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PREFACE

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Director of Indonesian Center for Agricultural Library and Technology Dissemination

TABLE OF CONTENTS

E10 AGRICULTURAL ECONOMICS AND POLICIES

001 AGUSTINA, D.S.
Economic analysis of rubber fertilizing. ***Analisis ekonomi pemupukan pada tanaman karet/*** Agustina, D.S; Syarifa, L.F.; Hendratno, S. (Pusat Penelitian Karet, Medan (Indonesia)). *Jurnal Penelitian Karet (Indonesia)* ISSN 0852-808 X (2010) v. 28(1) p. 55-64, 3 ills., 3 tables; 9 ref. Appendix.

HEVEA BRASILIENSIS; FERTILIZER APPLICATION; ECONOMIC ANALYSIS; PRODUCTIVITY; PRICES.

Fertilizing is one of the important activities in rubber technical cultivation. With the increasing price of fertilizer, rubber fertilizing mainly in the mature period has become a concern of the farmers. This article analyzed an economic aspect of fertilizing on PR 261 rubber clone in the experimental garden of Sembawa Research Station. The result showed that within the condition of rubber price and standard price of fertilizer as happened at present, fertilizer treatment was still beneficial. Sensitivity analysis made in time of the increase of fertilizer prices and the extreme decline of rubber prices still caused the fertilizer treatment remain profitable.

002 PURBA, H.J.
Impact of domestic support reduction on the economic performance of agricultural commodity in Indonesia: policy simulation analysis. ***Dampak penurunan bantuan domestik terhadap kinerja ekonomi komoditas pertanian Indonesia: analisis simulasi kebijakan/*** Purba, H.J.; Hutabarat, B.; Nuryanti, S. (Pusat Analisis Sosial Ekonomi dan Kebijakan Pertanian, Bogor (Indonesia)). *Jurnal Agro Ekonomi (Indonesia).* ISSN 0216-9053 (2007) v. 25(1) p. 84-102, 9 tables; 5 ref

AGRICULTURAL ECONOMICS; AGRICULTURAL POLICY; AGRICULTURAL PRODUCTS; EXPORTS; TRADE.

Agricultural negotiations in the World Trade Organization forum have been in deadlock until the recent Doha Round. Developing countries, represented by among others Indonesia and G-33, have persistently insisted that developed countries should also cut their tariffs and phase out their domestic support and export subsidies, but developed countries have not responded accordingly. This paper is an attempt to investigate several scenarios regarding tariff cut, domestic support and export subsidy reduction in developed and developing countries in order to predict its impacts on producer's and consumer's welfare and trade performance in both countries' groups. The analysis is done using the agricultural trade policy simulation model (ATPSM). The study indicates that if developed countries only reduce their tariff and domestic support without any reduction in export subsidy, the agriculture production and consumer surplus in developing countries would fall. Import and producer surplus in developing countries would increase. A fairer and healthier international trade liberalization would achieved if developed countries cut their tariffs and reduce their domestic support and export subsidies together. This has been proposed by G 20.

003 SUSILOWATI, S.H.
Impact of economic agro industry policy on poverty and income distribution: simulation analysis using socioeconomic balance system approach. ***Dampak kebijakan ekonomi di sektor agroindustri terhadap kemiskinan dan distribusi pendapatan rumah tangga di Indonesia: analisis simulasi dengan sistem neraca sosial ekonomi/*** Susilowati,

S.H. (Pusat Analisis Sosial Ekonomi dan Kebijakan Pertanian, Bogor (Indonesia)); Bonar; Sinaga, M.; Wilson; Limbong, H.; Erwidodo. *Jurnal Agro Ekonomi (Indonesia)* ISSN 0216-9053 (2007) v. 25(1) p. 11-36, 1 ill., 5 tables; 22 ref.

AGRICULTURAL POLICY; ECONOMIC POLICIES; AGROINDUSTRIAL SECTOR; ECONOMICS; POVERTY; INCOME DISTRIBUTION; HOUSEHOLDS.

The objective of this study is to analyze the impact of economic policy in agroindustry on household poverty and income distribution. Within the social accounting matrix (SAM) framework, agroindustry sector is disaggregated into food and nonfood agroindustry. This study used Susenas data to analyze household poverty and income distribution. The result showed that export, investment, and tax incentive policy in agroindustry have positive impact on household poverty and income distribution, while government expenditure policy give less impact. Policy in nonfood agroindustry have greater impact on poverty reduction while policy in food agroindustry result greater impact on income distribution improvement. Investment policy in priority industries of agroindustry (rubber, pulp, bamboo and rattan, cigarette, beverage and fisheries food industries) is the most effective policy to reduce household poverty as well as to improve household income distribution.

E11 LAND ECONOMICS AND POLICIES

004 RACHMAT, A.
[Impact of land use changes on soil water availability in the watershed Citanduy {Indonesia} based on infiltration coefficient]. ***Dampak perubahan tata guna lahan terhadap ketersediaan air tanah di DAS Citanduy berdasarkan koefisien infiltrasi***/ Rachmat, A. [Water resources and environment: potential, degradation and the future]. Sumber daya air dan lingkungan: potensi, degradasi dan masa depan/ Delinom, R.M.; Marganingrum, D. (eds.). Jakarta (Indonesia): LIPI Press, 2007; p 21-34, 7 ill., 5 tables; 6 ref. 9 Appendix 631.92/LEM/s

GROUNDWATER; WATER BALANCE; LAND USE; INFILTRATION WATER; HYDROLOGICAL CYCLE; WATERSHEDS; JAVA.

Infiltration value as one of the component of hydrological cycle is depended on the infiltration coefficient (k) which is influenced by the type of vegetation and land coverage. By using the water balance equation of Mock which is expressed by climatologically condition along Citanduy watershed for the years of 1993 to 1998, indicated that the changes of land use function in 1993 and 1998 tends to be come settlement and it caused the decrease of infiltration coefficient from 0.59 to 0.32. The decrease of infiltration coefficient will give an effect on the decrease of annual ground water volume storage (Vn).

005 SURIADIKARTA, D.A.
Potential analysis of swamp land for agribusiness development. ***Analisis potensi lahan rawa untuk pengembangan agribisnis*****/** Suriadikarta, D.A.; Sutriadi, M.T. (Balai Penelitian Tanah, Bogor (Indonesia)). *Jurnal Sumberdaya Lahan (Indonesia).* ISSN 1907-0799 (2007) v. 1(3) p. 13-20, 19 ref.

AGRICULTURE; SWAMP SOILS; SOIL ANALYSIS; LAND USE; SOCIOECONOMIC ENVIRONMENT; LAND MANAGEMENT; WATER MANAGEMENT; APPROPRIATE TECHNOLOGY; TECHNOLOGY TRANSFER; AGROINDUSTRIAL SECTOR.

Fertile agriculture land in Java was decreased due to conversion to non agricultural purposes, such as industries, residences, and highways. Unfortunately, because of population increasing, food availability is needed more, so that swamp land is one alternative for agriculture development outside of Java. The swamp land area is very wide and about nine millions hectare are suitable for agriculture land. However, only 3.6 millions hectare of it has been reclaimed. The research on swampy area has long been done, so the technology for reclaiming and developing of swamp area are available. The crop commodities which were suitable for swamp areas are lowland rice, vegetables, horticulture, fruits, rubber and oil palm, and fishery. The selection of commodities for agribusiness on swamp land must be directed to adaptability of agriculture technique, economic potentiality, and marketing.

E14 DEVELOPMENT ECONOMICS AND POLICIES

006 ANUGRAH, I.S.

[Agricultural and rural development in perspective of poverty]. ***Pembangunan pertanian dan perdesaan dalam perspektif kemiskinan berkelanjutan***/ Anugrah, I.S.; Suryani, E. (Pusat Analisis Sosial Ekonomi dan Kebijakan Pertanian, Bogor (Indonesia)) : Proceedings of national seminar on dynamic of agricultural and rural development: look for alternative direction on people economic development. Prosiding seminar nasional dinamika pembangunan pertanian dan perdesaan: mencari alternatif arah pengembangan ekonomi rakyat, Bogor (Indonesia), 4 Dec 2007/ Suradisastra, K.; Yusdja, Y.; Hutabarat, B. (eds.) Bogor (Indonesia): PSEKP, 2007: p. 39-49, 1 ill., 5 tables., 18 ref. 631.001.6/SEM/p

AGRICULTURAL DEVELOPMENT; RURAL AREAS; ECONOMIC GROWTH; POVERTY; PUBLIC SERVICES; DEVELOPMENT POLICIES.

World Development Report of the World Bank indicates that investment in agricultural sector is the best strategy to reduce poverty in developing countries. WDR suggests that the growth in agricultural sector is an effective way to improve poor farmers' income in rural areas. This paper aims to analyze the relationship between the growth of agricultural sector and efforts in poverty reduction in Indonesia. The study reveals that gross domestic product (GDP) of agricultural sector in Indonesia grew at 3.4% from 2004-2006, and absorbed 40.14 million employments. In the meantime, the growth of investment in the sector through domestic and foreign investment was 9.1 and 30.6%, respectively. Agricultural development was implemented through 29 major activities,financed by the national development budget (APBN) amounting to lDR 8,789.62 billion in 2007. About 17 government institutions implemented various programs in poverty reduction theme, and spent substantial amount of budget. However, such considerable efforts were unable to significantly reduce the poverty level. Data of the Central Statistics Agency (BPS) shows that from 2004-2006 the incidence of poverty remain high especially in agricultural sector as compared to other sectors. Weak integration among various programs and agencies resulted in less efficiency and effective of its implementation. The study recommends that the growth of GDP in agricultural sector should be used as the main consideration in formulating policies and programs for poverty reduction.

