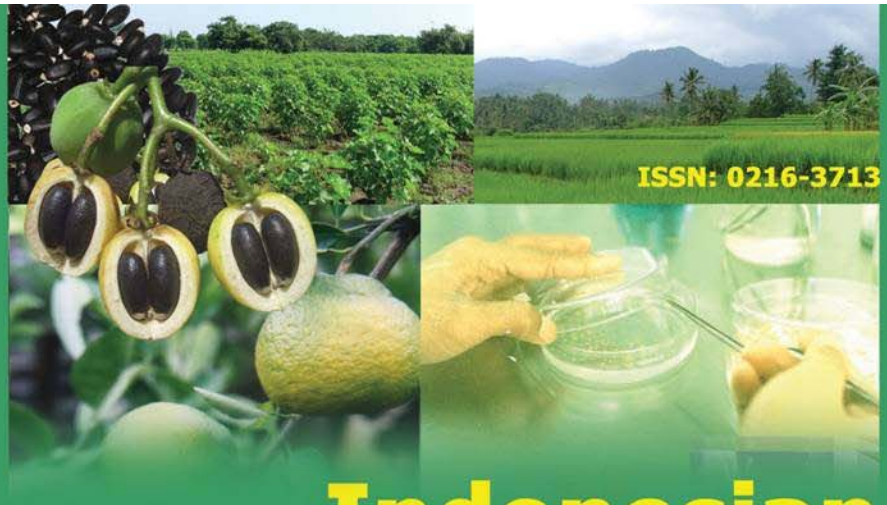

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PREFACE

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SHEEP; FARM INCOME; ANIMAL PERFORMANCE; ANTHELMINTICS; SOCIOECONOMIC DEVELOPMENT; JAVA.

Participatory research about anthelmintic implementation on sheep farming system was conducted in Purwakarta and Majalengka District, West Java. Sheep were grazing on which high prevalence of nematode diseases. Participation methods include of farmer training, continuous meeting with the sheep farmer, introducing farmer group, and demonstration plot model (agrostology). During the year study, there are positive impacts of sheep rearing practices such as improving farmer's income. The farmers can also improved the technology of rearing animals (adoption of technology), i.e.: feed management, breeding practices, housing systems, and improved farmer group activity to solve the problems of management especially of parasite controls. From the study it can be concluded that sheep farming can improve the number of animals sold per period, and increase the farmer's income by 138 and 87% respectively in Purwakarta and Majalengka.

002 SUTRISNO, S.
Farmer's decision making in institution of sugarcane farming (Case of sugarcane farming at Malang District (Indonesia). ***Pengambilan keputusan petani dalam kelembagaan petani tebu rakyat (Kasus petani tebu rakyat di Kabupaten Malang)***/ Sutrisno, S. (Universitas Brawijaya, Malang (Indonesia). Fakultas Pertanian). *Agrivita* ISSN 0126-0537 (2006) v. 28(1) p. 26-34, 5 tables; 22 ref.

SUGARCANE; FARMING SYSTEMS; FARMERS; DECISION MAKING; SOCIAL INSTITUTIONS; JAVA.

Farmer's decision to joint a farmer institution based on several socio and economic factors. The aim of this research was to analyze farmer motives to joint sugarcane partnership institution, and also factors that influence farmer's preference. The result of this research showed that economic motive was farmer's basic behavior to respond government policy and farmer gave a positive response based on their farming interest in participation to institutions. It is suggested to make a "guide project" for the pure farmer, KUD (village unit cooperative) and sugar factory partnership that funded by external cost of sugar factory, if INPRES 9/1975 did not put into effect.

E14 DEVELOPMENT ECONOMICS AND POLICIES

003 HANANI, N.
Investment need for agricultural sector based on commodity development: input-output approach. ***Kebutuhan investasi sektor pertanian berbasis pengembangan komoditi: pendekatan input-output***/Hanani, N. (Universitas Brawijaya, Malang (Indonesia). Fakultas Pertanian); Nugroho, I. *Agrivita* ISSN 0126-0537 (2006) v. 28(2) p. 114-126, 7 tables; 9 ref. Appendices.

AGRICULTURAL SECTOR; AGRICULTURAL PRODUCTS; AGRICULTURAL DEVELOPMENT; INVESTMENT REQUIREMENTS; INPUT OUTPUT ANALYSIS; CAPITAL.

Study was aimed to formulate a priority commodities and investment needs in agricultural development. The study used input-output framework implemented into incremental capital output ratio (ICOR) approach. The study resulted ICOR values of food crop, estate crop, livestock and fishery each 1.06, 1.98, 2.11 and 3.83 respectively. Five-years investment needs to sustain annual 4% an economic growth on those subsectors achieved 50, 39, 24 and 85% of current year GDP. The same way, to keep up to 8% annual growth rate, the five-years investment needs rise to 109, 84, 53, and 183% of the current GDP. Overall, the five-year investment need of agriculture sector on the each 4, 6 and 8% growth rate was 49, 77 and 107% of the current GDP. The priority commodities and investment needs was formulated as follows. First, commodities which significant the farmer impacted welfare were rice, vegetables, bird and fruits. The five-year investment to support the 4% growth rate achieved 57% of current GDP. Second, the commodities which significant impacted on economic multiplier were coffee, tobacco, and rubber. The five-year investment to support the 4% growth rate achieved 8% of current GDP. Third, the commodities with a significant export value were ocean fishery, cocoa, and other estate plants. The five year investment would achive 96% of the current GDP to sustain the 4% growth rate.

004 HERAWATI, T.

Transfering technology to woman in developing sheep agribusiness area in poor Pagergunung Village, Temanggung Regency (Indonesia). ***Transfer teknologi terhadap wanita tani dalam pengembangan kawasan usaha agribisnis domba di desa miskin Pagergunung, Kabupaten Temanggung***/Herawati, T.; Prawirodigdo, S.; Utomo, B. (Balai Pengkajian Teknologi Pertanian Jawa Tengah, Ungaran (Indonesia)). [Proceedings of the national seminar on animal husbandry and veterinary technology Book 1], Bogor (Indonesia) 12-13 Sep 2005/Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 530-538, 5 tables; 9 ref. 636:338.439/SEM/p

SHEEP; AGROINDUSTRIAL SECTOR; WOMEN; TECHNOLOGY TRANSFER; COFFEE PULP; INNOVATION ADOPTION; JAVA.

To increase poor farmer income in the village of Temanggung Regency, The Central Java BPTP had introduced feeding system by using coffee waste product for sheep fattening program in Pagergunung Village. In the base of highly carrying capacity from 26 hectares of coffee plantation, the technology innovation of using waste product of coffee for sheep fattening would become one of sheep agribusiness village area. One of this activities goals was to investigate the technology transfer from the first information receiver that male farmer to his wife as stakeholder of their family farming system. The demonstration plot existence among villagers could be the media of non-farmer cooperator learning. The impact shown that most of villagers, both cooperator and non-cooperator farmer had adopted innovation technology. Research shown that transferring technology from male farmer to female farmer was exist continuously. Husband got 100%, the highest scores as resource person and the neighbor got 72% in the second level of transferring technology. Nevertheless, only 12.5% of member of farmer group took the advantage of farmer organization as the media of transforming technology, 15.4% of cooperative farmer wives were aware of the existence of demplot. The technology which were adopted much and in the right way was feeding system. Feeding technology transferring from husband (male farmer) to their wife, because together husband and wife feed their sheep in 81.9% families. Without transferring technology, technology adoption will not sustainable. Two other technology components, stall model just been understood by 55.5% of female farmers and only 20% knew composting.

E20 ORGANIZATION, ADMINISTRATION AND MANAGEMENT OF AGRICULTURAL ENTERPRISES OR FARMS

005 MUNIER, F.F.

Assessment of integration farming system for fat tail sheep and groundnut in poor farmer area. ***Kajian sistem usaha tani integrasi domba ekor gemuk (DEG) dan tanaman kacang tanah di wilayah poor farmer***/Munier, F.F.; Rusdi, M.; Bulo, D.; Saidah; Fahmi, F.N. (Balai Pengkajian Teknologi Pertanian Sulawesi Tengah, Palu (Indonesia)). [Proceedings of the national seminar on animal husbandry and veterinary technology. Book 1], Bogor (Indonesia) 12-13 Sep 2005/Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 521-529, 9 tables; 13 ref. 636:338.439/SEM/p

SHEEP; BREEDS (ANIMALS); INTEGRATION; FARMING SYSTEMS; GROUNDNUTS; FARM INCOME; ECONOMIC ANALYSIS.

This assessment had aim to know technique, social and economic aspects in integration farming system of fat tail sheep and groundnut. This activity was done in Porame Village, Marawola Subdistrict, Donggala Regency where was one of poor farmer village, from August-December 2004. Fat tail ewes were used in this assessment 24 heads, 1.0-1.5 years old, body weights about 15-18 kg/head. Assessment pattern was farmer pattern (grazing in natural pasture) and introduction pattern (grazing in natural pasture + 500 g of groundnut byproduct + 200 g of rice bran). Assessment of groundnut agronomy was farmer pattern (to use of seed 2-3 seeds/hole, planting range 30 cm x 30 cm, without fertilizing, clear away of weeds 3 and 7 after planting, simple pest and disease control) and introduction pattern (to use of seed 1 seed/hole, planting range 40 cm x 10 cm, fertilizing to use urea 50 kg/ha, SP-36 75 kg/ha, KCL 50 kg/ha and sheep manure 2 tons/ha, clear away of weeds 7 and 9 after planting, pest and disease control by observation system/integrated pest control). Result of assessment has shown that average of finisher body weight in farmer pattern occurred decreasing 18.0 kg/head (decrease 0.9 kg) and introduction pattern was increase 22.8 kg/head (increase 3.9 kg). The sheep body weight for farmer pattern occurred decreasing 7.5 g/head/day and introduction pattern with daily body weight gain was 37.8 g/head. The groundnut production in farmer pattern was only 401.8 kg/ha and introduction pattern was 800.5 kg/ha. Income for fat tail sheep with farmer pattern was only Rp 402,830/4 months and introduction pattern was Rp 1,104,775/4 months, which was R/C 1.15 and 1.37, respectively. Income of groundnut farming with introduction pattern Rp 2,759,250/ha/planting season and farmer pattern Rp 1,051,700/ha/season which was R/C 2.13 and 1.67, respectively. Income of integration farming system for fat tail sheep and groundnut Rp 3,864,025/season or Rp 966,006/month with R/C 1.72.

006 ROESSALI, W.

Influence of technology to the productivity and the beef cattle farmers income in Canden Village, Jetis District, Bantul Regency. ***Pengaruh teknologi terhadap produktivitas dan pendapatan peternak sapi potong di Desa Canden Kecamatan Jetis Kabupaten Bantul***/Roessali, W.; Prasetyo, E.; Marzuki, S.; Oktarian (Universitas Diponegoro, Semarang (Indonesia). Fakultas Peternakan). [Proceedings of the national seminar on animal husbandry and veterinary technology. Book 1], Bogor (Indonesia) 12-13 Sep 2005/Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 545-550, 5 tables; 7 ref. 636:338.439/SEM/p

BEEF CATTLE; PRODUCTIVITY; TECHNOLOGY; FARM INCOME; RURAL AREAS; JAVA.

The survey was carried out from January to February, 2005, in Canden Village, Jetis District, Bantul Regency. This survey was aimed at knowing the technology impact on productivity and farmer income run by members of a farmer group compare to non-farmer group of stable. Respondents were chosen by

simple random sampling. There were 60 farmers chosen as respondent, consisted of 30 group members and 30 non-group members. Results showed that although they had a relatively the same level of knowledge accessibility to technology of the non-group members were lower than that of the group members, especially on their accessibility to artificial insemination facilities. Productivity showed that S/C of non group members was 2.9 compared to 2.0 of the group members, while value added of calve both of group members was not significant (P>0.05). Farmer income of the group members (Rp 3,612,753.l7/year) was significantly lower than those of the non-group members (Rp 6,124,946.46/year).

007 TUHERKIH, E.

Agro-forage land management for increasing soil fertility and lengthen availability of forage. ***Pengelolaan lahan agro-forage untuk meningkatkan kesuburan tanah dan memperpanjang masa penyediaan pakan/***Tuherkih, E.; Purnomo, J. (Balai Penelitian Tanah, Bogor (Indonesia)); Sutedi, E. [Proceedings of the national seminar on animal husbandry and veterinary technology. Book 2], Bogor (Indonesia) 12-13 Sep 2005/Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 910-920, 1 ill., 10 tables; 18 ref. 636:338.439/SEM/p

FEED CROPS; LAND MANAGEMENT; FERTILIZER APPLICATION; SOIL FERTILITY; DRY FARMING; SUPERPHOSPHATES; FARMYARD MANURE; APPLICATION RATES; INTERCROPPING; YIELDS; SOIL CHEMICOPHYSICAL PROPERTIES; FARMING SYSTEMS.

One of strategy for increasing soil fertility and lengthening availability of forage in upland area is integrating food crops with livestock in farming system (agro-forage) through improving cropping pattern and nutrient management. The research was carried out in Station Research Wera, Subang District, West Java during dry season (DS) 2004 and wet season (WS) 2004/05. The purpose of research was to obtain agroforage management technology for increasing soil fertility and lengthen availability of forage in upland area. A randomized completely block design (RCBD) with three replications was used. The treatments were combination of four cropping pattern plants: DS 2004 (A. fallow, B. stylo + pigeon pea, C. stylo + sorghum, and D. sorghum + pigeon pea) and WS 2004/05 (A. maize + peanut, B. stylo + maize + peanut, C. stylo + sorghum + peanut, and D. sorghum + peanut) combined with two application of fertilizations i.e. SP-36 with dosage 0 and 200 kg/ha; and cattle dung with 0 and 5 t/ha. The result showed that the application of 200 kg SP-36/ha + 5 t dung/ha increased soil pH, C-organic, N-total, and available P. Application of 200 kg SP-36/ha on intercropping stylo + pigeon pea (DS season) and stylo + maize + peanut (in wet season planting) increased carrying capacity about 4,40 cattle unit/ha compared with farmer practice's (intercropping maize + peanut) that yielded only 1,76 cattle unit/ha.

E50 RURAL SOCIOLOGY AND SOCIAL SECURITY

008 RESNAWATI, H.

Consumer preference on broiler breast meat fed ration utilizing *Lumbricus rubellus* earthworms meal. ***Preferensi konsumen terhadap daging dada ayam pedaging yang diberi ransum menggunakan tepung cacing tanah (Lumbricus rubellus)***/Resnawati, H. (Balai Penelitian Ternak, Bogor (Indonesia)). [Proceedings of the national seminar on animal husbandry and veterinary technology. Book 2], Bogor (Indonesia) 12-13 Sep 2005/Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 744-748, 2 tables; 13 ref. 636:338.439/SEM/p

BROILER CHICKENS; MEAT; CONSUMER BEHAVIOUR; FEED CONSUMPTION; OLIGOCHAETA; FLOURS; COLOUR; MEAT TEXTURE; FLAVOUR; PROXIMATE COMPOSITION.

A study was conducted to investigate the effect of earthworm meal levels in the ration on organoleptic test of broiler breast meat. Eighty broilers were assigned into 20 cages with 4 chicks per cage as an experimental unit. This experiment used a completely randomized design with four treatments (control versus 5, 10 and 15% earthworm meal) and five replications. The chickens were reared for a 5 weeks period, and then 10 chickens from each treatment were slaughtered to obtain data on consumer preference of breast meat. Parameters observed were color, texture, taste, tenderness and flavor of broilers breast meat. It was found that earthworm meal levels in the ration did not significantly (P>0.05) affect the consumers preference of all breast meat parameters compared with the control. This condition indicated that earthworm meal could be used as alternative feed ingredient in the broiler ration according to high consumers preference on breast meat.

E70 TRADE, MARKETING AND DISTRIBUTION

009 SUDJARMOKO, B.
Market performance of pandanus as raw material of handicraft industry in Tasikmalaya. ***Kinerja pasar pandan sebagai bahan baku industri anyaman di Kabupaten Tasikmalaya***/Sudjarmoko, B.; Listyati, D.; Herman, M. (Loka Penelitian Tanaman Sela Perkebunan, Sukabumi (Indonesia)). *Jurnal Penelitian Tanaman Industri* ISSN 0853-8212 (2005) v. 11(2) p. 73-77, 1 ill., 1 table; 10 ref.

PANDANACEAE; MARKETING CHANNELS; RAW MATERIALS; SECONDARY SECTOR; HANDICRAFTS; PRICES; JAVA.

Pandanus (*Pandanus* sp.) is the essential raw material of handicraft and potential export commodities. The study was conducted at Tasikmalaya, West Java, as main pandanus handicraft producer, on July-August 2004 by using survey method. Data that had been collected consisted of primary and secondary data (time series). The sampling method used was simple random sampling for farmers, traders I, traders II, and pandanus handicraft producer. Data analyzing was designed with Structure - Conduct - Performance or SCP model. Farmer share and price transmission elasticity as main indicator and criteria of analysis. The results showed that 89.25% farmers used marketing channel I, only 10.75% used marketing channel II. Farmers share were only 31.25% on marketing channel I and 37.50% on marketing channel II. Price transmission elasticity was 0.5148 indicated that pandanus market had asymmetric prices information. The weakness of pandanus performance market caused by imperfect market and market behaviour, besides powerless bargaining position of pandanus farmers.

F01 CROP HUSBANDRY

010 DJUNED, H.
Effect of harvesting date on content of fiber fractions of mulberry forage (*Morus indica* L. var. Kanva-2). ***Pengaruh umur pemotongan terhadap kandungan fraksi serat hijauan murbei (Morus indica L. Var. Kanva-2)***/Djuned, H.; Mansyur; Wijayanti, H.B. (Universitas Padjadjaran, Sumedang (Indonesia). Fakultas Peternakan). [Proceedings of the national seminar on animal husbandry and veterinary technology. Book 2], Bogor (Indonesia) 12-13 Sep 2005/Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 859-864, 5 tables; 5 ref. 636:338.439/SEM/p

MORUS; VARIETIES; HARVESTING DATE; FIBRES; CELLULOSE; HEMICELLULOSE; HARVESTING; QUALITY; DURATION; JAVA.

An experiment was conducted to find out the fiber fraction contents of mulberry forage at five harvesting dates. The three-months study was carried out in the field of farmer group at Sukanagara Distric, Cianjur Regency. The research used an experimental method using a completely randomized design with four

replications. Data observed were tested by analysis of variance, followed by the duncan multiple range test. The results showed that neutral detergent fiber (NDF), acid detergent fiber (ADF), lignin and cellulose content of the mulberry forage were high-significantly affected (P<0.05) by harvesting dates. They were increased as harvesting date increased, while hemicellulose were not significantly affected by harvesting dates. The highest fiber fractions concentration were showed by mulberry forage harvested at 8 weeks.

011 FANINDI, A.

Use combined fertilizers of N, P, K and Ca on growth and productivity of Sorghum (*Sorghum bicolor* (L) Moench and *Sorghum sudanense* (piper) Stafp. *Pertumbuhan dan produktivitas tanaman sorgum (Sorghum bicolor (L) Moench dan Sorghum sudanense (Piper) Stafp) yang mendapatkan kombinasi pemupukan N, P, K dan Ca*/Fanindi, A.; Yuhaeni, S.; Wahyu H. (Balai Penelitian Ternak, Bogor (Indonesia)). [Proceedings of the national seminar on animal husbandry and veterinary technology. Book 2], Bogor (Indonesia) 12-13 Sep 2005/Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 872-878, 5 tables; 4 ref. 636:338.439/SEM/p

SORGHUM BICOLOR; SORGHUM ARUNDINACEUM; GROWTH; FERTILIZER COMBINATIONS; NPK FERTILIZERS; CALCIUM FERTILIZERS; APPLICATION RATES; GROWTH; YIELDS; FORAGE; BIOMASS.

Sorghum is one of crops which can be made a forage and the seed be consumed by human being, or upon subsitutes maize for poultry. This crop adapted to dry season and short-lived. Therefore a research should be conducted to know sorghum productivity and growth given combination of N, P, K and Ca fertilizers with different dose. So that an optimum dose for of growth and forage and seed productionwas obtained. Research was conducted at Ciawi using split plot design, consisted of 3 replications and 13 treatments. As main plot was two types of sorghum and subplot was combination N, P, K and Ca fertilizers. Type of sorghum was *Sorghum bicolor* (L) Moench and *Sorghum sudanense* (Piper) Stafp, crop planted in pot with diameter 28 cm. Plant media was soil by Ciawi (Latosols). Parameters recorded were number of leaf, moist weight of leaf, dry weight of leaf, moist and dry weight of stem, flower initiation, seed production and forage production. Results indicated that sorghum type and fertilization significantly (P<0.05) affected on growth, forage and seed production. Fertilization combination suggested to both types of sorghum (*Sorghum bicolor* (L) Moench and *Sorghum sudanense* (Piper) Stafp) at soil of Ciawi (Latosols) is 200-300 kg/ha urea, 100-200 kg/ha TSP, 100 - 300 kg/ha KCl, and $CaC0_3$ addition of 5 ton.

012 MAMAT H.S.

Analysis of quality, productivity and sustainability and development direction of tobacco farming in Temanggung District, Central Java. *Analisis mutu, produktivitas, keberlanjutan dan arahan pengembangan usaha tani tembakau di Kabupaten Temanggung, Jawa Tengah*/Mamat H.S. (Pusat Penelitian dan Pengembangan Perkebunan, Bogor (Indonesia)); Sitorus, S.R.P.; Hardjomidjojo, H.; Seta, A.K. *Jurnal Penelitian Tanaman Industri* ISSN 0853-8212 (2006) v. 12(4) p. 146-153, 4 ill., 3 tables; 13 ref.

NICOTIANA TABACUM; CULTIVATION; QUALITY; PRODUCTIVITY; FARMING SYSTEMS; JAVA.

Temanggung tobacco is an important commodity for cigarette industry, farmers' income and product domestic regional bruto (PDRB) of Temanggung District. Tobacco stimulates economy activities, it can support other bussiness activities, such as transportation, agroproduct and employment availability. Uncontrolled cultivation intensity and market structure monopsonistic caused the farmers weak bargaining position in tobacco marketing. Tobacco is a fancy product, that its marketing and transaction are very

determined by quality. These conditions affected the sustainability of tobacco farm. This research was carried out from January 2004 to March 2005 at the center of Temanggung tobacco production, which are varied in terms of elevation, slope aspect and topography. Quality and productivity of Temanggung tobacco are varied. Elevation and slope aspect were the primary factors influencing tobacco productivity and quality. The quality of tobacco planted at farmer location at the elevation more than 1,000 m above sea level (asl) with slope facing east, was significantly better than the quality of tobacco planted at the elevation less than 1,000 m asl with slope facing north-east and north. The tobacco productivity planted on the slope facing east differed significantly with the tobacco productivity planted on northeast and north slope facing. The slope did not significantly influence tobacco quality and productivity. Sustainability index of Temanggung tobacco farm belongs to enough category (IKb = 55.53 at scale of sustainability 1-100).

013 PIRNGADI, K.

Increasing productivity of the rainfed lowland rice through integrated crop management. ***Peningkatan produktivitas padi pada lahan sawah tadah hujan melalui pengelolaan tanaman terpadu***/Pirngadi, K.; Makarim, A.K. (Balai Besar Penelitian Tanaman Padi, Sukamandi (Indonesia)). *Penelitian Pertanian Tanaman Pangan* ISSN 0216-9959 (2006) v. 25(2) p. 116-123, 11 tables; 19 ref.

ORYZA SATIVA; VARIETIES; RAINFED FARMING; FARMING SYSTEMS; GROWTH; YIELD COMPONENTS; ECONOMIC ANALYSIS.

The main agronomic constraints to rice production in rainfed area in Indonesia with dry seeded rice (gogo rancah rice) - minimum tillage rice (walik jerami rice) cropping pattern are low yielding local varieties, poor seed quality, inoptimum plant population (irregular plant spacing) and low rate of fertilizer application. The objectives of the study were to find the optimum farming system model (high yield, high profit and affordable input) in a rice based rainfed lowland of the poor resource area. Experiments were conducted at Bogem Village, Japah Subdistrict, District of Blora, Central Java during the wet season 2003/2004 and dry season 2004. Treatments were arranged in a randomized complete block design with ten replications using farmer cooperators as replication. There were three treatments of farming system models: (A) Farmers' practices as a control; (B) Farmers' practices plus improved varieties, good seed quality and regular plant spacing; and (C) Similar with B, plus by using organic and inorganic fertilizers based on soil nutrient status, while N application was based on Leaf Color Chart (LCC) reading. The highest yield of 5.87 and 6.01 t/ha were obtained for dry seeded rice and minimum tillage rice by treatment C, i.e. introduced varieties: Situ Patenggang for dry seeded rice and Fatmawati for minimum tillage rice, legowo 2:1 (double plant spacing), organic fertilizer (2 t/ha), inorganic fertilizers (N based on LCC 120 kg N/ha, 36 kg P_2O_5/ha, 60 K_2O/ha or 267 kg urea/ha + 100 kg SP-36/ha + 100 kg KCl/ha). The treatment gave income to the amount of Rp 13,669,000/ha/year, total yield 11.88 t/ha/year, net profit Rp 5,431,200/ha/year and B/C ratio 0.66.

014 SUGITO, Y.

Leaf activity, growth and radiation use efficiency of edible arroids under shading. ***Aktivitas daun, pertumbuhan dan efisiensi energi matahari umbi edible arroids di bawah naungan***/Sugito, Y.; Handayanto, E. (Universitas Brawijaya, Malang (Indonesia). Fakultas Pertanian); Murniyanto, E. *Agrivita* ISSN 0126-0537 (2006) v. 28(1) p. 1-7, 1 ill., 3 tables; 20 ref.

ROOT CROPS; SHADING; GROWTH RATE; SOLAR RADIATION; PHOTOSYNTHESIS; TRANSPIRATION.

The aim of this study was to know leaf activity, growth and radiation use efficiency of edible arroids under shading. The experiments used split plot design, with shading as main plot and corm species as subplot, which grown in polybag in the plastic house. The results indicated that photosynthesis rate, transpiration, relative growth rate, interception, absorption conversion and radiation use efficiency of each

species were different on shading level. Generally, *X. sagittifolium* species was tolerant until 70% of shading.

015 SUPRIYONO.
[Effect of climbing frame on velvet bean (*Mucuna pruriens*) yields]. ***Hasil karabenguk (Mucuna pruriens) pada penggunaan berbagai rangka penjalar***/Supriyono; Indradewa, D.; Tohari (Universitas Sebelas Maret, Surakarta (Indonesia). Fakultas Pertanian), Syukur, A. *Habitat* ISSN 0853-5167 (2005) v. 16(3) p. 178-183, 3 ill., 3 tables; 6 ref.

MUCUNA PRURIENS; VARIETIES; CLIMBERS; CLIMATE; NUTRIENT UPTAKE.

A field experiment to study the effect of climbing frame on velvet bean yield has been conducted at Tancep, ± 170 m asl., the slope was of 9-10^{o} deg., litosols, topsoil depth was of 5 - 17 cm, Ngawen, Gunungkidul. The experiment was designed in a randomized completely block design (RCBD) with three replications. First factor was rice cultivars, i.e. rase and putih gunungkidul and second factor was climbing frame, i.e. bamboo, corn 4 weeks old, cassava plant and mango plant. The results showed that (1) velvet bean that planted on rainy season completed life cycles on dry season; (2) rase cultivars yield and nutrition absorbed was higher, but protein and HCN content was higher only at putih gunungkidul cultivar; (3) velvet bean seed yield on various climbing-frames did not significantly differ; (4) rase planted with 4 week old corn plant climbing-frame was because of the high yield and beneficial to the farmers.

016 SYAFRUDDIN.
Maize productivity with planting space management and harvesting periode in upland Palu Valley. ***Produktivitas jagung dengan pengaturan jarak tanam dan penjarangan tanaman pada lahan kering Lembah Palu***/Syafruddin; Saidah (Balai Pengkajian Teknologi Pertanian Sulawesi Tengah, Biromaru (Indonesia)). *Penelitian Pertanian Tanaman Pangan* ISSN 0216-9959 (2006) v. 25(2) p. 129-134, 4 tables; 31 ref.

ZEA MAYS; PLANTING; SPACING; HARVESTING; DRY FARMING; GROWTH; YIELDS; ECONOMIC ANALYSIS.

Upland farming is often facing water availability and low soil fertility. It is crucial to search an alternative technology by which upland maize farming system yield a better economic return to the farmers. This research aimed at (1) increasing productivity and income of upland maize farmers in Palu Valley and (2) production capacity of the crop residues and quality of forage processed from every harvesting phase. The research was conducted from February to November 2005 at Palu Valley. After preparation, then field study which comprised of improvement technology for maize cultivation and processing of crop residues to be used as forages. The experimental method used in cultivation was factorial randomized block design with three replicaptions, meanwhile processing of the residue was by fermentation technique. Data were analysed with variance followed by Duncan multiple range test and proximate analysis of the forages resulted from fermentation process and analysis of the suitability of the farm. The result showed that all plants grew vigorously. The best harvest resulted 5.17 t/ha which was obtained under spatial arrangment of 35 cm x 30 cm with the thinning of 25 days after planting. Thinning in 45 days after planting gave 4.16 t/ha of grain. The biomass production was very high up to 136.08 t/ha/season that can add value significantly to farmers income. The economic analysis was suitable enough with B/C ratio 1.8 to 2.26. The income reached Rp 4,618,000/ha/season. Proximate analysis from forages resulted good enough was protein content and fat at 4.9% to 9.9% and 1.7% to 2.4%.

017 TRISILAWATI, O.
[Effect of arbuscular mycorrhiza to 3 clones of *Orthosiphon aristatus*]. *Respon tiga klon kumis kucing (Orthosiphon aristatus) terhadap mikoriza arbuskula*/Trisilawati, O. (Balai Penelitian Tanaman Rempah dan Obat, Bogor (Indonesia)). *Buletin Penelitian Tanaman Rempah dan Obat* ISSN 0215-0824 (2005) v. 16(1) p. 18-26, 6 ill., 3 tables; 7 ref.

DRUG PLANTS; VESICULAR ARBUSCULAR MYCORRHIZAE; CLONES; GROWTH; PRODUCTION.

The research was conducted in the green house and laboratory of Indonesian Spices and Medicinal Crops Research Institute, Bogor in 5 months. Completely randomized design, arranged factorially with 2 factors and 3 replications were used. The first factor was the clone of orthosipon consisted of white flower, purple and rather purple clones, meanwhile second factor was arbuscular mycorrhiza (AM) inoculation (300 spores of AM/plant) consisted of : without AM, *Glomus agregatum*, Mac-I (mixed of *Acaulospora* sp and *Glomus* sp), and Mac-2 (mixed of 8 kinds of AM). The result showed a significant effect of orthosipon clone to the plant growth (plant height, number of leaves and stem), fresh weight of stem, dry weight of leaf and root, and leaf area index. White flower clone showed the best growth responses to the AM inoculation (fresh weight of leaf and plant P uptake increased 41.1% to 89.59% and 48.9% to 109.2%, respectively). *Glomus agregatum* inoculation resulted the highest increasing plant height, number of leaves and stem, dry weight of leaf and stem, and leaf area index of the three clones.

018 WAHYUNI, S.
Morphological characteristics and oil content of two accession numbers of basil tree (*Ocimum gratissimum* L.). *Karakteristik morfologi dan kandungan minyak dua nomor selasih hutan (Ocimum gratissimum* L.)/Wahyuni, S.; Hadipoentyanti, E.; Kardinan, A. (Balai Penelitian Tanaman Rempah dan Obat, Bogor (Indonesia)). *Buletin Penelitian Tanaman Rempah dan Obat* ISSN 0215-0824 (2005) v. 16(1) p. 10-17, 1 ill., 2 tables; 9 ref.

OCIMUM; LIPID CONTENT; BASIL; PLANT GENETIC RESOURCES.

Accession of essential oil plants can be distinguished based on morphological characters, oil content and its major chemical constituent. In this research, observations on two accession numbers of basil tree were performed to know their differences. Seeds were planted at the nursery, then transplanted into the polybag before in the field. Fifty plants were planted at bedding size of 2 m x 3 m with 40 cm x 30 cm spacing. Morphological characters observed were habitus, stem diameter, shape and colour; leaves shape, colour and pubescentness; flower colour, petal colour and panicle arrangement; seed shape, colour and weight. The essential oil was extracted from whole herbs (young stem, leaves and flower) and analyzed their oil physicochemical characters and major oil constituent. Based on morphological characters both accession was difficult to be distinguished except for their leaf odour. Accession from Serang has less leaves odour than from Bogor. The oil content and physicochemical characters of both accessions were more similar but not in the oil chemical constituent. Major chemical constituent of basil tree from Bogor is eugenol (37.04%), sineol (21.44%) and timol (9.67%), while accession from Serang is sineol (40.03%), eugenol (13.94%) and linalool (11.17%). For the pesticides used, accession from Bogor was better because it had higher eugenol.

019 WIJAYANI, A.
Increasing of tomatoes quality in hydroponic culture. *Usaha meningkatkan kualitas beberapa varietas tomat dengan sistem budi daya hidroponik*/Wijayani, A.; Widodo, W. (Universitas Pembangunan Nasional Veteran, Yogyakarta (Indonesia). Fakultas Pertanian). *Ilmu Pertanian* ISSN 0216-4214 (2005) v. 12(1) p. 77-83, 3 tables; 11 ref.

TOMATOES; VARIETIES; PRODUCTION INCREASE; HYDROPONICS; FRUITS; QUALITY.

An experiment on increasing tomatoes quality in hydroponic culture was done in a plastic house of Agriculture Faculty, UPN "Veteran", Yogyakarta. The experiment was a factorial experiment of two factors, with five replications and arranged in randomized completely block design. The first factor was nutrition formulation: Sundstrom (F1) and Excell (F2). The second factor was varieties of tomato: Bonanza (V1), Intan (V2) and Kaliurang 206 (V3). The aim of this research was to determine the effect of those treatments on quality of tomato in hydroponic culture. The result showed that the yield and quality of Bonanza variety and Kaliurang 206 variety were improved, especially in fruit weight (1259.62 gram), fruit hardness and ascorbic acid content. The Sundstrom nutrition was the most appropriate for tomato hydroponic media, resulting in better quality, especially for fruit weight, number of fruits, fruit hardness, ascorbic acid content and sugar content.

F02 PLANT PROPAGATION

020 GUNADI, N.
Growth and yield of 20 TPS (true potato seed) progenies in the highland of Pangalengan, West Java. ***Pertumbuhan dan hasil 20 progeni kentang asal biji botani di dataran tinggi Pangalengan, Jawa Barat***/Gunadi, N. (Balai Penelitian Tanaman Sayuran, Lembang (Indonesia)). *Jurnal Hortikultura* ISSN 0853-7097 (2006) v. 16(2) p. 108-118, 6 tables; 18 ref.

SOLANUM TUBEROSUM; PROGENY; SEED; GROWTH; YIELDS; JAVA.

