.; Beriajaya; Natalia, L.; Nurhayati; Ketaren, P.P.; Priyanto, D.; Iskandar, S.; Sani, Y. (eds.); Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2004: p. 298-304.

SHEEP; RATIONS; RICE STRAW; PROBIOTICS; FERMENTATION; DIGESTIBILITY; NUTRITIVE VALUE.

The dietary nutrients use by ruminants is affected by the physical and chemical characteristics of the nutrients in the feedstuffs, and it is also by the enzymatic activity of ruminal microbes and the efficiency of tissue metabolisms. The nutritive values of rice straws used as the predominant feed for sheep or other ruminants need to be improved. The performance of sheep under traditional management is relatively low due to with the low quality of feedstuffs and inadequacy of required feed quantity. To increase the nutritive value of rice straw by using probiotics was examined in this experiment. Twenty four male sheep with approximately 17.5 kg live weight were divided into three groups of dietary treatments which were feeding by three different rice straw, i.e., probiotic treated rice straws (Probion) which were fermented one week, two weeks or three weeks and were given at a rate of about 2% of the body weight. Concentrate feed was offered at 200 g/head/day. The experiment was carried out for 16 weeks. Intake and digestion of neutral detergent fiber (NDF) and acid detergent fiber (ADF) as well as the ruminal fluid characteristics (concentration of ammonia, volatile fatty acids and pH) were observed. Data were analysed in a completely randomized design. The result indicated that the changes in nutritive value of the three weeks rice straws after being fermented for three weeks were more significant as compared to one- or two-weeks fermentation. Intake of fermented rice straws was relatively high, indicating that the palatability was also high. Dietary NDF and ADF intakes were higher for the three weeks fermented rice straws, and the digestibility of neutral detergent fiber was also greater (53.97% and 51.99%) compared to the other fermentation (48.16% and 45.09% for one week; 49.86% and 46.27% for two weeks). Rumen fluid characteristics (pH and ammonia concentration) did not change significantly, while the concentration of acetic acid and propionic acid increased comparing to those of one or two weeks fermentation. It was concluded that the use of probiotic in the bio-process of rice straws to increase the nutritive value on sheep could be carried out to improve the sheep productivity.

T01 POLLUTION

300 HARSANTI, E.S.
Residu insektisida pada kedelai dan tanah sawah Vertisol Bojonegoro. **Insecticide residues on soybean and Bojonegoro Vertisols lowland soil**/Harsanti, E.S.; Jatmiko, S.Y. (Loka Penelitian Pencemaran Lingkungan Pertanian, Jakenan (Indonesia)); Ardiwinata, A.N.; Soejitno 6 tables; 24 ref. Summaries (En, In). *Penelitian Pertanian Tanaman Pangan* (Indonesia) ISSN 0216-9959 (2003) v. 22(1) p. 6-13.

GLYCINE MAX; INSECTICIDES; RESIDUES; SOIL CHEMICOPHYSICAL PROPERTIES; SOIL POLLUTION; SOIL MICROORGANISMS; GROWTH; CROP LOSSES; IRRIGATED LAND; YIELDS; VERTISOLS.

A field experiment was conducted in Bojonegoro during dry season 2001 to determine the residue content of the insecticides in the Vertisols lowland, on the soybean crop, and its impact to the soil microorganism. The experiment was arranged in a randomized block design, with three replications and six treatments. The parameters measured were the agronomic characters, the soybean seeds, pod and leaf damage due to the pest attack, the insecticide residues in soil and soybean seeds, the population of total bacteria, and the soil respiration. Applications of chlorfluazuron and cyhalotrin were not detected in soil and crop. However, it was effective to reduce the yield loss due to the pest attack. The application of chlorfluazuron insecticide reduced significantly the intensity of pod and leaf damages of soybean crop and highly affected the microorganism activity and the bacterial population neither total nor *Rhizobium* sp. The application of chlorfluazuron and cyhalotrin in the recommended rates is safer and more effective for the soybean cropping in the Vertisol lowland than that thiodicarb, BPMC, and the mixed of various insecticides.

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