007 WASITO

Farmers perception in adopting lowland rice technologies in dryland ecosystem in Blora District, Central Java [Indonesia]. ***Pola tindak petani lahan kering Kabupaten Blora, Jawa Tengah dalam menerapkan teknologi usaha tani padi sawah***/ Wasito; Handoko, D.D. (Balai Pengkajian Teknologi Pertanian Sumatera Utara, Medan (Indonesia)); Ananto, E.E. [Proceedings of the national seminar on rice research results in 2009. Book 3].

Prosiding seminar nasional hasil penelitian padi 2009. Sukamandi (Indonesia), 28 Oct 2009. Buku 3/ Setyono, A.; Indrasari, S.D.Agus, S.Y. (eds.). Sukamandi (Indonesia): Balitpa, 2010: p.1287-1301, 2 ill., 6 tables; 16 ref. 633.18-115.2/SEM/p bk3

ORYZA SATIVA; LOWLAND; RICE; VARIETIES; QUALITY; CULTIVATION; FARMING SYSTEMS; FARMERS; DRY FARMING.

Surveys to evaluate and understand the adoption of lowland rice technologies by the farmers in the dryland ecosystem have been carried out in 16 villages of 4 sub-districts in Blora District during the year of 2007 and 2008. The surveys were begun by observing, discussing, and interviewing directly to a total of 96 farmers as respondents. Results of this surveys revealed that the wetland in Todanan and Tunjungan Villages were commonly planted with rice two times per year (CI 200), while in Cepu and Kedungtuban Villages, some parts were commonly planted with rice three times per year (CI 300) and the others were two times per year (CI 200). The rice production technologies which have commonly been practiced were new high yielding varieties and complete land preparation. While the certified rice seeds, crop rotation, amount of seeds of 25 kg/ha, young seedlings of less than 25 days old, planting of 1-3 seedlings/hole, and integrated pest management were still not commonly practiced by the farmers in those areas.

008 WIDYANTORO

Preferences of farmers in several improved upland rice varieties. ***Preferensi petani terhadap beberapa varietas unggul padi gogo: studi kasus di Kecamatan Randublatung, Kabupaten Blora***/ Widyantoro; Zarwazi, L.M.; Toha, H.M. (Balai Besar Penelitian Tanaman Padi, Sukamandi (Indonesia). [Proceedings of the national seminar on rice research results in 2009. Book 3]. Prosiding seminar nasional hasil penelitian padi 2009. Sukamandi (Indonesia), 28 Oct 2009 Buku 3/ Setyono, A.; Indrasari, S.D.; Agus, S.Y.(eds.). Sukamandi (Indonesia): Balitpa, 2010: p.1315-1329, 3 tables; 6 ref. 633.18-115.2/SEM/p bk3

UPLAND RICE; VARIETIES; PLANT ANATOMY; JAVA.

Improved new rice variety is one of the main technologies developed by the Indonesian Center for Rice Research which play a dominant role in increasing rice production in Indonesia. Several strategies of dissemination to introduce the newly developed varieties of rice to the farmers have already been done, but it seems still ineffective. Method of disseminaton in which farmers, both as the producer and the consumers have an opportunity to directly participate in evaluating, judging, and selecting the new rice varieties was being introduced. An experiment to evaluate the response of farmers in upland ecosystem to the 8 new varieties, Batutegi, Situ Patenggang, Situ Bagendit, Jatiluhur, Limboto, IR64, Ciherang, and Cimelati and a breeding line TB490C was conducted in land areas covered by the young teak trees in Ngliron Village, Randublatung Sub-district, District of Blora, Central Java Province during the WS of 2008/2009. This experiment involved a total of 25 cooperators consisted of farmers, rice traders, seed producers, and the household women. Evaluation on the response of farmers was conducted through the distribution of questionnaires during the cropping season, and through the organoleptic test. Results of this experiment indicated that based on plant type, plant height, number of tillers, and number of panicles, the varieties of Batutegi and Situ Patenggang were the most preferred by the farmers. Based on the type of rice grains, color of rice grain, and quality of milled rice, rice varieties of Situ Bagendit, IR64, and Ciherang were the most preferred by the farmers. While the type of long and slender grains was another character of grain in which farmers like more than the long oval type of rice grains. The organoleptic test showed that farmers favored to the quality of milled rice of all varieties tested.

E16 PRODUCTION ECONOMICS

009 DERMOREDJO, S.K.

[Impact analysis of decreasing export subsidy from developed countries on Indonesian agricultural production]. ***Analisis dampak penurunan subsidi ekspor negara maju terhadap produksi pertanian Indonesia*****/** Dermoredjo, S.K.; Wahida; Hutabarat, B. (Pusat Analisis Sosial Ekonomi dan Kebijakan Pertanian, Bogor (Indonesia)). Proceedings of national seminar on dynamic of agricultural and rural development: look for alternative direction on people economic development. Prosiding seminar nasional dinamika pembangunan pertanian dan perdesaan: mencari alternatif arah pengembangan ekonomi rakyat, Bogor (Indonesia), 4 Dec 2007/ Suradisastra, K.; Yusdja, Y.; Hutabarat, B. (eds.) Bogor (Indonesia): PSEKP, 2007: p.59-71, 7 tables; 9 ref. 631.001.6/SEM/p

AGRICULTURE; PRODUCTION; INTERNATIONAL TRADE; EXPORT SUBSIDIES; DATA ANALYSIS; SOCIAL WELFARE.

Export subsidy modalities have been agreed to decrease by each member countries in WTO until 2013. The objective of elimination of export subsidy is to create a "fair battle condition" between developed and developing countries in WTO and also to improve "trade liberalization climate" condition among the members. Each member country in WTO should have the same spirit, with effort and real action in implementing the export subsidies modalities that has been agreed. Such spirit should also reflect in each member country trade policies. This paper shows the impact of elimination of export subsidy in developed countries and its impact on developing countries, especially for agricultural sector. Impact analysis has been developed using Global Trade Analysis Project (GTAP) model by grouping the WTO member countries into 8 country groups and analyzing 16 groups of agricultural commodities. Simulation result indicated that the decreasing export subsidy (50%, 100%) in developed countries as recommended by WTO members (G-20, USA, EU and Hongkong Ministerial Meeting) will increase agriculture production in Indonesia to around 0.2-35%. This result should provide a direction for Indonesia Trade Policy, especially for AoA. Indonesia has a big opportunity to develop agricultural commodities by creating a consolidation and consultation with wider stakeholders and decision makers and also increasing the ability and quality of Indonesia's Trade Negotiators in international forums to implement the scheduled elimination of export subsidy.

010 DJATIHARTI, A.

Prospect of farming the melik black rice in Bantul District, Yogyakarta Province [Indonesia]. ***Potensi usaha tani padi beras hitam melik di Kabupaten Bantul, Yogyakarta*** / Djatiharti, A.; Kristamtini (Balai Pengkajian Teknologi Pertanian, Yogyakarta (Indonesia)). [Proceedings of the national seminar on rice research results in 2009. Book 3]. Prosiding seminar nasional hasil penelitian padi 2009. Sukamandi (Indonesia), 28 Oct 2009. Buku 3/ Setyono, A.; Indrasari, S.D.Agus, S.Y. (eds.). Sukamandi (Indonesia): Balitpa, 2010: p.1281-1286, 1 table; 8 ref. 633.18-115.2/SEM/p bk3

RICE; VARIETIES; FARMING SYSTEMS; ECONOMIC ANALYSIS; JAVA.

The Melik black rice, a local rice cultivar of Yogyakarta, grows only in particular areas of Yogyakarta. The taste, aroma, and the appearance characters of this locally grown rice were novelty, specific and also scarce. A survey to analyze the feasibility of growing the cultivar was conducted in the farmers' field carrying out organic rice farming in Ganjur Village, Bantul District during the wet season of 2008/2009. Results of the survey indicated that the B/C ratios were 1.39 and 1.58, for dried paddy and husked rice, respectively. It was

concluded that, beside for the purpose of rescuing the rice germplasm, black rice farming is profitable and possess a good prospect to be developed.

E20 ORGANIZATION, ADMINISTRATION AND MANAGEMENT OF AGRICULTURAL ENTERPRISES OR FARMS

011 TAMBUNAN, R.D.

Farming analysis of several upland rice varieties grown under different planting system in Central Lampung [Indonesia]. ***Analisis usaha tani padi gogo di Desa Buyut Udik Kecamatan Gunung Sugih, Kabupaten Lampung Tengah***/ Tambunan, R.D.; Barus, J. (Balai Pengkajian Teknologi Pertanian Lampung (Indonesia). [Proceedings of the national seminar on rice research results in 2009. Book 3]. Prosiding seminar nasional hasil penelitian padi 2009. Sukamandi (Indonesia), 28 Oct 2009. Buku 3/ Setyono, A.; Indrasari, S.D.; Agus, S.Y. (eds.). Sukamandi (Indonesia): Balitpa, 2010: p.1303-13013, 5 tables; 16 ref. 633.18-115.2/SEM/p bk3

ORYZA SATIVA; UPLAND RICE; FARMING SYSTEMS; ECONOMIC ANALYSIS; PRODUCTION DATA; FARM INCOME.