An on farm experiment to determine the plant growth and tuber yields of 20 new TPS progenies from CIP-Lima Peru was conducted in Padaawas, 1,400 m asl., Pangalengan, West Java from August to December 2004. Seedling tuber of 20 new TPS progenies were grown in the experimental plots, which were arranged in a randomized completely block design with 4 replications. The common cultivar of cv. Granola was used as control. The results indicated that 4 progenies of AL-624 x TPS-67, CFK-69-1 x TPS-67, MF-II x C95LB-13.2, and MF-II x TPS-67 had higher tuber yields than those of other progenies. These 4 progenies had comparable tuber yields per plant to that of cv. Granola. Two progenies of AL-624 x TPS-67 and CFK-69-1 x TPS-67 had also comparable tuber yields per ha to that of cv. Granola. The results could be used as a recommendation in order to select TPS progenies as alternative planting material in potato production using TPS other than traditional seed tuber.

021 KRISTINA, N.N.
Shoots multiplication, rooting, and acclimatization of *Gynura procumbens*. *Multiplikasi tunas, perakaran dan aklimatisasi tanaman sambung nyawa (Gynura procumbens)*/Kristina, N.N.; Sirait, N.; Bermawie, N. (Balai Penelitian Tanaman Rempah dan Obat, Bogor (Indonesia)). *Buletin Penelitian Tanaman Rempah dan Obat* ISSN 0215-0824 (2005) v. 16(2) p. 56-64, 3 tables; 15 ref.

DRUG PLANTS; SHOOTS; PLANT PROPAGATION; ROOTING; ADAPTATION; IN VITRO CULTURE.

The research was conducted in January 2004 up to May 2005 at the Laboratory of Tissue Culture of Germplasm and Breeding Division Indonesian Spice and Medicinal Crops Research Institute within two steps, i.e. (1) Shoots multiplication in MS + BA (0; 0.1; 0.3 and 0.5) mg/l, (2) rooting and acclimatization. Explants were cultured on rooting medium MS + IAA (0.1; 0.3); MS + IBA (0.1; 0.3) or NAA (0.1 and 0.3) mg/l. Acclimatization were performed on two kinds of media i.e. dung manure performed + soil (1 : 1) or husk + soil (1 : 1). Rooting and shoots multiplication were arranged in completely randomized design, with 10 replications and 2 explants for each bottle. Acclimatization was arranged in randomized-block design with 10 replications and 1 plantlet for each treatment. The results showed the best medium for shoot multiplication was MS-free hormone with 5.4 shoots, 2 months after cultured. The highest number of roots was obtained in NAA 0.1 mg/l with 9.3/plantet. MS + IBA 0.3 mg/l give the longest roots (9.58 cm) and IAA 0.1 mg/l the highest number of leaf (12/plantet). Interaction between the source

medium and acclimatization medium was observed however, there was no significant difference between IAA 0.1 mg/l and IBA 0.1 mg/l in number of shoots and long shoots (5.2 and 5.01 cm).

022 MELATI.
Effect of storage periods of rooted cutting on the growth of patchouli (*Pogostemon cablin* Benth). *Pengaruh lama penyimpanan setek berakar terhadap pertumbuhan nilam (Pogostemon cablin Benth*)/Melati; Rusmin, D.; Sukarman (Balai Penelitian Tanaman Obat dan Aromatik, Bogor (Indonesia)). *Jurnal Penelitian Tanaman Industri* ISSN 0853-8212 (2006) v. 12(4) p. 135-139, 6 ill., 3 tables; 10 ref.

POGOSTEMON CABLIN; ESSENTIAL OIL CROPS; SEEDLINGS; CUTTINGS; STORAGE; GROWTH.

Providing high quality of patchouli (*Pogostemon cablin* Benth) seedlings is necessary to support the development of patchouli plants. In the new developing area, transportation become serious problems (high cost transportation), therefore some alternative solution is reducing the transportation cost without reducing the quality of the seedlings. Base on the problems, this experiment was conducted. The objective of this experiment was to study the effect of storage periods of rooted cuttings on the growth of patchouli plant. The experiment was conducted in the green house of Indonesian Spice and Medicinal Crops Research Institute (ISMECRI), from April to August 2004. The experiment was arranged in a split-plot design with 3 replications. The main plot was 2 kinds of cutting there were: (1) leaf cutting and (2) non leaf cutting. The subplot was 5 different storage periods, there were: (1) control (no storage), (2) 1 day storage, (3) 3 days storage, (4) 5 days storage, (5) 7 days storage. The variables observed were plant growth (plant height, number of leaves and number of shoots), dry weight of stems, leaves and roots. The results of experiment indicated that after 7 days storage, rooted cuttings of patchouli were still 100% viable. The growth of patchouli from leaf cutting was significantly different from non leaf cutting. Patchouli plant from leaf cutting produced higher plant height, number of leaves, number of shoots and dry weight of plants compared to those of patchouli plants from non leaf cuttings. Storage period significantly affected the height of plants, however it did not significantly affected the number of leaves, number of shoots and dry weight of plants.

F03 SEED PRODUCTION AND PROCESSING

023 ARIEF, R.
Effect of seed size and storage period on growth and yield of maize. *Pengaruh ukuran biji dan periode simpan benih terhadap pertumbuhan dan hasil jagung*/Arief, R.; Saenong, S. (Balai Penelitian Tanaman Serealia, Maros (Indonesia)). *Penelitian Pertanian Tanaman Pangan* ISSN 0216-9959 (2006) v. 25(1) p. 52-56, 5 ill., 10 ref.

ZEA MAYS; SEED SIZE; STORAGE; QUALITY; GROWTH; YIELDS.

The study was aimed at evaluating the maize (*Zea mays* L.) var. Lamuru. A field experiment was conducted at the Bontobili Experimental Farm in Gowa District from April to July 2004. Observations were recorded for field emergence percentage, leaf N content at 50 days after sowing, plant height at harvesting, days to 50% flowering, and grain yield. No significant interaction effect on all data observed was found between seed size and storage period. Grain yield was not affected by different seed size, but was affected by different storage period. Yield decrease was 38% for large size seed and 54% for small size seed after 18 month storage.

F04 FERTILIZING

024 DJAZULI, M.
Responses of two promising clones of pyrethrum on fertilizer application. ***Respon dua nomor harapan piretrum terhadap pemupukan***/Djazuli, M. (Balai Penelitian Tanaman Obat dan Aromatik, Bogor (Indonesia)). *Buletin Penelitian Tanaman Rempah dan Obat* ISSN 0215-0824 (2006) v. 17(1) p. 13-21, 6 tables; 14 ref.

CHRYSANTHEMUM CINERARIAEFOLIUM; FERTILIZER APPLICATION; NPK FERTILIZERS; GROWTH; YIELDS; QUALITY; PLANT RESPONSE.

Pyrethrum is one of the potential botanical pesticides to be further developed for the substitution of synthetic pesticide such as pyrethroid, which is harmful both to the environment and human being. A high yielding plant with high pyrethrin content is a prerequisite for a continuous supply of raw material in botanical pesticides production. Two promising clones of pyrethrum were assessed for their response to fertilizer application and conducted at Kayu Giyang village (1500 m asl) of Wonosobo regency, Central Java. Two promising clones of pyrethrum namely Prau 6 and Gunung Wates 45 were subjected to seven NPK fertilizer combination treatments using Split Plot Design with three replications. The results showed that N and P fertilizer applications at the Kayu Giyang, Dieng highland were able in improving productivity of pyrethrum by increasing flower number and flower fresh weight of both Prau 6 and Gunung Wates 45 clones, significantly. NPK application with medium dosage (100 kg N, 200 kg P, and 100 kg K/ha) was able to produce high productivity and fertilizer efficiency. However, there was no significant effect as compared to the high dosage application. Based on the nutrient status and dry weight, it could be concluded that amount of N absorbed by plant was high, followed by K and P. Furthermore, based on the nutrient status, the P fertilizer absorbed by pyrethrum was relatively low and approximately 20.00% from N absorbed. The pyrethrin contents from the two clones tested were relatively high (>1.00%).

025 FANINDI, A.
Evaluation of growth *Panicum maximum* cv Purple guinea on organic fertilizer levels of kascing. ***Evaluasi pertumbuhan rumput Panicum maximum cv Purple guinea pada beberapa level pemberian pupuk organik kascing***/Fanindi, A.; Resnawati, H.; Sutedi, E. (Balai Penelitian Ternak, Bogor (Indonesia)). [Proceedings of the national seminar on animal husbandry and veterinary technology. Book 2], Bogor (Indonesia) 12-13 Sep 2005/Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 903-909, 6 tables; 7 ref. 636:338.439/SEM/p

PANICUM MAXIMUM; FERTILIZER APPLICATION; ORGANIC FERTILIZERS; LUMBRICIDAE; FARMYARD MANURE; APPLICATION RATES; GROWTH; CROP YIELD.

Land fertility is main constraint in forage development, because of competition with land for food crops. Therefore a technology for producing forage in land with low fertility is needed. One of way which can be conducted was by using fertilizer kascing (worm dirt) which have complete nutrients and able to improve aggregate and structure of soil. Research was conducted at Research Institute for Animal Production Ciawi with completely randomized design, with 9 treatments and 3 replications. Crop used was *Panicum maximum* cv Purple guinea, with planting media was soil from Ciawi (latosols soil). Crops were planted in pot of diameter 28 cm with soil of 8 kg. Treatments given were : A) 100% soil (control); B) 80% soil + 20% kascing; C) 60% soil + 40% kascing; D) 40% soil + 60% kascing; E) 20% soil + 80% kascing; F) soil + urea 300 kg/ha, TSP 150 kg/ha, KCl 150 kg/ha (NPK); G) soil + urea 300 kg/ha; H) soil + TSP 150 kg/ha; I) Soil + KCl 150 kg/ha. Parameter measured were plant height, plant width, total of tiller and forage production. Results indicated that plant height using all kascing dosages at first harvest showed

better value in comparison with all treatments (P<0.05) however it did not differ with complete fertilizer treatment. While at second to fifth harvest, kascing treatment gave better result if compared with all treatments (P<0.05). Kascing use gave better plant width and forage production compared to all treatment (P<0.05) at harvest 1 and 2, however for harvest 3 to 5, kascing gave better result (P<0.05) compared to all treatments. Kascing gave better total tiller at 1-5 harvest as well. It can be concluded that kascing could increase production of *Panicum maximum* cv Purple guineae.

026 PURNOMO, J.

Effect of N and cattle dung fertilizers to biomass production and carrying capacity on Subang District. *Pengaruh pemupukan N dan pupuk kandang terhadap hasil biomas dan daya dukung ternak pada Dystrudept di Subang*/Purnomo, J.; Tuherkih, E. (Balai Penelitian Tanah, Bogor Indonesia)); Nurhayati. [Proceedings of the national seminar on animal husbandry and veterinary technology. Book 2], Bogor (Indonesia) 12-13 Sep 2005/Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 851-858, 5 tables; 8 ref. 636:338.439/SEM/p

FEED CROPS; FERTILIZER APPLICATION; NITROGEN FERTILIZERS; FARMYARD MANURE; SOIL CHEMICOPHYSICAL PROPERTIES; FERTILIZER COMBINATIONS; BIOMASS; UREA; CATTLE; JAVA.

Ninety percent of national cow meat production depends on traditional husbandry mainly consumed native forage which was low in quality and quantity which was not distributed evenly over a year. One method for increasing quality and quantity of forage is improving soil fertility and introducing high yielding forage. The research activity was located at Typic Dystrudept in Wera Research Station, Subang District having low organic C, total N, P-Bray I, Mg, but high Al saturation. The purpose of study was to improve soil organic matter, to increase efficiency of N fertilization for forage production. Treatments were arranged in randomized block design with three replications. The experiment consisted of 10 incomplete combinations of four factors, i.e (a) three forage patterns: (*Panicum maximum* monoculture; *Arachis pintoi* and *Desmodim rensonii* with land area ratio 66%: 34%; *P. maximum*, *A. pintoi* and *D. rensonii* = 55%: 25%: 20%); (b) four rates of urea (0, 100, 200 and 300 kg/ha); (c) four rates of cattle dung (0, 2.5, 5 and 10 t/ha), and (d) two application of bio-fertilizers (with and without bio-fertilizer). The result showed that application of urea and dung significantly increased biomass of forages and optimum rate for urea was 200 kg/ha and 5 t/ha for dung which yielded biomass cutting of *P. maximum*, *A. pintoi* and *D. rensonii* of 11.35, 0.9, and 4.03 t biomass/ha/6 weeks, respectively. However, application of urea and dung significantly increased carrying capacity for cows from 5.7 animal unit/ha to 8.0 animal unit/ha.

027 SAJIMIN.

Utilization of rabbit manure for forage production of *Stylosanthes hamata*. *Produksi tanaman pakan ternak Stylosanthes hamata yang diberi pupuk feses kelinci*/Sajimin; Raharjodan, Y.C.; Purwantari, N.D. (Balai Penelitian Ternak, Bogor (Indonesia)). [Proceedings of the national seminar on animal husbandry and veterinary technology. Book 2], Bogor (Indonesia) 12-13 Sep 2005/Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 897-902, 4 tables; 9 ref. 636:338.439/SEM/p

STYLOSANTHES HAMATA; FERTILIZER APPLICATION; RABBITS; FARMYARD MANURE; PROBIOTICS.

Stylosanthes hamata is herbaceous legume which able to adapt to various agroclimates in Indonesia. However, it is hardly used for animal feed in Indonesia. The yield is expected to increase by adding the rabbit manure, enriched probiotic as fertilizer. Experiment was carried out in the glasshouse, Balitnak Ciawi using three probiotics, i.e. Biovet, Probion, Trichoderma and 2.5% of rabbit manure. Planting

material was *S. hamata* seed, grown in 7 kg soil media in polybag, fertilized by 10% of rabbit manure (700 g per polybag). Treatments were (1) rabbit manure + Probion, (2) rabbit manure + Biovet, (3) rabbit manure + Trichoderma, (4) rabbit manure only, (5) control (without manure). The treatments were arranged in randomized completely design and replicated 9 times. Data collected were manure quality, plant height, fresh and dry weight of shoot during 6 time harvests with cutting interval 6 weeks. The results showed that the quality of manure increased organic matter content when probiotic was added (C/N 11-12%, while without probiotic C/N was 10%). Adding rabbit manure with probiotic increased the growth and forage production ($P<0.05$) as higher as 58.4% than that without probiotic. Optimum forage production were obtained at harvest 3, 4 and 5 and decreasing until 50% at subsequent harvests.

028 SUPRIADI.
Combination of urea and organic fertilizer on the physiological respon of hermada grass (*Sorghum bicolor*) on Inceptisols. ***Kombinasi pupuk urea dengan pupuk organik pada tanah Inceptisol terhadap respon fisiologis rumput hermada* (*Sorghum bicolor*)**/Supriadi; Soeharsono (Balai Pengkajian Teknologi Pertanian Yogyakarta (Indonesia)). [Proceedings of the national seminar on animal husbandry and veterinary technology. Book 2], Bogor (Indonesia) 12-13 Sep 2005/Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 865-871, 2 ill., 8 tables; 9 ref. 636:338.439/SEM/p

SORGHUM BICOLOR; FERTILIZER COMBINATIONS; UREA; ORGANIC FERTILIZERS; SOIL TYPES; MAGNESIUM; CHLOROPHYLLS; FEEDS; CATTLE.

This research was aimed at finding out the effect of combination of urea and organic fertilizer on Inceptisol cover area in concerning to nitrogen, magnesium, chlorophyll content and growth of hermada grass (*Sorghum bicolor*). The treatments were combination of urea and organic fertilizer as P I (0:3000 kg/ha); P II (100:2500 kg/ha); P III (150:2000 kg/ha); P IV (200:1500 kg/ha; P V (250:1000 kg/ha) and P VI (300:0 kg/ha). Research design was CRD (completely randomized design) by four replications. Data analysis used statistical variance model and Duncan multiple range test. The result showed that application of urea and organic fertilizers combination did not significantly affect N content, chlorophyll content and growth of hermada grass, but affect Mg content. The combination variance did not give any effect, although on combination P III and P IV showed increasing of N, Mg and chlorophyll content and better growth of hermada grass. The highest panicle yield was obtained by P II treatment, which yielded of 1,169.8 kg/ha, the highest forage production was obtained by P III treatment and gave significant result among the others 14,408.1 kg/ha. The average potential production of seed and forage were 2,010.5 ton/ha and 12,642.7 ton/ha in one harvesting, respectively. The amount of forage production could be given to 6-7 cattles for 65 days up to next harvesting.

029 WAHJUDIN, U.M.
Effect of composted crops residues on aluminium exchangeable and soybean yield on Vertic Hapludult from Gajrug, Banten. ***Pengaruh kompos sisa tanaman terhadap aluminium dapat ditukar dan produksi tanaman kedelai pada tanah Vertic Hapludult dari Gajrug, Banten***/Wahjudin, U.M. (Institut Pertanian Bogor (Indonesia). Fakultas Pertanian). *Jurnal Penelitian Pertanian* ISSN 0152-1197 (2006) v. 25(1) p. 29-35, 2 ill., 4 tables; 16 ref.

GLYCINE MAX; COMPOSTS; CROP RESIDUES; ALUMINIUM; PRODUCTION INCREASE; GENETIC SOIL TYPES; YIELDS.

Soybean production can be increased by agricultural intensification and extensification techniques. Ultisols is a soil type with the widest distribution in Indonesia, however, it is characterized with acid reaction, low organic matter content, and low soil fertility level. Ultisols contains a high concentration of Al at a level that can interfere plant growth. Application of the crops residue compost can reduce the

exchangeable Al (exch-Al). Objective of this research was to study the effect of crops residue compost on the activities of exch-Al and soybean yield. A greenhouse experiment using Vertic Hapludult from Gajrug, Banten was conducted in a completely randomized design. The treatments were different crops residue compost, i.e. of upland rice, corn, soybean and peanut having level of C-organic of 0, 1 and 2%. Soybean was used as indicator plant. Results of this experiment indicated that the application of different types of crops residue compost increased organic acids at different concentrations resulting different decrease of exch-Al. The application of upland rice residue compost at level of 2% organic-C (D2) resulted in the highest yield of dried soybean (23.21 g/pot) or increased up to 72.53%.

030 WIHARDJAKA, A.
Direct seeded rice crop response on NPK nutrition input at different toposequence position and its influence to nitro-oxyde gas emission. ***Tanggap padi gogorancah terhadap masukan hara NPK pada posisi toposekuen berbeda dan pengaruhnya terhadap emisi gas nitro-oksida***/Wihardjaka, A. (Loka Penelitian Pencemaran Lingkungan Pertanian, Jakenan (Indonesia)). *Agrivita* ISSN 0126-0537 (2006) v. 28(2) p. 165-176, 3 ill., 5 tables; 14 ref.

ORYZA SATIVA; DIRECT SOWING; NPK FERTILIZERS; NUTRIENT UPTAKE; TOPOGRAPHY; FERTILIZER APPLICATION; SOIL FERTILITY; PLANT RESPONSE; NITROUS OXIDE; SOIL POLLUTION.

Direct seeded rice crop response to nutrients application under rainfed lowland rice soil is influenced by some factors, i.e. soil fertility status, topography and agrohydrological conditions. Drought stress or change of soil moisture content in a toposequence affects soil and crop productivities. A field experiment was carried out in Jakenan's rainfed lowland rice area of Pati District to determine the response of direct seeded rice crop to NPK fertilizers management in different position in a toposequence. The experiment was arranged using randomized block design with six treatments namely check, NP, NPK, CR_NPK, NPKZn, farmyard manure at three locations namely upper, sloping, bottom toposequences. The significant response of direct seeded rice crop was observed at treated N plots. However, application of controlled-release of N fertilizer in CR_NPK treatment did not significantly yield high grains, especially in upper toposequence. Nutrient uptake of NPK in bottom toposequence was higher than either upper or sloping toposequences. Application of N fertilizer increased effectively grain yield and nutrient uptake of NPK, except nutrient uptake of NPK in bottom toposequence was higher than maximum NPK accumulation line. Controlled release of N fertilizer emitted nitrous oxide lower than prilled urea fertilizer. The bottom toposequence position emitted nitrous oxide gas higher than upper and middle position of toposequence

F07 SOIL CULTIVATION

031 AMBAR, S.
Effect of tillage practices on soil erodibility in Jatiluhur footslope, West Java. ***Pengaruh pengolahan tanah terhadap erodibilitas lahan di kaki lereng bukit Jatiluhur, Jawa Barat***/Ambar, S. (Universitas Padjadjaran Jatinangor, Sumedang (Indonesia). Fakultas Matematika dan Ilmu Pengetahuan Alam). *Bionatura* ISSN 1411-0903 (2006) v. 8(2) p. 107-121, 8 tables; 12 ref.

JAVA; TILLAGE; EROSION; SOIL TYPES; SOIL CHEMICOPHYSICAL PROPERTIES; SOIL SORPTION; INFILTRATION.

The study of soils particularly in terms of soil erodibility was conducted to three land complexes in a part of Jatiluhur footslope, West Java. The objectives of study were to determine a relative soil erodibility indices and the influence of soil types, ploughed and unploughed with remain shrub vegetal covers on soil properties particularly those which might be related to soil erodibility. The study was also concerned with variation of soils in the study area according to their erodibility. The parameters of erosion indices measured and examined were water stable aggregate (WSA), particle size and stoniness, gravel size, crust

thickness, number of cracks and its width, conductivity, salinity, organic matter contents, pH, percentage of debris cover, and vegetative cover. The tillage condition affects the soil in term of their potential to erosion, ploughing helps to reduce erosion by producing a rough surface of micro-relief, by which the frictional resistance of the soil to run-off is increased. It also breaks up surface crusts, caused by traffic or by the impact of raindrops, and thereby increasing porosity, ultimately infiltration capacity. In this way it increases infiltration and reduces over land-flow. However, excess tillage may cause the aggregate to breakdown completely and the individual particle thus formed will be susceptible to erosion. This particularly true in sandy or silty soils, which are the common soil types occuring in the study area. Therefore, it can be suggested that strip-cropping and terracering combined with contour ploughing are the recommended control techniques of conserving water and soils in the area investigated.

032 YUNUS, Y.
Changes of physical-mechanical characteristics due to traffic soil tillage with tractor on slope soil and its effect on soybean. ***Perubahan sifat fisika-mekanika akibat lintasan pengolahan tanah dengan traktor pada lahan miring dan efeknya terhadap kedelai***/Yunus, Y. (Universitas Syiah Kuala, Banda Aceh (Indonesia). Fakultas Pertanian). *Jurnal Penelitian Pertanian* ISSN 0152-1197 (2006) v. 25(1) p. 18-28, 4 ill., 10 ref.

GLYCINE MAX; TILLAGE; TRACTORS; SLOPING LAND; SOIL CHEMICOPHYSICAL PROPERTIES; SOIL COMPACTION; SOIL STRUCTURAL UNITS; SOIL MECHANICS; GROWTH; YIELDS; LAND PRODUCTIVITY.

The research aimed at investigating the change of physical-mechanical properties of soil due to soil tillage using a tractor at different slopes was carried out from April to October 2004 on Fluventic Entrudepts soil in Jatinangor, Sumedang, West Java. The trial used factorial split-plot design with 3 levels of land slopes and 6 levels of traffic tillage frequency, with 2 replications. Result showed that frequency of tillage traffic and land slopes significantly afffected on some soil physical-mechanical properties, e.g. bulk density, total porosity, stability index of soil aggregate, permeability, consistency of the soil, etc. The descent of physical-mechanical properties of the soil significantly affected the growth and yield of soybean. Nevertheless, the highest yield of soybean was recorded at 6-10% slope.

F08 CROPPING PATTERNS AND SYSTEMS

033 TIRTOSUPROBO, S.
Multiple crop farming of cotton and groundnut in West Lombok Regency: case study on Slengen Village. ***Usaha tani tumpang sari kapas dan kacang tanah di Kabupaten Lombok Barat: studi kasus di Desa Slengen***/Tirtosuprobo, S.; Sahid, M.; Hartono, J. (Balai Penelitian Tanaman Tembakau dan Serat, Malang (Indonesia)). *Agrivita* ISSN 0126-0537 (2006) v. 28(2) p. 141-149, 3 ill., 2 tables; 12 ref. Appendix.

GOSSYPIUM HIRSUTUM; ARACHIS HYPOGAEA; MULTIPLE CROPPING; FARMING SYSTEMS; PLANTING DATE; INTEGRATED CONTROL; FARM INPUTS; FARM INCOME; TECHNOLOGY TRANSFER; RURAL AREAS; NUSA TENGGARA.

On farm research (OFR) study was conducted in the limited irrigation paddy fields in the Slengen Village, Kayangan District, Western Lombok Regency, starting from January until October 2004. This location was selected due to the consideration that this location is a new area where cotton would be cultivated in relation with the Smallholder Cotton Intensification program (Intensifikasi Kapas Rakyat, IKR). The research was conducted in 22.55 hectares of field which were cultivated by 44 trained farmers with groundnut and cotton simultaneously. As comparison, a sample was taken of 35 other farmers who cultivated groundnut monoculturally in a 22.23 hectares of field. The packages of simultaneous cultivation technology recommended for groundnut and cotton are: (a) delinted cotton seed utilization, (b) time and

method of cotton planting (c) proper time of weed control and fertilizer application (d) integrated pest control. The data was collected on the following points: (a) the recommended technology which was applied by the farmer, (b) the production facility and manpower utilized by the farmers, (c) the production of cotton and groundnut, and (d) farmers' income. The result showed that the level of the adoption of simultaneous groundnut and cotton cultivation was 79%. By applying the simultaneous cultivation system for cotton and groundnut, the farmers' income increased Rp 1,030,620 per hectare, or equivalent to an increase of 124.7% in comparison to the groundnut yield cultivated monoculturally.

F30 PLANT GENETICS AND BREEDING

034 ASWANI, N.
Betha-carotene content analysis of some oil palm germplasms (*Elaeis guineensis* Jacq.). ***Analisis kadar beta-karoten beberapa genotip kelapa sawit* (*Elaeis guineensis* Jacq.)**/Aswani, N. (Universitas Sumatera Utara, Medan (Indonesia). Fakultas Pertanian); Pangaribuan, Y.; Oelim, T.M.H. *Jurnal Penelitian Pertanian* ISSN 0152-1197 (2006) v. 25(1) p. 52-59, 2 ill., 1 table; 16 ref. Appendices

ELAEIS GUINEENSIS; GENETIC PARAMETERS; HERITABILITY; GENETIC VARIATION; CAROTENOIDS; GENETIC GAIN.

The tree germplasms produced by the Indonesian Oil Palm Research Institute (IOPRI), i.e. Dumpy Dura, Marihat Tenera and Zaire Tenera were further studied as sources of commercial hybrids for high betha-carotene content (BCC) using non factorial completely randomized design. The ANOVA revealed that the genotypes significantly influenced BCC. Genetic parameter measurement showed that oil palm BCC was a high heritable character (heritability/h^2 = 0.67, the genetic variability was 87,870.42, each average genetic gain and expected genetic gain was 70% and 501.31). Hence, based on these calculations, these germplasms met the international requirement as source for high BCC.

035 AZRAI, M.
Genetic model estimate and heritability of downy mildew resistance in maize. ***Pendugaan model genetik dan heritabilitas karakter ketahanan terhadap penyakit bulai pada jagung***/Azrai, M. (Balai Penelitian Tanaman Serealia, Maros (Indonesia)); Aswidinnoor, H.; Koswara, J.; Surahman, M. *Zuriat* ISSN 0853-0808 (2005) v. 16(2) p. 101-111, 6 tables; 30 ref.

ZEA MAYS; MILDEWS; DISEASE RESISTANCE; GENETIC RESISTANCE; HERITABILITY; GENETIC PARAMETERS.

Genetic model of downy mildew resistance in maize caused by *Peronosclerospora maydis* was estimated from generation means in progenies derived from crosses between the resistant inbred lines Mr10 and Nei 9008, and susceptible inbred line CML 161. Seven generations from each cross (parents: P1 and P2, their progenies: F1, F2, F3, BC1P1 and BC1P2) were grown in Cikeumeuh-Bogor experimental farm. The experiment was arranged in a split plot design with two replications. The genetic material was evaluated for downy mildew resistance under artificial screening nursery using spreader rows technique. The joint scaling test was used to determine the genetic model. The calculated values of t-test at levels 5% and 1% indicated that additive [d], dominance [h], and additive x additive [i] gene effects play important role in downy mildew resistance in maize. The genetic components of the [d] and [i] had the same sign for Mr10 x CML 161, indicating the interaction type was complementary epistasis. For Nei 9008 x CML 161, genetic components [d] and [i] had different sign indicating the interaction type was duplicate epistasis. Broad sense heritability estimates were high and narrow sense heritability estimates were medium.

036 IRIANY, R.N.
Response of 210 maize recombinant inbred lines under drought stress condition. ***Tanggap 210 galur rekombinan jagung terhadap cekaman kekeringan***/Iriany, R.N.; Takdir M., A.; Pabendon, M.B.; Dahlan, M.M. (Balai Penelitian Tanaman Serealia, Maros (Indonesia)). *Penelitian Pertanian Tanaman Pangan* ISSN 0216-9959 (2006) v. 25(1) p. 45-51, 1 ill., 5 tables; 11 ref.

ZEA MAYS; VARIETIES; DROUGHT STRESS; DROUGHT RESISTANCE; CROP PERFORMANCE; YIELDS.

Low yield of maize (*Zea mays* L.) on upland farming is usually due to the non intensive cultivation, and abiotic stress. The most important abiotic stress in Indonesia is commonly induced by drought. Rainfed dryland has limited water supplies, and depend on the rainfall. The experiment was conducted at Muneng, East Java during dry season 2004, arranged in Lattice Design 14 x 15, with 2 replications. Among 210 RILs showed different responses to drought stress. Yield potential ranged from 7.6-103.9 g/plant, and the highest yield potential was obtained by genotype 169. In normal condition (without drought stress treatment) the yield potential of genotype 169 was low of 89.6 g/plant. Generally, yield potential was lower for drought stress treatment compared to that for normal condition. It showed that there was an interaction among them.

037 KRISMAWATI, A.
Adaptation test of kenaf (*Hibiscus cannabinus* L.) varieties and lines at tidal swamps land, Central Kalimantan. ***Uji adaptasi varietas dan galur kenaf* (*Hibiscus cannabinus* L.) *di lahan pasang surut Kalimantan Tengah***/Krismawati, A. (Balai Pengkajian Teknologi Pertanian Kalimantan Tengah, Palangkaraya (Indonesia)). *Jurnal Penelitian Tanaman Industri* ISSN 0853-8212 (2005) v. 11(3) p. 107-111, 3 tables; 11 ref.

HIBISCUS CANNABINUS; VARIETIES; ADAPTATION; SWAMP SOIL; GROWTH; INTERTIDAL ENVIRONMENT; KALIMANTAN.
The area of tidal swamps in Central Kalimantan is about 5.5 million hectares and parts of that area can be developed by kenaf plant. The adaptation test was conducted in Samuda Village, Mentaya Hilir Selatan, Kotawaringin Timur District, Central Kalimantan. The experiment used a randomized block design with three replications and six treatments consisting of two kenaf varieties (Hc G-4 and Cuba 108/II) and four kenaf lines (Hc 85.9.75; Hc 85.9.40.1; Hc 85.9.42; Hc 85.9.66.1). Parameters observed were plant height, stem diameter at 40, 75 and 105 days after planting on 10 random plants per plot, fresh biomass, dried fiber, and dried adventive root weight. The results of this experiment showed that two lines, namely Hc 85.9.66.1 and Hc 85.9.75 obtained the optimal vegetative growth as their plant height and stem diameter at harvesting time reached 265.25 cm and 260.25 cm, 2.17 cm and 2.10 cm, respectively. The fiber yields of the two lines were 2.40 and 2.30 ton/ha, respectively, while the control line Hc G-4 was only 2.25 ton/ha.

038 KUSWANTO.
Evaluation of genetic variability on F2, F3 and F4 bulk population of yardlong bean (*Vigna sesquipedalis* (L.) Fruwirth) from PS X MLG15151. ***Evaluasi keragaman genetik populasi bulk F2, F3 dan F4 kacang panjang* (*Vigna sesquipedalis (L.) Fruwirth*) *hasil persilangan PS x MLG 15151***/Kuswanto (Universitas Brawijaya, Malang (Indonesia). Fakultas Pertanian). *Agrivita* ISSN 0126-0537 (2006) v. 28(2) p. 108-113, 1 ill., 2 tables; 15 ref.

VIGNA UNGUICULATA SESQUIPEDALIS; GENETIC VARIATION; CROSSBREDS; F2 HYBRIDS; F3 HYBRIDS; POPULATION GENETICS; HERITABILITY.

The present study is part of a long-term research, which aimed at evaluating genetic variability on F2, F3 and F4 of yardlong bean, from PS x MLG 15151. This research was executed in Junrejo Batu and Karangploso Malang, from December 2003-Pebruary 2005. It consisted of three plantings. Six hundred

seeds of F2 population planted based on bulk method, and then their 1-2 dried pods bulked as next seeds on F3 population. The second planting, 1200 seeds of F2, F3 and MLG 15151 populations planted and then their 1-2 dried pods bulked as next seeds. The third planting the seeds of F3, F4, and MLG 15151 populations planted and then their 1-2 dried pods bulked as seeds on next research. The natural selection was executed on all of planting and some of plants did not produce any pod. The number and weight of pod per plant had high heritability on F2, F3 and F4 populations. Both of them would be fit ones as selection characters on the next population. Number of pod and seed, pod length, fresh weight of one pod and weight of pod per plant, increased on F3 and F4 population. Selection from them would obtain higher fresh pod yield.

039 KUSWANTO.
[Selection of yardlong bean (*Vigna sesquipedalis* L. Fruwirth) promising lines]. *Seleksi galur-galur harapan kacang panjang* (*Vigna sesquipedalis L. Fruwirth*) *Unibraw*/Kuswanto; Soetopo, L.; Hadiastono, T. (Universitas Brawijaya, Malang (Indonesia). Fakultas Pertanian); Kasno, A. *Habitat* ISSN 0853-5167 (2005) v. 16(4) p. 258-269, 2 tables; 16 ref. Appendix

VIGNA UNGUICULATA SESQUIPEDALIS; PROGENY; SELECTION; GENOTYPES; ADAPTATION; RESISTANCE TO INJURIOUS FACTORS; YIELD COMPONENTS.

The research was carried out to evaluate yield potential and resistance to CABMV, and also to select the Unibraw promising lines. The selected lines will be evaluated on adaptation test. The experiments was conducted at Research Station of Brawijaya University, Jatikerto, Kromengan, Malang during November 2004 to March 2005. The materials were 177 promising lines and 4 parent genotypes. The promising lines had genetic variation on yield potential and the other variables, so they were selected. Eighteen lines which have high yield potential and resistant to CABMV were obtained, i.e. Unibraw 34039, Unibraw 34061, Unibraw 34042, Unibraw 34053, Unibraw 24068, Unibraw 24034, Unibraw 34041, Unibraw 14008, Unibraw 24035, Unibraw 24017, Unibraw 24089, Unibraw 24071, Unibraw 24088, Unibraw 14023, Unibraw 24062, Unibraw 24191, Unibraw 24041 and Unibraw 14017.