The assessment was conducted at Buyut Udik Village, Gunung Sugih Sub-District, Central Lampung District during the wet season of 2008/09 involving a total of 6 farmers with total of 3 ha dryland. The objective of this assessment was to evaluate the financial feasibility of cropping several varieties of upland rice grown under some methods of planting, the in-row planting (legowo), squared-planting, integrated crop management (ICM), and farmer practice (non-ICM). Data collected and analyzed were farmer's income and R/C ratio. Results of this assessment indicated that legowo 2 : 1 planting system increased rice yield and farmers income. Total production cost in the legowo 2 : 1 planting system was 2.4% higher than that of in the squared-planting system, but the profit was 15.92% higher. Both legowo 2 : 1 and squared-planting systems were feasible, with their R/C values of 1.91 and 1.78, respectively. Rice crops managed through ICM increased profit by 65.57%. Both cropping systems indicated R/C values of 1.84 and 1.38 for the ICM and the non-ICM planting systems, respectively.

012 WAHYUNI, S.

[Motivating strategy in cattle fattener professionalism: an analysis of roles and financial aspects of supply chain agent]. ***Strategi memotivasi profesionalisme peternak sapi potong rakyat: analisis peran dan finansial agen rantai pasok***/ Wahyuni, S. (Pusat Analisis Sosial Ekonomi dan Kebijakan Pertanian, Bogor (Indonesia)). Proceedings of national seminar on dynamic of agricultural and rural development: look for alternative direction on people economic development. Prosiding seminar nasional dinamika pembangunan pertanian dan perdesaan: mencari alternatif arah pengembangan ekonomi rakyat, Bogor (Indonesia), 4 Dec 2007/ Suradisastra, K.; Yusdja, Y.; Hutabarat, B. (eds.). Bogor (Indonesia): PSEKP, 2007: p.119-127, 1 ill., 4 tables; 11 ref. 631.001.6/SEM/p

BEEF CATTLE; FARMERS; ANIMAL BREEDERS; COST BENEFIT ANALYSIS; PROFITABILITY; ECONOMIC ANALYSIS; SUPPLY BALANCE; MANAGEMENT.

Some references reported that the benefit of actors in supply chain agent (SCA) in beef and cattle farming were unfair. Research had been conducted to understand the role and benefit of each level of the SCA. The information gathered is important as a base policy in motivating cattle fattener of fattening agro industry development. This research was

conducted during 2006 fiscal year in West Java. Interview technique was applied for 60 SCA as well as key informants. Data were analyzed descriptively and showed that: (1) there are three types of cattle fattener, they are (a) individual cattle management (M), (b) beside M, the production of feed (MP), and (c) beside MP also the selling of beef from own slaughter house (MPR); (2) It is not easy to calculate the SCA's benefit based on certain volume by period of time; however, the results could be described as follows. The daily benefit of cattle fattener was Rp 5,950/head; cattle fattener who also act as trader as well as butcher Rp 26,865/head. Trader at district level could receive Rp 650,000, between the districts Rp. 214,278 and between provinces Rp 248,273. The butcher's benefit was Rp 1,094,000 (large scale), Rp 375,000 (medium scale), and Rp 99,000 (retailer). The cattle fattener (M) received the lowest benefit, however if they could increase their status to become traders, as well as butchers, they might gain higher profit. Butchers received the highest benefit but it is difficult to find appropriate places to sell the beef. The level of traders and butchers require special efforts and professionalism. The suggestions drawn from this research are: (1) Economists should create certain tools to analyze the SCA's benefit, (2) Professionalism in cattle fattener should be increased towards the development of agroindustry, and (3) Legal matters or regulations on beef marketing place should be improved in favor of the traders.

013 WIDYANTORO

Analysis of factors affecting the production of rice in irrigated ecosystem in Subang District [Indonesia]. ***Analisis faktor-faktor produksi padi sawah irigasi di Kabupaten Subang***/ Widyantoro (Balai Besar Penelitian Tanaman Padi, Sukamandi (Indonesia)). [Proceedings of the national seminar on rice research results in 2009. Book 3]. Prosiding seminar nasional hasil penelitian padi 2009. Sukamandi (Indonesia), 28 Oct 2009. Buku 3/ Setyono, A.; Indrasari, S.D.; Agus, S.Y. (eds.). Sukamandi (Indonesia): Balitpa, 2010: p.1223-1232, 8 tables; 32 ref. 633.18-115.2/SEM/p bk3

ORYZA SATIVA; FARMING SYSTEMS; FARM INCOME; IRRIGATED LAND; SEED; PLANTING DATE; LABOUR; FARM INPUTS; JAVA.

An experiment to identify factors affecting irrigated rice production was conducted at Cipunegara Sub-district, Subang District during April 2008. A descriptive method of analyses was used to evaluate data obtained from 60 farmers consisted of 30 farmers each of irrigated and semi-irrigated rice fields. The Cobb-Douglas with double naturally logarithmic analysis was used to analyze the production function of the factors affecting rice production. The regression analysis of production function with OLS method estimated that during the rainy season rice crops seeds and labors were among the production factors significantly affected the rice production. Both irrigated and semi-irrigated rice ecosystems significantly affected the rice production, but was not the planting time. It was observed that rice cultivation in irrigated rice field was more efficient than that in semi irrigated rice field.

E21 AGRO-INDUSTRY

014 SUPRIYATI

[Role of rural agroindustry on rural economic and its development prospective]. ***Peranan agroindustri perdesaan dalam perekonomian dan perspektif pengembangannya***/ Supriyati (Pusat Analisis Sosial Ekonomi dan Kebijakan Pertanian, Bogor (Indonesia)). Proceedings of national seminar on dynamic of agricultural and rural development: look for alternative direction on people economic development. Prosiding seminar nasional dinamika pembangunan pertanian dan perdesaan: mencari alternatif arah pengembangan ekonomi

rakyat, Bogor (Indonesia), 4 Dec 2007/ Suradisastra, K.; Yusdja, Y.; Hutabarat, B. (eds.). Bogor (Indonesia): PSEKP, 2007: p.101-107, 5 tables; 5 ref. 631.001.6/SEM/p
AGROINDUSTRIAL SECTOR; RURAL AREAS; AGRICULTURAL ECONOMICS; SMALL ENTERPRISES; HOUSEHOLDS; MANPOWER; TECHNOLOGY TRANSFER; PARTNERSIPS.

The objectives of this paper are to analyze: (a) The dynamic role of rural agroindustry on Indonesian economy; and (b) Perspective of rural agro-industry development. Rural agro industry in this context is the smallscale and home industry of food, beverage and tobacco industries. The role of rural agro industry in this case is its significant role in labor absorption and in added value generation. Descriptive analysis on agro industry role in this paper was based on small-scale/home industry statistic (Statistik IKKR), 1998-2003. This study shows that the role of agroindustry in labor absorption was the highest and added value generation was the lowest. In respect to the unemployment and poverty issues in rural areas, rural agroindustry has a good opportunity to become an alternative to solve the problems, although many constraints are embedded in its development. Policies to support the development of rural agro industry are suggested through the increasing capacity of human resources, technology infrastructure and partnerships between large and medium industries with small-scale/home industries.

015 SUSILOWATI, S.H.
[Roles of agroindustrial sector on national economics and agricultural households income]. ***Peran sektor agroindustri dalam perekonomian nasional dan pendapatan rumah tangga pertanian***/ Susilowati, S.H. (Pusat Analisis Sosial Ekonomi dan Kebijakan Pertanian, Bogor (Indonesia)). Proceedings of national seminar on dynamic of agricultural and rural development: look for alternative direction on people economic development. Prosiding seminar nasional dinamika pembangunan pertanian dan perdesaan: mencari alternatif arah pengembangan ekonomi rakyat, Bogor (Indonesia), 4 Dec 2007/ Suradisastra, K.; Yusdja, Y.; Hutabarat, B. (eds.). Bogor (Indonesia): PSEKP, 2007: p.108-118, 4 tables; 6 ref 631.001.6/SEM/p

AGROINDUSTRIAL SECTOR; SYSTEM ANALYSIS; MANPOWER; SKILLED LABOUR; FARMERS; HOUSEHOLDS; FARM INCOME; AGRICULTURAL DEVELOPMENT.

The objectives of this study are (a) to analyze the role of agroindustry sector on national economy and agriculture household income and (b) to identify the sequence of influence transmitting from agro industry sector to other sectors, labor and household. The analysis uses the social accounting matrix (SAM) model. The agroindustry sector is disaggregated into food and nonfood industry. The results show that the agroindustry sector have a higher role on the national output and value added as well as labor creation compare to the primary agriculture sector. However, agroindustry sector has not showed a better role to increase the income of agriculture household as well as nonagriculture household. The most direct influence of food agroindustry development is transmitted to the agriculture labor, meanwhile the most direct influence of the nonfood agroindustry development is transmitted to the nonagriculture labor. Considering the indirect influence, the nonagriculture labor and household will receive a higher total impact of the agroindustry development compared to the agriculture labor and household.