040 PARJANTO.
Chromosome analysis for sex determination on salak (*Salacca zalacca* [Gaertner) Voss). *Analisis kromosom untuk penentuan kelamin tanaman salak* (*Salacca zalacca [Gaertner] Voss*)/Parjanto (Universitas Sebelas Maret Surakarta (Indonesia). Fakultas Pertanian); Artama, W.T.; Sukarti-Muljopawiro. *Agrivita* ISSN 0126-0537 (2006) v. 28(1) p. 35-44, 2 ill., 4 tables; 13 ref.

SALACCA; CHROMOSOMES; FEMALES; MALES; SEX DETERMINATION.

Chromosome variation analysis of male, female, and hermaphrodite of salak (*Salacca zalacca*) have been done by squash-aceto orcein method for identifying the cytological sex marker and sex chromosome. The results showed that the number, length, and shape of chromosome in the male, female, and hermaphrodite plants were not different. They had the same karyotype structure, that is 2n = 28 = 11 m + 1 m (SAT) + 2 sm (consisted of 11 pairs of metacentric chromosomes, 1 pair of metacentric chromosome bearing satellite, and 2 pairs of submetacentric chromosomes). Sex of salak (*S. zalacca*) could not be identified based on the observation of chromosome morphology. The morphological heteromorphic sex chromosomes were not appeared.

041 PRIYONO.
Confirmation of transgenic robusta coffee (*Coffea canephora*) transformed by chitinase-encoding gene and its propagation through somatic embryogenesis. *Konfirmasi kopi robusta* (*Coffea canephora*) *transgenik hasil transformasi dengan gen chitinase dan perbanyakannya melalui embriogenesis somatik*/Priyono; Budiani, A.; Mawardi, S.; Siswanto (Pusat Penelitian Kopi dan Kakao

Indonesia, Jember (Indonesia)). *Pelita Perkebunan* ISSN 0215-0212 (2005) v. 21(2) p. 73-89, 4 ill., 5 tables; 26 ref.

COFFEA CANEPHORA; CHITINASE; GENETIC ENGINEERING; TRANSGENIC PLANTS; GENETIC TRANSFORMATION; SOMATIC EMBRYOS; GENETIC MARKERS.

Genetic engineering of robusta coffee resistant to fungal diseases might be done by introducing a chitinase-encoding gene into genome of this plant. This research was aimed to confirm transgenic plant of BP 308 clone robusta coffee transformed by chi gene and to evaluate its ability for the somatic embryogenesis. Confirmation of transgenic was carried out by analyzing the presence of NPTII gene as a selectable marker for Canamysin resistant using PCR technique. The somatic embryo initiation and reproduction were evaluated in 11 plant accessions. Three kinds of sucrose concentration (20%, 30% and 40%) were applied in initiation stage of somatic embryo germination. The suitability of 4 medium, namely M1 (without addition by liquid medium), M2 (addition by liquid medium contained 0.25 mg/l kinetin), M3 (addition by liquid medium contained 0.25 mg/l IAA), and M4 (addition by liquid medium contained 0.25 mg/l GA3) was evaluated for somatic embryo maturation. The result showed that 8 out of 10 plant accessions tested were transgenic and they could be propagated through somatic embryogenesis. The ability of transgenic plant for somatic embryo initiation, reproduction and regeneration were similar with that of non-transgenic one. Germination of somatic embryo could be improved by using 40% sucrose. Maturation of somatic embryo could be improved by addition of fresh liquid medium on the ancient gelled medium that used for somatic embryos reproduction. The best result was obtained on addition of fresh medium contained 0.25 mg/l GA3 in which 65% of the somatic embryos developed to pregerminate somatic embryo.

042 REFLINUR.

Reaction of rice monogenic lines carrying blast disease resistance genes to *Pyricularia grisea* isolate in Indonesia. ***Reaksi galur padi monogenik pembawa gen ketahanan penyakit blas dari beberapa isolat Pyricularia grisea di Indonesia***/Reflinur; Bustamam, M. (Balai Besar Penelitian dan Pengembangan Bioteknologi dan Sumberdaya Genetik Pertanian, Bogor (Indonesia)); Widyastuti, U.; Aswidinnoor, H. *Penelitian Pertanian Tanaman Pangan* ISSN 0216-9959 (2006) v. 25(1) p. 9-14, 1 ill., 4 tables; 14 ref.

ORYZA SATIVA; UPLAND RICE; VARIETIES; MAGNAPORTHE GRISEA; GENETIC RESISTANCE; BLIGHT; GENES; INDONESIA.

Rice blast disease caused by *Pyricularia grisea* is one of the most important diseases of upland rice in Indonesia. The use of resistant varieties is an effective way to control rice blast disease. A set of resistance monogenic lines is now available, but its effectively was still unknown in Indonesia. To investigate the effectiveness of rice blast resistance gene carried by monogenic lines, phenotypic tests by using Indonesian blast isolates were required. The effectiveness of the 31 monogenic lines were tested across nine rice blast isolates. The young leaves of 21 day old plants were sprayed with 50 ml of inoculum suspension (2 x 10^6 conidia/ml). The symptom of disease as observed at seven days after inoculation was determined. Score 0-3 was categorized as resistant, 4-6 as moderately resistant, and 7-9 was susceptible reaction. The phenotypic analysis indicated that seven major resistant genes (Pik, Pik-h, Piz, Piz5, Pi1, Pi7(t) and Pik-m) were incompatible to nine tested isolates. The other three resistant genes which were also effective namely Pik-p, Pish, and Pi9 were just compatible to one isolate but incompatible to the other isolates. Three resistant genes, Piz-t, Pit, and Pi19 showed specific interaction to one of the tested isolates. The specific interaction was an incompatible reaction between Piz-t gene and R-173Skb isolate but compatible to the others, while both Pit and Pi19 genes were incompatible to 04-012 isolate and compatible to the other isolates.

043 RUSWANDI, D.
Preliminary study on the heterotic pattern of tropical quality protein maize (QPM) and downy mildew resistance (DMR) maize inbreds. *Studi awal pola heterotik di antara galur-galur jagung tropis berkualitas protein (QPM) dan tahan patogen bulai (DMR)*/Ruswandi, D. (Universitas Padjadjaran, Bandung (Indonesia). Fakultas Pertanian). *Zuriat* ISSN 0853-0808 (2005) v. 16(2) p. 94-100, 3 tables; 17 ref.

ZEA MAYS; INBRED LINES; PROTEIN QUALITY; MILDEWS; DISEASE RESISTANCE; HETEROSIS BREEDING; COMBINING ABILITY; YIELDS.

Exploration of heterotic patterns among maize inbreds has become important since it could provide information on which new germplasm could be used to improve basic population in breeding program. This experiment was a preliminary study on the heterotic relationships between tropical quality protein maize (QPM) and downy mildew resistance (DMR) maize inbreds based on analysis on combining ability. Seven tropical maize inbreds were crossed in a line x tester. One commercial hybrid from Bisi Company, Bisi 2, was included for the evaluation of hybrids as check cultivar. The result revealed that two heterotic groups have been recognized, i.e., major group consisted of CML 161, CML 163, CML 172, Nei 9008, and P 345. Whereas the small group contained MR 10 and Ki 3. The hybrids and their parental inbreds were evaluated in Jatinangor, Indonesia (753 m above sea level) in February until May 2004. The location of yield test has a humid climate with an annual rainfall of about 1925 mm. The field experiment was arranged in a randomized block design with two replications. The present study revealed two heterotic groups: major group involving CML 161, CML 163, CML 172, Nei 9008, and Ki 3; and small group containing MR 10 and P 345. Moreover, the major group can be divided into two subgroups involving all CML lines for the first subgroup and Nei 9008 and Ki 3 for the second subgroup.

044 SAPTADI, D.
[Study of strawberry (*Fragaria* sp.) crossbreeding]. *Studi persilangan stroberi* (*Fragaria sp.*)/Saptadi, D.; Soetopo, L.; Lestari P., S. (Universitas Brawijaya, Malang (Indonesia). Fakultas Pertanian); Marheni; Pamulatsih, W.S. *Habitat* ISSN 0853-5167 (2005) v. 16(3) p. 171-177, 1 ill., 1 table; 10 ref.

FRAGARIA; HYBRIDIZATION; POLLINATION; VARIETIES; JAVA.

Local Batu and Bali are the strawberry cultivars cultivated in Batu, East Java. Bali cultivar has characteristics on big fruit and high yield but the taste is sour. Although Batu has the smaller fruit size it has a sweet taste. Recombination of those characters could be done by breeding program. This research was conducted as preliminary step to do the strawberry breeding. Research was carried out at strawberry field in Pandan, Pandanrejo village, Bumiaji District, Batu, East Java. The crossing materials were Batu and Bali which was cultivated by farmer. The preliminary study was carried out to know flowering biology of strawberry, proper time for pollination and the compatibility between these two parental. The advanced study conducted to know the time of the pistil remains receptive. Reciprocal crossing was done using randomized completely block design with 2 factors. The first factor was delaying time of pollination (0 hour, 24 hours, 47 hours and 72 hours after emasculation). The second factor was a female parent. Result of this research showed that strawberry flower open up at 4 - 5 days after budding and it can be emasculated a day before. The successful of pollination could be observed 2 days after pollination. There was no incompatibility between two parental and the most proper pollination time was in the early morning about 06.00 - 07.00 a.m. Pollination could be done until 04.00 p.m. Pistils remain receptive until 72 hours after emasculation. Delaying time of pollination caused the decrease of seed production in artificial pollination. The size of fruit and the amount of seed produced by artificial pollination depended on female parent characteristic.

045 SETIYO, I.E.
Genetic diversity analysis of interpopulation of oil palm tenera based on RAPD markers. ***Analisis keragaman genetik Elaeis guineensis interpopulasi tenera berdasarkan marka RAPD***/Setiyo, I.E. (Pusat Penelitian Kelapa Sawit, Medan (Indonesia)). *Jurnal Penelitian Pertanian* ISSN 0152-1197 (2006) v. 25(1) p. 60-70, 6 ill., 3 tables; 14 ref. Appendix.

ELAEIS GUINEENSIS; GENETIC VARIATION; GERMPLASM; RAPD; POPULATION GENETICS; RECOMBINATION; HETEROZYGOTES.

Availability of germplasm and its genetic diversity information is very important for creating superior plant cultivar. Germplasm introduction and recombination are usually undertaken by breeders in order to enrich genetic diversity. Indonesian Oil Palm Research Institute (IOPRI) has integrated technology of DNA based molecular marker into breeding program. Beside, in optimalization of germplasm utilization, the use of DNA technology is important for early identification of plant traits. In this experiment, the diversity of 16 elite families of oil palm tenera were analyzed its diversity using RAPD markers with four selected oligonucleotide primers (OPD-16, OPN-09, OPM-16 and OPR-11). Calculation of genetic similarity coefficient and construction of their dendogram were carried out by using computer program NTSYSpc version 2.02. All primers used to amplify genome DNA generated total 22 fragment bands with polymorphism level as many as 15 bands (68.5%). Estimated heterozygosity of SP 540 population was lower than that of Binga population. In general, recombination was able to increase value of heterozygosity. Dendogram showed that in 47% coefficient of genetic similarity tenera populations were separated into four groups. In this similarity level, SP 540 was selfed population (family 1391 and 1540) and SP 540*Bangun population (family 1394) were clustered in one big group in concurrence with Binga population (particularly family 1664, 1667 and 1670) into group I. Two individual palms of Binga population of other family (1669 and 1677) segregated to group II and IV, respectively. All individual of SP 540*Marihat (family 1543) clustered into group II. Group III composed of only one individual palm as segregation of family 1547 (SP 540*Polonia).

046 SOBIR.
Identification of cDNA fragment tightly linked to NV and TM-2 loci in tomato. ***Identifikasi fragment cDNA yang berpautan dengan lokus NV dan TM-2 pada tomat***/Sobir (Institut Pertanian Bogor (Indonesia). Fakultas Pertanian); Motoyoshi, F. *Zuriat* ISSN 0853-0808 (2005) v. 16(2) p. 111-120, 3 ill., 2 tables; 24 ref.

LYCOPERSICON ESCULENTUM; LOCI; DNA; GENETIC RESISTANCE; RNA; IDENTIFICATION; COMBINING ABILITY; HYBRIDIZATION.

Tm-2 is a resistance gene in tomato against tomato mosaic virus (ToMV), located in heterochromatic region of chromosome nine. Since map based cloning was difficult to perform for identify the gene on that region, differential display approach was applied by using two near-isogenic tomato lines (NILs), one without Tm-2 and the other with Tm-2 to identify cDNAs of the transcripts from the region surrounding the Tm-2 locus. Among the 150 combinations of three anchor primers and fifty arbitrary primers, 10 combinations generated cDNA polymorphic bands. Out of them, only one combination of CA6, exhibited, polymorphic band under southern blot analysis, subsequently a genetic experiment showed that the CA6 locus tightly linked to the Tm-2 locus. The CA6 fragment also hybridized to genomic DNA fragments from a tomato line carrying Tm-2a, a line of *L. peruvianum* from which Tm-2a was originated, and a tomato line carrying another Tm-2-like gene. A northern hybridization blotting result suggested that the gene corresponding to CA6 fragment was constitutively transcribed.

047 SUPRIYANTO, A.
Genotype analysis of vegetatively propagated of citrus using RAPD primers. ***Analisis genotip pohon induk jeruk bebas penyakit hasil perbanyakan tunas pucuk dengan primer RAPD***/Supriyanto, A.; Agisimanto, D.; Purbiati, T.; Devy, N.F.; Dwiastuti, M.E. (Loka Penelitian Tanaman Jeruk dan Hortikultura Subtropik, Batu, Malang (Indonesia)). *Jurnal Hortikultura* ISSN 0853-7097 (2006) v. 16(1) p. 1-4, 1 ill., 15 ref.

CITRUS SINENSIS; CITRUS GRANDIS; RAPD; VIRUSFREE PLANTS; MERISTEM CULTURE; GRAFTING.

Accurate variety testing is needed to proof the genotype accuracy of virus free mother plant that vegetatively multiplied. Study was done to analyze the genotype similarity of the kind mother plant through shoot tip grafting from the single mother plant by using DNA RAPD marker. Leaves from young flush of 20-25 days were extracted in order to find out the bulk DNA. Each DNA sample from each variety was amplified by 2 RAPD primer and separated electrophoretically. The results indicated that 2 RAPD OPN14 and OPN16 primer revealed the uniformity of DNA band of the breeder seeds and the mother plant. The results strongly confirmed that there was no genotype differences among the plant generated from standard protocol of producing virus free of citrus breeder seeds and the single mother plant.

048 WICAKSANA, N.
Multivariate analysis on flowers and leaves characters of three yam bean species (*Pachyrhizus* spp.) population. ***Analisis multivariat karakter bunga dan daun pada populasi tiga spesies bengkuang* (*Pachyrhizus spp.*)**/Wicaksana, N.; Karuniawan, A. (Universitas Padjadjaran, Jatinangor, Sumedang (Indonesia). Fakultas Pertanian). *Bionatura* ISSN 1411-0903 (2006) v. 8(2) p. 171-181, 2 ill., 4 tables; 19 ref.

PACHYRHIZUS; SPECIES; FLOWERS; LEAVES; GENOTYPES; CROP PERFORMANCE; STATISTICAL METHODS; AGRONOMIC CHARACTERS.

The objective of this study was to analyze flowers and leaves morphological characters of three yam bean species (*P. erosus*, *P. ahipa*, and *P. tuberosus*) in Jatinangor West Java. Twelve *P. erosus* genotypes, six *P. ahipa* genotypes, and four *P. tuberosus* genotypes were planted on randomized block design with two replications. Multivariate analysis, i.e. principal component and cluster analysis was used to grouping the three species of yam bean based on 18 characters of flowers and leaves performances. Both principal component and cluster analysis clearly separated the three species. The analysis showed that identification of floral variables was the main character to discriminate between species.

049 YASIN H.G., M.
Intra-population improvement of quality protein maize MSQ-K1 and MSQ-P1. ***Perbaikan populasi jagung QPM MSQ-K1(S1)C0 dan MSQ-P1(S1)C0***/Yasin H.G., M.; Arifuddin; Mejaya M.J. (Balai Penelitian Tanaman Serealia, Maros (Indonesia)). *Penelitian Pertanian Tanaman Pangan* ISSN 0216-9959 (2005) v. 24(3) p. 140-146, 8 tables; 13 ref.

ZEA MAYS; PLANT POPULATION; HIGH YIELDING VARIETIES; SELECTION; AGRONOMIC CHARACTERS.

MSQ-P1 and MSQ-K1 were two quality protein maize (QPM) populations with white and yellow grain colours, respectively. The intra-population improvement was done to increase the grain yields of both QPMs. The variety trial on a C0 cycle was conducted in Blora, Central Java, during the planting season of June-October 2004. A randomized completely block design with three replications was used in the experiment. Each entry was planted in a four-rows plot at a plant spacing of 75 cm x 25 cm, one plant per hill. Results of the trial showed that grain yield (m.c. 15%) of the MSQ-K1(C0) was 4.76 t/ha, while

MSQ-P1(C0) was 4.68 t/ha. These yields were not significantly different from the control cultivars Srikandi Yellow-1, Srikandi White-1, Bisma, Lamuru, and MS-2. Plant aspects, husk cover, and ear aspect were scored 1 and 2. The intra-population improvement method was done to increase the status C1 to selected S1 families from the F2 generations. The S1 families were evaluated using an incomplete block design alpha lattice with two replications with a selection intensity 8-10%. MSQ-P1(S1)C0 and MSQ-K1(S1)C0 were evaluated in Maros and Bajeng experimental farm, respectively. The results showed that grain yield (w.c. 15%) was 6.31 -7.49 t/ha for family selected of MSQ-K1(S1)C0 and 5.93-7.58 t/ha of MSQP1(S1)C1. Plant aspect, husk cover, and ear aspect of the two populations were 1-2, position of ear was middle of plant height, and moderate resistance to leaf blight and rust.

F50 PLANT STRUCTURE

050 AZIZ-PURWANTORO.
Phylogenetic of orchids based on morphological characters. *Kekerabatan antar anggrek spesies berdasarkan sifat morfologi tanaman dan bunga*/Aziz-Purwantoro; Ambarwati, E. (Universitas Gadjah Mada, Yogyakarta (Indonesia). Fakultas Pertanian); Setyaningsih, F. *Ilmu Pertanian* ISSN 0216-4214 (2005) v. 12(1) p. 1-11, 1 ill., 2 tables; 14 ref.

ORCHIDACEAE; SPECIES; PHYLOGENY; PLANT ANATOMY.

Morphological relationships among species orchids is necessary to orchid breeder in obtaining good hybrids in perennial plants. Closely related among species orchids would increase their crossing opportunity. The objectives of this study was to classify orchid into cluster according to their similarities in phenotypic characters. The phenotypic characters observed were plant height (cm), leaf length (cm), leaf width (cm), ratio of leaf length and leaf width number of flowers per inflorescence, lenght of flower stalk (cm), flower diameter (cm), sepala lenght (cm), leaf colour, type of pseudobulb growth and flower aroma. Relationships among 16 types of species orchids was analyzed according to cluster analysis with agglomerative method (Everitt, 1993). The cluster analysis showed that Phalaenopsis consisted of one cluster, based on the similarities in type of pseudobulb growth, characteristics of plant height and leaf, number of flowers per inflorescence, length of flower stalk, flower diameter and sepal length. Dendrobium consisted of four clusters, because of the difference of flower characteristics. Meanwhile, *B. lobii*, *A. miniatum*, *Vanda tricolor*, and *G. scriptum* has one cluster, respectively.

F70 PLANT TAXONOMY AND GEOGRAPHY

051 SUHIRMAN, S.
[Toxicity of *Zingiber zerumbet* extracts against *Artemia salina*]. *Uji toksisitas ekstrak lempuyang gajah (Zingiber zerumbet) terhadap larva udang (Artemia salina Leach.)*/Suhirman, S.; Syukur, C. (Balai Penelitian Tanaman Obat dan Aromatik, Bogor (Indonesia)); Hernani. *Buletin Penelitian Tanaman Rempah dan Obat* ISSN 0215-0824 (2006) v. 17(1) p. 30-38, 6 ill., 6 tables; 8 ref.

ARTEMIA SALINA; TOXICITY; PLANT EXTRACTS; ZINGIBER; QUALITY.

Zingiber zerumbet has long been used as a traditional medicine to cure dysentri, stomachache, and also as carminative. The present work was to study the toxicity of extract of *Z. zerumbet* used brine shrimp lethality test (BSLT) method and *A. salina* as bioindicator. The raw material came from Bogor, Subang, Sumedang and Garut. The method of raw material quality determining used Materia Medika Indonesia (MMI) such ash content, ash insoluble in acid, water and alcohol soluble extractives and also fiber, starch and curcumin contents. Extracts were made by maceration combined with stirring and 3 types of solvents, such as polar (methanol), semipolar (ethyl acetate) and non polar (hexane). The chemical compounds were analyzed by thin layer chromatography (TLC) with toluene: ethyl acetate: acetic acid = 8:2:2 drops as a eluen and 50% sulphuric acid as spray and GCMS. The result showed that there was variation between

areas for ash, ash insoluble in acid, water and alcohol soluble extractives, in the fiber, starch and curcumin contents were also different. The highest water and alcohol soluble extractives were from Garut followed by Sumedang. For fiber, starch and curcumin contents were from Sumedang, Bogor and Subang, respectively. The highest and the lowest yield of extract were from ethyl acetate, Bogor (8.30%) and hexane, Garut (1.49%). The highest and the lowest LD_{50} of extracts were from ethyl acetate, of Garut and Subang which was 1.85 ppm and 108.05 ppm, respectively. The result of TLC showed that there were differences in chemical compound separations from extracts between areas, respectively. The identification of chemical compound revealed that the chemical component of extract which was showed the highest LD50 has the mixture of organic compound such as buthyl hexadecanoic, followed by octadecanoic acid, hexacosan, and also the component which found in Zingiberaceae family such as 3-hydroxy-ll-hyperoxy bisabolan-1,9-dion, 2', 4'. 5' trimethoxyphenyl butadien, 7-(4'hydroxi-3 'methoxyphenyl-1 heptan-4-en-3-on and 1,7 diphenyl-3,5 -heptan dion.

H10 PESTS OF PLANTS

052 ARIFIN, M.
Compatibility of SlNPV with HaNPV to control soybean cutworm and pod feeder. *Kompatibilitas SlNPV dengan HaNPV dalam pengendalian ulat grayak dan ulat pemakan polong kedelai*/Arifin, M. (Balai Besar Penelitian dan Pengembangan Bioteknologi dan Sumberdaya Genetik Pertanian, Bogor (Indonesia)). *Penelitian Pertanian Tanaman Pangan* ISSN 0216-9959 (2006) v. 25(1) p. 65-70, 6 ill., 1 table; 12 ref.

GLYCINE MAX; SPODOPTERA LITURA; HELICOVERPA ARMIGERA; BIOLOGICAL CONTROL; NUCLEAR POLYHEDROSIS VIRUS; MORTALITY.

The cutworm, *Spodoptera litura* (F.) and pod feeder, *Helicoverpa armigera* (F.) are the most important insect pests on soybeans. Both insect pests can be controlled by using an entomopathogenic virus called nuclear-polyhedrosis virus (NPV). An experiment was conducted in a laboratory from September to December 2004 to determine the compatibility of SlNPV with HaNPV as active ingredients of a broad spectrum and virulence NPV biopesticide to control soybean cutworm and pod feeder. The experiment used four treatments of SlNPV and HaNPV combinations, each with nine concentrations ranged from 5 x 10^2 to 5 x 10^6 polyhedra inclusion bodies (PIBs)/ml. Results indicated that the SlNPV and HaNPV combinations were highly virulence to the cutworm and pod feeder, with LC50 values were 6.0 x 10^3 and 6.5 x 10^3 PIBs/ml, respectively. The SlNPV and HaNPV combinations were the same virulence with NPV standards. Therefore, both NPVs were compatible and suitable to be combined as a broad spectrum biopesticide to control soybean cutworm and pod feeder.

053 HARNI, R.
Effect of application method of endophytic bacteria on root lesion nematode (*Pratylenchus brachyurus*) on patchouli. *Pengaruh metode aplikasi bakteri endofit terhadap perkembangan nematoda peluka akar (Pratylenchus brachyurus) pada tanaman nilam*/Harni, R.; Mustika, I. (Balai Penelitian Tanaman Rempah dan Obat, Bogor (Indonesia)); Supramana; Munif, R. *Jurnal Penelitian Tanaman Industri* ISSN 0853-8212 (2006) v. 12(4) p. 161-165, 2 tables; 18 ref.

POGOSTEMON CABLIN; PRATYLENCHUS BRACHYURUS; PLANT DISEASES; BIOLOGICAL CONTROL; ENDOPHYTES.

Endophytic bacteria is one of the important agents recently used for controlling plant parasitic nematodes such as *P. brachyurus* which is one of the factors affecting the productivity of patchouli (*Pogostemon cablin* Benth.) in Indonesia. The objective of the research was to find out an efficient application method of endophytic bacteria to reduce *P. brachyurus* on patchouli. The research was conducted in the Nematology Laboratory, Department of Plant Protection, Bogor Agricultural University and in the

Laboratory and Greenhouse of Indonesian Spice and Medicinal Crops Research Institute, from January to July 2005. The research used randomized complete design with two factors, the first factor was application method (drencing and deeping), the second factor was bacteria isolates (NJ2, NJ25, NJ41, NJ46, NJ57, NA22, ERB21, ES32, E26). The result showed that the population of nematode was affected by the interaction between bacterial isolates and application method. While shoot weight, root length and plant height were affected by bacterial isolates. Bacillus NA22, Bacillus NJ46 and Bacillus NJ2 applicated by deeping the root into bacterial suspension significantly gave good result in reducing *P. brachyurus*, i.e. 75%, 63% and 60%. All bacterial isolates increased shoot weight, root length, and plant height.

054 HERMAWAN, W.

Effect of leaf extract of *Kalanchoe daigremontiana* on diet activity of larvae *Epilachna vigintioctopunctata* Fabricius. *Pengaruh ekstrak daun Kalanchoe daigremontiana terhadap aktivitas makan larva Epilachna vigintioctopunctata Fabricius*/Hermawan, W.; Melanie; Kasmara, H.; Supratman, U. (Universitas Padjadjaran, Bandung (Indonesia). Fakultas Matematika dan Ilmu Pengetahuan Alam). *Bionatura* ISSN 1411-0903 (2005) v. 7(2) p. 101-111, 2 ill., 2 tables; 15 ref.

SOLANACEAE; KALANCHOE; BOTANICAL INSECTICIDES; DRUG PLANTS; EPILACHNA VIGINTIOCTOPUNCTATA; PLANT EXTRACTS; LARVAE.

The research was conducted on the effect of leaves extract of *Kalanchoe daigremontiana* (Crassulaceae) against *Epilachna vigintioctopunctata* Fabricius (Coleoptera) which known as major pest of Solanaceae. The purpose of this study to find out antifeedant activity of extract *Kalanchoe daigremontiana* against early fourth instar larvae of *Epilachna vigintioctopunctata* Fabricius at concentration lower than 5000 ppm which decrease into half concentration of previous. The data were obtained from counting mean sector of leaf area consumed by the larvae, both in treatment and control. The data were analysed by the Mann Whitney U test to compare with the control and the treatments. The result showed that the leaves extract of *K. daigremontiana* have antifeedant activity against to early fourth instar larvae of *Epilachna vigintioctopunctata* Fabricius significantly at 78.125 ppm, 156.25 ppm, 312.5 ppm, 625 ppm, 1250 ppm, 2500 ppm, dan 5000 ppm concentrations.

055 KARMAWATI, E.

Role of environment factors on the population of *Helopeltis* spp. and *Sanurus indecora* on cashew plantation. *Peranan faktor lingkungan terhadap populasi Helopeltis spp. dan Sanurus indecora pada jambu mete*/Karmawati, E. (Pusat Penelitian dan Pengembangan Perkebunan, Bogor (Indonesia)). *Jurnal Penelitian Tanaman Industri* ISSN 0853-8212 (2006) v. 12(4) p. 129-134, 3 tables; 13 ref.

ANACARDIUM OCCIDENTALE; HELOPELTIS; ENVIRONMENTAL FACTORS.

An experiment to find out the effect of environment factors on the attack of insect pests on cashew plantation was carried out in West Lombok District, West Nusa Tenggara Province, in dry and rainy seasons from June 2004 to March 2005 at two locations: Tanah Sebang and Sambik Jengkel which located in the same district (Kecamatan Kayangan, West Lombok District). Forty sample plants were observed: 20 from monoculture and 20 from polyculture (mixed cropping). The variables observed were (a) *Helopeltis* sp. population per plant (b) *S. indecora* population per plant, (c) number of shoots attacked by *Helopeltis* sp., (d) number of shoots attacked by *S. indecora*, (e) number of ant colonies per plant, (f) percentage of eggs parasitoid, (g) temperature, relative humidity, and daily raindrops, (h) type of intercrops as alternative hosts, (i) litters or weeds surrounding the plantation, (j) number of hermaphrodite flowers and fruits. The research result showed that the population and damage intensity were different between dry and rainy seasons. In dry season, only the symptom of *Helopeltis* sp. damage was seen. The population *S. indecora* always existed during the dry season. In the rainy season from January to March, shoots started to appear, also the population of *Helopeltis* sp. The injury level was different between those two insects. At Tanah Sebang, the shoots attacked by *S. indecora* was 23.1% higher than that of *Helopeltis* sp. (3.8-7.4%), while in Sambik Jengkel, the shoots attacked by *Helopeltis* sp. was (43.8-54.6%) higher than that

of *S. indecora* (11.5-22.3%). The main factors played roles in the environment were alternate hosts, micro climate and interaction between *S. indecona*, *Helopeltis* sp. and predator ants.

056 KUSWARDANI, R.A.
Inventory of prey of *Tyto alba javanica* on rice field ecosystem. *Inventarisasi jenis mangsa Tyto alba javanica pada ekosistem persawahan*/Kuswardani, R.A. *Jurnal Penelitian Pertanian* ISSN 0152-1197 (2006) v. 25(1) p. 36-41, 3 tables; 16 ref.

OWLS; PREDATORY BIRDS; RATS; BIRDS; CHIROPTERA; ECOSYSTEMS; RICE FIELDS; SURVEYS.

The research on the inventory of prey of *Tyto alba javanica* on rice field ecosystem was conducted in Kendal District, Central Java Province, in 50 locations of its release and distribution areas. Results indicated that prey species were diverse and rats were the most common one. Among rats *R. argentiventer* was found to be the most dominant prey. The kind of prey found were rats 89.35%, bird 5.68%, bat 2.95%, other prey 2.02%, respectively. The kind of rats were *R. argentiventer* (80.07%), *R. norvegicus* (4.88%), *R. rattus diardii* (3.08%), *B. indica* (1.19%), and *R. tiomanicus* (0.13%).

057 SUBIYAKTO.
Role of straw mulching in controlling cotton pest on cotton intercropped with soybean. *Peranan mulsa jerami padi dalam pengendalian serangan hama kapas pada tumpangsari kapas dan kedelai*/Subiyakto (Balai Penelitian Tanaman Tembakau dan Serat, Malang (Indonesia)); Rasminah C.S., S.; Mudjiono, G.; Syekhfani. *Agrivita* ISSN 0126-0537 (2006) v. 28(1) p. 17-25, 6 ill., 1 table; 19 ref.

GLYCINE MAX; GOSSYPIUM HIRSUTUM; INTERCROPPING; STRAW; MULCHES; INSECT CONTROL; CROP YIELD.

An experiment was conducted at Mojosari Experimental Garden, Mojokerto, East Java. The objective was to find out the role of straw mulching in controlling cotton pest on cotton intercropped with soybean. The treatments were application of straw mulch 6 ton/ha and no straw mulch. Each treatment used plot size 41 m x 61 m, no treatment replication. The results showed that application of straw mulch 6 ton/ha reduced the number of spraying from 4 times to 2 times (50%) or reduced insecticide application from 1.75 to 0.75 l/ha (57%). Application of straw mulch 6 ton/ha on cotton intercropped with soybean increased cotton yield from 1,056 kg/ha up to 1,284 kg/ha (57%). Application of straw mulch on cotton intercropped with soybean reduced insecticide application and increased yield of cotton and soybean.

058 SULISTYANTO, D.
Using agents *Steinernema carpocapsae* and *Beauveria bassiana* to control coffee pest, *Hypothenemus hampei* in order to increase production and quality of robusta coffee. *Pengendalian hama bubuk buah kopi Hypothenemus hampei dengan memanfaatkan agens hayati Steinernema carpocapsae dan Beauveria bassiana untuk meningkatkan produksi dan kualitas kopi robusta*/Sulistyanto, D. (Universitas Jember (Indonesia). Fakultas Pertanian); Limantono, T.H.; Subroto, G. *Agrivita* ISSN 0126-0537 (2006) v. 28(2) p. 87-96, 8 tables; 11 ref.

ROBUSTA COFFEE; COFFEA CANEPHORA; BIOLOGICAL CONTROL AGENTS; HYPOTHENEMUS HAMPEI; FRUIT DAMAGING INSECTS; STEINERNEMA CARPOCAPSAE; BEAUVERIA BASSIANA; ENTOMOGENOUS FUNGI; ENTOMOPHILIC NEMATODES; MORTALITY.

The research was conducted due to the difficulties of controlling coffee pest *Hypothenemus hampei* by using insecticide. One of the alternative control which environmentally friendly was by using biological

control agents of entomopathogenic fungi and nematodes. Entomopathogenic nematodes and fungi were effectively control *H. hampei* and considered as environmentally friendly insecticide. The purpose of the research was to find out entomopathogenic nematodes which be effective againts pest of coffee plantation *H. hampei*. The experiment was done on Faculty of Agriculture, Jember University and Kalijompo Plantation, Klungkung Distric, Jember, East Java from May until August 2004. Experiment was arranged in completely randomized block design (RCBD). The result showed that entomopathogenic nematodes, *Steinernema carpocapsae* had the highest pathogenicity to *H. hampei* than entomopathogenic fungus, *Beauveria bassiana*.

059 TRISAWA, I.M.
Effectiveness of *Beauveria bassiana* and *Spicaria* sp. to pepper lace bug, *Diconocoris hewetti* (Dist.) (Hemiptera: Tingidae). *Keefektifan Beauveria bassiana dan Spicaria sp. terhadap kepik renda lada Diconocoris hewetti (Dist.) (Hemiptera: Tingidae)*/Trisawa, I.M.; Laba, I W. (Balai Penelitian Tanaman Obat dan Aromatik, Bogor (Indonesia)). *Buletin Penelitian Tanaman Rempah dan Obat* ISSN 0251-0824 (2006) v. 17(2) p. 99-106, 1 ill., 2 tables; 22 ref.

PIPER NIGRUM; BEAUVERIA BASSIANA; SPICARIA; HEMIPTERA; MORTALITY; PATHOGENS; BIOLOGICAL CONTROL AGENTS.

The experiment was conducted in laboratory and in the field Research Assessment of Agricultural Technology Bangka Belitung Province, since November to December 2004. The objective of this experiment to find out effectiveness of *Beauveria bassiana* and *Spicaria* sp. to adult of pepper lace bug, *Diconocoris hewetti*. Three type of *B. bassiana* were used, they are ED2, ED3, and ED6. The concentration of laboratory experiment were used 1 g/l and 10 g/l for each strain. Beside of pathogen fungi also used Nimbo 0.3 AS, botanical insecticide as treatment check and water as control. The experiment was arranged with randomized completely design with 10 treatments and 4 replications in laboratory, while in the field was used randomized block design with 8 treatments and 4 replications. The treatment of field experiment based on the laboratory test result. The result indicated that *B. bassiana* and *Spicania* sp. effective to control of *D. hewetti* in laboratory and in the field. The highest mortality in laboratory are 93.33% on *B. bassiana* treatment with ED2 strain and 10 g/l concentrations. Strain of ED2 and ED6 with 10 g/l concentrations for each treatment indicated that 97.50% of the mortality in the field experiment. *Spicaria* sp. able to kill *D. hewetti* but the level of mortality lower than *B. bassiana* namely 16.67% until 9 days after application.

H20 PLANT DISEASES

060 AZRAI, M.
Genotype x environment interaction variance for downy mildew infection in ICERI maize collections. *Ragam interaksi genotip x lingkungan untuk infeksi penyakit bulai pada beberapa jagung koleksi Balitsereal*/Azrai, M. (Balai Penelitian Tanaman Serealia, Maros (Indonesia)). *Agrivita* ISSN 0126-0537 (2006) v. 28(1) p. 45-53, 4 tables; 31 ref.

ZEA MAYS; GENOTYPE ENVIRONMENT INTERACTION; SCLEROSPORA; GENETIC VARIATION.

Twenty-one maize genotypes were tested for downy mildew (DM) pathogen infection under three environments in Maros, Bogor, and Natar. Spreader rows screening technique to observe percentage of disease infection was conducted on genetic materials. In each location, 11 introduced genetic materials plus 10 Indonesian genotypes were arranged in randomized completely block design with two replications. Each entry was grown in one row plot with 2.5 m length, 0.60 m apart, and 0.25 m within row spacing and two plants per hill. Analysis of variance in each location and combined analysis in third locations were performed. In general, all of the genotypes materials showed moderate until high susceptible DM

incidence under all locations, except of variety of Sukmaraga, Bisma, Bayu and Mr-4 x AMATLCOHS-9-1-1-1-1-1-2-B hybrid which was resistant at Maros. The result of analysis of variance indicated that the genotypes and genotype x environment interaction were highly significant. Heritability estimates at Maros, Bogor, Natar and across environments were 0.75, 0.89, 0.84 and 0.92, respectively.

061 HADIASTONO, T.
Mozaic disease on tomato (*Lycopersicon esculentum* Mill.) *Penyakit mosaik pada tanaman tomat (Lycopersicon esculentum Mill.)*/Hadiastono, T. (Universitas Brawijaya, Malang (Indonesia). Fakultas Pertanian). *Agrivita* ISSN 0126-0537 (2006) v. 28(2) p. 160-164, 3 ill., 5 tables; 7 ref.

LYCOPERSICON ESCULENTUM; CUCUMBER MOSAIC CUCUMOVIRUS; SYMPTOMS; ISOLATION TECHNIQUES; DISEASE TRANSMISSION; INDICATOR PLANTS.

A virus obtained from tomato (*Lycopersicon esculentum* Mill.) plant was identified as a strain of cucumber mosaic virus. The virus infected plants of 5 species, including 3 species of legumes and 2 species of Solanaceae. It tolerated 6 hours aging and about 1:100 dilution. Plants of broad bean, *Dolichos lablab*, *Glycines max*, and tomato, chilli, are useful in distinguish this virus from others. The last two spesies had specific symptoms. No symptom on *Glycine max* and *D. lablab*.

062 NOVERIZA, R.
Application of *Fusarium oxysporum* non pathogenic (FoNP) in inducing black pepper seedlings resistance on *Phytophthora capsici. Aplikasi Fusarium oxysporum non patogenik (FoNP) untuk menginduksi ketahanan bibit lada terhadap Phytophthora capsici L.*/Noveriza, R.; Tombe, M.; Manohara, D. (Balai Penelitian Tanaman Rempah dan Obat, Bogor (Indonesia)); Rialdy, H. *Buletin Penelitian Tanaman Rempah dan Obat* ISSN 0215-0824 (2005) v. 16(1) p. 27-37, 2 ill., 2 tables; 29 ref.

PIPER NIGRUM; PHYTOPHTHORA CAPSICI; FUSARIUM OXYSPORUM; INDUCE RESISTANCE; PATHOGENS.

Phytophthora capsici Leon is a soil borne pathogen which is known as the causal agent of foot rot disease of black pepper (*Piper nigrum* L.). Induced plant resistance against pathogens is a widespread phenomenon that has been intensively investigated with respect to the underlying signaling pathway as well as to its potential use in plant protection. This study used non pathogenic *Fusarium oxysporum* (FoNP) for resistance inducing on black pepper cuttings against foot rot disease at laboratory and glass house of Phytopatology Laboratory of Indonesian Spice and Medicinal Crop Research Institute-Bogor from July until December 2004. It was observed that FoNP had ability to reduce disease severity. The level of effectiveness was 84.99% (at four months seedlings) while by fungicide treatment was 14.49%. FoNP was able to colonize black pepper seedlings up to two and a half months. The lowest viability of *P. capsici* was observed on seed treating with Organo-TRIBA. This study suggest that FoNP has potencies to be used in resistance inducing of black pepper seedlings on foot rot disease, eventually will reduce severity of the disease.

063 RAHAJU, M.
Antagonistic between two isolates of *Pseudomonas fluorescens* against *Sclerotium rolfsii* and *Rhizoctonia solani* and their effect to soybean damping-off. *Antagonisme antara dua isolat Pseudomonas fluorescens dengan Sclerotium rolfsii dan Rhizoctonia solani serta pengaruhnya terhadap penyakit rebah kedelai*/Rahaju, M. (Balai Penelitian Tanaman Kacang-kacangan dan Umbi-umbian, Malang (Indonesia)). *Agrivita* ISSN 0126-0537 (2006) v. 28(1) p. 79-86, 4 tables; 22 ref.

GLYCINE MAX; PSEUDOMONAS FLUORESCENS; CORTICIUM ROLFSII; ANTAGONISM; DISEASE CONTROL.

The effect of *P. fluorescens* isolates (two isolates) against both pathogens was studied by *in vitro* trial at laboratory and their effect on soybean damping-off caused by *S. rolfsii* was studied by *in planta* trial at greenhouse. The experiment was conducted at Indonesian Legume and Tuber Crops Institute (ILETRI) Malang on 2004. *In vitro* trial consisted of six treatments which arranged in randomized completely design with five replications. *In planta* trial was laid in factorial randomized block design with five replications. The result of *in vitro* trial showed that both of isolates (pf-A1 and pf-A2) suppressed the growth of pathogens highly of 84-92% antagonistic capacity against *S. rolfsii*, and up to 93% against *R. solani*. *In planta* trial showed that the application of pf reduced the incidence of damping-off (17.03%) compared with uncontrolled up to 37%. The effectiveness of biocontrol agent ini controlling the disease was 55.16%. Due to the presence of pf as biocontrol agent, the fresh matter of soybean increased to 6.51 g/plant compared with uncontrolled (4.84 g/plant) observed at vegetative stage.

064 SUDIR.

Change in virulence of strain *Xanthomonas oryzae pv. oryzae*, a causal pathogen of bacterial leaf blight in rice. *Perubahan virulensi strain Xanthomonas oryzae pv. oryzae*, *penyebab penyakit hawar daun bakteri pada tanaman padi*/Sudir; Suprihanto (Balai Besar Penelitian Tanaman Padi, Sukamandi (Indonesia)). *Penelitian Pertanian Tanaman Pangan* ISSN 0216-9959 (2006) v. 25(2) p. 100-107, 10 tables; 12 ref.

ORYZA SATIVA; VARIETIES; INOCULATION; XANTHOMONAS ORYZAE; BACTERIOSES; PATHOGENS.

The shift of strain of *X. oryzae pv oryzae* (Xoo) was evaluated in the screen field of Indonesian Center for Rice Research in Sukamandi during the dry season (DS) of 2004 and the wet season (WS) of 2004/2005. The experiment was arranged in a split-plot design with three replications. Five differential varieties were used as main plots and three levels of the virulences as subplots. Strains of Xoo representing high virulent (strain IV), medium virulent (strain VIII), and low virulent (strain III) were used as subplots. Results indicated that differential rice varieties and virulency strain of Xoo significantly affected the severity of bacterial leaf blight (BB) which was higher on differential variety of Kinmaze and lower on Java 14. Results of the first inoculation indicated that all strains resulted in a similar reaction on 3 differential varieties (Kinmaze, Kogyoku, and Tetep). But in both resistant varieties of Wase Aikoku and Java 14, the low virulent strain resulted in a lower symptom length as compared to high virulent and medium virulent strains. These strains of Xoo were able to change their virulence only within two planting seasons. In the dry season of 2004, data indicated that low virulent strain increased to medium virulent, while high virulent strain (strain IV) decreased to medium virulent. In the wet season of 2004/2005, low and medium virulent strains increased to high virulent.

065 SUPRIATI, L.

[Antagonistic potential of indigenous peatland in controlling *Sclerotium rolfsii* Sacc. on soybean]. *Potensi antagonis indigenus lahan gambut dalam mengendalikan penyakit rebah semai (Sclerotium rolfsii Sacc.) pada tanaman kedelai*/Supriati, L. (Universitas Negeri Palangkaraya (Indonesia). Fakultas Pertanian); Sastrahidayat, I.R.; Abadi, A.L. *Habitat* ISSN 0853-5167 (2005) v. 16(4) p. 292-308, 6 tables; 34 ref.

GLYCINE MAX; CORTICIUM ROLFSII; TRICHODERMA; MICROORGANISMS; DISEASE CONTROL; ANTAGONISM; PEAT SOILS.

The experiment aimed at determining the antagonistic microorganisms (bacteria, fungi, actinomycetes) and analyzed the antagonistic potential toward *Sclerotium rolfsii* Sacc. both *in vitro* and *in vivo*. Antagonistic test in PDA medium showed *Trichoderma hamatum*, *Trichoderma koningii*, *Trichoderma viride*, *Trichoderma harzianum* were antagonistic and microparasitic. It was showed that *Trichoderma koningii* had lower suppression potential than three isolates of *Trichoderma* sp., *Bacillus subtilis* spp.l,

Bacillus subtilis spp.3, actinomycetes isolate 1, 4, 6 and 7 had antibiotic antagonistic with a significantly higher suppression potential toward *Sclerotium rolfsii*. Antagonistic test in CMS medium showed the highest suppression potential of the three *Trichoderma* sp. isolates followed by *Bacillus subtilis* spp.l, unsterilized soil, and actinomycetes isolate 7. *In vivo* antagonistic test showed *Trichoderma hamatum* was more effective in suppressing stem rot disease (SRD) intensity and resulting in slower SRD spread, particularly on peat soil.

066 SURYADI, Y.

Detection of *Xanthomonas oryzae pv. oryzae*, the causal agent of rice bacterial blight. *Deteksi Xanthomonas oryzae pv. oryzae*, *penyebab hawar daun bakteri pada tanaman padi*/Suryadi, Y.; Machmud, M. (Balai Besar Penelitian dan Pengembangan Bioteknologi dan Sumberdaya Genetik Pertanian, Bogor (Indonesia)); Kadir, T.S. *Penelitian Pertanian Tanaman Pangan* ISSN 0216-9959 (2006) v. 25(2) p. 108-115, 6 ill., 3 tables; 29 ref.

ORYZA SATIVA; XANTHOMONAS ORYZAE; POLYCLONAL ANTIBODIES; BACTERIOSES; ELISA; ISOLATION.

Bacterial blight (BB) caused by *Xanthomonas oryzae pv oryzae* (Xoo) is an economically important bacterial disease, which is very destructive to rice plant. Hence, early detection and identification of the pathogen is a crucial step to manage the disease. A study was done to detect Xoo using a polyclonal antibody (PAb) and the NCM-ELISA technique. PAb-Xoo derived from Sukamandi isolate (strain 4) revealed positive reaction against all isolates tested. High titer of antibody was obtained as much as 2048, mean of protein purity (OD280/260) ranging from 1.23 ± 0.14 to 1.55 ± 0.25. The result showed that the optimum dilution of specific PAb Xoo was 1:800. The PAb was able to detect incidence of Xoo antigen derived from crude extract (whole cells), heated cells, and pure cultures of samples fixed with glutaraldehyde or formalin. The minimum detectable concentration of Xoo antigen was approximately 10^4 cells/ml. The samples containing plant sap or pure culture of Xoo, which was extracted from diseased rice plant of various locations in West Java, Central Java, East Java, and Lampung showed a positive reaction against PAb-Xoo. The study indicated that no other cross-reaction observed with other different plant pathogenic bacteria such as *Ralstonia solanacearum*, *Pseudomonas syringae pv glycinea* or *Xanthomonas campestris pv glycinea*.

067 WAROKKA, J.S.

Detection of phytoplasm associated with Kalimantan (Indonesia) wilt disease of coconut by the polymerase chain reaction. *Deteksi fitoplasma yang berasosiasi dengan penyakit layu Kalimantan pada kelapa dengan reaksi rantai polymerase*/Warokka, J.S. (Balai Penelitian Tanaman Kelapa dan Palma Lain, Manado (Indonesia)); Jones, P.; Dickinson, M.J. *Jurnal Penelitian Tanaman Industri* ISSN 0853-8212 (2006) v. 12(4) p. 154-160, 3 ill., 1 table; 28 ref.

COCOS NUCIFERA; PLANT DISEASES; WILTS; PHYTOPLASMAS; PCR; KALIMANTAN.

Coconut is the second Indonesia's most important social commodity after rice. There are more than 3.6 million hectares of coconut plantations in Indonesia equivalent to one third of the total world coconut area. However, the production and productivity of the coconut are very low and unstable caused by various reasons, including pests and diseases. Kalimantan wilt (KW) disease causes extensive damage to coconut plantation. In previous investigations, bacteria, fungi, viruses, viroids and soil-borne pathogens such as nematodes were tested, but none of them were consistently associated with the disease. The objective of this research was to detect and diagnose the phytoplasm associating with KW. Two DNA extraction methods, namely a modification of CTAB method involving grinding coconut trunk tissue in pre-warmed CTAB instead of liquid nitrogen, and a small scale DNA extraction method were used to prepare DNA from coconut trunk tissues. Research results showed that both methods were found equally suitable for preparing DNA from coconut trunk tissues for PCR analysis. The phytoplasm aetiology of KW had been

proved by the nested PCR approach using P1/P7 and R16F2n/R16R2 primer combinations. The study had further demonstrated that the nested PCR approach can be employed to effectively detect the presence of phytoplasm both in infected and in symptomless coconut trunk tissues. Phytoplasma DNA was amplified from 95 out of 116 samples (81.9%). Based on source of samples, phytoplasma DNA was amplified from KW infected and symptomless samples, 95.1% and 67.3%, respectively. This study confirmed that KW is caused by phytoplasma.

H50 MISCELLANEOUS PLANT DISORDERS

068 SUNDARI, T.
[Assessment of mungbean genotype resistance to shading]. ***Penilaian ketahanan kacang hijau (Vigna radiatus* L.*) terhadap naungan***/Sundari, T. (Balai Penelitian Tanaman Kacang-kacangan dan Umbi-umbian, Malang (Indonesia)); Soemartono; Tohari; Mangoendidjojo, W. *Habitat* ISSN 0853-5167 (2005) v. 16(3) p. 189-201, 5 tables; 16 ref.

VIGNA RADIATA RADIATA; GENOTYPES; RESISTANCE TO INJURIOUS FACTORS; SHADING.

An assessment of mungbean genotypes resistance to shading was conducted at Research Installation of Indonesian Legume and Tuber Crops Research Institute (ILETRI) at Malang from May to July 2004. The aim of the experiment was to obtain mungbean genotypes resistant to shading. One hundred genotypes of mungbean were evaluated in two shading levels (without shading and with shading level of 52%). A randomized completely block design with three replications was used. An assessment of resistance to shading was based on selection parameters value i.e. mean productivity of two shading levels (MP), geometric mean productivity (GMP), tolerance (TOL), stress susceptible index (SSI) and stress tolerance index (STI). Based on the selection parameters value, mungbean genotypes were grouped into three, i.e. susceptible, moderate resistant and resistant to shading. There were 18 genotypes of mungbean which resistant to shading, with MP, GMP and STI value above the population means and TOL, SSI and yield loss below than population means. Dried pod and seed weight were the characters correlated with MP, GMP and STI. Both characters of dried pod and seed weight had narrow genetic variability and low heritability.

J11 HANDLING, TRANSPORT, STORAGE, AND PROTECTION OF PLANT PRODUCTS

069 ISMAYADI, C.
Influence of storage of wet arabica parchment prior to wet hulling on moulds development, Ochratoxin A. contamination, and cup quality of mandheling coffee. ***Pengaruh penyimpanan biji kopi arabika mandheling bercangkang sebelum pengupasan basah terhadap perkembangan jamur, kontaminasi Ochratoxin A. dan mutu seduhan***/Ismayadi, C.; Sumartono, B. (Pusat Penelitian Kopi dan Kakao Indonesia, Jember (Indonesia)); Marsh, A.; Clarke, R. *Pelita Perkebunan* ISSN 0215-0212 (2005) v. 21(2) p. 131-146, 1 ill., 7 tables; 11 ref.

COFFEE BEANS; HUSKING; SEED STORAGE; MOULDS; OCHRATOXINS; CONTAMINATION; BOILING; FLAVOUR.

Mandheling coffee has been a well known special coffee for decades and the demand for this coffee is currently increasing. This coffee is characterized by low acidity, heavy-complex body, spicy-little earthy and fruity flavor. Mandheling coffee is produced by smallholder farmers in the highland surrounding Lake Toba, North Sumatra in an unique way i.e. following de-pulping and 1-2 days sundrying, wet parchment is stored for varying periods up to a few weeks, the parchments are then dehulled when still wet (40-45% moisture content) then the beans sundried. The handling procedure presumably contributes to the unique cup character of mandheling coffee. On the other hand, the storage of wet parchments may cause mould growth and mycotoxin contamination. This trial was designed to study the influence of storage of wet

parchments prior to wet hulling on mould development, OTA contamination and cup mandheling characteristic of the coffee product. The normal wet process, drying of parchment thoroughly to 12% moisture content was used as the control. Parchment coffees (6 lots) used for this trial were drawn from farmers and collectors in the region. The wet parchments (41.74-53.96% moisture content) were stored for 1 (D1), 7 (D7) and 14 (D14) days in PE sacks in a warehouse in the region. During the storage period, when there was visible mould growth, the parchments were spread on a plastic sheet inside the warehouse, as per common practice to suppress the mould growth. Following storage, the wet parchment was de-hulled and then sun-dried to a moisture content of 12% (MC 12%) or dried to a moisture content of 17%, and held in storage for 3 weeks prior to final drying to 12% MC. The normal wet process (fresh-non stored parchments dried thoroughly to 12%) were used as the control. Parameters measured were visual evaluation, mould infestation, aW, moisture content (MC) on the stored parchment; while for dried beans mould infestation, OTA content and the mandheling cup character evaluation (done by 4 panelists who were familiar to the coffee) were determined. Some mould species grew during the storage course, which black Aspergillus was the dominant species found in the beans; while *A. ochraceus* an OTA producer, was found in some samples with low infection rate (0-15.3%). Spreading of coffee inside the warehouse during the day could suppress moulds growth. OTA was found in only 5 samples out of 42 samples with range of 0.17-2.24 ppb, very less than European Union limit. There was no clear trend of storage period on the mould infection rates, OTA content, and the mandheling cup characters. The high variability of the outcome was likely due to the inhomogenity of parchments used for this trial. The best mandheling was found in the sample of D1-MC 12% coffee source of lot 1.

070 NURDJANNAH, N.

Use of antioxidant to inhibit browning on white pepper decorticating process. *Penggunaan antioksidan untuk mencegah proses pencoklatan pada proses pengupasan kulit lada*/Nurdjannah, N. (Balai Besar Penelitian dan Pengembangan Pascapanen Pertanian, Bogor (Indonesia)). *Jurnal Penelitian Tanaman Industri* ISSN 0853-8212 (2005) v. 11(2) p. 78-84, 6 tables; 17 ref.

PEPPER; ANTIOXIDANTS; POSTHARVEST TECHNOLOGY; POSTHARVEST EQUIPMENT; ESSENTIAL OILS; MOISTURE CONTENT.

White pepper is an important export commodity for Indonesia which until 2003 supplied about 70% of world demand. In 2004 it dropped to about 40%. White pepper is still processed at farm level by using a very modest method consists of soaking the berries for seven to twelve days, followed by peeling and drying the pepper corn for three to five days. The product is often contaminated by undesirable microorganism, and also unpleasant odor which is caused by improper method and limited clean water for soaking process. Research Institute for Spice and Medicinal Crops had designed and constructed the pepper thresher and decorticating machine to improve the product quality and process efficiency. Those machines could produce the hygienic white pepper with high essential oil content, however it has brownish white color caused by browning process during decorticating. The consumer preferred to white pepper with creamy white in color. The antioxidants, malic and tartaric acids were applied to prevent the browning process. The treatment consisted of three factors, i.e.: kind of antioxidant (malic and tartaric acid), antioxidant concentration (1.5, 2.0 and 2.5%) and soaking period (1, 2 and 3 hours). The experiment was arranged in completely randomized design with two replications. The result showed that both acids could be used as antioxidant to inhibit browning in pepper mechanical decorticating process. The colour of white pepper produced was creamy white similar to the one produced by traditional method. The optimum treatment was malic acid with 2.5% concentration and 2 hours soaking period.

071 ONGGO, T.M.

Change of starch and sugar compositions of two sweet potato cultivars nirkum Cilembu during storage. *Perubahan komposisi pati dan gula dua jenis ubi jalar nirkum Cilembu selama penyimpanan*/Onggo, T.M. (Universitas Padjadjaran, Jatinangor, Sumedang (Indonesia). Fakultas Pertanian). *Bionatura* ISSN 1411-0903 (2006) v. 8(2) p. 161-170, 2 ill., 2 tables; 5 ref.

SWEET POTATOES; VARIETIES; KEEPING QUALITY; STARCH; SUCROSE; FRUCTOSE; ORGANOLEPTIC ANALYSIS; STORAGE.

Cilembu sweet potato has a better eating-quality compared to other sweet potato cultivars. To have a sweeter taste, sweet potato root normally should be stored for few weeks after harvest. The aims of this experiment was to study the change of starch and sugar composition of Cilembu sweet potato during 5 weeks of storage period and to determine the optimum storage length of this root to obtain a better taste. Two types of Cilembu sweet potato, namely the orange root fleshed colour and the yellow ones were stored in room condition after harvest. The weight-loss and water content of roots were measured on weekly interval and the starch, sucrose, glucose and fructose content were analysed at the same time. The results showed that the 5 weeks storage period did not affect the water and starch content of Cilembu sweet potato, the sucrose content was also not significantly increase. The glucose content increased after 1 - 2 weeks of storage and continue increased until 3 weeks of storage, the fructose content also increased significantly after 3 weeks of storage, but both sugars were remained constant until 5 weeks of storage. The increase of fructose content reached more than three times during the 3 - 5 weeks of storage and seem to be the one reason that Cilembu has the sweeter taste. There was no significant different on all parameters tested between the orange flesh colour and the yellow colour.

072 YUHONO, J.T.
Enterprise status of essential oil and the factors of postharvest technology that caused its the low of oil rendement. ***Status pengusahaan minyak atsiri dan faktor-faktor teknologi pascapanen yang menyebabkan rendahnya rendemen minyak***/Yuhono, J.T.; Suhirman, S. (Balai Penelitian Tanaman Obat dan Aromatik, Bogor (Indonesia)). *Buletin Penelitian Tanaman Rempah dan Obat* ISSN 0251-0824 (2006) v. 17(2) p. 79-90, 13 tables; 15 ref.

ESSENTIAL OILS; ENTERPRISES; POSTHARVEST TECHNOLOGY; OILS; DISTILLING; PROCESSING; QUALITY.

In generally, essential crops were cultivated by farmer with limited capital, large area and using a simple distillation, which result in lower quality and rendement. The research aimed at knowing status of essential oil enterprise and the factors that caused low oil rendement. The research was conducted on April - July 2004 in 7 provinces of essential oil production centers. The result indicated that generally distillation method in 7 provinces still used the simple processing technology, which a kettle of its distillation made of waste drum or iron plate, except in Province of Banten, West Java, and Central Java had already used good distillation technology (patchouly and cananga). The factors causing low oil rendement and quality were materials construction of distillation tools, preparations of raw materials and distillation process.

J13 HANDLING, TRANSPORT, STORAGE, AND PROTECTION OF ANIMAL PRODUCTS

073 AULIA, O.A.
Improvement on slaughtering management to produce local beef at the same quality as imported beef. ***Perbaikan manajemen pemotongan ternak untuk menghasilkan daging sapi lokal berkualitas impor***/Aulia, O.A.; Dwiloka, B.; Arifin, M. (Universitas Diponegoro, Semarang (Indonesia). Fakultas Peternakan). [Proceedings of the national seminar on animal husbandry and veterinary technology. Book 1], Bogor (Indonesia) 12-13 Sep 2005/Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 215-219, 1 table; 9 ref. 636:338.439/SEM/p

BEEF CATTLE; SLAUGHTERING; QUALITY; ORGANOLEPTIC PROPERTIES.

A study on the improvement of slaughtering management of local beef has been conducted through selecting slaughter beef, improving *ante mortem* management, slaughtering and *post mortem* handling. As many as 4 male ongole grade cattle, 270-370 kg slaughters weight, body score conditions (BSC) of 7 were slaughtered at a standard manner with a minimum stress. After carcass aging period of 12 hours at room temperature of 15-16°C, top side meat sample was taken as many as 6 kg. As a comparison, 6 kg of topside cuts was taken from different batchs of imported beef. Both beef samples were objectively analyzed to measure their cooking loss values, while hedonic analysis was conducted through pan-broiling steak method, and assigning panel study involving 30 guests of Patra Convention Center Hotel at Semarang to measure firmness and taste traits. Based on t-student test, it could be concluded that selecting slaughter local beef at BCS=7 and standard slaughtering management was significantly (P>0.05) able to improve local beef meat quality as good as imported one. The average value of cooking loss, firmness, and taste were 21.63%, 2.54, and 2.98, respectively. Based on the results, it can be concluded that if the slaughtering procedures and management were conducted in a standard manner, the quality of local beef meat could be improved as good as the imported one.

L01 ANIMAL HUSBANDRY

074 GINTING, S.P.
Development of goat-palm oil integrated production system: an assessment based on feed availability and nutrient requirements. ***Pengembangan sistem integrasi usaha ternak kambing dengan perkebunan kelapa sawit: kajian berdasarkan ketersediaan pakan dan kebutuhan nutrisi***/Ginting, S.P. (Loka Penelitian Kambing Potong, Galang, Sumatera Utara (Indonesia)). *Wartazoa* ISSN 0216-6461 (2006) v. 16(2) p. 53-64, 2 ill., 7 tables; 29 ref.

GOATS; ELAEIS GUINEENSIS; INTEGRATION; CARRYING CAPACITY; FEEDS; STOCKING DENSITY; ANIMAL POPULATION.

The integration of goats and palm oil plantation is prospective agricultural production systems that exploit the complementary relationship among various components in the system. The main components are the oil palm trees, vegetation underneath the trees, processing plant of palm oil bunch, and the goat. The estimation of carrying capacity of the plantation system is based on the quantitative analysis on nutrient supply from various feed resources in the plantation system and nutrient requirements for goat production. The goat demographic parameters, such as prolificacy, fertility and fecundity are used to estimate goat population size, dynamics and structures. The development of production model could be based on a certain production target, such as the number of animals sold or the amount of income (demand driven approach), or based on the availability of certain resources such as feed supply (supply driven approach). Using the demand driven approach, and considering 6000 heads of one-year old goats to fill the Malaysian market as the production target, it is calculated that a population size of 3,636 does and 810 ha of palm oil plantation are required to meet this production target. In a typically medium-size oil palm plantation system (500 ha of oil palm plantation) with one unit of small scale palm oil bunch processing plant (1 ton/hour), the potency to supply metabolisable energy from various feed resources in the system is 2,778,800 Mcal/year, equivalent to a carrying capacity of 5,155 Goat Units/year. This system could carry 2,951 does and 295 bucks to produce 1,116 heads of one-year old goats annually. A medium-size oil palm plantation without processing plant unit is potential in supplying metabolisable energy of 1,983,300 Mcal/year, equivalent to a carrying capacity of 3,680 Goat Units/year. In order to fill the export market to Malaysia, a number of 10 units of medium sized plantation with small scale plant processing or a number of 17 units medium scale plantation without processing unit are required. Using similar approach, the potential of either large-scale or small scale plantation system to produce goat in an integrated production system could be estimated.

075 ROHAENI, E.S.

Feasibility analysis of alabio duck farm with lanting system at Hulu Sungai Tengah. ***Analisis kelayakan usaha itik alabio dengan sistem lanting di Kabupaten Hulu Sungai Tengah***/Rohaeni, E.S. (Balai Pengkajian Teknologi Pertanian Kalimantan Selatan, Banjarbaru (Indonesia)). [Proceedings of the national seminar on animal husbandry and veterinary technology], Bogor (Indonesia) 12-13 Sep 2005/Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 845-850, 3 tables; 8 ref. 636:338.439/SEM/p

DUCKS; SPECIES; FARM MANAGEMENT; REARING TECHNIQUES; FARMING SYSTEMS; FARM INCOME; ECONOMIC ANALYSIS; KALIMANTAN.

The alabio duck is one of the local poultry livestock that are commonly reared by farmers in South Kalimantan Province. This paper aims at finding out the feasibility of alabio duck rearing using lanting system in Hulu Sungai Tengah (HST) Regency. This activity was done by survey method through interview techniques in Mantaas Village, Labuan Amas Utara Subdistrict, HST Regency. From the survey it was found out that alabio ducks were still reared with lanting system, rearing above the cage or above bog water. The ducks reared were grower and laying ones. The rearing scale ranged from 50 to 1,000 heads per household. This was conducted as one business apart from catching fish. Based on the analysis grower alabio duck rearing produced income of Rp. 6,600,000, R/C value amounted to 1.46 with a rearing scale of 700 heads. The alabio entrepreneur of layers gained income of Rp. 32,075,000, R/C value of 1.57 with a rearing scale of 700 heads for a production period of 9 months. Based on the analysis results it was concluded that duck rearing with lanting system was profitable.

076 TRIYANTINI.

Performance of carcass component characteristics and carcass quality of several sumatera composite sheep genotypes. ***Karkas dan mutu karkas dari beberapa genotipa domba komposit sumatera***/Triyantini; Setiyanto, H. (Balai Besar Penelitian dan Pengembangan Pascapanen Pertanian, Bogor (Indonesia)); Subandriyo; Mulyadi. [Proceedings of the national seminar on animal husbandry and veterinary technology. Book 1], Bogor (Indonesia) 12-13 Sep 2005/Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 479-486, 5 tables; 18 ref. 636:338.439/SEM/p

SHEEP; CARCASS COMPOSITION; GENOTYPES; MEAT; QUALITY; ANIMAL PERFORMANCE; SUMATRA.

In attempting to increase animal productivity of local Indonesian sheep through genetical improvement, the Research Institute for Animal Production (Balai Penelitian Ternak) is developing new breed of sheep by combining superior traits of local sheep and exotic tropic sheep. The sumatra composite sheep (K), those are, composite genotype of the first generation (K1), composite genotype of the second generation (K2), and composite genotype of the third generation (K3) that could adapt to humid tropical environment with intensive and extensive management conditions, had litter size of around 1.4 and productivity of 28.88 kg total weaning lamb per year. This postharvest research was conducted to evaluate the carcass component, carcass quality, byproducts, and meat quality of the composite genotypes (K1, K2, and K3) compared to barbados blackbelly cross sheep (BC) from the same management condition. Results of the evaluation indicated that carcass components of the K3 sheep involving life weight, carcass weight, carcass percentage, carcass wide, back thigh round, and front thigh round were 25.2 kg, 11 kg, 43.64%, 31 cm, 29 cm, and 21.50 cm, respectively, which was little higher compared to that of K1, K2, and BC sheep but the differences were not significant; carcass quality of the composite genotypes and BC sheep, evaluated by National Standard of Indonesia (NSI) 1988, were in the first class, although the pelvic fat was relatively thin. Differences of the sheep genotypes (K and BC) did not affect significantly to

byproducts and commercial carcass cutting while meat quality of the K1, K2 and K3 composite genotypes were enough good as protein source with the average of protein content around of 17.61-19.30%.

077 WINARTI, E.
Potential of infertile duck egg as consumption egg in a hatchery proceed. ***Peluang telur infertil pada usaha penetasan telur itik sebagai telur konsumsi***/Winarti, E. (Balai Pengkajian Teknologi Pertanian Yogyakarta (Indonesia)); Triyantini. [Proceedings of the national seminar on animal husbandry and veterinary technology], Bogor (Indonesia) 12-13 Sep 2005/Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 768-771, 4 tables; 9 ref. 636:338.439/SEM/p

DUCKS; EGG HATCHABILITY; HATCHERIES; QUALITY; CONSUMPTION; EGG WHITE; EGG YOLK; PH; SELECTION; TIME.

Infertile egg from the hatchery probably can be consumed. The aim of the research was to find out quality of infertile duck egg from hatchery machine. Infertile egg observed from day two until day six in the hatchery machine, as a control used consuming egg. Observation of egg quality was as follow: pH albumen, pH yolk, index of albumen, and index of yolk. Observation was repeated 5 times, data were analyzed using t test. The results showed that pH albumen was not significantly different ($P>0.05$). Egg yolk pH increased apparently ($P<0.05$) in day two, day three and day six. Index of albumen was stable along observation ($P>0.05$). Index of yolk decreased significantly ($P<0.05$) in day six. It was concluded that quality of infertile egg of hatchery decreased in the time but still able to be consumed.