016 TARIGAN, H.
[Increasing added value of banana fruits through agro industrial development in Lumajang Regency (Indonesia)]. ***Peningkatan nilai tambah melalui pengembangan***

agroindustri pisang di Kabupaten Lumajang/ Tarigan, H. (Pusat Analisis Sosial Ekonomi dan Kebijakan Pertanian, Bogor (Indonesia)). Proceedings of national seminar on dynamic of agricultural and rural development: look for alternative direction on people economic development. Prosiding seminar nasional dinamika pembangunan pertanian dan perdesaan: mencari alternatif arah pengembangan ekonomi rakyat, Bogor (Indonesia), 4 Dec 2007/ Suradisastra, K.; Yusdja, Y.; Hutabarat, B. (eds.). Bogor (Indonesia): PSEKP, 2007: p.128-134, 3 ill., 7 ref. 631.001.6/SEM/p

BANANAS; SNACKS FOODS; AGROINDUSTRIAL SECTOR; VALUE ADDED; ECONOMIC VALUE.

Agroindustry is an activity that plays important role in generating added value. The optimal of added value could be achieved through specific industrial pattern which directly integrated with family farming and agricultural enterprises. This paper tries to analyze the role of banana chip agroindustry in Lumajang District, West Java, in generating added value and investigate the significant role of the agents in agro industrial process. The result shows that the added value at the second link (main production process, assembly, packing and quality management) is the amount of profit enjoyed by the entrepreneurs at industrial economic of scale. Other added values could not be calculated numerically, include the employment opportunity, entrepreneurs and worker skill improvement. The network and access to various education, technology and market opportunity are also accumulated into a precious investment at both individual level as well as at regional level.

017 TARIGAN, H.

[Opportunity and constraints of sago agroindustry in Jayapura Regency (Indonesia)]. ***Peluang dan kendala pengembangan agroindustri sagu di Kabupaten Jayapura***/ Tarigan, H.; Ariningsih, E. (Pusat Analisis Sosial Ekonomi dan Kebijakan Pertanian, Bogor (Indonesia)). Proceedings of national seminar on dynamic of agricultural and rural development: look for alternative direction on people economic development. Prosiding seminar nasional dinamika pembangunan pertanian dan perdesaan: mencari alternatif arah pengembangan ekonomi rakyat, Bogor (Indonesia), 4 Dec 2007/ Suradisastra, K.; Yusdja, Y.; Hutabarat, B. (eds.). Bogor (Indonesia): PSEKP, 2007: p.135-140, 9 ref. 631.001.6/SEM/p

SAGO; AGROINDUSTRIAL SECTOR; AGRICULTURAL DEVELOPMENT; FOODS; FARM INCOME; RAW MATERIALS; TECHNOLOGY; POLICIES; INSTITUTIONS; PROCESSING; PARTNERSHIPS; PAPUA.

In the province of Papua, sago is the main staple food. As Papuan economy steadily increase, more people are engaged in regular earning activities. As a consequence, household self-provision of sago for daily consumption is no longer practical. Sago should be collected from the market, which in turn could pull out sago agroindustry. The development of sago agro industry could offer employment and added value opportunity to local community. This research aims to analyze the opportunities and constraints of sago agroindustry development in Jayapura District, Papua Province. Data analyzed are both primary and secondary data. The result shows that sago agro industry has a relatively high opportunity to develop in the city of Jayapura, taking into account its geographic location of the city, raw material availability, technology, and the support of government policy. On the other hand, some main constraints are farming culture of sago farmers, and land ownership system which is controlled by the local people while industrial activities are controlled by presentiments. There is no institution that officially serves and organization in-charge in the development of sago farmers. Some serious policies required for the development of sago agro industry are: (1) to decide and deliver sago development to one related technical service institution/office,

and (2) processing system should be treated as part of the demand side strategy, so that technology engineering and partnership development could be capitalized.

E70 TRADE, MARKETING AND DISTRIBUTION

018 PURBA, H.J.
[Impact analysis of decreasing domestic support from developed countries on price of commodities and Indonesian agriculture resources]. ***Analisis dampak penurunan bantuan domestik negara maju terhadap harga dan penggunaan sumberdaya pertanian Indonesia***/ Purba, H.J.; Lokollo, E.M.; Hutabarat, B. (Pusat Analisis Sosial Ekonomi dan Kebijakan Pertanian, Bogor (Indonesia)). Proceedings of national seminar on dynamic of agricultural and rural development: look for alternative direction on people economic development. Prosiding seminar nasional dinamika pembangunan pertanian dan perdesaan: mencari alternatif arah pengembangan ekonomi rakyat, Bogor (Indonesia), 4 Dec 2007/ Suradisastra, K.; Yusdja, Y.; Hutabarat, B. (eds.). Bogor (Indonesia): PSEKP, 2007: p. 72-84, 4 tables., 10 ref. 631.001.6/SEM/p

AGRICULTURAL RESOURCES; DOMESTIC PRODUCTION; SUPPORT MEASURES; TRADE; POLICIES; PRICES; AGRICULTURAL PRODUCTS; INDONESIA.

The agreement was called an Agreement of Agriculture (AoA) covers three main pillar of issues, namely: (1) domestic support, (2) export subsidy, and (3) market access. Those three issues were intensively being negotiated and insisted upon by the developing countries to reach a new trade deal, through the mechanism of special and differential treatment. This paper is an attempt to investigate several scenarios regarding the reduction of domestic support in developed countries in order to predict its impacts on prices of commodities and resources allocation in agriculture in rural areas. The analysis is conducted using the Global Trade Analysis Project Model/GTAP Modeling. The result shows that if developed countries cut their domestic support off, Indonesia will be facing the increasing prices of all commodities. The highest increase will be on the price of land (1%) and the price of oil seeds/soybean (2%). Therefore, the potential rate of the use of the Indonesia's resources allocation (land, labor/employment or other natural resources) on those commodities are increasing, with the highest rate on oil seeds/soybean for more than 3 to 5%. The negative rate is on the commodity of wheat due to incompatibility of the tropical climate of Indonesia. Another impact observed is on the land-based resource allocation for paddy/rice, sugar and cattle. In the near future, land use for these commodities will face consequences on land availability.

019 SIAGIAN, V.
Pattern of rice marketing in Musi Rawas and East OKU District South Sumatra Province [Indonesia]. ***Pola pemasaran beras di Kabupaten Musi Rawas dan OKU Timur, Sumatera Selatan/*** Siagian, V. [Proceedings of the national seminar on rice research results in 2009. Book 3]. Prosiding seminar nasional hasil penelitian padi 2009. Sukamandi (Indonesia), 28 Oct 2009.Buku 3/ Setyono, A.; Indrasari, S.D.; Agus, S.Y. (eds.). Sukamandi (Indonesia): Balitpa, 2010: p.1255-1269, 2 ill; 5 tables; 6 ref. 633.18-115.2/SEM/p bk3

RICE; FARMERS; MARKETING MARGINS; SUMATRA.

The objectives of this experiment was (1) to analyze the existing rice marketing system in rice production center of Musi Rawas and East OKU Districts, South Sumatra Province, (2) to evaluate the margin and the farmer share of rice marketing, (3) to identify pattern of collaboration among those involved in rice marketing activities, as well as its problems.

Sampling was carried out through the method of Snowball Sampling Technique. Results of this experiment revealed that (1) there were two patterns of rice marketing chains in Musi Rawas and East OKU Districts, namely (a) the pattern of farmer - village retailers - district merchant - province grocer - retailer consumer, (b) the pattern of farmer - village retailers - province merchant –retailer - consumer; (2) the value of farmer share in Musi Rawas and East OKU District was 78.3% and 76.1%, respectively, while the marketing margin was Rp1,060 and Rp1,100/kg, respectively; (3) there was a mutual understanding cooperation between the farmer and the village retailers, between the village retailers and the district/province merchant. Rice marketing problems faced by rice merchant in the area were fluctuative price and poor quality of rice.

020 SYARIFA, L.F.

Estimating elasticities of export demand of Malaysian natural rubber using error correction model (ECM). ***Estimasi elastisitas permintaan ekspor karet alam Malaysia menggunakan error correction model (ECM)***/ Syarifa, L.F. (Pusat Penelitian Karet, Medan (Indonesia)). *Jurnal Penelitian Karet (Indonesia).* ISSN 0852-808 X (2010) v. 28(1) p. 75-86, 1 ill.; 3 tables; 18 ref.

RUBBER; DEMAND; EXPORTS; ESTIMATED COSTS; PRICE ELASTICITIES; MALAYSIA.

Malaysia is the third largest producer of natural rubber (NR) in the world behind Thailand and Indonesia. However, the export demand of Malaysian NR has fluctuated that could be due to the export price, foreign income, and price of synthetic rubber. The aim of this study was to estimate demand elasticities of Malaysian natural rubber towards factor changes that significantly influenced the demand. Quarterly data were used to estimate the export demand function with an error correction model. The estimation result showed that the own price elasticities of SMR 20 and latex were 0.20 and 0.98, respectively, suggesting that they were inelastic. Thus, the changes of prices of NR would cause only a small change in the quantities demanded, implying that the changes in price would not give important effect on export quantity demanded. Based on latex income elasticity of 2.95, it suggested that foreign income became the important determinant of the export demand. Then, the cross price elasticities of SMR 20 and latex concentrate were 0.21 and 0.08, respectively, suggesting that they were inelastic against synthetic rubber.