078 WINUGROHO, M.
Comparation of milk production in dairy cattle treated by bioplus and supplemented by legor. ***Komparasi respons produksi susu sapi perah yang diberi imbuhan bioplus vs suplementasi legor***/Winugroho, M.; Widiawati, Y. (Balai Penelitian Ternak, Bogor (Indonesia)); Prasetiyani, W.; Iwan; Hidayanto, M.T.; Indah. [Proceedings of the national seminar on animal husbandry and veterinary technology. Book 1], Bogor (Indonesia) 12-13 Sep 2005/Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 385-389, 5 tables; 7 ref. 636:338.439/SEM/p

DAIRY CATTLE; MILK PRODUCTION; SUPPLEMENTS; PROBIOTICS; RATIONS; PROXIMATE COMPOSITION.

Feed management is the basic weaknesses in dairy cattle industry in Indonesia. The study was investigated the effect of shrub legume supplemented to the basal diet of dairy cattle on milk production compared to the animals treated by probiotic Bioplus added to the basal diet. Twenty pregnant and lactation dairy cattles were divided into 4 groups of treatment, namely Group I was control group fed by basal diet; Group II fed basal diet supplemented by shrub legumes (legor 400 g/day); Group III fed basal diet treated by probiotic Bioplus (500 g) plus *Candida utilis* (5 g/day); and Group IV fed basal diet supplemented by shrub legumes (legor 400 g/day) plus treated by probiotic Bioplus (500 g) plus *Candida utilis* (5 g/day). The basal diet offered consisted of 8 kg concentrate and grass or rice straw (NRC, 1989). The data on milk production were recorded during 45 days after 14 days adaptation period to the feeds. The data collected were then calibrated and calculated based on 305 days of production. After that, the data were analyzed by using complete randomized design. When significant differences were found, the data was then tested by Duncan test. After 25 days of observation period, there were problems on the quality of concentrate and the amount of grass/rice straw availability. However, all the animals received similar amount of grass/rice straw, therefore the different response of the animals was due to the treatment given. The average dry matter consumption was 15.4 kg/head/day similar for all treatment Groups ($P>0.05$). Milk production for

Group I, II, III and IV was 2162; 2574; 2156 and 1961 litre/305 days, respectively. They were not significantly different (P>0.05). However, probiotic Bioplus and *C. utilis* significantly increased protein content of the milk from 4.3-4.7% (P<0.05) but not for fat content (3%; P>0.05). It can be concluded that probiotic Bioplus combined with *C. utilis* increased protein content of milk.

L02 ANIMAL FEEDING

079 BATUBARA, L.P.
Utilization of palm kernel cake and solid ex-decanter as an additional feed on growth of goats. ***Penggunaan bungkil inti sawit dan lumpur sawit sebagai pakan tambahan untuk kambing potong***/Batubara, L.P.; Krisnan, R.; Ginting, S.P.; Junjungan S. (Loka Penelitian Kambing Potong Sei Putih, Deli Serdang (Indonesia)). [Proceedings of the national seminar on animal husbandry and veterinary technology. Book 1], Bogor (Indonesia) 12-13 Sep 2005/Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 611-616, 5 tables; 9 ref. 636:338.439/SEM/p

GOATS; FEED ADDITIVES; PALM KERNELS; OILSEED CAKES; RATIONS; WEIGHT GAIN.

A feeding trial were conducted in utilization of solid ex-decanter (SED) and palm kernel cake (PKC) as an additional feed for growing young male goats. Twenty head of young male crossbreed goats (kacang x boer) were used within body weight range 12-16 kg and kept in individual pens. A good quality of additional feed using conventional feedstuff was used as a control ration. Additional feed and grass were fed in ad libitum level. The results showed that using up to 30% of solid ex-decanter mixed in palm kernel cake as an additional feed gave daily weight gain 54-62 g/h/d with a feed conversion ratio of 8.1-9.2 and gave 30-35% higher net gain in rupiah compared to the good quality additional feed. The cheaper price of solid ex-decanter and palm kernel cake gave the more benefit compare to good quality feedstuff when fed to the young male goats.

080 BESTARI, J.
Use of mengkudu (*Morinda citrifolia* Linn) flour mash submerged in hot water on broiler performance. ***Pengaruh pemberian tepung daun mengkudu (Morinda citrifolia Linn) yang direndam air panas terhadap penampilan ayam broiler***/Bestari, J. (Balai Penelitian Ternak, Bogor (Indonesia)); Parakkasi, A.; Akil, S. [Proceedings of the national seminar on animal husbandry and veterinary technology], Bogor (Indonesia) 12-13 Sep 2005/ Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 703-713, 3 ill., 7 tables; 14 ref. 636:338.439/SEM/p

BROILER CHICKENS; RUBIACEAE; LEAVES; DRUG PLANTS; FLOURS; HEAT TREATMENT; WATER TOLERANCE; ANIMAL PERFORMANCE; WEIGHT GAIN.

The utilization of medicinal plants as an additional feed in poultry feed has not been a common, although it is frequently used and consumed by human being. This research should be done because of the demand and consumer prefence on consumed food. Research was held on Poultry Products Laboratory, Bogor Institute of Agriculture, Darmaga Bogor. Sixty day old chicks strain Hubbard provided by PT. Charoend Pokphan, divided into 4 feeding treatments and 3 replications. Treatment of *Morinda citrifolia* flour submerged in hot water consisted of T1 (0%), T2 (5%), T3 (10%) and T4 (15%), was given to 1-5 weeks old chicks. Poultry feed and water gave *ad libitum*. Before flour processing and mixing in poultry feed *Morinda citrifolia* leaves were submerged in hot water for 30 minutes and sundried for 4 days. The body weight gain and feed intake were recorded weekly, carcass weight, heart weight were measured on final research. The research used RAL with 4 treatments and 3 replications and analyzed by SAS. Result

indicated that body weight gain on treatment at 0% (796 g), 5% (765 g) and 10% (761 g) was not significantly different (P>0.05), but significantly different (P<0.05) on treatment at 15% (522 g). Similar was happen with feed efficiency. Feed intake compared between the control (2469 g) and the treatment on 5% (2469 g), 10% (2323 g) and 15% (2255 g) was not significantly different (P>0.05). Carcass weight significantly increased (P>0.05) in treatment 10% (517 g) but decreased significantly in treatment 15% (387 g) comparing with the control (476 g) and 5% (471 g). Heart weight significantly increased (P>0.05) in treatment 5% (28.33 g), 10% (29.24 g) and 15% (27.83 g), similar to gizzard weight which significantly increased at treatment 5% (39.52 g), 10% (38.35 g) and 15% (34.21 g). This research recommended that *Morinda citrifolia* Linn. Flour submerged in hot water was able to provide 5-10% into broiler feed.

081 BINTANG, I.A.K.

Effect of turmeric (*Curcuma domestica* Val) meal as feed additive on the performance of broiler. ***Pengaruh penambahan tepung kunyit (Curcuma domestica Val) dalam ransum broiler***/Bintang, I.A.K. (Balai Penelitian Ternak, Bogor (Indonesia)); Nataamijaya, A.G. [Proceedings of the national seminar on animal husbandry and veterinary technology], Bogor (Indonesia) 12-13 Sep 2005/Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 733-736, 1 table; 9 ref. 636:338.439/SEM/p

BROILER CHICKENS; TURMERIC; FLOURS; FEED CONSUMPTION; FEED CONVERSION EFFICIENCY; WEIGHT GAIN; ANIMAL PERFORMANCE.

A study on the utilization of turmeric meal as feed additive in broiler ration was conducted. One hundred and fifty day old chicks (DOC) were allocated into five levels of turmeric meal addition (0; 0.04; 0.08; 0.12 and 0.16%) with 6 replications of 5 DOC each. The experimental design used was completely randomized design. Parameters measured were feed intake, average body weight, feed conversion ratio (FCR) and mortality. The results showed that turmeric meal which used as additive at levels of 0.04; 0.12 and 0.16% of feed intake was significantly (P<0.05) lower than that of control. The addition of 0.16 % turmeric meal gave significantly (P<0.05) lower feed intake than that of 0.08 and 0.12% levels. The average body weight of 0.04% addition was significantly (P<0.05) higher than that of 0.08%. FCR of chicks with the addition of 0.08% turmeric significantly (P<0.05) higher than those of control, 0.04 and 0.16%. It is concluded that the best treatment was the addition of 0.04% turmeric which improved the feed efficiency as much as 4.19% than those of control.

082 BUDIARSANA, I.G.M.

Economic value of thin tail sheep on fermented rice straw. ***Nilai ekonomis penggemukan domba ekor tipis yang diberi pakan dasar jerami padi fermentasi***/Budiarsana, I.G.M.; Haryanto, B.; Jarmani, S.N. (Balai Penelitian Ternak, Bogor (Indonesia)). [Proceedings of the national seminar on animal husbandry and veterinary technology. Book 1], Bogor (Indonesia) 12-13 Sep 2005/Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 445-454, 6 ill., 11 ref. 636:338.439/SEM/p

SHEEP; FATTENING; RICE STRAW; ECONOMIC VALUE; FERMENTED PRODUCTS; WEIGHT GAIN; FEED CONSUMPTION; CARCASSES.

The utilization of rice straw as relatively cheap and easy to find waste product of rice field is the best strategy to reduce the cost of feed in livestock farming. The other advantage was reduce of environmental damage. The objectives of this assessment were a) to study rice straw as animal feed, b) to obtain economic feed ration. Experimental design was CRD, with 3 treatments T1, T2 and T3 and 10 replications, feed concentrate base on body weight respectively as level as 1, 2 and 3%. The animals used were 30 heads of thin tail sheep, 9-12 months of age, on body weight between 16-22 kg. The results

showed that (T3) gave highest ADG followed by (T2) respectively 87 vs 68 g/d, different statistically (P>0.0l) to 25 g/d (T1). The conclusion of this assessment was feeding 3% of concentrate is the most economic.

083 GINTING, S.P.

Substitution of forages with pineapple wastes in complete feed for goats. ***Substitusi hijauan dengan limbah nenas dalam pakan komplit pada kambing***/Ginting, S.P.; Krisnan, R.; Tarigan, A. (Loka Penelitian Kambing Potong Sei Putih, Deli Serdang (Indonesia)). [Proceedings of the national seminar on animal husbandry and veterinary technology. Book 1], Bogor (Indonesia) 12-13 Sep 2005/Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 604-610, 4 tables; 19 ref. 636:338.439/SEM/p

GOATS; COMPLETE FEEDS; FORAGE; PINEAPPLES; AGRICULTURAL WASTES; NUTRITIVE VALUE; FEED CONSUMPTION.

It is important to keep searching for alternative feeds that are not competitive with other animals in order to develop an efficient goat production system. Waste products in the form of pressed-fleshy part and the shell of the pineapple fruits are available from the processing of pineapples into pineapple juice. This waste products are potential alternative feeds in term of its quantity. The objective of this study is to evaluate the nutritive values (chemical compositions, intake, digestibility) and the potential to use as substitution of forages in goat diets. Intake and digestion studies were conducted using 20 male weaned goats. The animals were divided into two groups (10 animals/group) and randomly allocated to forage diets or pineapple wastes. The animals were put into individual metabolism crates. To study the optimum level of forage substitution by the pineapple wastes, 25 male kids were divided into five groups and randomly allocated to one of five feed treatments with pineapple waste substitution level of 0, 25, 50, 75, and 100%. Chemical analyses showed that the contents of NDF, ADF and organic matter were relatively high, being 57.3; 31.1 and 81.9%, respectively. The crude protein content was low (3.5%) and water content was high (85.8%). These figures indicated that these waste products had potential as energy source. When fed as a sole feed, it was shown that the intake level was relatively low (293 g/d) which was approximately equals to 2.5% of body weight (BW). This intake level was lower than the recommended level of 3.0-3.5% BW. The coefficient of digestion of dry matter was also relatively low (53%). It was shown from the study that forages could be substituted by the pineapple wastes at 25, 50, 75, or 100% in complete diets without significant effects on feed intake and daily gain. Feed intake and daily gain across the treatments ranged from 525-564 g/d and 62-66 g/d, respectively. Total substitution of forage by the pineapple wastes significantly lowered the feed efficiency as indicated by the higher feed consumed/g ADG (12.2) in this treatment group as compared to the other treatment groups (8.7, 8.6, and 9.2), for 25, 50 and 75% substitution level, respectively. No significant differences in feed efficiency, however, observed among the 0, 25, 50 and 75% substitution levels. It was concluded that using pineapple wastes in a complete feed could be used as the basal feed to substitute forages at the recommended substitution level ranging from 25 to75%.

084 ISKANDAR, S.

Pelung-kampung crossbred chicken: dietary protein for 12 weeks old meat production. ***Ayam silangan pelung - kampung: tingkat protein ransum untuk produksi daging umur 12 minggu***/Iskandar, S. (Balai Penelitian Ternak, Ciawi, Bogor (Indonesia)). *Wartazoa* ISSN 0216-6461 (2006) v. 16(2) p. 65-71, 1 ill., 5 tables; 24 ref.

CHICKENS; CROSSBREDS; PROTEINS; RATIONS; NUTRIENTS; MEAT PRODUCTION; GROWTH; FEED INTAKE.

Increasing the utilization of local chickens has been put into national priority. Kampung chicken has been one of many local chickens used as a source of meat for consumption. Kampung chicken has actually an important role to rural community. Meat production of kampung chicken is considerably low compared to modern selected broiler chicken. Pelung chicken is one of the local chickens, having larger body size than other local chickens. The crossing of pelung male to kampung female is one of the shortcuts in improving local chickens meat production. Pelung-kampung crossbred could be a choice for commercial local meat type of chicken. Discussion is done on growth, carcass composition, body composition, and energy and nitrogen retentions. Keeping the bird up to 12 weeks of age with dietary protein of 21% for starter (0 - 6 weeks of age) followed by dietary protein of 17% (6 - 12 weeks of age) resulted in the most economic return, but did not indicate a significant increase in biological variables. The rations with 19% dietary protein for starter followed by dietary protein of 15% for finisher up to 12 weeks of age were relatively a better choice of feeding strategy with lower input.

085 KRISHNA, N.H.

Feeding management in related to the use of crop byproduct: case study on farming beef cattle enterprise in Bantul Regency, DI Yogyakarta. ***Tata laksana pakan, kaitannya dengan pemanfaatan limbah tanaman pangan: studi kasus pada usaha sapi potong rakyat di Kabupaten Bantul DI Yogyakarta***/Krishna, N.H.; Umiyasih, U. (Loka Penelitian Sapi Potong, Grati, Pasuruan (Indonesia)). [Proceedings of the national seminar on animal husbandry and veterinary technology. Book 1], Bogor (Indonesia) 12-13 Sep 2005/Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono(eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 137-142, 4 tables; 11 ref. 636:338.439/SEM/p

BEEF CATTLE; FEEDING SYSTEMS; BYPRODUCTS; AGRICULTURAL WASTES; FOOD CROPS; JAVA.

The aim of this research was to find out the feeding management characteristic as initiate step to determine appropriate feeding pattern of harvest season on beef cattle farming. The study was conducted by survey on farmer group Maju, in Bambanglipuro, Bantul Regency, during three harvests season (padi-palawija-palawija). Interview was held on 28 selected farmers to find out feeding management characteristic namely method and frequency of feeding (forage and concentrate), feed supplement for pregnant cow, and calf feeding. Monitoring was held twice per season on 40 head cows which consisted of calves, heifers, pregnant cows, and lactating cows in order to know average daily gain (ADG) and nutrient requirement. Data was evaluated and served descriptively. The results showed that forage feeding highly depend on byproduct but feeding of concentrate was rarely. Most of farmer (78.58%) gave forage by chopping, with feeding frequency was once a day (hold by 92.86% farmer), concentrate was always gave in wet (treated by all farmers) with feeding frequency once a day. Most of farmer (92.31%) gave feed supplement for pregnant cows, forage was given first time to calf at the age of 1.96 month and concentrate at 2.30 month. At paddy harvest season, dry matter intake was lower than their requirement standard at each physiological status except lactating cows, but in palawija season I and II were higher than those of respective physiological status. ADG paddy season was positive (due to the increase of body weight) at respective physiological status (0.15-0.48 kg/head/day) in palawija harvest season I and II. ADG increased in each physiological status (0.32-0.84 kg/head/day), except lactating cows which was decreased from 0.27 to 0.30 kg/head/day. It was concluded that feeding management namely method and frequency of feeding was not allowed recommendation technology, but in pregnant cows and calves feeding pattern was at the opposite.

086 KRISNAN, R.

Productivity of kacang goat using *Aspergillus niger* fermented passion fruit (*Passiflora edulis* Sims. Edulis Deg.) rind as a complete feed. ***Produktivitas kambing kacang dengan pemberian pakan komplit kulit buah markisa (Passiflora edulis Sims. F. Edulis Deg.) terfermentasi Aspergillus niger***/Krisnan, R.; Ginting, S.P. (Loka Penelitian Kambing Potong Sei Putih, Deli Serdang (Indonesia)). [Proceedings of the

national seminar on animal husbandry and veterinary technology. Book 1], Bogor (Indonesia) 12-13 Sep 2005/Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 625-629, 2 tables; 15 ref. 636:338.439/SEM/p

GOATS; BREEDS (ANIMALS) ; COMPLETE FEEDS; PASSION FRUITS; FERMENTATION; ASPERGILLUS NIGER; CHEMICAL COMPOSITION; ANIMAL PERFORMANCE; DIGESTIBILITY.

An experiment was conducted to evaluate the utilization of passion fruit (*Passiflora edulis* Sims. edulis Deg.) rind fermented with *Aspergillus niger* in complete feed for weaning kacang goat. Twenty male kacang goats were used in a randomized block design. The animals were divided into four treatments groups with five replications. Dietary treatments were formulated based on the level of inclusion of fermented passion fruit rind content in the diet, namely R0 (0.0%), R1 (20.0%), R2 (40.0%), and R3 (60.0%). The results indicated that the inclusion of fermented passion fruit rind at 0, 20, or 40% gave the same daily gain ($P>0.05$), while inclusion at 60% resulted in significant ($P<0.05$) decreased daily gain. It was concluded that the optimum level of inclusion of fermented passion fruit rind in complete diet was 40%, although inclusion at 60% resulted in the same level of consumption and feed efficiency.

087 MATHIUS, I W.
Utilization of organic chromium in the diet for pregnant and lactating local ewes. *Pemanfaatan mineral kromium dalam ransum untuk induk domba bunting dan laktasi*/Mathius, I W.; Yulistiani, D.; Puastuti, W.; Martawidjaya, M. (Balai Penelitian Ternak, Bogor (Indonesia)). [Proceedings of the national seminar on animal husbandry and veterinary technology. Book 1], Bogor (Indonesia) 12-13 Sep 2005/Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 422-429, 4 tables; 23 ref. 636:338.439/SEM/p

EWES; DIET; PREGNANCY; LACTATION; USES.

An adequate supply of dietary chromium to ewes is necessary to optimize animal performance. This experiment was intended to study three different levels of organic-chromium in the diet on the performance of late pregnancy and lactating ewes. Twenty-four local pregnant ewes were penned individually, which allowed for separate given of forages and concentrate. Water was made available at all times. To maintain nutrient requirements, all ewes are fed ad libitum of fresh chopped king grass and commercial concentrate having 18% of crude protein, as much as 2% of body weight. Since the beginning of late pregnancy till 12 weeks of lactating period, ewes were allocated to three dietary treatment groups of concentrate containing different amount of chromium. The three concentrate treatments were (R1) additional 0 ppm organic-Cr (control), (R2) additional 2 ppm and (R3) additional 4 ppm organic-Cr. Data were analyzed by analysis of variance (ANOVA) using GLM procedures of SAS with a model appropriate for a randomized completely design. Feed intake on the basis of dry matter during pregnancy period was not significantly different as well as during lactation. Total feed intake (dry matter intake) during lactating phase was not affected by dietary chromium, averaging 1142 g/head/day. Individual mean birth weight was 2.7 kg for control group and 2.3 kg for group fed diet containing 4 ppm organic-chromium. There was no significant ($P>0.05$) effect of dietary chromium on lamb birth weight. However, when expressed as ewes, lamb birth weight was 3.7 kg for ewes fed control diet and 4.3 kg for ewes fed diet contain 4 ppm organic chromium ($P<0.05$). From birth to 12 week of age, there was no significant difference ($P>0.05$) in lamb growth rate. It was concluded that feeding diet containing chromium was not suitable for pregnant and lactating ewes.

088 PASARIBU, T.

Effectivity of *Aloe vera barbadensis* bioactives on commercial farmer. *Efektivitas bioaktif lidah buaya (Aloe vera barbadensis) di tingkat peternak komersial*/Pasaribu, T.; Sinurat, A.P.; Purwadaria, T. (Balai Penelitian Ternak, Bogor (Indonesia)). [Proceedings of the national seminar on animal husbandry and veterinary technology], Bogor (Indonesia) 12-13 Sep 2005/ Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 727-732, 3 tables; 10 ref. 636:338.439/SEM/p

LAYER CHICKENS; EGG PRODUCTION; WEIGHT; ALOE BARBADENSIS; FEED CONSUMPTION; ANTIBIOTICS; MORTALITY; COMMERCIAL FARMING.

Two trials with laying hens were conducted to evaluate the effectivity of *Aloe vera* bioactives in dry gel form (DG) at 1.0 concentration. Laying hens strain Loghman (n= 1008 per trial and r=504 per pen) were used in 24 weeks with measurements: egg production (% hen day), egg weight, feed consumption, feed consumption rate (FCR), egg quality, and mortality. Results showed that feed consumption, percent HD, egg weight, FCR, and egg quality were insignificantly different (P>0.05) between control and DG treatment. It was concluded that *Aloe vera* bioactives had potential in replacing antibiotic in laying hens diet at the commercial farmer.

089 PRAWIRODIGDO, S.

Utilization of coffee pulp and hull in the diet for sheep fattening. *Pemanfaatan kulit kopi sebagai komponen pakan seimbang untuk penggemukan ternak domba*/Prawirodigdo, S.; Herawati, T.; Utomo, B. (Balai Pengkajian Teknologi Pertanian Jawa Tengah, Semarang (Indonesia)). [Proceedings of the national seminar on animal husbandry and veterinary technology. Book 1], Bogor (Indonesia) 12-13 Sep 2005/ Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 438-444, 2 ill., 11 ref. 636:338.439/SEM/p

SHEEP; FATTENING; COFFEE PULP; DIET; AGRICULTURAL WASTES.

An experiment was performed in an elevated sheep barn belongs to the Ngudi Raharjo Farmers Association at Pagergunung Village, Pringsurat Subdistrict, Temanggung District. The experiment demonstrated the inclusion of the coffee pulp and hull (CKP) in the adequate feeds for sheep for 14 weeks fattening period. The purpose of the study was to confirm the utilization of CKP in feed for sheep to overcome feed limitation during dry season. The present experiment employed 24 male local breed sheep having initial body weight of 18.71 kg. The sheep was penned individually and randomly fed either one of the three experimental diets namely AD-Kuat1; AD-Kuat2 and traditional feed. The AD-Kuat1, AD-Kuat2 diets contained CKP, dried cassava tuber, elephant grass (*Pennisetum purpureum*), calliandra (*Calliandra calothyrsus*) and glirisidia (*Glirisidia maculata*), which were formulated to provide a daily intake of 560 g dry matter, 6.8 MJ metabolisable energy, and 57 g of crude protein. Whereas, the traditional diet contained 6 kg of elephant grass and 0.5 kg fresh cassava tuber. The study used completely randomized design with 8 replications/treatments. Results showed that, inclusion of 200 g CKP in the diet did not render lower growth rate of the sheep (44 g versus 43 g/d, for sheep receiving AD-Kuat2 and traditional diet, respectively). However, the sheep fed AD-Kuat1 diet tended (P<0.05) to grow (62 g/d) faster than the other two groups of experimental animal. In conclusion, CKP can be used as a feedstuff for sheep to overcome feed limitation problem during dry season at Pagergunung Village, and introduction of 200 g of CKP in the diet is save for the animal.

090 PUASTUTI, W.

Effect of substitution of protected soybean meal with banana juice as rumen undegradable protein source to rumen fermentation. ***Pengaruh substitusi bungkil kedelai terproteksi getah pisang sebagai sumber protein tahan degradasi terhadap fermentasi rumen***/Puastuti, W.; Mathius, I W. (Balai Penelitian Ternak, Bogor (Indonesia)). [Proceedings of the national seminar on animal husbandry and veterinary technology. Book 1], Bogor (Indonesia) 12-13 Sep 2005/Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 405-409, 1 ill., 3 tables; 12 ref. 636:338.439/SEM/p

RUMINANTS; RUMEN; FERMENTATION; DEGRADATION; SOYBEAN MEAL.

Protein supply to the duodenum was increased through microbial protein synthesis in the rumen and rumen undegradable protein supply. The study was conducted to determine the effect of protected soybean meal with banana juice as rumen undegradable protein source to the rumen fermentation. Fourteen growing lambs with average live weight of 18.6 ± 2.2 kg were grouped according to early weight. Three diets were isonitrogenous and isoenergy (CP 18% and TDN 75%) with different level of protected soybean meal with banana juice, R0 = control diet with 100% of untreated soybean meal, R50 = R0, with 50% of protected soybean meal, and R100 = R0, with 100% of protected soybean meal. Dry matter of diets was given approximately 3.5% of live weight. The result showed that pH value, NH_3-N concentration, purine base, total bacteria and total VFA were not effected by level of protected soybean meal with banana juice ($P>0.05$). It was concluded that substitution of protected soybean meal with banana juice as rumen undegradable protein did not affect rumen fermentation.

091 PURNOMOADI, A.

Effect of soybean pulp (soy-sauce industrial byproduct) in ration on chewing efficiency of eating and rumination of buffalo heifers. ***Pengaruh ampas kecap dalam ransum terhadap efisiensi kunyah untuk makan dan ruminasi pada kerbau dara***/Purnomoadi, A.; Atiqoh, L.; Dartosukarno, S. (Universitas Diponegoro, Semarang (Indonesia). Fakultas Peternakan). [Proceedings of the national seminar on animal husbandry and veterinary technology. Book 1], Bogor (Indonesia) 12-13 Sep 2005/Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 306-309, 2 tables; 5 ref. 636:338.439/SEM/p

WATER BUFFALOES; RATIONS; SOYBEAN MEAL; SOYFOODS; SAUCES; INDUSTRIAL WASTES; RUMINATION; BYPRODUCTS.

Effect of soybean pulp (byproduct of soy sauce industry) on chewing efficiency of eating and rumination has been studied using eight buffalo heifers (initial live weight 166 kg, aged 18 months). The buffaloes were grouped into two: first group was fed napier grass and commercial concentrate (NC-O group), while second group was fed napier grass, concentrate and soybean pulp (NC-SP group). Napier grass was provided after 7 days wilted. Napier grass and concentrate were given at ratio 70:30. For NC-SP group, the concentrate was composed by 75% commercial concentrate and 25% soybean pulp. The feed was set to meet the dry matter (DM) requirement at 2.5% of live weight. Eating behavior was measured from 3 days continuously observation. Chewing number was accounted by halter equipped with tape switch in jaw side and was recorded in every 1/10 second in connected PC. The results showed that soybean-pulp gave a similar on DM1 (NC-O : 5.659 vs NC-SP : 5.680 g/d) and rumination time (385 vs 389 min/d). However, soybean pulp tend to decrease eating time (561 vs 437 min/d), total chewing activity (49,986 vs 41,907 chews/d), chewing for eating (27,887 vs 21,797 chews/d) as well as chewing for rumination (22,099 vs 20,110 chews/d). The lower eating time in similar DM1 for NC-SP showed that soybean pulp increased palatability, while the lower rumination time showed that soybean pulp increase degradability of feed in rumen.

092 RESNAWATI, H.

Response of broiler on the diet containing *Lumbricus rubellus* earthworms meal. *Respon ayam pedaging terhadap ransum yang mengandung tepung cacing tanah (Lumbricus rubellus)*/ Resnawati, H. (Balai Penelitian Ternak, Bogor (Indonesia)). [Proceedings of the national seminar on animal husbandry and veterinary technology], Bogor (Indonesia) 12-13 Sep 2005/ Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 715-720, 4 tables; 22 ref. 636:338.439/SEM/p

BROILER CHICKENS; FEED CONSUMPTION; OLIGOCHAETA; FLOURS; LUMBRICUS RUBELLUS; ANIMAL PERFORMANCE; WEIGHT GAIN.

The experiment was carried out to evaluate the effect of earthworms meal in the diet on broiler performance. There were 80 days old chicks of the Arbor Acre (AA) strains: allocated to 4 treatments and 5 replications. The treatments were the diets with 0, 5, 10 and 15% of earthworm meal levels given to chick aged of 0-5 weeks. Body weight gain per chick per week for each treatment were 280.2; 282.5; 266.0, and 280.3 g; feed consumption were 506.95 g, 512.32 g, 515.46 g and 501.67 g; feed conversions were 2.05, 1.96, 2.02 and 2.05, respectively. Results showed that body weight gain, feed consumption, feed conversion, carcass weight, parts of carcass weight and internal organs were not significantly ($P>0.05$) influenced by dietary treatments. It was indicated that the diet with 5-15% earthworms meal given up to 5 weeks age was recommended to be an optimum broiler performance.

093 RIANTO, E.

Performance of young swamp buffalo bulls fed brewery byproduct as fabricated concentrate substitution. *Penampilan produksi kerbau lumpur jantan muda yang diberi pakan ampas bir sebagai pengganti konsentrat jadi*/Rianto, E.; Heryanto, Y.; Arifin, M. (Universitas Diponegoro, Semarang (Indonesia). Fakultas Peternakan). [Proceedings of the national seminar on animal husbandry and veterinary technology. Book 1], Bogor (Indonesia) 12-13 Sep 2005/Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 299-305, 1 ill., 5 tables; 9 ref. 636:338.439/SEM/p

WATER BUFFALOES; FEEDS; BREWERY BYPRODUCTS; RICE STRAW; ANIMAL PERFORMANCE; WEIGHT GAIN.

An experiment was carried out to investigate the effect of concentrate substitution by brewery byproduct on the performance of young swamp buffalo bulls. This experiment used 8 young buffalo bulls (aged 1.5 years and weighed 160.32 ± 17.82 kg), fed rice straw as a basal diet. The buffaloes were allocated into a completely randomized design (CRD) with 2 treatments, i.e. T0: 100% concentrate (without brewery byproduct); and T1: 50% concentrate and 50% brewery byproduct. Data was collected in 10 weeks. The results showed that dry matter intake of the treatments were not significantly different ($P>0.05$), while crude protein intake of T1 was significantly ($P<0.05$) higher than that of T0. The dry matter digestibility of the two treatments were not significantly different ($P>0.05$). Average daily live weight gain of T1 (0.66 kg) was significantly ($P<0.05$) higher than that of T0 (0.37 kg), and feed conversion of T1 (8.02) was significantly ($P<0.05$) lower than that of T0 (11.92). It was concluded that substitution of concentrate by brewery byproduct improved the performance of young buffalo bulls.

094 SIREGAR, Z.

Effect of hydrolyzed poultry feather and mineral essential supplementation in plantation byproduct based ration on utilization, biological value of protein, and efficiency of ration. *Pengaruh suplementasi hidrolisat bulu ayam, mineral esensial dalam ransum berbasis limbah perkebunan terhadap penggunaan, nilai hayati protein dan efisiensi ransum*/Siregar, Z. (Universitas Sumatera Utara,

Medan (Indonesia). Fakultas Pertanian). [Proceedings of the national seminar on animal husbandry and veterinary technology. Book 1], Bogor (Indonesia) 12-13 Sep 2005/Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 416-421, 2 tables; 6 ref. 636:338.439/SEM/p

SHEEP; RATIONS; AGRICULTURAL WASTES; SUPPLEMENTS; FEATHER MEAL; PROTEIN QUALITY.

The objective of this study was to evaluate the effect of supplementation of hydrolyzed poultry feather and S, Cl (as the essential macro mineral) and I, Co, Se (as essential rare mineral) in plantation byproduct based ration on utilization, biological value of protein, and efficiency of ration. The experiment was designed in a randomized complete block design with 2 x 4 factorial arrangement. The first factor was sheep breed consisted of 2 levels, b1 (sumatra thin tail lamb) and b2 (Sunge Putih crossbred). The second factor was supplementation consisted of 4 levels, S1 = basal ration (control) containing 14% crude protein (CP) and 70% total digestible nutrient (TDN). S2 = S1 + hydrolyzed poultry feather 3%. S3 = S2 + 0.12% Cl + 0.17% S and S4 = S3 + 0.40 ppm I + 0.15 ppm Co + 0.15 ppm Se. Twenty four heads lamb, 12 heads b1 and 12 heads b2 were used in the experiment. Lambs were divided into 3 group based on the initial body weight. Initial body weight of lamb was 23.90 ± 2.60 kg. The results showed that hydrolyzed poultry feather and S, Cl as well as I, Co, Se supplementation did not increase the utilization and biological value of protein, but increased ration efficiency. The value of ration efficiency at b2 was higher ($P<0.05$) than that at b1 (0.16 vs 0.15). It was concluded that byproduct supplemented with hydrolyzed poultry feather and S, Cl as well as I, Co, Se could be used as substitute of grass for sheep.

095 SOEHARSONO.
Effect of cassava meal-steamed urea on crude protein intake, digestibility and nitrogen balance for sheep. ***Pengaruh pemberian tepung gaplek - urea yang dikukus terhadap konsumsi dan kecernaan protein serta neraca nitrogen pada domba***/Soeharsono; Supriadi; Winarti, E. (Balai Pengkajian Teknologi Pertanian Yogyakarta (Indonesia)). [Proceedings of the national seminar on animal husbandry and veterinary technology. Book 1], Bogor (Indonesia) 12-13 Sep 2005/Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 400-404, 3 tables; 11 ref. 636:338.439/SEM/p

SHEEP; COMPLETE FEEDS; CASSAVA; FLOURS; UREA; STEAMING; CRUDE PROTEIN; NITROGEN; DIGESTIBILITY.

This research was conducted to evaluate the effect of cassava meal-steamed urea on crude protein (CP) intake and digestibility and N retention *in vivo* for sheep. The substitution of concentrate feed with cassava meal-steamed urea for treatments were R-1 (0%), R-2 (20%), R-3 (40%) and R-4 (80%). The ration was given in the form of complete feed with an average 12% crude protein and 64% TDN contents. The research used the latin square design. Four female local sheep were reared in a metabolic cage. Feed intake, feces, and urine were collected. CP intake, digestibility and N balance were analyzed for their variance and if there were significant differences it was then continued with Turkey test. The results indicated that the CP intake treatment R-2 (44.17 g/day) was significantly different ($P<0.05$) from R-1 (32.68 g/day) and R-3 (35.12 g/day), but it did not significantly differ from the R-4 (41.27 g/day). CP digestibility of R-2 treatment (51.63%) was significantly different ($P<0.05$) from R-1 (34.84%) and R-3 (41.77%), but did not significantly differ from the R-4 (45.59%). The best N retention was achieved by treatment R-3 (2.95 g/day) followed by R-2 (2.93 g/day); R-4 (2.73 g/day) and R-l (2.50 g/day). It was concluded that the utilization of cassava meal-steamed urea as concentrate components could increase intake and CP digestibilily and has a positive effect on N balance in sheep. The treatment of R-2 induced the highest response on the CP intake and digestibility and also has good N retention.