021 WARDANA, I P.

Relationship between the price and the quality of rice at the milling unit and the trader level in Bali [Indonesia]. ***Hubungan harga dan kualitas beras di tingkat penggilingan dan pedagang di Provinsi Bali***/ Wardana, I P.; Jumali; Wibowo, P. [Proceedings of the national seminar on rice research results in 2009. Book 3]. Prosiding seminar nasional hasil penelitian padi 2009. Buku 3, Sukamandi (Indonesia), 28 Oct 2009/ Setyono, A.; Indrasari, S.D.; Agus, S.Y. (eds.). Sukamandi (Indonesia): Balitpa, 2010: p.1047-1056, 5 tables; 7 ref. 633.18-115.2/SEM/p bk3

RICE; QUALITY; PRICE; TRADER; GRINDERS; PROCESSING; BALI.

Objective of this experiment was to identify the price of rice as affected by its quality. This activity involved the rice milling units and the milled rice traders in Tabanan, Gianyar, and Jembrana Districts, Bali. The owner of the rice milling unit and the traders were interviewed and samples were collected for its physical characters. Data were analyzed and the milled rice characters obtained were compared to the National Standard of Indonesia (SNI) on the milled rice criteria. Results of the experiment revealed that the quality of milled rice at the

milling unit and at the trader levels was not significantly different, since the rice traders usually obtained the milled rice from the local rice milling unit. It was observed that good milling and selling processes of rice occurred but the understanding on the national standard of rice quality established by the National Standard of Indonesia for Rice was still poor. A significant different of price was observed at the trader level among locations. Price of rice at Tabanan Market was Rp 4,675/kg higher than those at Gianyar and Jembrana Markets. Approximately 60% of price of milled rice at Tabanan Market was affected by head rice, damaged grain, and size of grain. Head rice and size contributed about 33% of price at Gianyar Market, while at Jembrana Market, 45% of price was affected by head rice, milling degree, and size of grain.

E71 INTERNATIONAL TRADE

022 NURYANTI, S.
[Increasing soybean farmers welfare through optimizing tariff policies]. ***Meningkatkan kesejahteraan petani kedelai dengan kebijakan tarif optimal***/ Nuryanti, S.; Kustiari, R. (Pusat Analisis Sosial Ekonomi dan Kebijakan Pertanian, Bogor (Indonesia)). Proceedings of national seminar on dynamic of agricultural and rural development: look for alternative direction on people economic development. Prosiding seminar nasional dinamika pembangunan pertanian dan perdesaan: mencari alternatif arah pengembangan ekonomi rakyat, Bogor (Indonesia), 4 Dec 2007/ Suradisastra, K.; Yusdja, Y.; Hutabarat, B. (eds.). Bogor (Indonesia): PSEKP, 2007: p.50-58, 1 ill., 6 tables; 4 ref.; Appendices 631.001.6/SEM/p

SOYBEANS; IMPORTS; TARIFFS; FARM INCOME; FARMING SYSTEMS; PROFITABILITY; SUPPLY BALANCE; LIVING STANDARDS.

The imbalance between production and consumption of soybean triggers import dependency. World market of soybean is concentrated in several developed countries which highly support their farmers. International market structure of soybean is oligopolistic. It causes high risk on instability of supply and price to importer countries, such as Indonesia. Tariff is one of the effective policies to protect domestic soybean farmers from import surge and price depression. By using cost structure data and macro parameters of soybean, partial equilibrium of domestic soybean market is analyzed. The aim of this analysis is to know farm's profit at the current import duty of soybean, the optimum level of import duty (farming's profit by 25%) and the impact of optimum tariff on domestic market equilibrium. The current 10% of level of import duty provides farm's profit by 18.85%. The optimum import duty of soybean is 24.3%, however, it probably decreases social welfare by Rp121.5 billions.

E80 HOME ECONOMICS, INDUSTRIES AND CRAFTS

023 LOKOLLO, E.M.
[Roles of agricultural sector on farmer household's income]. ***Peran sektor pertanian dalam pendapatan rumah tangga***/ Lokollo, E.M.; Friyatno, S. (Pusat Analisis Sosial Ekonomi dan Kebijakan Pertanian, Bogor (Indonesia)). Proceedings of national seminar on dynamic of agricultural and rural development: look for alternative direction on people economic development. Prosiding seminar nasional dinamika pembangunan pertanian dan perdesaan: mencari alternatif arah pengembangan ekonomi rakyat, Bogor (Indonesia), 4 Dec

2007/ Suradisastra, K.; Yusdja, Y.; Hutabarat, B. (eds.). Bogor (Indonesia): PSEKP, 2007: p.85-91, 4 tables; 12 ref. 631.001.6/SEM/p

AGRICULTURE; HOUSEHOLDS; FARM INCOME; AGRICULTURAL ECONOMICS; AGRICULTURAL PRODUCTS; MANPOWER; CAPITAL; AGROINDUSTRIAL SECTOR.

Agricultural sector had been and continually plays a major role in the economic development of Indonesia. Majority of its population lives in rural areas and depends on the agriculture for their livelihoods. The structure and the dynamic of the household's income for the last three decades was analyzed in this paper based on statistics, data and information obtained from CBS (Central Bureau Statistics-BPS) in addition to ICASEPS' research reports. During the last three decades the major share of household's income was still relied on agriculture though it was decreasing overtime, both in Java and off-Java. This was due to the decreasing share of food crops sub-sector to the total share of agriculture. In nominal term, household income was found increasing to more than 50% during 1993-2003. Almost the entire agricultural household's income comes from self-employment activities. In 2003, the average household's income was around lDR 8 to 13 millions. About 40 to 72% out of it came from agricultural activities, both as self-employed and as workers. As workers, the share to household's income increased for the last decade, from 17 to 24% (as income-transfer). Public policy recommendations to increase household's income in rural and agricultural areas are: (1) to build human capacity, (2) to develop infrastructures, (3) to increase farmer's financial accessibility to small scale/micro banks, and (4) to develop rural agro-industry. All these policy recommendations are aiming to increase rural and agricultural household's real income.

F01 CROP HUSBANDRY

024 IRIANI, E.

Exploitation of rice field in dry season for growing the high production mungbean variety under the limited water condition in Grobogan District. ***Pemanfaatan lahan sawah pada musim kemarau melalui budi daya kacang hijau varietas unggul di wilayah kekurangan air di Kabupaten Grobogan***/ Iriani, E.; Anwar, H.; Sarjana (Balai Pengkajian Teknologi Pertanian Jawa Tengah, Ungaran (Indonesia)). [Proceedings of the seminar on agricultural technology innovation and transfer for development of rural industrial agribusiness in marginal areas: innovation of production technology. Book 2. Prosiding inovasi dan alih teknologi pertanian untuk pengembangan agribisnis industrial pedesaan di wilayah marginal: inovasi teknologi produksi. Buku 2, Semarang (Indonesia), 8 Nov 2007/ Muryanto; Prasetyo, T.; Prawirodigdo, S.; Yulianto; Hermawan, A.; Kushartanti, E.; Mardiyanto, S.; Sumardi (eds.). Bogor (Indonesia): BBP2TP, 2007: p. 289-294, 6 ill., 2 tables; 6 ref. 631.17/BAL/p bk2

VIGNA RADIATA RADIATA; HIGH YIELDING VARIETIES; RICE FIELDS; CULTIVATION; DRY SEASON; YIELDS; YIELD COMPONENTS; JAVA.

Innovation of agricultural technology and high production variety of mungbean is potential to improve mungbean production, particularly at mung bean center that the area is lack of water and fallow rice field. A study was conducted at Kluwan Village, Penawangan Sub-District of Grobogan District in dry season 2007. The study demonstrated the use of the new agricultural technology and the high production variety of mung bean, namely Kutilang variety. The bean was grown on the former rice omission plot investigation field under the integrated plant disease management. There were five spaces rice field that in the past was fertilized using nitrogen (N. T1), phosphorus (P. T2), potassium (K. T3), NPK (T4)

fertilizers, and under farmers management (T5). Measurements were made for growth rate of plant and production components. Results showed that the Kutilang mungbean grown on T4 and T5 rice fields grew faster (P<0.05) than others. The two of them reached the maximum height of 56.33 cm and 54.66 cm (for T4 and T5, respectively). The rice field of T5 produced the largest number of mung bean pod (l8.0/plant) followed by T4 (16.66/plant). The average number of seed /pod of T4 and T5 was similar (9.66). It was documented that the average bean production/plant of T5 (13.4 g equal to 1.34 ton/ha) and T4 (12.13 g equal to 1.21 ton/ha) were superb among the experimental fields.

025 SAJIMIN

Production of elephant grass on vegetable crop farming system at Canggal Village Temanggung District. ***Produksi rumput gajah (Pennisetum purpureum) pada sistem usaha tani tanaman sayuran di Desa Canggal Kabupaten Temanggung***/ Sajimin; Isbandi; Kusnadi, U. (Balai Penelitian Ternak Ciawi (Indonesia)). [Proceedings of the seminar on agricultural technology innovation transfer for development of rural industrial agribusiness in marginal areas: innovation of production technology. Book 2]. Prosiding inovasi dan alih teknologi pertanian untuk pengembangan agribisnis industrial pedesaan di wilayah marginal: inovasi teknologi produksi. Buku 2, Semarang (Indonesia), 8 Nov 2007/ Muryanto; Prasetyo, T.; Prawirodigdo, S.; Yulianto; Hermawan, A.; Kushartanti, E.; Mardiyanto, S.; Sumardi (eds.). Bogor (Indonesia): BBP2TP, 2007: p.353-357, 4 tables; 10 ref. 631.17/BAL/p bk2

VEGETABLE CROPS; FARMING SYSTEMS; PENNISETUM PURPUREUM; PRODUCTION; JAVA.