096 UMIYASIH, U.

Evaluation of new release maize byproduct as beef cattle feed. ***Evaluasi limbah dari beberapa varietas jagung siap rilis sebagai pakan sapi potong***/Umiyasih, U.; Anggraeny, Y.N. (Loka Penelitian Sapi Potong, Grati, Pasuruan (Indonesia)). [Proceedings of the national seminar on animal husbandry and veterinary technology. Book 1], Bogor (Indonesia) 12-13 Sep 2005/Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 125-130, 5 tables; 11 ref. 636:338.439/SEM/p

BEEF CATTLE; FEEDS; BYPRODUCTS; MAIZE; AGRICULTURAL WASTES.

The development of superior variety of maize is one alternative to increase national corn production. The increasing of plantation corn area can increase crop byproduct such as corn stover. The purpose of this research was to find out the potency and nutrient value of commercial corn stover and the benefit as roughage for beef cattle. This research was done by Loka Penelitian Sapi Potong and Balai Penelitian Tanaman Jagung dan Serealia. This research had 8 of new varieties of commercial corn stover (S99TLYQGH-AB, S99TLYQ-AB, POZARICA 8365, ACROSS 8666, POZARICA 8563, S 98TLWQ-FLD, POP 63 C2 QPMTLV and MAROS SINTETIK 2). This research used randomized completely design. Parameter observed was corn stover and its nutrient content. The nutrient content was analyzed by proximate (DM, CP, TDN, CF, EE and organic matter), fiber analysis by Van Soest method (ADF and NDF) analysis of *in sacco* digestibility. The results showed that production of DM, CP and TDN was not affected by corn variety, but affected to CF. The highest CF is MAROS SINTETIK 2 (2.56 ton/ha) and the lowest is POP 63 C2 QPMTLV (0.73 ton/ha). The DM, CP, EE, CF, SK, NDF and ADF was affected by corn variety ($P<0.05$), but not to TDN and OM. The DM content of maize straw was 43.24-49.44%; CP content was 4.32-4.89%; TDN content was 47.20-48.08%; CF content was 29.02-34.96%, EE content was 0.55-0.77%; OM content was 83.62-85.14%; ADF content was 39.70-45.18% and NDF content was 55.25-73.58%. Corn maize from POP 63 C2 QPMTLV and MAROS SINTETIK 2 had low DM solubility (12.93%), whilst the corn maize ACROSS 8666 had high DM solubility (19.00%). The lowest DM digestibility was S99TLYQGH-AB (53.75%) and the highest DM digestibility was S98TLWQ-FLD (58.99%). According to production and nutritive value, it was concluded that corn varieties of POZARICA 8563, S98TLWQ-FLD and MAROS SINTETIK 2 had low potency as beef cattle roughage than those of five varieties.

097 ZURRIYATI, Y.

Increasing the productivity of PE and kacang goat by using probiotic technology. ***Peningkatan produktivitas kambing PE dan kacang melalui penerapan teknologi probiotik***/Zurriyati, Y. (Balai Pengkajian Teknologi Pertanian Riau, Pekanbaru (Indonesia)). [Proceedings of the national seminar on animal husbandry and veterinary technology. Book 1], Bogor (Indonesia) 12-13 Sep 2005/Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 596-603, 1 ill., 5 tables; 9 ref. 636:338.439/SEM/p

GOATS; BREEDS (ANIMALS); PRODUCTIVITY; PROBIOTICS; TECHNOLOGY TRANSFER; COST BENEFIT ANALYSIS.

Goats have considerably potential to be developed in Riau Province, but until now its productivity is relatively low. Therefore innovation technology is highly required to increase its productivity. This assessment was conducted at Hangtuah and Sialang Kubang Village, Kampar District, Riau Province in 2004 involving 14 cooperators having 29 kacang goats and 22 PE (peranakan etawah) goats. The treatment of technology package was (a): introduction technology (introduction-starbio = IS and introduction probion = IP), (b): Farmer technology (control). The parameter observed was body weight and economic value of production factor. To compare the biological aspect between the treatment used T - test, whereas to compare the economic aspect used R/C ratio. The assessment results showed that IP gave

the highest daily body weight gain, severally male PE goat 81.33 g/h/day, female PE goat 63.0 g/h/day, male kacang goat 58.33 g/animals/day and female kacang goat 43.67 g/h/day. Daily body weight gain of goat with IS showed that male PE goat 70.83 g/h/day, female PE goat 52.22 g/h/days, male kacang goat 49.33 g/h/day and female kacang goat 28.88 g/h/day. While at the control, daily body weight gain of male PE goat 66.67 g/h/day, female PE goat 29.33 g/h/day, male kacang goat 34.67 g/h/day and female kacang goat 25.00 g/h/day. Daily body weight gain of PE was higher than that of kacang at the same treatment. The highest profit from sale PE goat found at IS about Rp 196,300/animals (R/C ratio 1.31). While the highest profit from sale kacang goat found at IP about Rp 78,700/animals (R/C ratio 1.12). At control, profit from sale PE goat was Rp 74,400/animals (R/C ratio 1.20) and kacang goat of Rp 4,400/animals (R/C ratio 1.01).

L10 ANIMAL GENETICS AND BREEDING

098 BUDIARSANA, I G.M.

Performance of peranakan etawah goats in two different agroecosystems. ***Performan kambing peranakan etawah (PE) di lokasi agroekosistem yang berbeda***/Budiarsana, I G.M. (Balai Penelitian Ternak, Bogor (Indonesia)). [Proceedings of the national seminar on animal husbandry and veterinary technology: Book 1], Bogor (Indonesia) 12-13 Sep 2005/Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 650-659, 1 ill., 9 tables; 12 ref. 636:338.439/SEM/p

GOATS; CROSSBREDS; ANIMAL PERFORMANCE; AGROECOSYSTEMS; WEIGHT GAIN; ECONOMIC ANALYSIS.

Field research to test the performance of crossed etawah (PE) goats was conducted in two different locations, Panulisan Timur Village, Subdistrict of Dayeuh Luhur, Regency of Cilacap, Central Java Province categorized as rubber plantations agroecosystem (Clc), and secondly, in Leuwisari Village, Subdistrict of Singaparna, Regency of Tasikmalaya, West Java Province categorized as forestations agroecosystem (Tsk). Observing 58 PE goats, 14 non PE goats which reared by 12 cooperator farmers. Totals of PE goats, non PE goats and cooperative farmers involved in each locations were; 29, 6 heads and 9 farmers vs 29, 8 heads and 12 farmers, respectively for Clc and Tsk. Parameter measured were pregnancy rate, total kid born and wean, growth rate, mortality rate, and feed consumptions, presented descriptively. The result showed that the pregnancy rate of PE goats was 69-l00%, birth weight was 2.6-3.0 kg, and a-preweaning growth rate of 86-l15 g/day, which were higher compared to control with is 2.5 kg and a growth rate were 70-75 g/day. Net cash benefit analysis showed that the average of benefit arose up tp Rp 511,000 and Rp 571,000 year/farmer, respectively for Tsk and Clc.

099 MASKUR.

Characterization of beta-lactoglobulin gene and its relationship with the nature of milk production on hissar cattle. ***Karakterisasi gen beta-laktoglobulin dan hubungannya dengan sifat produksi susu pada sapi hissar***/Maskur (Universitas Mataram (Indonesia). Fakultas Peternakan); Sumantri, C.; Muladno. *Zuriat* ISSN 0853-0808 (2005) v. 16(2) p. 164-171, 3 ill., 3 tables; 12 ref.

CATTLE; BETA LACTOGLOBULIN; MILK YIELD; GENES; GENOTYPES; PCR; RFLP.

Characteristics of beta-lactoglobulin gene of Hissar cattle covering number, type and allele frequency were analyzed by the PCR-RFLP technique. The PCR product and the result of DNA restriction by the Hae III-enzyme were separated on the polyacrylamide gel electrophoresis (PAGE) and then the silver-staining method was applied to detect the fragment. Allele detected from the beta-lactoglobulin gene were A and B with the frequency of each 0.19 and 0.81, respectively. Significance of genotype BB was 69.05%, AB 23.81% and AA 7.14%. The average milk production indicated the strong correlation with the

genotype of beta-lactoglobulin gene. The average milk production of Hissar cattle with genotype AA, AB, and BB were 4.03 liter/day, 3.11 liter/day, and 2.17 liter/day, respectively.

100 PAMUNGKAS, F.A.
Relation of weight moment nanny bearing with weight born and litter size goat crossing kacang x boer. ***Hubungan bobot induk saat melahirkan dengan bobot lahir dan litter size kambing persilangan kacang x boer***/Pamungkas, F.A.; Mahmilia, F.; Elieser, S.; Doloksaribu, M. (Loka Penelitian Kambing Potong Sei Putih, Deli Serdang (Indonesia)). [Proceedings of the national seminar on animal husbandry and veterinary technology. Book 1], Bogor (Indonesia) 12-13 Sep 2005/Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 586-589, 3 tables; 10 ref. 636:338.439/SEM/p

GOATS; CROSSBREDS; BIRTH WEIGHT; BODY WEIGHT; LITTER SIZE.

A study was conducted at Research Institute for Goat Production Sei Putih, North Sumatra to evaluate the correlation between ewe weight at giving birth and birth weight and litter size of kacang X boer crossed goats. The total numbers of ewes observed were 35 heads of kacang and boer crossbreeds. The ewes were weighed after bearing, and so were the young ones. The results showed that ewe weights at bearing significantly affected (P<0.0l) the young goat weights in which the heavier the ewe weight at bearing the heavier the young weight. This also applied to litter size, the ewe weight at bearing gave significant effect (P<0.05) on litter size.

101 PRASETYO, L.H.
Interaction between genotypes and quality of diets on egg productions and quality of local ducks. ***Interaksi antara bangsa itik dan kualitas ransum pada produksi dan kualitas telur itik lokal***/Prasetyo, L.H.; Ketaren, P.P. (Balai Penelitian Ternak, Bogor (Indonesia)). [Proceedings of the national seminar on animal husbandry and veterinary technology], Bogor 12-13 Sep 2005/Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 811-816, 1 ill., 3 tables; 8 ref. 636:338.439/SEM/p

DUCKS; BREEDS (ANIMALS); GENOTYPE ENVIRONMENT INTERACTION; EGG PRODUCTION; QUALITY; FEED INTAKE; DURATION; PERFORMANCE TESTING.

Tegal and mojosari ducks are important local breeds of layer ducks in Indonesia with similar visual characteristics, but with medium genetic distance based on protein polymorphism. Their egg production are largely affected by quality of their diets. Therefore, this study was aimed at investigating the response of each breed to different diet quality on their egg production and quality. Eighty two female tegal ducks and 90 female mojosari ducks were used in this study with two different diets, RI containing 14% crude protein (CP) and 2100 kkal/kg metabolisable energy (ME) and R2 containing 20% CP and 3000 kkal/kg ME. Observations were taken on age at first laying, weight of first egg, egg production to 49 weeks, and various components of egg quality. Results showed that both breeds gave good response to improvement in diet quality on egg production in the first three months, 23.7% increase in mojosari ducks and only 10.6% in tegal ducks. However, after 3 months only mojosari ducks still responded positively to high quality diet, and tegal ducks did not. Interaction between breeds and diet quality was also shown by the weight of egg yolk, weight of albumen, and egg yolk color, but not by egg weight, eggshell weight and thickness, and Haugh Unit value. It can be concluded that under optimal condition mojosari ducks were able to show their genetic superiority to tegal ducks, but under suboptimal condition tegal ducks were more able to maintain their productivity.

102 RASYID, A.
Stratification of cow and the function of livestock service as a part of improvement genetics quality of bali cattle. ***Stratifikasi induk dan pembinaan kelompok sebagai bagian dalam perbaikan mutu genetik sapi bali***/Rasyid, A.; Affandhy, L.; Wijono, D.B. (Loka Penelitian Sapi Potong, Grati, Pasuruan (Indonesia)); Londra, M.; Siregar, A.R.. [Proceedings of the national seminar on animal husbandry and veterinary technology. Book 1], Bogor (Indonesia) 12-13 Sep 2005/Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 112-118, 6 tables; 14 ref. 636:338.439/SEM/p

CATTLE; BREEDS (ANIMALS); STRATIFICATION; GENETICS; QUALITY.

The traditional breeding stock of beef cattle is mostly oriented on cow ability to produce the calf, but still not for the quality. The genetic improvement of beef cattle can be done by empowerment of groups of breeding stock. The survey was aimed to stratify cow of bali cattle, for the process of forming breeding stock. The survey was carried out in the Tabanan Regency, Province of Bali, as the area of local village breeding centre and combined with the Bali Cattle Improvement Project (P3 Bali). The survey was done through the observation technique, monitoring and livestock services of farmer groups. The observation was done on the performance of body weight of cow and linier body size. The stratification of cow was grouped into three groups (class) namely a group of cow having performance over means (A), a group of cow of the same means (B) and a group of cow under means (C). The livestock services were done to groups institution and gave suitable innovation technology. The data analysis was done descriptively consisting of the average value, variety, and frequency distribution. The results of the survey showed that the average body weight of dam was 282.44 ± 51.53 kg (192.5-424 kg), body length, body height and chest girth were 121.1 cm; 114.3 cm and 162.4 cm. The stratification body weight of cow for group A was 295-424 kg, B was 260-294 kg and C was 192.5-259 kg. It was concluded that the empowerment of groups by guidance service, and selecting and recording regularly would reinforce to keep good dam and the improvement of calf produced.

103 SUMANTRI, C.
Gene controlling high milk lactoferrin content in Holstein Friesian cows. ***Gen pengontrol produksi susu berkadar laktoferin tinggi pada sapi perah FH***/Sumantri, C. (Institut Pertanian Bogor (Indonesia). Fakultas Peternakan). *Wartazoa* ISSN 0216-6461 (2006) v. 16(2) p. 72-81, 4 ill., 24 ref.

DAIRY CATTLE; LACTOFERRIN; GENETIC MARKERS; ANTIMICROBIALS; ANTIVIRAL AGENTS; SELECTION; IDENTIFICATION; ISOLATION TECHNIQUES.

Lactoferrin is considered as an antimicrobial and antiviral protein, therefore milk that contains high lactoferrin is potential for health-enhancing nutraceuticals for food and pharmaceutical applications. The main objective of this paper is to discuss in more detail about lactoferrin function and how gene could control high lactoferrin content in milk. Milk lactoferrin content is still varied among individual. Therefore, selection should be carried out to increase lactoferrin content in local Friesian Holstein. The selection could be accelerated by using lactoferrin gene as a gene marker that directly contributes to the milk lactoferrin content.

L20 ANIMAL ECOLOGY

104 TIESNAMURTI, B.
Lambing behavior of sumatra and merino ewes in confinement. ***Tingkah laku beranak domba merino dan sumatera yang dikandangkan***/Tiesnamurti, B.; Subandriyo (Balai Penelitian Ternak, Bogor (Indonesia)). [Proceedings of the national seminar on animal husbandry and veterinary technology. Book 1], Bogor (Indonesia) 12-13 Sep 2005/Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.;

Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 505-511, 4 tables; 13 ref. 636:338.439/SEM/p

SHEEP; EWES; PARTURITION; BEHAVIOR; ANIMAL HUSBANDRY EQUIPMENT; ANIMAL HOUSING.

A study was conducted to find out lambing behavior of merino and sumatra ewes. The parameters observed were prelambing behavior, at lambing behavior (lambing position, duration of lambing and lambing time) and after lambing behavior (success time to stand and to suckle). Data were analyzed using t test and regression analysis was conducted between duration of lambing and ewe's body weight as well as time to suckle and ambient temperature. The study showed that prelambing behavior of both sheep were consisted of laying down, walking around the barn, flechmen, vocalization, urination and floor scratching. Lambing position was mostly laying down (75.56%) for the merino and standing up (50%) for the sumatra. The average lambing duration for both sheep was not significantly different, 23.61 ± 17.95 and 31.5 ± 13.34 minutes. Whereas lambing time for merino was occurred in the evening (65.84%) and for sumatra sheep was at day time (75%). Duration to stand up for merino and sumatra lambs was significantly different ($P<0.05$) which is 38.2 ± 21.5 and 23.5 ± 16.4 minutes. Meanwhile time for suckling for merino and sumatra lambs was not significantly different, 67.0 ± 31.5 and 56.1 ± 35.1 minutes, respectively. The regression coefficient between lambing duration and ewe weight was significantly different ($P<0.05$) of the ewe's weight, whereas regression coefficient between time to suckle and the ambient temperature showed significantly ($P<0.05$) effect of the ambient temperature. The study showed that sumatra and merino sheep were not significantly different for the lambing behavior and considered to have good mothering ability.

L50 ANIMAL PHYSIOLOGY AND BIOCHEMISTRY

105 PURBA, M.
Moulting patterns of alabio and mojosari ducks and their relation on blood lipids (triglycerides), egg production and egg quality. ***Pola rontok bulu itik betina alabio dan mojosari serta hubungannya dengan kadar lemak darah (Trigliserida), produksi dan kualitas telur***/Purba, M.; Prasetyo, L.H. (Balai Penelitian Ternak, Bogor (Indonesia)); Hardjosworo, P.S.; Ekastuti, D.R. *Jurnal Ilmu Ternak dan Veteriner* ISSN 0853-7380 (2005) V. 10(2) p. 96-105, 5 tables; 23 ref.

DUCKS; MOULTING; TRIGLYCERIDES; EGG PRODUCTION; QUALITY; LAYING PERFORMANCE.

Moulting is a biological condition that can happen in poultry. It is resulted from the complex interaction which involves the function of thyroxine hormone. Moulting can reduce or even stop the egg production. A study was conducted to observe the moulting patterns of local ducks (Alabio and Mojosari) and to determine the relation of moulting with blood lipids (triglycerides), egg production and quality. Each breed consisted of ten female ducks were observed for moulting pattern, blood triglycerides, egg production and quality. Fourty ducks were used for simulation of egg production. Data from moulting patterns, egg production and quality were analyzed using t-based on Least Square means with Statistical Analysis System. The relation of breeds and moulting patterns with triglycerides were analyzed using Analysis of Variance (ANOVA) for a completely randomized design in a factorial arrangement of 2 x 2. The main factor was kind of breeds, while the subfactor was the period of moulting, before and during moulting. There were not interaction in every variables between both factors. The average moulting periode of Alabio was significantly ($P<0.05$) shorter than that of Mojosari (69 vs 76 days). There were 40% of Alabio ducks moulting for 61-70 days, while 40% of Mojosari ducks moulting for 71-80 days. Egg production of Alabio ducks before and after moulting were higher than those Mojosari ducks. The triglycerides content of Alabio and Mojosari ducks was decreased during moulting, in Alabio ducks were

32.02 and 27.64 micro g/ml before and during moulting, while in Mojosari ducks they were 32.83 and 29.32 micro g/ml, respectively. Egg weight, albumin weight, yolk weight, and haugh unit of the two breeds increased after moulting, while yolk colour decreased. The average yolk colour of Alabio ducks before and after moulting were 6.90 and 5.11, while in Mojosari ducks were 7.90 and 4.60, respectively.

106 PURBOWATI, E.

Physiological responses of male local sheep at wide range liveweight after transported from upland to lowland area. ***Respon fisiologis domba lokal jantan pada rentang bobot hidup yang lebar akibat pengangkutan dari dataran tinggi ke dataran rendah***/Purbowati, E.; Purnomoadi, A. (Universitas Diponegoro, Semarang (Indonesia). Fakultas Peternakan). [Proceedings of the national seminar on animal husbandry and veterinary technology. Book 1], Bogor (Indonesia) 12-13 Sep 2005/Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 539-544, 1 ill., 2 tables; 9 ref. 636:338.439/SEM/p

SHEEP; MALES; ANIMAL PHYSIOLOGY; BODY WEIGHT; TRANSPORT OF ANIMALS; HIGHLANDS; LOWLAND.

Eighteen male local sheep weighed at range 7.5-35.6 kg were used in this study. These sheep were provided based on six groups liveweight which each group containing three sheep, namely 5-10 (averaged 7.7 kg), 11-15 (11.4 kg), 16-20 (16.4 kg), 21-25 (23.1 kg), 26-30 (27.1 kg), and 31-35 (34.0 kg). Before transportation, sheep were fasted for 12 hours. Sheep were transported from upland with ambient temperature 24°C at 9 o'clock to lowland area with ambient temperature 35°C at 11 o'clock. Time needed for transportation was 2 hours. Transportation can was provided shade to avoid the sheep from direct sun radiation. The results after transported were agreed with other previous reported, such as liveweight loss ranged at 0.2-0.8 kg (equal with 1.5-3.2% liveweight), rectal temperature increasing ranged at 0.3-1.0°C, heart rate increasing ranged at 13.7-45 pulse/minute, respiration rate increasing ranged at 21.0-53.3 breaths/minute, blood glucose increased at range of 19.2-33.9 mg/dL, but there was a different result on hematocrite which was found decreased at range of 0.3-6%, and blood urea N changed at range -3.5-15.1 mg/dL. The loss of liveweight after transportation tend to be higher at bigger liveweight followed equation $Y = 0.02LW + 0.068$ ($R = 0.721$). With that equation, the loss of liveweight could be calculated to be 0.27 kg of each 10 kg LW during 2 hours transportation from upland (cool) to lowland (hot) area.

107 SETIOKO, A.R.

Identification of body size and qualitative characteristics of matured tegal, cirebon and turi ducks. ***Identifikasi sifat-sifat kualitatif dan ukuran tubuh pada itik tegal, itik cirebon dan itik turi***/Setioko, A.R.; Sopiyana, S. (Balai Penelitian Ternak, Bogor (Indonesia)); Sunandar, T.. [Proceedings of the national seminar on animal husbandry and veterinary technology], Bogor (Indonesia) 12-13 Sep 2005/Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 786-794, 7 tables; 11 ref. 636:338.439/SEM/p

DUCKS; SPECIES; BODY CONDITION; FEATHERS; COLOUR; WEIGHT; DIMENSIONS; ANIMAL PERFORMANCE.

Research was conducted at three different districts, Brebes of Central Java, Cirebon of West Java and Bantul of Yogyakarta. The objective of this research was to look at the general view of qualitative and quantitative characteristics female matured tegal, cirebon, and turi ducks. This research was conducted through a survey method. Fifty ducks for each strain were measured for further characterized both qualitatively and quantitatively. The results indicated that the majority of tegal ducks were speckled (fawn) brown with black bill and feet, although coloring might vary from light fawn, almost white through brown and grey to almost black. The body was small and thin with average adult body weight varied from

1,200 to 1,875 gs. Cirebon ducks were more homogeneous than the tegal, and the feather color was generally slightly darker than the tegal. The body weight was similar to the tegal, varied from 1,325 to 1,865 gs with the average of 1,555 gs. Turi ducks had characteristic slender posture and erect gait with majority light brown with black bill and feet. The average body weight varied from 1,270 to 1,795 gs. This result could be used to improve database, supporting the standardization and development of local duck including to support genetic resources conservation program.

L51 ANIMAL PHYSIOLOGY - NUTRITION

108 HASAN, Z.H.

Potency of Lactobacillus isolated from chickens digestive tracts as probiotics agents: its tolerance and resistance towards bile salt. ***Potensi isolat Lactobacillus dari saluran pencernaan ayam sebagai agensia probiotik: toleransi dan ketahanannya terhadap garam empedu***/Hasan, Z.H. (Balai Pengkajian Teknologl Pertanian Kalimantan Selatan, Banjarbaru (Indonesia)). [Proceedings of the national seminar on animal husbandry and veterinary technology], Bogor (Indonesia) 12-13 Sep 2005/Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 721-726, 3 ill., 3 tables; 15 ref. 636:338.439/SEM/p

CHICKENS; ISOLATION; LACTOBACILLUS; PROBIOTICS; DIGESTION; BILE SALTS.

The objective of this research was to find out the potency of Lactobacillus isolated from chickens digestive tracts as probiotic agents. The research was conducted by inoculating the isolates of Lactobacillus in GYP (glucose-yeast extract-peptone) liquid media, added with bile salt in various concentrations, 0.2; 0.4; 0.6; 0.8; 1.0% (w/v), and the media without bile salt as the control. The isolates in this liquid media was inoculated in GYP agar media using pour plate method. Incubation was carried out at 37^0C for 24 hours. The test to know its tolerance towards bile salt was done by observing its growth, that was measuring by the OD (optical density) of the media after incubation. The production of lactic acid was known by measuring the pH of the growth media after incubation, and the volume of 0.1 N NaOH needed for titration the media. The resistance of the isolates towards bile salt was done by counting the amount of the colony which was inoculated on GYP agar, before and after incubation, using total plate count (TPC) method. Nine isolates of Lactobacillus isolated from chicken digestive tracts were tested. These 9 isolates consisted of 4 isolates from caecum were identified as *Lactobacillus murinus*, while 5 isolates from crop were identified as 1 isolate of *Lactobacillus acidophilus* and 4 isolates of *Lactobacillus murinus*. All isolates could grow in the media containing bile salt up to the concentration of 1.0%, but the result for the test of its resistance towards bile salt showed that the amount of the viable cell was declining after incubation for 24 hours. The decline of viable cell for isolate 6, 8, 9 was 1 log cycle, isolate 7 was 2 log cycle, while isolate 1-5 did not decline.

109 LESTARI, C.M.S.

Edible portion of male indigenous sheep fed rice bran and napier grass. ***Edible portion domba lokal jantan yang diberi pakan dedak padi dan rumput gajah***/Lestari, C.M.S.; Dartosukarno, S.; Puspita, I. (Universitas Diponegoro, Semarang (Indonesia). Fakultas Peternakan). [Proceedings of the national seminar on animal husbandry and veterinary technology. Book 1], Bogor (Indonesia) 12-13 Sep 2005/Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 461-466, 2 tables; 15 ref. 636:338.439/SEM/p

SHEEP; MALES; FEEDS; RICE; BRAN; PENNISETUM PURPUREUM; CARCASSES.

The experiment was conducted to evaluate the influence of rice bran levels with napier grass as a basal diet on edible portion of male indigenous sheep. Twelve yearling male indigenous sheep with initial body

weight range from 18.23 to 23.63 kg were treated as followed T0 = napier grass *ad libitum*, T1 = napier grass *ad libitum* + 200 g rice bran, T2 = napier grass *ad libitum* + 400 g rice bran. The diet given based on the dry matter requirement for sheep was 3.6% of body weight. Data gathered on slaughter weight, carcass and non carcass, edible portion of carcass and non carcass, and total edible portion were analyzed using ANOVA for randomized block design, followed by polynomial orthogonal contrast. Result of the study showed that the addition of rice bran increased slaughter weight, weight and carcass percentage, non carcass percentage, weight of edible portion carcass and non carcass, weight and total edible portion percentage ($P<0.05$), but it did not influence of non carcass weight, edible portion carcass and non carcass percentage ($P>0.05$). The average slaughter weight of T0, T1, T2 were 21,200; 25,000; and 25,980 g, respectively, while carcass weight and DP for T0 = 7,194.25 g (34.00%), T1 = 9,789.00 g (39.08%), T2 = 10,148.25 g (39.04%). The average edible portion of non carcass were T0 3,430.00 g (24.67%), T1 = 4,270.00 g (28.44%), and T2 = 4,678.00 g (29.95%), whereas total edible portion of T0, T1, and T2 were 8,313.46 g (38.85%), 11,517.54 g (46.06%), and 12,344.76 g (47.45%). It can be concluded that the addition of rice bran of 200 and 400 g increased edible portion of male indigenous sheep. With increasing level of rice bran, edible portion of carcass, non carcass and total edible portion were increased.

110 PAMUNGKAS, D.

In sacco* feed dry matter degradability of inoculated sheep's rumen derived from rumen content of goat. *Studi kecernaan bahan kering in sacco rumen domba yang mendapat inokulasi isi rumen kambing/Pamungkas, D. (Loka Penelitian Sapi Potong, Grati, Pasuruan (Indonesia)); Sevilla, C.C.. [Proceedings of the national seminar on animal husbandry and veterinary technology. Book 1], Bogor (Indonesia) 12-13 Sep 2005/Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 467-472, 2 tables; 15 ref. 636:338.439/SEM/p

SHEEP; GOATS; RUMEN DIGESTION; BIODEGRADABILITY; IN SACCO EXPERIMENTATION.

Aim of this study was to determine changes on dry matter (DM) degradability of feeds in the rumen of sheep which received ruminal content of goat via cross inoculation (CI). Four male native goats with range of 22-35 kg live weight and four male sheep with range live weight of 25-35 kg, fitted with permanent rumen cannula, were used. The animals were placed in individual pens during experiment and fed a diet of 70% napier grass and 30% concentrate. The amount of dry matter offered was calculated at 2.5% of live weight. Feeding was done twice daily at 8.00 am and 2.00 pm. The concentrate mixture consisted of 60% wheat pollard, 36% copra meal, 2% urea, 1% salt and 1% calcium phosphate. The experiment consisted of preliminary/preparation, preinoculation, cross inoculation and postinoculation periods. During the last three days of the first week of preinoculation, an *in situ* dry matter degradability was conducted. The samples of feeds such as napier grass (NG), leucaena (L), and wheat pollard (WP) were incubated separately in the nylon bags were incubated for 0, 3, 6, 9, 12, 24, 48 and 72 hours in the rumen of the experimental animals. During the last three days of first week of postinoculation, an *in sacco* DM digestibility trial similar to the preinoculation period was conducted. Changes in *in sacco* DM degradability of feeds as substrates at before and after cross inoculation were determined by using t-test. Results showed that there were no significant differences in the soluble fractions (a) water insoluble fraction (b), potential digestible fraction (a + b), and the rate of degradation (c) of NG before and after inoculation. However, there was a significant increase of 8.76% ($\alpha<0.05$) on (a) and decrease of 7.97% on (b) of L after cross inoculation, the effective degradability of NG was not significantly different for all of the outflow rates. In WP, a significantly increase ($\alpha<0.01$) was recorded on (a) value and decrease ($\alpha<0.05$) of (b).

111 SIANIPAR, J.

Nutrition efficiency for goats costa, gembrong and kacang. *Efisiensi nutrisi pada kambing kosta, gembrong dan kacang*/Sianipar, J.; Batubara, A.; Karokaro, S.; Ginting, S.P. (Loka Penelitian Kambing Potong Sei Putih, Deli Serdang (Indonesia)). [Proceedings of the national seminar on animal husbandry

and veterinary technology. Book 1], Bogor (Indonesia) 12-13 Sep 2005/Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 630-636, 6 tables; 6 ref. 636:338.439/SEM/p

GOATS; GENOTYPES; METABOLISM; SUPPLEMENTS; EFFICIENCY; FEED CONSUMPTION; DIGESTIBILITY.

This study was conducted using three local genotypes of goats 16 costa, 4 gembrong and 16 kacang were divided into 4 level feed supplements, i.e. 0; 0.5; 1 and 1.5% dry matter basis of body weight (each animal received diet; grass + supplement in 3.5% dry matter bases of body weight). The trial was designed by latin square for gembrong because prepared animal was limited and complicated randomized for costa and kacang. Each trial needed 7 days adaptation and 7 days collecting data. Results showed that the efficiency nutrition for costa and gembrong were higher ($P<0.05$) than kacang goats. Each requirement of dry matter diet for costa, gembrong and kacang were 3.25, 3.14 and 3.31% of body weight, respectively. Crude protein was 75.36 g/tail/day for costa, 68 g for gembrong and 43 g/tail per days for kacang goats. Requirement of digestible energy per tail per days for costa was 2.6 Mcal/kg, gembrong 2.3 Mcal/kg and kacang 2.0 Mcal/kg. The higher the supplement used the more efficient the nutrition use. Retention nitrogen (protein) was 0.8-1.2% or 30-40% of intake protein and digestible energy retention 1.4 Mcal. The loss of nutrition content of the supplement was due to older animal (non productive animal status).

112 SUGORO, I.
Effect of yeast probiotic on *in vitro* rumen fermentation. *Pengaruh probiotik khamir terhadap fermentasi dalam cairan rumen secara in vitro*/Sugoro, I.; Gobel, I.; Lelananingtyas, N. (Pusat Penelitian dan Pengembangan Teknologi Isotop dan Radiasi, Jakarta (Indonesia)). [Proceedings of the national seminar on animal husbandry and veterinary technology. Book 1], Bogor (Indonesia) 12-13 Sep 2005/Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 455-460, 5 ill., 11 ref. 636:338.439/SEM/p

RUMINANTS; RUMEN; PROBIOTICS; YEASTS; IN VITRO.

Supplementation of yeast probiotic can increase rumen metabolism. The objective of experiment was to detect the effect of yeast probiotic on *in vitro* rumen fermentation. Yeast probiotics were R1, R2, R3 and R4 isolates which were isolated from buffalo rumen liquid. The method was gas production test by buffalo rumen liquid and grass powder as basal diet. The parameters were gas production, bacteria biomass, VFA concentration, ammonia concentration, pH and digestibility of dry, organic and NDF matter. The results showed that all probiotics could increase rumen metabolism than control, except ammonia production.

L52 ANIMAL PHYSIOLOGY – GROWTH AND DEVELOPMENT

113 KUSWANDI.
Growth of weaning goats offered a restricted amount of concentrate. *Pertumbuhan kambing lepas sapih yang diberi konsentrat terbatas*/Kuswandi; Thalib, A. (Balai Penelitian Ternak, Bogor (Indonesia)). [Proceedings of the national seminar on animal husbandry and veterinary technology. Book 1], Bogor (Indonesia) 12-13 Sep 2005/Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 590-595, 1 tables; 19 ref. 636:338.439/SEM/p

GOATS; GROWTH; WEANING; CONCENTRATES; FEED INTAKE; FEED CONSUMPTION.

Decision to develop a livestock breed needs to be adapted to the animal production potential and its supporting resources. In this case, production and feed conversion to synthesize body tissues are the main choice in examining the animal potency. A feeding experiment was conducted to compare relative growth of weaning etawah crossbred goats and kacang goats (initial average weight of 20.3 kg). A restricted amount (200 g/d) of concentrate containing 17.7% protein and 11.2 MJ ME/kg dry matter was offered to each of 25 etawah crossbred goats and 22 kacang goats. Fresh napier grass was offered *ad libitum*. Water was available at all time. Data was analyzed using t-test with unequal replicates. The results showed faster growth of etawah crossbred goats than that of kacang goats (36.5 vs 19.8 g/day) despite no significant feed intake difference.

114 PURBOWATI, E.

Growth of carcass and carcass component of local male lamb reared in the village. ***Tumbuh kembang karkas dan komponen karkas domba lokal jantan yang dipelihara di pedesaan***/ Purbowati, E.; Sutrisno, C.I. (Universitas Diponegoro, Semarang (Indonesia). Fakultas Peternakan); Baliarti, E.; Budhi, S.P.S.; Lestariana, W.. [Proceedings of the national seminar on animal husbandry and veterinary technology. Book 1], Bogor (Indonesia) 12-13 Sep 2005/Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 487-494, 2 tables; 21 ref. 636:338.439/SEM/p

SHEEP; MALES; GROWTH; CARCASS COMPOSITION; REARING TECHNIQUES; RURAL AREAS.

Quantity and quality of carcass can be used to measure productivity of meat animal because carcass is the part of animal slaughter yield which has high economic value. Local lambs used as subject research which were from Temanggung, i.e. healthy male lamb, aged 1.5-12 months which slaughtered at 6 categories slaughter weight with range 5-30 kg. The objective of the research was to study the growth of carcass and its components (meat, fat and bone) with allometric model $Y = aX^b$. The results showed that local male lamb with body weight of 6.80 kg - 31.40 kg (the average 17.99 kg ± 8.40 kg) yielded 36.60% - 49.41% of carcass (the average 44.29% ± 3.71 %). Carcass with weight 3.22 kg - 14.80 kg yielded carcass muscle, carcass fat and carcass bone of 56.03% - 65.23% (the average 62.23% ± 2.34%), 3.93% - 21.13% (the average 12.66% ± 4.53%), and 17.59% - 29.21% (the average 21.94% ± 3.02%), respectively. Meat and fat (without kidney fat and pelvis fat) were 66.69% - 78.3% (the average 73.63% ± 3.71%) and meat-bone ratio was 2.28 - 4.45 (the average 3.43 ± 0.60). The growth of carcass components that was relative to empty body weight and carcass weight showed that carcass weight fixed, carcass muscle fixed, carcass bone decreased, and carcass fat increased with the increasing of empty body weight and carcass weight. The growth of fat depot that was relative to total carcass fat weight showed that subcutaneous fat weight increased, intramuscular fat and kidney fat and pelvis fat fixed with the increasing of total carcass fat weight. It was concluded that local male lamb in Temanggung generated high carcass containing fat and the development of this carcass fat concentrated in subcutaneous fat simultaneously increasing of body weight.

L53 ANIMAL PHYSIOLOGY - REPRODUCTION

115 BELLI, H.L.L.

Hormonal patterns of pre and postcalving bali cows supplemented with multinutrient blocks. ***Pola hormonal induk sapi bali yang diberi suplementasi multinutrien blok sebelum dan sesudah melahirkan***/Belli, H.L.L.; Holtz, W. (Universitas Nusa Cendana Kupang (Indonesia). Fakultas Peternakan). [Proceedings of the national seminar on animal husbandry and veterinary technology. Book 1], Bogor (Indonesia) 12-13 Sep 2005/Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 164-170, 3 ill., 20 ref. 636:338.439/SEM/p

COWS; BREEDS (ANIMALS); SUPPLEMENTS; PROGESTERONE; PROLACTIN; NUTRIENTS.

The influence of multinutrient blocks during pre and postcalving on progesterone and prolactin profiles of bali cows were evaluated. Seventeen multiparous pregnant cows with BCS 1 to 2, approximately 90 day before the expected date of calving, were divided randomly into groups A (n=9) and B (n=8), and were grazed on the native pasture as a basal diet, while those of group B received 1.25 kg multinutrient blocks, whose constitute was as follows (%): molasses (28), urea (5), coconut cake (15), fishmeal (5), rice bran (25), lime (8.5), salt (7.5), grit (5) and ultramineral (1). Cows were weighed and assessed for BCS (on a five-point scale) every two weeks, commencing at 12 weeks prior to calving, within 24 day after calving up to 16 weeks after calving. Plasma progesterone was measured twice weekly using RIA procedure while serum prolactin concentrations was measured using an ELISA at weekly interval. Bali cow grazing on natural pasture had a similar pattern of prepartum progesterone profile to bali cows supplemented with multinutrient blocks. Plasma progesterone of both groups was low after parturition, but 4 cows from non-supplemented and 5 cows from supplemented group had a transient rise of progesterone prior to the first estrus. Supplementation with multinutrient blocks to pre and postcalving bali cows grazing on natural pasture did not affect serum prolactin concentration. The fluctuation of serum prolactin levels were still substantially lower than that occurred at calving. The magnitude of prolactin concentrations in bali cows is much lower than that in other breeds. Plasma progesterone concentrations between the two groups around precalving period were not significantly affected by the multinutrient block.

116 SAID, S.
Live capacity of fresh spermatozoa of simmental cattle which is kept in straw at temperature 5°C. ***Daya tahan hidup sperma cair sapi Simmental yang disimpan dalam straw pada temperatur 5°C***/Said, S.; Gunawan, M.; Kaiin, E.M.; Tappa, B. (Pusat Penelitian Bioteknologi-LIPI, Bogor (Indonesia)). [Proceedings of the national seminar on animal husbandry and veterinary technology. Book 1], Bogor (Indonesia) 12-13 Sep 2005/Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 87-90, 5 tables; 11 ref. 636:338.439/SEM/p

CATTLE; SPERMATOZOA; STORAGE; STRAW; TEMPERATURE.

This research was conducted to know live capacity of fresh spermatozoa of simmental cattle in tris-egg yolk dilution (TKT, 20% v/v) which is kept in straw at 5°C (K 1). Examination of live capacity was conducted every day until fourth day, including: percentage of motility, live cell, abnormality and plasma membrane integrity. Fresh semen placed in glass bottle as control (K0). Results of this research indicated that motility and live cell of fresh spermatozoa after fourth days Kl (20.63% and 56.98%, respectively) were higher compared to control K0 (15.63% and 54.89%, respectively). Furthermore, percentage of abnormality and plasma membrane integrity after fourth days K0 (9.95% and 65.03%, respectively) was higher compared to Kl (9.18% and 61.49%, respectively). These result indicated that live capacity fresh spermatozoa of simmental cattle kept in straw at 5°C was better than that in glass bottle and can be used for insemination until on third day.

L70 VETERINARY SCIENCE AND HYGIENE – GENERAL ASPECTS

117 ARIYANTI, T.
Development enzyme linked immunosorbent assay for evaluating antibody response of egg yolk from chicken immunized with killed whole cell antigen of *Salmonella enteritidis* phage type 4. ***Pengembangan enzyme linked immunosorbent assay untuk evaluasi respon antibodi pada egg yolk dari ayam yang diimunisasi antigen sel utuh inaktif S. enteritidis phage type 4***/Ariyanti, T.; Supar; Djaenuri; Iskandar (Balai Penelitian Veteriner, Bogor (Indonesia)). [Proceedings of the national seminar on animal husbandry and veterinary technology], Bogor (Indonesia) 12-13 Sep 2005/Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat

Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 1056-1069, 6 ill., 2 tables; 20 ref. 636:338.439/SEM/p

CHICKENS; EGG YOLK; ELISA; ANTIBODIES; MASTIGOPHORA; SALMONELLA ENTERITIDIS; IMMUNOLOGICAL TECHNIQUES.

Salmonellosis is an important disease in poultry industries that may occur in the animal level at farms as well as in the laying eggs or egg product. *S. enteritidis* phage type 4 is one of the most important serotype causing disease in chicken which could spread vertically through the eggs as well as horizontally by direct contact. Detection of *S. enteritidis* phage type 4 infections or its antibodies in eggs are important and appropriate for reducing egg-borne disease transmission. At present, enzyme linked immunosorbent assay was developed to detect the presence of *S. enteritidis* phage type 4 antibody responses in egg derived from experimental chicken against somatic antigen (0), extracellular toxin and H:g,m flagella antigen. A group of 14 weeks old of layer chicken (group I) were immunized with killed whole cell antigen of *S. enteritidis* phage type 4 isolated from Sukabumi. A group of the same age of other chickens (group II) was left unimmunized used as control. Each of that group were divided into 3 subgroups designated as IA, IB, IC and IIA, IIB, IIC, respectively. Two weeks postboostered, subgroup IB and IIB were challenged with life homologous of *S. enteritidis* phage type 4 whereas subgroup IC and IIC were challenged 12 weeks postboostered, subgroup IA, IIA were left unchallenged. ELISA antigen of whole sonicated extract, heated whole sonicated extract, extracellular toxins and H:g,m flagella antigen were prepared from homologous *S. enteritidis* phage type 4 serotype. The enzyme substract reaction of the ELISA were determined by optical density reading (OD), then converted to ELISA unit based on the positive control. The somatic (0) antibody responses and antitoxin antibody responses were detected from egg yolk of chicken immunized with killed whole cell antigen. Anti H:g,m flagella antibody responses could be detected earlier at 14 days after immunization. From four types of the ELISAs developed, the H:g,m flagella antigen coating ELISA microplates demonstrated specific for detecting anti H:g,m flagella antibody responses from eggs yolk, whereas somatic (O) antigen coating ELISA microplates detected anti-somatic (O) antibody from eggs, produced from chicken injected with other Salmonella serotype of group D. From this study conduted, the use of H:g,m flagella for coating ELISA microplate could be used for differentiation Salmonellosis infection status due to the *S. enteritidis* or other group of D.

118 KAIIN, E.M.

Quality of sperm after sexing frozen in dynamic and static racks. *Kualitas sperma hasil pemisahan yang dibekukan menggunakan rak dinamis dan statis*/Kaiin, E.M.; Said, S.; Tappa, B. (Pusat Penelitian Bioteknologi LIPI, Bogor (Indonesia)); Ginting, S.S.; Djuarsawidjaja, M. [Proceedings of the national seminar on animal husbandry and veterinary technology. Book 1], Bogor (Indonesia) 12-13 Sep 2005/Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 105-111, 5 tables; 21 ref. 636:338.439/SEM/p

BULLS; SEMEN; FREEZING; QUALITY.

The aim of this study is to evaluate the quality of sperm after sexing and frozen in two different kinds of racks. Factorial randomized design (2x3) with five replications was used to evaluate the result. A male hungarian bull was used as sperm donor. Semen of the bull was collected using an artificial vagina (AV) and was evaluated macroscopically and microscopically. Separation of sperm was done using a column albumin methods, with 5% BSA for the upper fraction and 10% BSA for the lower fraction. Sperm after sexing was diluted using Tris buffer solution containing 20% egg yolk and 8% glycerol (v/v). Sperm after sexing in the 0.25 ml straw were frozen in 10 cm above liquid nitrogen using dynamic and static racks for 10 minutes. Thawing of straw was done in warm water (37°C) for 30 seconds. Higher percentage of sperm motility was seen at sperm frozen with dynamic racks, for control group (47 %) and separated spermatozoa (X=44.1% and Y=43.7%) than static racks (control = 39.9%; X=35.4% and Y=36.8%). The same result was seen also in percentage of live sperm (control = 51.2%; X = 40.9% and Y = 47.3%) for

dynamic racks, than static racks (control = 39.3%; X = 37.8% and Y = 42.7%). The abnormality of sperm was decreased (control = 13.2%; X = 13.2% and Y = 11%) in dynamic racks compared to the static racks (control = 15.8%; X = 15.3% and Y = 12%), respectively. It was concluded that dynamic racks used at freezing of spermatozoa increased the quality of frozen sperm after sexing.

L72 PESTS OF ANIMAL

119 BERIAJAYA.
Efficacy of pineapple leaf extract against gastrointestinal nematode infection on sheep in Stasiun Pembibitan Domba Nanggung Bogor. ***Efikasi serbuk daun nanas terhadap infeksi cacing saluran pencernaan pada domba di Stasiun Pembibitan Domba Nanggung Bogor***/Beriajaya; Handiwirawan, E. (Balai Penelitian Veteriner, Bogor (Indonesia)). [Proceedings of the national seminar on animal husbandry and veterinary technology], Bogor (Indonesia) 12-13 Sep 2005/Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 973-978, 2 tables; 25 ref. 636:338.439/SEM/p

SHEEP; NEMATODA; HELMINTHS; ANTHELMINTICS; INFECTION; PINEAPPLES; LEAVES; PLANT EXTRACTS; AGE; DOSAGE; DURATION; APPLICATION RATES.

Gastrointestinal nematodes are most found in grazing sheep. Regular treatments with anthelmintic lead to anthelmintic resistance and residue in tissue. One of alternative treatments in to use herbal medicine from extract of pineapple leaf (*Ananas comosus*). The purpose of this study is to determine the efficacy of pineapple leave extracts on sheep naturally infected with gastrointestinal nematodes. Slices of pineapple leaves were dried at room temperature and ground into powder. A number of 20 heads of sheep aged less than 2 years were randomly divided into 2 groups of 10 based on worm egg counts. Group I was given pineapple leaves extract orally at dose of 300 mg/kg body weight on day 0, while group II was untreated and served as control group. Collection of faecal samples were carried out on day 0, 3 and 10 on each sheep. Faecal samples were processed for egg counts. The results showed that the effect of pineapple leaves extract were seen on day 3 which mean of egg counts reduced 30.2% on treated group compared to control group. Based on this data it is recommended to further study with repeated treatments and increasing doses.

120 BERIAJAYA.
Efficacy of pineapple skin extract to control Haemonchus contortus on sheep. ***Efikasi cairan serbuk kulit buah nanas untuk pengendalian cacing Haemonchus contortus pada domba***/Beriajaya; Manurung, J.; Haryuningtyas, D. (Balai Penelitian Veteriner, Bogor (Indonesia)). [Proceedings of the national seminar on animal husbandry and veterinary technology], Bogor (Indonesia) 12-13 Sep 2005/Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 934-940, 3 ill., 22 ref. 636:338.439/SEM/p

SHEEP; HAEMONCHUS CONTORTUS; PINEAPPLES; PEEL; DIGESTIVES SYSTEM DISEASES; ANTHELMINTICS; OVA; LARVAE; EGG HATCHABILITY.
Gastro-intestinal nematodes found in sheep and goats are causing of economic loss due to retardation of growth rate and causing of death. Regular control with anthelmintic treatment is leading to development of resistance and residue in the tissue. Pineapple (*Ananas comosus*) is one of herbal medicine probably to be used as anthelmintic. The purpose of these studies was to determine the efficacy of the extract of pineapple skin against sheep experimentally infected only with *Haemonchus contortus*. A number of 25 male sheep aged 5-6 months was divided into 5 groups of 5 head. Groups 1, 2 and 3 were drenched with filtered fruit skin of pineapple 250 mg/kg, 750 mg/kg and 1250 mg/kg body weight on days 1, 3, 7, 10 and 14, respectively; meanwhile groups 4 and 5 as a group of untreated and treated with ivermectin at a dose

rate of 200 mcg/kg, respectively. Parameters measured were egg and larvae counts; and egg hatch. Faeces were collected individually on day 1, 3, 7, 10 and 14. The results indicated that even water extract of skin of pineapple 250 mg/kg did not eliminate eggs, however the egg and larvae counts did not increase and hatchability of egg was 1.3% inhibited as compared to the control group.

121 HARYUNINGTYAS S., D.

Polymerase chain reaction optimization on tubulin beta isotipe-1 gene *Haemonchus contortus* worm Indonesian isolate. *Optimasi polymerase chain reaction gen tubulin isotope-1 cacing Haemonchus contortus isolat lokal Indonesia*/Haryuningtyas, D. (Balai Penelitian Veteriner, Bogor (Indonesia)); Artama, W.T.; Asmara, W. [Proceedings of the national seminar on animal husbandry and veterinary technology], Bogor (Indonesia) 12-13 Sep 2005/Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 963-967, 2 ill., 1 table; 11 ref. 636:338.439/SEM/p

HAEMONCHUS CONTORTUS; POLYMERIZATION; ANTHELMINTICS; BENZIMIDAZOLES; GENES; ISOLATION TECHNIQUES.

Resistance to anthelminthic especially benzimidazoles groups on *Haemonchus contortus* is a serious problem which need to be controlled immediately. Study on *H. contortus* showed genetics mechanism to benzimidazoles resistantce related to changed on tubulin isotipe-1 gene. The aim of this research was to optimize tubulin isotipe-1 gene fragment. Seven *H. contortus* worms were isolated from four sheep from two government farms that resistant to benzimidazole which have been occurred (SPTD Trijaya, Kuningan, West Java and UPTD Pelayanan Kesehatan Hewan, Bantul, Yogyakarta) and one sheep that susceptible from Cicurug, Sukabumi, West Java. DNA was extracted from each worm and a fragment of central part isotype 1 tubulin gene was amplified using 2 pairs of primer Pn1, Pn2 and Phc1, Phc2, forward and reverse respectively. The results showed that the Pn1, Pn2 primer could not amplified tubulin isotipe-1 gene. PCR using Phcl and Phc2 amplified 520 bp fragment from that gene. PCR was performed for 36 cycles and the program were same to all isolates. The first denaturation step was at 95°C for 5 minutes (1 cycle) followed with 95°C denaturation for 2 minutes, hybridisation at 58°C for 40 second and extension 72°C for 1 minutes (36 cycle). The final extension was for 7 minutes at 72°C.

122 WARDHANA, A.H.

Larvacidal effect of water extract from *Annona squamosa* seed against *Chrysomya bezziana* larvae. *Efek larvasidal ekstrak air biji srikaya (Annona squamosa L.) terhadap larva lalat Chrysomya bezziana*/Wardhana, A.H.; Husein , A. (Balai Penelitian Veteriner, Bogor (Indonesia)). [Proceedings of the national seminar on animal husbandry and veterinary technology], Bogor (Indonesia) 12-13 Sep 2005/Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 1070-1077, 2 ill., 2 tables; 20 ref. 636:338.439/SEM/p

LIVESTOCK; PEST CONTROL; CHRYOSOMYA; ANNONA SQUAMOSA; MYIASIS; EXTRACTS; BOTANICAL INSECTICIDES; TOXINS; VERMICULITES; MORTALITY.

The use of synthetic insecticide for pest of livestock control raised negative impact in both environment and livestock production. *Annona squamosa* seed contain of both annonain and squamosin compounds and had an insecticide property. *Chrysomya bezziana* is fly causing myiasis and should be controlled. The aim of this study was to know larvacidal effect of water extract from *A. squamosa* seed against *C. bezziana* larvae. This study was divided into two stages e.g. digested and contacted property assays for both second (L2) and third (L3) instars larvae, respectively. A number of 750 (L2) and 750 (L3) of larvae were used in this study and divided into five treatments and five replications for each instars. The treatments were negative control (P0), 5% (PI), 10% (PII) and 20% (PIII) of water extracts. Asuntol

(0,05% coumaphos) was used as positive control (PIV). The water extract in certainly concentration was mixed to larval rearing media (LRM) for digested property assay and then reared until into pupae. The contacted property assay was tested by soaking the larvae to water extract for 10 seconds, then incubated in vermicullite and investigated both weight pupae and emerged rate into imago. The data was analyzed by ANOVA and continued by the smallest significantly different test (BNT 5%). The result showed that mortality of *C. bezziana* larvae were not significantly different between 5, 10 and 20% of water extract compared with 0.05% coumaphos on the first until third days (P>0.05). Mortality of *C. bezziana* was 95% after treated by 5% water extract in the first day and increasing up to 100% in the third day. All of L2 failed into pupae except control group (P0). Abnormal weight of pupae occurred at 20% of water extract for contacted property. It was not significantly different with 0.05% coumaphos (PIV) (P>0.05). Soaked L3 at 5% (PI), 10 % (PII) and 20% (PIII) of water extract was able to reduce the emerged rate of *C. bezziana* e.g. 18.1; 49,14, and 80.17% respectively.

123 YUNINGSIH.
Effectivity of *Croton tiglium* extra to golden snail (*Pomacea canaliculata*) as a botanical molusciside in order to subtitute the synthetic molusciside. *Efektivitas ekstrak biji tanaman kemalakian (Croton tiglium) terhadap keong mas (Pomacea canaliculata) sebagai moluskisida botani dalam upaya pengganti moluskisida sintetik*/Yuningsih; Damayanti, R.; Firmansyah , R. (Balai Penelitian Veteriner, Bogor (Indonesia)). [Proceedings of the national seminar on animal husbandry and veterinary technology], Bogor (Indonesia) 12-13 Sep 2005/Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 979-984, 2 tables; 8 ref. 636:338.439/SEM/p

POMACEA CANALICULATA; CROTON TIGLIUM; MOLLUSCICIDES; METALDEHYDE; BOTANICAL PESTICIDES; BLUMEA BALSAMIFERA; DERRIS; EUPHORBIACEAE; SEED EXTRACTION; CRUDE FAT; APPLICATION RATES; MORTALITY.

One of synthetic moluscicide consists of methaldehyde and tricalcium arsenate which is toxic to animals, especially cats and dog which consumed pelleted moluscicide. In order to substitute the synthetic moluscicide, this study used botanical moluscicide, *Croton tiglium*. The effectivity of the substance was tested to kill golden snail, *Pomacea canaliculata*. *Croton tiglium* was extracted with water and petroleum ether respectively. Ten groups of 10 snails were each treated with *Croton tiglium* extract diluted in water (0.01; 0.02; 0.03; 0.04 and 0.05%) and petroleum ether (0.01; 0.02; 0.03; 0.04 and 0.05%). The results showed that the lethal concentration (LC) 100 for water extract was 0.03% (death within 2-3 hours) and petroleum extract was 0.02% (death within less than 1 hour).

L73 ANIMAL DISEASES

124 ADJI, R.S.
Antibody titers description of vaccination in ruminant in Bogor Regency. *Gambaran titer antibodi pascavaksinasi antraks pada ternak ruminansia di Kabupaten Bogor*/Adji, R.S. (Balai Penelitian Veteriner, Bogor (Indonesia)). [Proceedings of the national seminar on animal husbandry and veterinary technology], Bogor (Indonesia) 12-13 Sep 2005/Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 985-988, 3 ill., 11 ref. 636:338.439/SEM/p

RUMINANTS; ANTHRAX; BACILLUS ANTHRACIS; ENDEMICS; LIVE VACCINES; IMMUNOENZYME TECHNIQUES; IMMUNE RESPONSE; JAVA.

Anthrax was a bacterial disease of herbivorous animals which able to attact all mamals including humans and some avian species. This disease is caused by *Bacillus anthracis* bacteria. Disease control in endemic areas has been done through vaccination program. Vaccination by using live spora vaccine can induced

humoral immune response (antibody anti-PA). Serological tests have been done by using enzyme linked immunosorbent assay (ELISA) technique to investigate antibody titers. As many as 291 serum samples resulted from ELISA tests in endemic areas showed that 196 serum samples were positives and 95 were negatives. Both success and effectiveness of anthrax vaccination in some endemic areas reached upto 65.9%.

125 ARTAMA, I K.

Prevalence infection of *Cryptosporidium parvum* on bali cattle in high and low land in Karangasem Regency Bali. *Prevalensi infeksi Cryptosporidium parvum pada sapi bali di dataran rendah dan dataran tinggi di Kabupaten Karangasem, Bali*/Artama, I K. (Institut Pertanian Bogor (Indonesia). Fakultas Kedokteran Hewan); Cahyaningsih, U.; Sudarnika, E. [Proceedings of the national seminar on animal husbandry and veterinary technology], Bogor (Indonesia) 12-13 Sep 2005/Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 926-933, 1 ill., 4 tables; 31 ref. 636:338.439/SEM/p

CATTLE; SPECIES; CRYPTOSPORIDIUM; INFECTION; LOWLAND; HIGHLANDS; MORBIDITY; PARASITES; BALI.

Prevalence research of cryptosporidiosis was important to be conducted, because *Cryptosporidium parvum* causes diarrhea in mammals, and as zoonotic disease for human. The aim of this research was to know the effects of high and low land of animal husbandry to the prevalence of cryptosporidiosis in bali cattle. The research of cryptosporidiosis for bali cattle was done in Karangasem Regency of Bali Island during January-April 2005. Locations of the research divided into two topographic areas, low and highland areas. There were 337 fecal samples collected with multistage random sampling. The water sample also collected from 8 rivers, as places for deeping their cattles. The fecal and water samples were examined in Protozoology Laboratory Faculty of Veterinary Medicine, Bogor Agriculture University for diagnosing the parasite using sugar flotation and identification was carried out under light microscope. The result of this research showed that prevalence of cryptosporidiosis in lowland was 28.74%, with the range between (28.71% - 28.78%); whereas in highland was 45.88% (45.81% - 45.99%). Crude prevalence (CP) was 37.39% (37.36% - 37.56%). Khi quadrate test indicated that there was association between cryptosporidiosis and land topography. RR analysis of highland to lowland was 1.67. The result of sample water examination were 100% positively contaminated by *Cryptosporidium parvum* parasites.

126 ELIESER, S.

Effect of monolaurin and other drug alternatives in fighting against scabies disease of goat. *Efektivitas pemberian monolaurin dan obat alternatif lainnya dalam memberantas penyakit scabies pada kambing*/Elieser, S.; Junjungan (Loka Penelitian Kambing Potong Sei Putih, Galang (Indonesia)); Manurung, J.; Suibu, T. [Proceedings of the national seminar on animal husbandry and veterinary technology], Bogor (Indonesia) 12-13 Sep 2005/Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 941-949, 3 ill., 4 tables; 7 ref. 636:338.439/SEM/p

GOATS; MANGE; DRUGS; APPLICATION RATES; PLANT EXTRACTS; SIDE EFFECTS; DISEASE CONTROL.

Research aimed at knowing effectiveness of using monolaurin and other drug alternatives in detaining scabies disease at goat have been executed at Research Station for Goat Farming, Sungei Putih. The research used 25 disease infection goats infected by scabies, divided into 5 groups treatment with 5 replications. Group T0 as control without drug treatment, Group T1 given monolaurin (Mo) 0.5 g/tail/day in concentrate, Group T2 given drug from sulphur (Klt) dissolved in water with comparison 1 g:25 ml

irrigate and sweeped at all body, Group T3 given drug from tobacco leaf extract (Edt) thinned with water 1:10 sweeped at all body and Group T4 given drug from plant leaf extract (Etb) thinned with water 1:10 sweeped at entire/all body. The result showed that attacked area was natural scabies with the highest degradation at treatment T4 (early 1219 mm become 828 mm), followed by T3 (early = 1282 mm become 897 mm); T1 (early = 980 mm become 830 mm), while T0 and T2 were improving (early = 784 mm become 2240 mm and early = 1045 mm become 4135 mm). Obstetrical of eosinofil at blood showed significantly different of each treatment. Eosinofil content was the highest in blood compared to before drug treatment (early research) obtained at treatment T2 which was increased (280.55 micro liter); treatment T3 increased (180.55 micro liter), treatment T1 increased (161.15 micro liter); treatment T0 increased (27.77 micro liter) and treatment T4 increased (24.92 micro liter), and neutrophyl in blood at treatment T3 (8%); treatment T1 (7.75%); treatment T4 (5.25%); treatment T2 (4.25%) were increasing; and treatment T0 decreasing (-0,5%). Lympocyte content in blood at treatment T1 (3%); treatment T3 (2.25%); treatment T4 (1,5%) were increasing; treatment T0 and treatment T2 decreasing -1,25% and -6,75% respectively. Monocyte content in blood at treatment of treatment were T3 (1.25%); treatment T4 (0.75%); treatment T1 (0.5%); treatment T0 (0,25%); while treatment T2 was decreasing - 0.25%. The result concluded that application of tobacco leaf extract and plant leaf extract was potential in fight against scabies disease of goat.

127 MUHARSINI, S.

In vitro trial of local isolates of *Bacillus thuringiensis* which contain cry gene against *Chrysomya bezziana*. *Uji efikasi isolat lokal Bacillus thuringiensis yang mempunyai gen cry terhadap lalat Chrysomya bezziana secara in vitro*/Muharsini, S.; Wardhana, A.H. (Balai Penelitian Veteriner, Bogor (Indonesia)). [Proceedings of the national seminar on animal husbandry and veterinary technology], Bogor (Indonesia) 12-13 Sep 2005/Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 1131-1136, 1 table; 21 ref. 636:338.439/SEM/p

BACILLUS THURINGIENSIS; IN VITRO EXPERIMENTATION; BIOLOGICAL CONTROL; CHRYSOMYA; BACTERIAL TOXINS; ISOLATION.

Bacillus thuringiensis is a species of bacteria which produce toxic crystal protein and has potential use for biological control of parasite. The aim of the study was to test *in vitro* of isolates collected from West Java, Yogyakarta and South Sulawesi for control of myiasis fly, *Chrysomya bezziana*. Eighty three isolates have been tested *in vitro*. The results showed that seven isolates (14, 108.3, 177.42, 31R, 31S, 104.3A and 104.4B) have high toxicity, while ten isolates (31B, 31L, 31M, 31N, 310, 31Q, 31T, 103.3A, 187.33 and 227.41) have moderate toxicity and 66 isolates have no toxicity. Those pathogen and moderate isolates were collected from Bogor, Sukabumi, Majalengka, Sidedeng Rappang and Yogyakarta. However, more screening are needed to choose the most pathogen isolate for *in vivo* trial. *In vivo* trial is needed for further experiment.

128 SUSETYA, H.

Genetic analysis of glycoprotein gene of Indonesian rabies isolate. *Analisis genetik gen penyandi glikoprotein dari virus rabies isolat Indonesia*/Susetya, H. (Universitas Gadjah, Yogyakarta (Indonesia). Fakultas Kedokteran Hewan). [Proceedings of the national seminar on animal husbandry and veterinary technology], Bogor (Indonesia) 12-13 Sep 2005/Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 1137-1142, 2 ill., 10 ref. 636:338.439/SEM/p

RABIES; GLYCOPROTEINS; AMINO ACIDS; ISOLATION; VIRUSES; PHYLOGENY; NUCLEOTIDE SEQUENCE; INDONESIA.

The amino acid sequence of the glycoprotein gene of field rabies virus isolate SNO1-23 from West Sumatra, Indonesia was determined. This isolate showed high deduced amino acid homology of 92-93% in the ectodomain of the G protein to that of the RC-HL strain, which is used for production of animal vaccine in Japan and Thailand isolates. Results of phylogenetic analysis using the nucleotide sequences of the G genes of rabies street viruses showed that SN01-23 from Indonesia is more closely related to a rabies virus from China than to viruses from Thailand and Malaysia.

129 WAHYUWARDANI, S.

Immunosuppresive effect of local reovirus isolate infection in broiler chicken. ***Efek imunosupresif infeksi reovirus isolat lokal pada ayam pedaging***/Wahyuwardani, S.; Huminto, H.; Parede, L. (Balai Penelitian Veteriner, Bogor (Indonesia)). [Proceedings of the national seminar on animal husbandry and veterinary technology], Bogor (Indonesia) 12-13 Sep 2005/Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 1049-1055, 6 tables; 11 ref. 636:338.439/SEM/p

BROILER CHICKENS; IMMUNOSUPPRESSION; REOVIRIDAE; ISOLATION TECHNIQUES.

Local reoviral isolate was essayed to show its immunosuppresive effect on broiler chicken. Batch of 80 DOC were divided into 4 groups: reoviral infected, reoviral infected and NDV vaccinated, NDV vaccinated, and non treated control. On day 1, two groups of chicken were infected orally with 2 x 10^3 reoviral particles. To stimulate the immune responses, at day 4, two groups of chickens were vaccinated by eye drops with La sota strain of NDV. The result of NDV titer on reoviral infected groups examined at 3 consecutive weeks postvaccination were lower compare to non reoviral infected and statistically, significant different was occurred at 2 and 3 weeks post vaccination. On comparing the weight of bursa fabricii, as presented by their bursal indexes, the reoviral infected groups were significantly lower than non infected, starting from week 2 to week 4 after infection. The pathology result clarified the occurrence of bursal athropy and follicular lymphoid cells depletion due to cytolysis. Most of the spleen of reoviral infected groups were hyperthrophy and had indexes of significantly higher than non infected groups. The local reoviral isolate infection has immunosuppresive effect on broiler immune system.

N10 AGRICULTURAL STRUCTURES

130 PARAMAWATI, R.

Design and testing of screw-horizontal type fruit juicer. ***Rekayasa dan pengujian mesin pemeras buah-buahan tipe ulir-horisontal***/Paramawati, R.; Mardison (Balai Besar Pengembangan Mekanisasi Pertanian, Serpong (Indonesia)). *Jurnal Enjiniring Pertanian* ISSN 1693-2900 (2005) v. 3(1) p. 33-40, 4 ill., 2 ref.

FRUIT JUICES; POSTHARVEST EQUIPMENT; MANGOSTEEN; TROPICAL FRUITS; DESIGN; TESTING.

Fruit is one of rich-nutrition source, especially in vitamin and fiber, which are important for human health. The weaknesses of fruit is perishable character and short shelflife, as consequences they have limited market. The main problem usually found in fruit production centers are low prices during harvesting time and high amount of fruit losses because of limited market. To solve the problem, the processing fruits into processed food, such as fruit juice is strongly needed. The objective of this research was to construct juicer. The method consisted of technical analysis, design and manufactured and technical testing. Functional tested with mangosteen, guava and starfruit showed that this machine has running successfully. This research noted that the yield of juicer machine during testing were 53.57% for mangosteen, 71.60% for guava and 48.00% for star fruit, with real capacity about 217, 225 and 201 kg/hour, respectively.

Subjective test exhibited a specific aroma and taste as same as original fresh fruit. Mangosteen, guava and starfruit produced juice with viscosity value of 0.68, 0.77 and 0.06 mPa, and total soluble solid (TSS) 0.68, 0.77 and 9°Brix, respectively.

N20 AGRICULTURAL MACHINERY AND EQUIPMENT

131 HARSONO.
Design of planning modelling for maize processing unit. ***Rekayasa model perencanaan unit prosessing jagung***/Harsono; Triwahyudi, S.; Gultom, R.Y.; Supriyanto(Balai Besar Pengembangan Mekanisasi Pertanian, Serpong (Indonesia)). Marhaen, B. *Jurnal Enjiniring Pertanian* ISSN 1693-2900 (2005) v. 3(1) p. 13-18, 5 ill., 8 ref.

MAIZE; POSTHARVEST EQUIPMENT; PROCESSING; DESIGN; PLANNING; MODELS.

The lack of maize production number compare to national consumption is still an important problem for Indonesian government. During 2001-2004 national consumption of maize has reached to be 11-12 million tones per year. In contrast national production noted about 9.2 million tones that makes Indonesia still depend on maize international market. In addition, imported maize for feed and food industries is also consider to the low quality of local maize. To improve maize local quality as well as to increase added value, series of appropriate processing machineries should be applied. Developing maize pilot plant model based on smallholder farming which highly expected would improve maize postharvest handling, increase quality, and value added. The model of maize processing plant can be used for decision maker as well as investors as guidance to build maize processing unit.

132 WIDYOTOMO, S.
Performance of rotary cutter type breaking machine for breaking and deshelling cocoa roasted beans. ***Kinerja mesin pemecah biji dan pemisah kulit kakao pascasangrai tipe pisau putar***/Widyotomo, S.; Mulato, S.; Suharyanto, E. (Pusat Penelitian Kopi dan Kakao Indonesia, Jember (Indonesia)). *Pelita Perkebunan* ISSN 0215-0212 (2005) v. 21(3) p. 184-199, 7 ill., 3 tables; 6 ref.

COCOA BEANS; POSTHARVEST EQUIPMENT; SEPARATORS; EQUIPMENT PERFORMANCE; EQUIPMENT CHARACTERISTICS.