An experiment of elephant grass introduction in vegetable crop farming system for providing green feed for sheep was conducted at Canggal Village, Temanggung District. The grass was grown on the vegetable field bank of 0.5 m wide as the crop hedge. The study employed a completely randomized block design. The treatments of the experiment were grass cutting interval at: a) 4 weeks, b) 6 weeks, and c) 8 weeks. The experiment used 5 replications in each treatment. Measurements were made for the height, production, and the nutrients profile of the grass. Results showed that the largest amount of grass production was harvested at 6 weeks cutting interval, but the lowest one was resulted at the 4 weeks cutting interval. Thus, the highest carrying capacity for the animal was obtained when the cutting interval of the grass at 6 weeks old. However, there was no significant difference compared to the grass carrying capacity, at 8 weeks cutting interval. Nevertheless, 8 weeks cutting interval provided the lowest nutrient profile of the grass. The present study concluded the best grass cutting interval was 6 weeks. Furthermore, there was no deleterious effect of elephant grass introduction on the vegetable production.

026 SIAGIAN, N.

Possibility of shortening immaturity period of rubber plant by using planting material with many rootstocks. ***Peluang mempersingkat masa belum menghasilkan pada tanaman karet melalui penggunaan bahan tanam berbatang bawah banyak***/ Siagian, N. (Pusat Penelitian Karet, Medan (Indonesia)). *Jurnal Penelitian Karet (Indonesia)* ISSN 0852-808 X (2010) v. 28(1) p. 11-25, 8 ill., 7 tables; 10 ref.

HEVEA BRASILIENSIS; ROOTSTOCKS; STEMS; PROPAGATION MATERIALS; CULTIVATION; GROWTH.

In order to increase growth and uniformity of rubber plant, improvement of cultural practice from planting material preparation, land clearing, field planting up to plant maintenance during immaturity period is necessarily needed. Up to present, rubber immaturity period by

using recent technology has become four years after planting. Short immaturity period will hasten the return of investment. Since 2005, the use of rubber planting materials with many rootstocks has been expanded in farmer level especially in Singkut Sarolangun, Jambi Province. Rubber planting materials with many rootstocks logically will increase girth growth of rubber due to having a lot of roots for the absorption of water and nutrients. Further research is required to prove whether rubber planting materials with lots of roostocks can shorten the immaturity period. The aim of this research was to evaluate the influence of rootstocks number on rubber growth during immaturity period. The experiment was conducted in Sungei Putih Rubber Research Center, arranged in a factorial completely block design with three replications. First factor was rootstock number, i.e. two, three, four and control only one rootstock as usually used. The second factor was types of clone grafted, ie. PB 260 and IRR 118. Two-whorl polybag plant was used as planting material and field planting was done in May 2006. Each experimental unit used 60 plants, so total plants were 1440. Variables observed were girth growth and bark thickness, number and diameter of latex vessels, N,P,K and Mg leaf contents at four years old, and soil chemicophysical properties of observed area before planting. The results of research indicated that at the age of four years, girth growth of PB 260 with two rootstocks reached 42.93 cm, only 2.13 cm bigger compared to that of control (40.80 cm). On IRR 118 clone, girth growth under control was 40.74 cm, namely 2 cm smaller compared to that of three-rootstock plant (42.07 cm). In general, growth of IRR 118 clone was more vigorous compared to that of PB 260 clone. There was no significant influence of treatment of clone and rootstock number interaction on all parameters observed. Girth growth increased of 1.5-2 times by using many rootstoks planting materials as informed previously was unprovable in this research. The possibility of shortening the immaturity period of rubber plant by using planting materials with many rootstocks was low.

027 SYUKUR, C.

[Evaluation of production and curcumin on different collections of turmeric under shading]. ***Evaluasi produksi dan kurkumin pada nomor-nomor kunyit di bawah naungan***/ Syukur, C.; Pitono, J.; Syahid, S.F.; Kristina, N.N.; Haryudin, W.; Lukman, W.; Mardiana; Rudiana. [Research technical report of Indonesian Medicinal and Aromatic Crop Research Institute year 2007]. Laporan teknis penelitian T.A. 2007 Balai Penelitian Tanaman Obat dan Aromatik. Bogor (Indonesia): Balittro, 2008: p.67-80; 10 tables; 6 ref. ISSN 0853-9456 633.88/BAL/l

CURCUMA LONGA; DYES; DRUG PLANTS; CULTIVATION; SHADING; AGRONOMIC CHARACTERS; GROWTH; PRODUCTION.

Turmeric is one of superior medicinal plants used in traditional medicine. This plant is commonly used as cosmetic, food, spice and natural colour. Turmeric is often planted under shading area to increase the farmer income. To support the development of turmeric under shading, the evaluation on plant adaptation at shading condition is needed. The research on production and curcumin evaluation of 70 numbers of turmeric was conducted from January-December 2007 at Cicurug Research Installation, Sukabumi. Seventy numbers of turmeric were planted in two different environment conditions (without and under shading). Plant spacing used was 50 cm x 50 cm, with ten plants per plot. The experiment was arranged in split plot design with three replications. The parameter observed were growth components and curcumin compound on six months, while production was observed on six months. The result revealed that analysis of 6 months curcumin stage of 70 turmeric accessions that evaluated in production and curcumin under shading (30%) treatment and without shading, from the average could be clustered into 3 clusters. First cluster with curcumin contents of 7% was 8 accessions, second cluster between 6-7% were 30 accesions, and the third cluster less than 6% was 32 accessions. Curcumin standard for turmeric commodity based on SNI

MMI is 6%. According to those curcumin analysis, the results showed that the first and second cluster were upper SNI MMI standard, and the third cluster was below the standard. Based on curcumin analysis, eight number have curcumin content above 7% (no. 3, 5, 7, 14, 24, 38, 42 and 64). No. 42 performed the stable curcumin content on two condition (without and under shading), while number 24 had the highest curcumin on shading condition (7.70%).

028 YUSRON, M.
[Research and assessment of medicinal and aromatic plants]. ***Penelitian dan pengkajian tanaman obat dan aromatik***/ Yusron, M.; Yuhono, J.T.; Januwati, M.; Supriadi; Sembiring, B.S.; Imelda. [Research technical report of Indonesian Medicinal and Aromatic Crop Research Institute in year of 2007]. Laporan teknis penelitian T.A. 2007 Balai Penelitian Tanaman Obat dan Aromatik. Bogor (Indonesia): Balittro, 2008: p. 404-415, 9 tables; 15 ref. ISSN 0853-9456 633.88/BAL/l

DRUG PLANTS; ESSENTIAL OIL CROPS; CURCUMA; ZINGIBER OFFICINALE; GROWTH; PRODUCTION; RHIZOMES; CHEMICAL COMPOSITION; TRACE ELEMENT; COST BENEFIT ANALYSIS; FARMING SYSTEMS; FARM INCOME.

Swampland represents land which have potential to be exploited as agriculture farm. According to its physical condition, up to now the swampland is exploited more for the development of paddy crop. To support regional economic expansion, exploiting pattern of farming system should be developed, not only orienting at production approach but rather to earnings approach. Result of research on zingiberaceae in swamp farm showed good result. The objective of research was to obtain technology of zingiberaceae specific to swampland. Activity of this year represents continuation step of year 2005, covering performance of technology cooperative with farmer, including evaluation of farmer response to technology tested. In the year 2007 observation was done to (1) Level of examined technology at condition of local environment and (2) Level of quality and productivity of zingiberaceae. Up to this year-end the important results were (1) Bad growth of ginger because *Phylosticta* sp. attack, while growth of turmeric and java tumeric was good, (2) Enthusiastic farmer to obtain knowledge on postharvest technology and processing of zingiberaceae, (3) Analysis of farming system of ginger, turmeric and java tumeric based on price and production revealed negative earnings, (4) Efforts to increase earnings of farmer was by advanced processing of primary products becoming middle product or final product.

F02 PLANT PROPAGATION

029 HASANAH, M.
[Stock seed production of medicinal and aromatic plants]. ***Produksi benih sumber tanaman obat dan aromatik***/ Hasanah, M.; Sukarman; Wahyuni, S; Rusmin, O.; Melati; Repianyo. [Research technical report of Indonesian Medicinal and Aromatic Crops Research Institute in year of 2007]. Laporan teknis penelitian T.A. 2007 Balai Penelitian Tanaman Obat dan Aromatik. Bogor (Indonesia): Balittro, 2008: p. 417-436, 24 ref. ISSN 0853-9456 633.88/BAL/l

CYMBOPOGON LONGA; POGOSTEMON CABLIN; ZINGIBER OFFICINALE; CURCUMA; CURCUMA XANTHORRHIZA; KAEMPFERIA; SEEDS.