Conversion of cocoa beans to chocolate product is, therefore, one of promising alternatives to increase the value added of dried cocoa beans. On the other hand, the development of chocolate industry requires an appropriate technology that is not available yet for small or medium scale of business. Breaking and deshelling cocoa roasted beans is one important steps in cocoa processing to ascertain good chocolate quality. The aim of this research is to study performance of rotary cutter type breaking machine for breaking and deselling cocoa roasted beans. Indonesian Coffee and Cocoa Research Institute has designed and tested a rotary cutter type breaking machine for breaking and deshelling cocoa roasted beans. Breaker unit has rotated by 1/2 HP power, single phase, 110/220 V and 1440 rpm. Transmission system used for rotating breaker unit is pulley and single V belt. Centrifugal blower as separator unit between cotyledon and shell has specification 0.5 m^3/minute air flow, 780 Pa, 370 W and 220 V. Field tests showed that the optimum capacity of the machine was 268 kg/h with 500 rpm speed of rotary cutter, 2.8 m/s separator air flow, and power requirement was 833 W. Percentage product in outlet 1 and 2 were 94.5% and 5.5%. Particle distribution from outlet 1 was 92% as cotyledon, 8% as shell in cotyledon and on outlet 2 was 97% as shell, 3% as cotyledon in shell.

P10 WATER RESOURCES AND MANAGEMENT

133 SITOMPUL, S.M.
Evaluation and parameterization of rains model on Konto watershed: water absorption of mahogani agroforestry system (*Swietenia mahogani* L.) with maize and soybean. *Evaluasi dan parameterisasi model rains pada DAS Konto resapan air sistem agroforestri mahoni (Swietenia mahogani* L.*) dengan jagung dan kedelai*/Sitompul, S.M. (Universitas Brawijaya, Malang (Indonesia). Fakultas Pertanian); Alamsyah, J.H.; Pasaribu, M.R.U.; Budiastuti, M.S. *Agrivita* ISSN 0126-0537 (2006) v. 28(1) p. 64-78, 9 ill., 4 tables; 20 ref.

GLYCINE MAX; ZEA MAYS; SWIETENIA; AGROFORESTRY; HYDROLOGY; ABSORPTION; RUNOFF.

The present study is part of a long-term research to develop a hydrological model of Brantas Watershed in East Java for the study and simulation of rain absorption in natural systems (RAINS). This study was executed in the form of a field experiment at the production forest of 10 years old-mahogani (Mahoni) with a soil texture of loamy sand at Gombong, Ngantang, Malang under Konto watershed with a soil texture of loamy sand. The main objective was to examine and to obtain parameter values of RAINS model for the land cover of mahogani monoculture at steep slopes (> 15%). Other land covers involved in the study were mahogani+soybean and mahogani+maize at the slope of less than 10%, > 10% - < 15% and > 15%. The measurement of infiltration with an infiltrometer was also conducted to obtain the coefficient of potential water absorption (Zref). The results showed that water absorption rates varied considerably between rainfall events (3-99% of rainfall intensity). The rate of water absorption could be maintained with the application of agroforestry system of mahoni+soybean or mahoni+maize particularly on sloping lands. Rainfall was the main factor determining water absorption in the plots under study which increased with an increase in rainfall intensity. The RAINS model with a constant value of $(1-\lambda) = 0.8$ was able to describe the absorption of water in mahogani systems under study. The Z value of RAINS model was 36.9 cm/m for the mahogani monoculture, and varied between 33,1-36,4 cm/m for the agroforestry systems. A good relationship was obtained between Zref, calculated from infiltration data, and Z/Zref, called land cover index (0), which suggests that Z values are likely generated from infiltration data.

P33 SOIL CHEMISTRY AND PHYSICS

134 SUPIT, J.M.J.
Analysis and mapping of soil nutrient in the municipal of Bolaang Mongondow. *Analisis dan pemetaan unsur hara tanah di Kabupaten Bolaang Mongondow*/Supit, J.M.J. (Universitas Sam Ratulangi, Manado (Indonesia). Fakultas Pertanian). *Agrivita* ISSN 0126-0537 (2006) v. 28(2) p. 177-184, 11 tables; 13 ref.

SULAWESI; SOIL ANALYSIS; CARTOGRAPHY; SOIL FERTILITY; SOIL SURVEYS; LAND USE; PRODUCTIVITY; AGRICULTURAL DEVELOPMENT.

The activity of survey were carried out to obtain data and mapping of information of land resources characteristics which is required for analysis and soil nutrient used for planning and improvement of agricultural productivity at the municipal of Bolaang Mongondow. The objective of the research was to identify, inventory, analysis and evaluation of soil nutrient for the plant productivity on the soil mapping scale 1 : 350000. The result showed that described research area in region of Bolaang Mongondow had the good soil fertility status, because the content of N, P and K were high, but at the District of Lolak and Bolaang potassium fertilizers application was required because soil K nutrient was low.

P34 SOIL BIOLOGY

135 ANWAR, E.K.
Use of earthworm *Pheretima hupiensis* to increase the yield of corn. *Pemanfaatan cacing tanah Pheretima hupiensis untuk meningkatkan produksi tanaman jagung*/Anwar, E.K.; Prastowo K. (Balai Penelitian Tanah, Bogor (Indonesia)); Subowo. *Jurnal Penelitian Pertanian* ISSN 0152-1197 (2006) v. 25(1) p. 42-51, 1 ill., 4 tables; 14 ref.

ZEA MAYS; OLIGOCHAETA; SOIL ORGANISMS; SOIL FERTILITY; SOIL IMPROVEMENT; LAND PRODUCTIVITY; SOIL ORGANIC MATTER; PRODUCTION INCREASE; SOIL CHEMICOPHYSICAL PROPERTIES.

Upland area in wet tropical region generally has a compacted subsurface horizon in soil, low nutrient and organic matter content, hence the population of the detritivorous organism (fauna) is low. The burrower soil fauna such as earthworm will prevent soil compaction, and by the cast will increase soil nutrient content and the placement of nutrient in the rhizosphere area. Therefore, the potential use of earthworm as biological agent to increase soil fertility and sustain land productivity need to be examined. The purpose of the study was to find out the amelioration technology of organic matter and endogaesic earthworm to increase corn yield. The result showed that the earthworm inoculation with organic matter 5 t/ha increased corn grain yield and biomass compared to that of without earthworm inoculation. The 10 cm depth organic matter application increased yield from 3.95 t/ha to 5.58 t/ha and the biomass increased from 12.58 t/ha to 14.18 t/ha. The 20 cm depth of organic matter application increased yield from 4.99 t/ha to 5.42 t/ha and biomass increased from 13.25 t/ha to 15.45 t/ha. Besides, the earthworm inoculation increased soil P availability, soil total cation, and C/N. Regarding soil physical properties, total soil pores, drainage pores, and soil permeability were increased, while the soil bulk density was decreased.

136 ROHYADI, A.
Arbuscular mycorrhizal fungi developing soybean tolerance to the dryness on Vertisol soil, Lombok (Indonesia). *Jamur mikoriza arbuskular meningkatkan toleransi tanaman kedelai terhadap kekeringan di tanah Vertisol Lombok*/Rohyadi, A.; Nasrul; Rachim, M.A. (Universitas Mataram (Indonesia). Fakultas Pertanian). *Agrivita* ISSN 0126-0537 (2006) v. 28(1) p. 8-16, 3 ill., 2 tables; 21 ref.

GLYCINE MAX; VESICULAR ARBUSCULAR MYCORRHIZAE; INOCULATION; DROUGHT RESISTANCE; VERTISOLS; PLANT RESPONSE; NUSA TENGGARA.

Arbuscular mycorrhizal fungi increased the tolerance of soybean to water stress on Lombok Vertisol soils. The role of arbuscular mycorrhizal fungi in improving the drought resistance of soybean was assessed by carrying out an experiment under glasshouse conditions. Seeds were grown singly in a pot containing 3 kg sterilized Vertisol soil samples inoculated with and without mycorrhizal inoculums. During the experiment soil moisture content in pots was maintained at 0.24, 0.31, 0.38 or 0.45 g/g soil respectively. Root length and colonization by mycorrhiza, plant dry weight and shoot P content were measured 6 weeks after planting. Growth of plants was very poor at the lowest moisture content tested of 0.24 g/g soil, and the growth could be increased either by increasing moisture content or primarily by inoculating with mycorrhizal fungi. Stimulation effects of mycorrhiza were higher than of changes in soil moisture. Growth response of plants to mycorrhiza increased with decreasing soil moisture. This indicates that mycorrhiza is able to promote soybean plants to be more resistant to water stress in the soil.

Q02 FOOD PROCESSING AND PRESERVATION

137 SUHIRMAN, S.
The effect of tannin remover from the kinds of nutmeg on nutmeg juice. ***Pengaruh penghilang tanin dari jenis pala terhadap sari buah pala***/Suhirman, S.; Hadad E.A. (Balai Penelitian Tanaman Obat dan Aromatik, Bogor (Indonesia)); Lince. *Buletin Penelitian Tanaman Rempah dan Obat* ISSN 0215-0824 (2006) v. 17(1) p. 39-51, 6 ill., 6 tables; 8 ref.

NUTMEGS; FRUIT JUICES; TANNINS; CHEMICOPHYSICAL PROPERTIES.

Having special flavor, the flesh of nutmeg is potensial to be processed into juice product. However, harsh flavor and bitter aftertaste in this fruit influences the taste of nutmeg juice. Nutmeg juice would be better when composition of acid, sugar, vitamin, and other phenolic materials could be arranged. Nutmeg juice contained flavor and its fruit characteristic colour with pH 4.00 - 4.50 (materials of acid food). The objective of the research was to improve the taste of nutmeg juice by reducing harsh flavor using tannin removing agents, formulation improvement and selection of nutmeg kinds. The experiment was arranged in a completely randomized design with two replications. Research were conducted in six stages, i.e. covered determination of treatment for harsh reduction, ratio determination between nutmeg flesh, water and percentage of sugar, duration of blanching process, optimation based on combination of the result of the first and third stages, determination of nutmeg species to be processed into nutmeg juice, and organoleptic test by 30 panelist. The result showed that the usage of albumin 1% in nutmeg juice was more preferred and could reduce harsh flavor and declined content of 3,544.06 mg per 100 g material, while $CaCl_3$ solution 2.00% for 12 hours could reduce tannin to be 4,271.22 mg per 100 g material. The result of organoleptic test showed that the taste of nutmeg juice could be enhanced using best formulation in every stage i.e. albumin 1.00%. Without blanching, ratio nutmeg flesh and water 1:4, 25% sugar, the use of Patani nutmeg, Banda nutmeg and Irian nutmeg was more preferred by panelist.

Q03 FOOD CONTAMINATION AND TOXICOLOGY

138 ARIFIN, Z.
Formalin detection of broiler chickens from the market. ***Deteksi formalin dalam ayam broiler di pasaran***/Arifin, Z.; Murdiati, T.B.; Firmansyah, R. (Balai Penelitian Veteriner, Bogor (Indonesia)). [Proceedings of the national seminar on animal husbandry and veterinary technology], Bogor (Indonesia) 12-13 Sep 2005/Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 1036-1040, 1 ill., 3 tables; 13 ref. 636:338.439/SEM/p

BROILER CHICKENS; CHICKEN MEAT; FORMALDEHYDE; DATA ANALYSIS; MEASURING INSTRUMENTS; MARKETS; SUPERMARKETS.

Formalin is a commercial name of formaldehyde solution 35-40% solution in water. Formalin is classified as strong disinfectant, also used as cadaverous convervacy and has been used as food preservative although formalin is not permitted used as food preservative or food additive, since formalin is toxic for human consumption. A study was conducted to develop method to detect formalin contaminant in chicken meat by distillation followed by detection with spectrophotometer at 415 nm. The study suggested that the method was able to detect formalin in chicken with limit detection of 0.25 ppm. Recovery study showed 99.46 ± 1.72%, and standard curve gave R value 0.9962. Formalin in sampels of 46 chickens were collected from traditional market and supermarket in Tangerang, Sukabumi, Cianjur, and Bogor was not detected in all samples collected. Formalin was detected in all sampels collected from South Jakarta, with concentration range from 0.08-0.12 ppm.

139 HARSOJO.
Decontamination of some phatogenic bacterials on goat meat and bowel by gamma irradiation. ***Dekontaminasi bakteri patogen pada daging dan jeroan kambing dengan iradiasi gamma***/Harsojo; Andini, L. (Pusat Penelitian dan Pengembangan Teknologi Isotop dan Radiasi, Jakarta (Indonesia)); Trimey T., N.R. [Proceedings of the national seminar on animal husbandry and veterinary technology], Bogor (Indonesia) 12-13 Sep 2005/Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 1027-1031, 4 tables; 17 ref. 636:338.439/SEM/p

GOATS; MEAT; BACTERIA; PATHOGENS; SALMONELLA; IRRADIATION; RADIOACTIVE DECONTAMINATION.

Goat meat and bowel are consumed a lot by Indonesians to make roast goat meat or curry soup. Animal derived product like the others meat is the best media for the growing of microorganims/bacteria. Some methods were also done to preserve meat. An experiment has conducted to study the effect of irradiation on pathogenic bacteria which inoculated at goat meat and bowel. Some pathogenic bacteria such as *Salmonella agona*, *Salmonella kentucky* and *Staphylococcus aureus* were inoculated on the goat meat and bowel, respectively. The measured parameter was the amount of colonies which still survive after irradiation at 0; 0.5; 1.0; 1.5; 2.0; 2.5 and 3.0 kGy. The irradiaton was done at a multipurpose panoramic batch irradiator (PANBIT) with the dose rate of 2.657 kGy/h. Results showed that Salmonella was more radioresistant compared to *S. aureus*. The D10 value of *S. agona* for goat meat and bowel were 0.31 and 0.65 kGy, while D10 value of *S. kentucky* were 0.68 and 0.79 kGy. On the otherhand, D10 value of *S. aureus* were 0.58 and 0.64 kGy.

140 INDRANINGSIH.
Pesticide residues in milk and animal feeds in some areas of Java. ***Residu pestisida dalam susu segar dan pakan dari beberapa daerah di Jawa***/Indraningsih; Sani, Y. (Balai Penelitian Veteriner, Bogor (Indonesia)). [Proceedings of the national seminar on animal husbandry and veterinary technology], Bogor (Indonesia) 12-13 Sep 2005/Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 956-962, 2 ill., 2 tables; 21 ref. 636:338.439/SEM/p

MILK; PESTICIDES; RESIDUES; FEEDS; CONTAMINATION; ORGANOCHLORINE COMPOUNDS; PHOSPHATES; JAVA.

Analysis of pesticide residues had been undertaken in milk and animal feeds collected from some places of West Java (Bogor, Lembang and Pangalengan), Central Java (Solo) and East Java (Nongkojajar and Ngantang). The purposes of this study were to investigate the status of pesticide residues in milk and animal feeds and a source of contamination in milk. The samples were extracted with organic solvents and detected by gas chromatography. The results showed that both groups of pesticides (organochlorines/OCs and organophosphates/OPs) were detected in milk of the three provinces. Milk of Central Java has the highest level of total pesticide residues (13.15 ppb) compares to West Java (11.15 ppb) and East Java (1.06 ppb). The OP residues in milk were higher than OC in Central Java (10.65 ppb vs 2.5 ppb) and West Java (5.93 ppb vs 5.22 ppb), but not detected in East Java. Similar situation was also noted in animal feeds to which the total pesticide residues were 186.25 ppb (Central Java), 134.57 ppb (West Java) and 54.82 ppb (East Java) subsequently. The OP residues in feeds were higher than OC in all provinces as shown in West Java (129.18 ppb vs 5.39 ppb), Central Java (97.86 ppb vs 88.39 ppb) and East Java (52.72 ppb vs 2.1 ppb). The OCs were still higher in animal feeds of Central Java at the level of 88.39 ppb. It appeared that there was a correlation between contamination of animal feeds and the occurence of pesticide residues in milk. Pesticide contaminated feed has an important role as source of contamination sources for milk.

141 MISGIYARTA.
Concentrations of antibiotic residues in fresh milk. ***Status tingkat residu antibiotik pada susu segar***/Misgiyarta; Roswita S.; Munarso, S.J.; Abubakar; Usmiati, S. (Balai Besar Penelitian dan Pengembangan Pascapanen Pertanian, Bogor (Indonesia)). [Proceedings of the national seminar on animal husbandry and veterinary technology. Book 1], Bogor (Indonesia) 12-13 Sep 2005/Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 206-214, 6 tables; 12 ref. 636:338.439/SEM/p

COW MILK; ANTIBIOTICS; RESIDUES; QUALITY.

Milk is an important livestock product commodity as a very good source of nutrition produced by dairy cattle at dairy farms centers. Relatively few number of cattle owned, rearing method and inadequate postharvest handling result in low quality milk. Low quality milk causes farmers having very weak bargaining position to obtain high fresh milk price. The improvement of milk quality is crucial to be carried out, which eventually will increase the income of dairy cattle farmers. Before conducting the efforts on improving the milk quality, it is necessary to find out the initial milk quality. The milk processing industries start implementing the requirements concerning the price in accepting fresh milk including the present of antibiotic contaminants. Researches to find out the milk quality were conducted at KSU Tandang Sari, Tanjung Sari, Sumedang, and KUD Sarwamukti, Lembang, West Java. The contaminants observed were antibiotic residues including penicillin, oxytetracycline, tetracycline, and chlortetracycline. The milk residue concentrations measured were at the level of farmers, collectors, and cooperative bodies. The concentrations of residues were analyzed by using high pressure liquid chromatography (HPLC) method. The antibiotic concentrations in fresh milk from KSU Tandang Sari and KUD Sarwamukti areas varied. The antibiotic residue concentrations in ppm at the farmer levels are penicillin 0.0023, tetracycline 0.0002, oxytetracycline 0.0002, and chlortetracycline 0.0055. At the level of collectors, the antibiotic residue concentrations in ppm are penicillin 0.0008, tetracycline 0.0002, oxytetracycline 0.0002, and chlortetracycline 0.0037. The antibiotic residue concentrations in ppm at the level of cooperative body are: penicillin undetected, tetracycline undetected, oxytetracycline undetected, and chlortetracycline 0.02. The Indonesian National Standard (Standar Nasional Indonesia (SNI)) 01-6366-2000 allows a maximum limit for antibiotic in fresh milk amounted (ppm); penicillin 0.1, tetracycline 0.05, oxytetracycline 0.05, and chlortetracycline 0.05. The concentrations of antibiotic residues in fresh milk are still safe as they are still below the maximum antibiotic limit recommended by SNI 01-6366-2000.

142 RACHMAWATI, S.
ELISA kit (Aflavet) for detecting aflatoxin in agricultural product. ***Kit ELISA (Aflavet) untuk deteksi aflatoksin pada produk pertanian***/Rachmawati, S. (Balai Penelitian Veteriner, Bogor (Indonesia)). [Proceedings of the national seminar on animal husbandry and veterinary technology], Bogor (Indonesia) 12-13 Sep 2005/Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 1105-1110, 2 ill., 1 table; 36 ref. 636:338.439/SEM/p

FOODS; FEEDS; GROUNDNUTS; MAIZE; CONTAMINATION; AFLATOXINS; ELISA; CHEMILUMINESCENCE; METHOD; QUALITY CONTROLS.

Aflatoxin is a carcinogenic toxic compound which is dangerous for animal and human health. Research Institute for Veterinary Bogor has been developed an ELISA method for AFB1 analysis named Af1avet, which has been validated with an accurate and consistent results compared to standard method of chromatography. In this paper the use of the ELISA kit was applied for AFB1 analysis in peanut, corn as a feed ingredient and poultry feed. Twenty of peanut samples including peanut butter, 12 corn samples and 20 of feed samples were collected from tradisional market, supermarket and poultry shops around Bogor. Samples were grounded, extracted with 60% methanol, centrifuged, and the supernatant were taken for

analysis. Result of analysis indicated that 6 of 20 samples of peanut contained quite high AFB1, exceeding the maximum limit determined by FDA which is 20 ng/g. Five of these peanut samples contained AFB1 more than three times of maximum limit (>60 ng/g), 1 peanut sample contained AFB1 25.5 ng/g and another 14 samples contained AFB1 in the range of 0.9-15.3 ng/g. Corn and feed samples contained quite low AFB1 which the value of AFB1 below the standard determined by SNI (<50 ng/g). The AFB1 content in corn was in the range of 5.1-36.9 ng/g whereas AFB1 content in feed samples were in the range of not detected (<0.3 ng/g) to 23.9 ng/g. ELISA kit (Af1avet) can be applied to detect the AFB1 content in samples with quick, accurate and sensitive results (detection limit of 0.3 ng/g), relatively cheap analysis with simple extraction procedure. It is hope that with this rapid assay technology available in the market, quality control of AFB1 in food and feed can be controlled easily, hence the food and feed are safe for human and animal consumptions.

143 RUSDI, U.D.

Effect of wood extract of secang to preservation of groundnut cake. ***Efek ekstrak kayu secang (Caesalpinia sappan L.) terhadap daya simpan bungkil kacang tanah***/Rusdi, U.D.; Hidayati, Y.A. (Universitas Padjadjaran, Bandung (Indonesia). Fakultas Peternakan); Widowati, W. *Bionatura* ISSN 1411-0903 (2005) v. 7(2) p. 165-178, 3 tables; 23 ref.

GROUNDNUT MEAL; PRESERVATION; CAESALPINIA; EXTRACTS.

This research aimed to find out the effect of wood extract of secang (EKS) to preservation of groundnut cake, which showed by total mushroom colony, sour number and number of iodine. Research was conducted experimentally by using completely randomized design of factorial 7 x 5 with replicated three times. The measured data were total mushroom colony, sour number and number of iodine. Result indicated that treatment of EKS effectively delayed mushroom colony and sour number increase and delay degradation of iodine number at groundnut cake. EKS as preservative was better than treatment of butylated hydroxytoluene (BHT) 0.1% and also natrium benzoate (NB) 0.1%.

144 YUNINGSIH.

Status of tylosin antibiotic residue in chicken meat samples from Sukabumi, Bogor and Tangerang. ***Keberadaan residu antibiotika tilosin (golongan makrolida) dalam daging ayam asal daerah Sukabumi, Bogor dan Tangerang***/Yuningsih; Murdiati, T.B.; Juariah, S. (Balai Penelitian Veteriner, Bogor (Indonesia)). [Proceedings of the national seminar on animal husbandry and veterinary technology], Bogor (Indonesia) 12-13 Sep 2005/Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 921-925, 3 tables; 10 ref. 636:338.439/SEM/p

CHICKEN MEAT; TYLOSIN; RESIDUES; FEED ADDITIVES; ORGANOLEPTIC ANALYSIS; JAVA.

Tylosin (macrolide antibiotics) is commonly used in feed additives beside in treatment. Improper used of tylosin can cause residue, resistance and allergic reactions. In order to find out the extend of the residue content, so an improved method has been developed for determination of tylosin in tissue. The tissue were extracted with acetonitrile and isoctane and its filtrate was applied to SPE cartriddge (C-18), then were eluted with methanolic ammonium 0.1 M and detected by high pressure liquid chromatography (HPLC) with UV detection at 287 nm, C-18 Bondapak column, mobile phase: 0.05 M $NaHPO_4$; CH_3CN = 65:35, pH 2.5. The validation improved method were repeatability precision (5 replicate standards at 1 concentration) calibration and linearity (replicate standards at 5 concentration) and recovery (replicate spike samples with 3 concentration of standards). This method applied to 36 tissue samples from Sukabumi, Tangerang and Bogor. The results of validation method were relative standard deviation: 5.23%, linearity (correlation coeficient): 0.9975 and mean of recovery 101.91, 86.66 and 94.74%. The validation result of improved method is quite significant 15 of 36 samples were positive tylosin, containing 0.0006-0.0845 mg/g which below the maximum residue limits (MRL tylosin in tisue 0.1 mg/g).

Q04 FOOD COMPOSITION

145 ABUBAKAR.
Quality of caramel milk of broken milk during storage. ***Mutu susu karamel asal susu pecah selama penyimpanan***/Abubakar (Balai Besar Penelitian dan Pengembangan Pascapanen Pertanian, Bogor (Indonesia)); Ilyas, M. [Proceedings of the national seminar on animal husbandry and veterinary technology. Book 1], Bogor (Indonesia) 12-13 Sep 2005/Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor: Puslitbangnak, 2005: p. 350-357, 4 ill., 4 tables; 17 ref. 636:338.439/SEM/p

COW MILK; CARAMEL; MILK PRODUCTS; QUALITY; STORAGE; ORGANOLEPTIC ANALYSIS.

Broken milk has not been utilized for food, even most people just throw away. Therefore this study was done in attempt to find effort in utilizing broken milk. In this study milk caramel was made and then studied its quality during storage. This study was done based on factorial completely randomized design with three factors and three time repetitions. The factors were: A (two milk conditions: fresh and broken), B (wrapping and no wrapping used), C (five storage times: 0, 2, 4, 6 and 8 weeks). The quality of milk caramel was observed based on organoleptic test (color, aroma, softness and taste), nutrition content (water fat, protein and ash). The result showed that both fresh milk caramel and broken milk caramel were acceptable organoleptically and could last for 8 weeks wrapped and unwrapped. Fresh milk caramel contained: 9.43% water, 2.1% ash, 19.20% protein and 25.64% fat. While broken milk caramel contained: 8.18% water, 2.23% ash, 19.15% protein and 25.55% fat.

146 MA'MUN.
Characteristics of several essential oils of Zingiberaceae family plant in trade. ***Karakteristik beberapa minyak atsiri famili Zingiberaceae dalam perdagangan***/Ma'mun (Balai Penelitian Tanaman Obat dan Aromatik, Bogor (Indonesia)). *Buletin Penelitian Tanaman Rempah dan Obat* ISSN 0251-0824 (2006) v. 17(2) p. 91-98, 3 tables; 7 ref.

ZINGIBERACEAE; ELETTARIA CARDAMOMUM; ZINGIBER OFFICINALE; CURCUMA XANTHORRHIZA; ESSENTIAL OILS; CHEMICOPHYSICAL PROPERTIES; TRADE.

The essential oils of Zingiberaceae such as cardamom oil, ginger oil and curcuma oil are used in medicine, perfume, food and beverage industries and aromatherapy. Cardamom oil is distilled from *E. cardamomum*, produced in India and Sri Langka. Ginger oil (*G. officinale*) comes from China and India. Curcuma oil (*C. xanthorrhiza)* is still used in domestic and limited scale. The identification of cardamom oil, ginger oil and curcuma oil characteristics originated from West Java, Central Java, Lampung and some exporters was conducted in the Postharvest Technology Laboratory, Research Institute for Spice and Medicinal Crops. The essential oils distilled by using water and steam distillation method. Oils obtained were analyzed to get the oil characteristics which described in specific gravity, refractive index, optical rotation, solubility in ethanol, acid number and ester number. The characteristics of those essential oils were compared to the international standard. The result showed that the oil characteristics of *A. cardamomum* and *E. cardamomum* were highly different. But the oil characteristics of *E. cardamomum* from West Java and Indonesian exporter were similar to the international standard specification. But characteristics of ginger oil from Central Java, Lampung and Indonesian exporter were not equal with international standard especially in optical rotation specification.

147 MANOI, F.

Effect of carboxy methyl cellulose concentration on the quality of cashew (*Anacardium occidentale* L.) syrup. *Pengaruh konsentrasi karboksil metil selulosa (CMC) terhadap mutu sirup jambu mete (Anacardium occidentale L.)*/Manoi, F. (Balai Penelitian Tanaman Obat dan Aromatik, Bogor (Indonesia)). *Buletin Penelitian Tanaman Rempah dan Obat* ISSN 0251-0824 (2006) v. 17(2) p. 72-78, 1 ill., 3 tables; 10 ref.

ANACARDIUM OCCIDENTALE; CASHEWS; CARBOXYMETHYLCELLULOSE; QUALITY; FRUIT SYRUPS; ACIDITY; ASCORBIC ACID.

The stored cashew syrup often precipitates and its quality are declining. One method to prevent this problem was by using stabilizing material carboxy methyl cellulosa. The experiment was carried out at Village Ekoae, Ende, East Nusa Tenggara since October to November 2004. The objective of the research was to find out the best concentration of carboxy methyl cellulose for the best quality of cashew syrup. This research was laid out in a completely randomized design by using four (4) treatments and four (4) replications. The following treatments were (1) control (no carboxy methyl cellulosa), (2) 0.50% carboxy methyl cellulosa, (3) 1.00% carboxy methyl cellulose, and (4) 1.50% carboxy methyl cellulose. The results showed that the use of carboxy methyl cellulose with different concentration had significantly affected observed variables at the stored cashew syrup as long as six week. Carboxy methyl cellulose with 1.50% concentration gave the best results with highest score for pH 5.8; 8.06 mg/100 g of vitamin C and 88.86% of stability.

148 YUSIANTO.

Physical, chemicals and flavors of some varieties of arabica coffee. *Sifat fisiko-kimia dan cita rasa beberapa varietas kopi arabika*/Yusianto; Hulupi, R.; Sulistyowati; Mawardi, S.; Ismayadi, C. (Pusat Penelitian Kopi dan Kakao Indonesia, Jember (Indonesia)). *Pelita Perkebunan* ISSN 0215-0212 (2005) v. 21(3) p. 200-222, 10 ill., 12 tables; 24 ref.

COFFEA ARABICA; VARIETIES; CHEMICOPHYSICAL PROPERTIES; FLAVOUR; ORGANOLEPTIC ANALYSIS.

Export of arabica coffee was 28,100 tons/year or 8.28% total export of Indonesian coffee, the most of them are special coffee. Beside their origin, coffee varieties are determined by physical, chemical and flavors characters. The promising clones or varieties, i.e. BP 416A, BP 430A, BP 432A, BP 509A, BP 542A and P 88 has not been determined their quality. This research was conducted to analyze their physicals, chemicals and flavors during 2 periods of harvesting (2004 and 2005), using AS 1, S 795 and USDA 762 as the control. Mature coffee berry was harvested, sorted manually, and depulped, cleaned manually and then fermented in plastic sacks during 36 hours. The fermented parchment was washed, and then sundried, dehulled to obtain green coffee. Observations were conducted on green coffee yield, husk content, color of green coffee, distribution of size, bulk density of green and roasted coffee, roasting characters, color of roasted beans, and pH, acidity and flavors. The results showed (a) The lowest content of husk was BP 432A and the highest was USDA 762. The control varieties of AS 1, S 795 and USDA 762, showed husk content more than 15%, while those potential varieties were less than 15%, except BP 416A; (b) Beans size more than 6.5 mm and more than 80% were BP 416A, BP 430A, BP 432A, BP 509A, P 88, and S 795. Green coffee of BP 430A, BP 432A and BP 509A were uniform, but S 795 was not uniform. (c) Green coffee of USDA 762 was the palest color, but BP 542A was the darkest color. AS 1 and S 795 were a group with all potential varieties, except BP 542A; (d) Roasted coffee of USDA 762 was the palest color and AS 1 was the darkest. In this case, AS 1 was a group with BP 430A, BP 509A and P 88, while S 795 was a group with BP 416A and BP 432A, but USDA 762 and BP 542A were the other groups; (e) The lowest pH and the highest acidity was AS 1. In this case, S 795, BP 416A, BP 509A, BP 430A, P 88, BP 542A, AS 1 and BP 542A were one group, but USDA 762 was the other group; (f) Bulk density of all observed varieties were more than 0.7 for green coffee, and 0.39-0.47 for medium roasted coffee; (g) Roasted bean yield of all observed varieties were more than 83% and volume increment more

than 50%, except for USDA 762; (h) AS 1 showed the best flavor characters, while USDA 762 was the lowest. The promising varieties which showed a group with AS 1 were P 88 and BP 542A, which fruity. All of tested varieties showed green flavor. Harsh flavor was found in BP 416A, BP 509A, P 88, S 795 and USDA 762; (i) Based on the physicals, chemicals and flavors characters, AS 1 was a group with P 88 and BP 542A; S 795 a group with BP 416A, BP 430A, BP 432A and BP 509A, while USDA 762 was other group.

Q55 FEED ADDITIVES

149 ISKANDAR, T.
Effect of vitamin A on caecum lesion score sporulation time and oocyst production of *Eimeria tenella* on arab chicken. *Pengaruh pemberian vitamin A terhadap nilai perlukaan sekum waktu sporulasi dan produksi ookista Eimeria tenella pada ayam arab*/Iskandar, T. (Balai Penelitian Veteriner, Bogor (Indonesia)). [Proceedings of the national seminar on animal husbandry and veterinary technology], Bogor (Indonesia) 12-13 Sep 2005/Mathius, I W.; Bahri, S.; Tarmudji; Prasetyo, L.H.; Triwulanningsih, E.; Tiesnamurti, B.; Sendow, I.; Suhardono (eds.) Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia). Bogor (Indonesia): Puslitbangnak, 2005: p. 1041-1048, 2 ill., 4 tables; 13 ref. 636:338.439/SEM/p

CHICKENS; RETINOL; APPLICATION RATES; INTESTINES; SPORULATION; TIME; EIMERIA TENELLA; PRODUCTION; ZYGOTES.

The aim of this experiment was to identify the effects of 25.000 IU vitamin A mixed with Coxalin on arabic chickens that inoculated by *Eimeria tenella*. Forty five male arab chickens were used as experimental animals and were divided into three groups (K1, K2, and K3). All of the animals were inoculated by 10.000 oocyst of four weeks old *E. tenella*. The control was K1, K2 was treated with Coxalin, and K3 was treated with Coxalin + 25.000 IU Vitamin A. The result of the experiment showed that caecum lesion score and oocyst production of *E. tenella* were decreased ($P<0.01$) by treated with Coxalin and or mixed with 25.000 IU of vitamin A. However, the oocyst production on K2 and K3 were significantly different ($P<0.05$). The average sporulation time of the *E. tenella* was 20 hours.

U10 MATHEMATICAL AND STATISTICAL METHODS

150 NURHASANAH, A.
Development of algorithm on image procesing and artificial neural network to determine maturity level of mangosteen. *Pengembangan algoritma pengolahan citra dan jaringan syaraf tiruan untuk menentukan tingkat kematangan manggis*/Nurhasanah, A. (Balai Besar Pengembangan Mekanisasi Pertanian, Serpong (Indonesia)) Suroso; Ahmad, U. *Jurnal Enjiniring Pertanian* ISSN 1693-2900 (2005) v. 3(1) p. 1-12, 10 ill., 7 tables; 9 ref

MANGOSTEEN; IMAGE PROCESSING; NEURAL NETWORKS; QUALITY; MATURITY.

Mangosteen is one of the fruit with high prospect for export. Quality of mangosteen is based on several parameters including maturity level (color indexes) and size (diameter). This research was aimed at developing non destructive quality sorting using image processing and artificial neural network. A CCD camera was used to obtain the image in 256 x 192 pixel resolution. The area corresponds to weight while texture and color indexes correspond to maturity level. The features extracted from the image were used as input for artificial neural network, which was modeled to use 4 and 8 inputs on 3, 6, 9, 12, 15 hidden layers. The training of artificial neural network was conducted with value of 0.8 for momentum constant and learning rate constant 1.0 for sigmoid function in 10000 iteration. The results showed that maturity level provided the highest accuracy of validation with 93.7%

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