One of the problem for developing medicinal and aromatic crops is inadequate stock seed. In order to limit those problems, since 2002 nucleus seed garden for medicinal and aromatic

crops has been established. The main objective of this activity is to guarantee for supplying stock seed to consumer, especially for seeds of patchouli, lemon grass, ginger, indian galanga, turmeric, and javanese turmeric. In the budget of 2007, the results of activity could be reported as follow: maintainance of patchouly Foundation Seed Garden 1 ha in Manoko, maintenance of indian galanga var. galesia 1, 2 and 3 1 ha in Sukamulya, also maintenance ginger foundation seed 1 ha in Sukamulya including (white big ginger var Cimanggu 1, white small ginger var. Halina 1, 2 and 3, red ginger var. Jahira 1 and maintenance of turmeric foundation seed var. Turina 1 and 2 in Sukamulya of 1 ha and 0,5 ha, respectively. Replanting for some medicinal crops such as ginger, turmeric, indian galanga and javanese turmeric were conducted as follow: ginger 0.75 ha in Cicurug, indian galanga, turmeric and javanese turmeric were 0.5 ha, 0.25 ha and 0.3 ha in Cibinong, respectively. Cultivation techniques such as planting, fertilizer, pest and diseases control was conducted based on the standard operational procedure for cultivation of each commodity. In order to control seed quality, the certification has been conducted on ginger, indian galanga, and turmeric seed. Certification was conducted by the Agency of Certification and Control for Food and Horticulture Crops.

030 KASI, P.D.

Development of embryogenic callus of sago (*Metroxylon sago* Rottb.) on three systems of in vitro culture. *Perkembangan kalus embriogenik sagu (Metroxylon sago Rottb.) pada tiga sistem kultur in vitro*/ Kasi, P.D.; Sumaryono (Balai Penelitian Bioteknologi Perkebunan, Bogor (Indonesia)). *Menara Perkebunan* (Indonesia) ISSN 0215-9318 (2008) v. 76(1) p. 1-10, 4 ill., 1 table; 18 ref.

METROXYLON; CULTURE TECHNIQUES; IN VITRO CULTURE; EMBRYO CULTURE; CALLUS; PLANT PROPAGATION

Embryogenic callus of sago (*Metroxylon sago* Rottb.) has been grown on three systems of in vitro culture i.e. agar-solidified medium, liquid medium, and temporary immersion system (TIS) medium to observe and compare the development of embryogenic callus over one passage of six weeks. A-half gram of embryogenic callus was cultured on a modified MS medium containing 10 mg/l 2,4-D and 0.1 mg/l kinetin. For histological studies, embryogenic callus was fixed in FAA and embedded in paraplast wax. Serial sections were stained with safranin 1% and observed microscopically. By the end of culture period, the development of embryogenic callus in TIS medium was relatively better than those of the other two media. Fresh weight of callus in liquid medium and TIS increased by 6.5-fold, while on agar-solidified medium increased by 5.4-fold in six weeks. About 40% of callus in liquid medium and TIS and 20% of callus on agar solidified medium have changed into somatic embryos at globular stage. Histology structure of embryogenic callus of the three systems of in vitro culture shows different pattern. On agar-solidified medium, secondary callus and friable embryogenic callus that consist of meristematic cells were formed. In contrast, more embryogenic cells were formed in liquid medium and TIS to support maturation process to somatic embryos. Therefore, temporary immersion system and liquid medium are recommended for maturation of embryogenic callus, whereas agar-solidified medium is for proliferation of embryogenic callus of sago.

031 MARISKA, I.

[Propagation of some patchouly somaclones resistant to drought]. *Perbanyakan beberapa somaklon nilam tahan kekeringan*/ Mariska, I.; Purnamaningsih, R. (Balai Besar Bioteknologi dan Sumberdaya Genetik Pertanian, Bogor (Indonesia)). [Research technical report of Indonesian Medicinal and Aromatic Crops Research Institute in year of 2007].

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POGOSTEMON CABLIN; PLANT PROPAGATION; CLONES; TISSUE CULTURE; DROUGHT; MUTATION; PLANT GROWTH SUBSTANCES.

Patchouly (*Pogostemon cablin* Benth.) is source of patchouly oil. Indonesia is the biggest producer of patchouly oil in the world reaching to 90% of supply. Generally, patchouly is cultivated at dry land, so that drought stress becomes problem for patchouly development. In vitro culture is alternative method to conduct propagation of patchouly somaclones tolerant to drought. Combination of mutation with in vitro selection have been conducted to obtain plant varieties with specific characters. Patchouly lines tolerant to drought have been conducted by using mutation and in vitro selection with PEG. Those lines must be tested in green house for tolerance characteristic. Therefore those lines must be multiplied in the laboratory and acclimatized in the green house. Multiplication of each line was done by using MS medium added with BA or kinetin at several dosages concentrations, while rooting induction was done by using IAA. Result showed that there was different response of each lines to in vitro multiplication treatment. Rooting induction can be done without plant growth regulator added.

32 ROOSTIKA, I.

[Cryopreservation of *Pimpinella pruatjan* by encapsulation-vitrification technique]. *Kriopreservasi tanaman obat langka purwoceng dengan teknik enkapsulasi-vitrifikasi/* Roostika, I.; Rahayu, S.; Sunarlim, N. (Balai Besar Penelitian dan Pengembangan Bioteknologi dan Sumberdaya Genetik Pertanian, Bogor (Indonesia)). *Buletin Plasma Nutfah* (Indonesia) ISSN 1410-4377 (2008) v. 14(2) p. 49-56, 7 ill., 20 ref.

PIMPINELLA; DRUG PLANTS; BIOLOGICAL PRESERVATION; ENCAPSULATION; VITRIFICATION; CULTURAL METHODS; DRYING; TISSUE CULTURE

Pruatjan (*Pimpinella pruatjan* Molk.) is an Indonesian endangered medicinal plant, so that it is highly protected. Cryopreservation can be applied to this plant for long-term preservation. The aim of this research was to obtain a method of encapsulation-vitrification by optimizing each step in cryopreservation protocol, i.e. preculture, loading, dehydration with and without freezing in liquid nitrogen. The best treatment of each step would be applied in the following step. On preculture experiment, in vitro shoots were planted on the Driver and Kuniyaki (DKW) basal media containing 0.3 M sucrose and incubated for 1, 2, 3, 4, and 5 days. After those incubation period, shoot tips were encapsulated with 2.5 percent Na-alginate and soaking for 15 minutes in 100 ppm CaCl2 solution before planting. On loading experiment, precultured explants were loaded in DKW basal solution containing 2 M glycerol and 0.4 M sucrose for 0, 30, 60, and 90 minutes. On dehydration experiment, precultured and loaded explants were dehydrated with PVS2 solution (DKW + 30% glycerol + 15% DMSO + 15% ethyleneglicol + 0.4 M sucrose) for 0, 30, 60, 90, and 120 minutes. The parts of them were freezed in liquid nitrogen (-196°C). The result showed that cryopreservation through encapsulation-vitrification technique could be applied on pruatjan. The best preculture treatment was 5 days incubation period. The best loading treatment was 30 minutes. The best dehydration treatment was 90 minutes. The successful level of this research was still low (10 percent) so that it needs optimization method.

033 SUKARMAN

[Efficiency of promising java turmeric (*Curcuma xanthorrhiza* Roxb.) clones seed application]. *Efisiensi penggunaan benih nomor harapan tanaman temu lawak (Curcuma*

xanthorrhiza Roxb.)/ Sukarman; Rahardjo, M.; Rusmin, D.; Melati; Repianyo; Kosasih. [Research technical report of Indonesian Medicinal and Aromatic Crops Research Institute in year of 2007]. Laporan teknis penelitian T.A. 2007 Balai Penelitian Tanaman Obat dan Aromatik. Bogor (Indonesia): Balittro, 2008; p.251-256. ISSN 0853-9456 1 table; 10 ref. 633.88/BAL/l

CURCUMA XANTHORRHIZA; VARIETIES; SEEDLINGS; AGRONOMIC CHARACTERS.

Effectiveness of seed utilization was conducted in Sukamulia experiment garden from January - December 2007 to support release of Java turmeric (*Curcuma xanthorrhiza* Roxb.). The objective of this experiment was to improve the effectiveness of java turmeric seed utilization. Field experiment consisted of five treatments, 3 replications and arranged in randomized completely block design (RCBD). The treatments were seed use of (1) branch rhizome, (2) whole main rhizome, (3) main rhizome split into two parts, (4) main rhizome split into four parts, and (5) main rhizome split into eight parts. Variables observed were germination percentage, plants growth (plant height, diameter of trunk, number of tiller per plants, number of leaf per plants). The results of experiment indicated that germination percentage was not significantly affected by treatments, however the best plants growth was found on treatment where seed originated from whole main rhizome.

F03 SEED PRODUCTION AND PROCESSING

034 ARIEF, R.W.

Performance of seed quality of some new improved rice varieties based on the laboratory standard. *Keragaan mutu benih padi varietas unggul baru berdasarkan standar laboratorium*/ Arief, R.W.; Mustikawati, D.R. [Proceedings of the national seminar on rice research results in 2009. Book 3]. Prosiding seminar nasional hasil penelitian padi 2009. Buku 3. Sukamandi (Indonesia), 28 Oct 2009/ Setyono, A.; Indrasari, S.D.; Agus, S.Y. (eds.). Sukamandi (Indonesia): Balitpa, 2010: p.1093-1099, 3 tables; 7 ref 633.18-115.2/SEM/p bk3

RICE; VARIETIES; SEED; QUALITY; PRODUCTIVITY; YIELDS.

To most of the rice farmers in Indonesia, the availability of quality rice seeds is paramount to support their rice farming. The availability of rice seeds is depended on the seed companies available in Indonesia. Unfortunately, the rice seeds available in the markets were often found to be very poor, such as low germinability, contain other varietal mixtures, unnecessary stuffs, etc. Therefore, the farmers should be encouraged to become seed producers with the guidance from the Seed Control and Certification Center (BPSB). This experiment was carried out in Lampung District during the WS of 2008. Five new rice varieties, namely Cimelati, Mekongga, Gilirang, Bondoyudo, and Conde were grown. During the rice cropping season, crop inspection by the team of BPSB were carried out three times, i.e. when the rice crops were at 21 days after transplanting (DAT), at the growth stage of 90% flowering, and at 7 day before harvesting. Results of the experiment indicated that the highest yield of 6.43 t/ha were demonstrated by Mekongga, while the highest quality seed of 26.97% was by Conde. Due to their high productivity and taste, most farmers preferred more on Mekongga, Conde, and Gilirang than the other varieties. The quality seeds produced by all rice varieties evaluated meet the criteria to be as the foundation seeds (FS) class.

035 BOBIHOE, J.

Study on the production of quality rice seed in semi intensive lowland of Tanjung Jabung Barat, Jambi Province [Indonesia]. ***Kajian perbenihan padi di lahan sawah semi intensif Kabupaten Tanjung Jabung Barat, Provinsi Jambi***/ Bobihoe, J.; Jumakir. [Proceedings of the national seminar on rice research results in 2009. Book 3]. Prosiding seminar nasional hasil penelitian padi 2009. Sukamandi (Indonesia), 28 Oct 2009. Buku 3/ Setyono, A.; Indrasari, S.D.; Agus, S.Y. (eds.). Sukamandi (Indonesia): Balitpa, 2010: p.1173-1183, 2 tables; 8 ref. 633.18-115.2/SEM/p bk3

ORYZA SATIVA; RICE FIELDS; VARIETIES; SEED; PRODUCTION; QUALITY; YIELDS.

One of the factors determining the rice yields in Jambi was the continuous cropping of a particular rice variety without any crop rotation and lack of quality rice seed in the areas. It is understandable, therefore, that quality rice seed should be available and easily obtained by farmers when needed. For this purpose, the development of rice seed system to facilitate farmers in obtaining quality rice seed is necessary. A study to evaluate the development of rice seed production system was executed in Sri Agung Village, Tungkal Ulu Sub-district, Tanjung Jabung Barat District, Jambi Province during the dry season of 2008. Results of the study indicated that the rice yield of 5.70 t/ha of milling dried grain produced by Ciherang variety was certified as quality rice seed as much as 3.5 t/ha. Economically, it provided the farmers a total benefit of Rp 6,832,500 with the R/C ratio of 2.4 when they were sold for consumption. The benefit obtained became as much as Rp 8,932,500 with the R/C ratio of 2.7 when the seed were sold as quality rice seed. It appeared that the benefit obtained from producing quality seeds was approximately Rp 2,100,000/ha higher as compared to that obtained from producing grains for consumption.

036 ISHAQ, I.

Possibility of SWOT method to analyze the potential of rice seed development in West Java [Indonesia]. ***Potensi pengembangan perbenihan padi di Jawa Barat berdasarkan analisis SWOT***/ Ishaq, I. (Balai Pengkajian Teknologi Pertanian Jawa Barat, Lembang (Indonesia). [Proceedings of the national seminar on rice research results in 2009. Book 3]. Prosiding seminar nasional hasil penelitian padi 2009. Sukamandi (Indonesia), 28 Oct 2009. Buku 3/ Setyono, A.; Indrasari, S.D.; Agus, S.Y. (eds.). Sukamandi (Indonesia): Balitpa, 2010: p.1157-1171, 4 tables; 15 ref. 633.18-115.2/SEM/p bk3

RICE; ORYZA SATIVA; SEED; VARIETIES; QUALITY.

One of the main factors determining rice production was the use of quality rice seeds. It was estimated that the need of quality rice seeds in West Java was approximately 45,078.19 t/year and 3,674.11 t/year for irrigated lowland and upland rice, respectively. Ironically the utilization of certified seeds was only 31.36% of the above mentioned predicted demand. Various problems related to this condition might arise since the process of seed production, the distribution, and the spread of the seeds, as well as the organization of the seed growers themselves. Based on these issues, it might be useful to apply the SWOT analysis method to identify problems and opportunity, as well as to identify strategies to solve the identified problems in the quality of rice seed development in West Java. Results of the study indicated that the development of the quality rice seeds in West Java can be achieved through a well consideration of four strategies, namely (1) strength-opportunity/SO strategy is aggressive, (2) strength- threat/ST strategy is consolidation, (3) weakness-opportunity/WO strategy is diversification, and (4) weakness-threat/WT strategy is defensive. The policies needed to achieve the target increase of rice seed development, such as (1) performance improvement, planning, supervision, and consistency in the implementation of government policy

(intensification) is mainly associated with rice seed development oriented agribusiness, (2) increase coordination among relevant agencies in developing rice seed and the involvement of private sector through partnership with farmers, (3) increase production efficiency and quality of rice seeds during the next five years with growth of 10-20% or 2-4% per year, and (4) increased farmer households income which were rice seed breeder with 100-150% or 20-25% growth per year.

037 MULSANTI, I W.

Influence of different seed classes to the irrigated rice productivity of Ciherang and IR64. ***Pengaruh perbedaan kelas benih terhadap produktivitas padi varietas Ciherang dan IR64***/ Mulsanti, I.W.; Wahyuni, S. [Proceedings of the national seminar on rice research results in 2009. Book 3]. Prosiding seminar nasional hasil penelitian padi 2009. Sukamandi (Indonesia), 28 Oct 2009. Buku 3/ Setyono, A.; Indrasari, S.D.; Agus, S.Y. (eds.). Sukamandi (Indonesia): Balitpa, 2010: p.1101-1110, 3 tables; 17 ref. 633.18-115.2/SEM/p bk3

ORYZA SATIVA; VARIETIES; SEED; PRODUCTIVITY; YIELDS; JAVA.

Response of farmers to high quality rice seeds was increasing at recent time. Formally, the quality of seeds, including the rice seeds in each province was under the responsibility of the Seed Control and Certification Center. There are 4 classes of rice seeds in Indonesia, i.e. breeder seed (BS), foundation seed (FS), stock seed (SS), and extension seed (ES). Due to the price of each class of rice seeds, it is suggested that farmers should grow the extension seeds in producing rice grain for consumption. However, recently several farmers preferred the stock seed class instead, as they thought that the higher the level of the seed class will produce the higher of the rice grain when they were grown. An experiment to study the influence of various seed classes on plant performance, yield, and yield component of paddy has been conducted at Sukamandi Experimental Station of the Indonesian Center for Rice Research (ICRR) during the dry season of 2007. Three different rice seed classes of Ciherang and IR64 varieties, i.e. FS, SS, and ES were planted in plots of 6 m x 4 m in size with the planting distance of 25 cm x 25 cm. The crops were fertilized with 250 kg/ha urea, 100 kg/ha SP36, and 100 kg/ha KCl. The yield and yield components were measured at harvest time, while seed quality was assessed in the Seed Quality Laboratory of the ICRR. Results of this experiment indicated that plant performance, yield component, yield of rice, and seed quality were not significantly affected by the seed classes used.

038 MULYA, S.H.

Studies on the role of seed institution and seed system on the development of hybrid rice. ***Studi peran kelembagaan dan sistem perbenihan dalam pengembangan padi hibrida***/ Mulya, S.H.; Wardana, S.P.; Setyono, A. [Proceedings of the national seminar on rice research results in 2009. Book 3]. Prosiding seminar nasional hasil penelitian padi 2009. Sukamandi (Indonesia), 28 Oct 2009. Buku 3/ Setyono, A.; Indrasari, S.D.; Agus, S.Y. (eds.). Sukamandi (Indonesia): Balitpa, 2010: p.1125-1143, 5 tables; 4 ref. 633.18-115.2/SEM/p bk3

ORYZA SATIVA; SEED; HYBRIDS; VARIETIES; QUALITY

A survey to obtain information on the pattern of development of hybrid rice seed production systems done by either formal or informal institutions was carried out in Central Java and East Java, during the cropping season of 2009. Results of the experiment indicated that the

performance of the rice seed institutions in Central Java was still unsatisfied. This condition was might be due to the limited human resources in term of numbers, ability, or skills, and lack of supports. Farmers' groups were not interested in hybrid rice seed development, due to high level of risk and low profit. In East and Central Java, slow development of hybrid rice was mostly due to the low average yields, its susceptibility to major rice pests and diseases, high cost of production, low price of the grains, less knowledge of farmers on hybrid rice, farmers were not familiar with the hybrid seeds, and the hybrid seeds were not easily obtained from the market. The yields obtained from the primary source of seeds were different from that the growers. This might be due to genetic factors of rice varieties and low technological level of the farmers.

039 RUSKANDAR, A.

Impact of dissemination of seed development model on variety distribution in Blora [Indonesia]. ***Dampak diseminasi model pengembangan benih padi terhadap perkembangan sebaran varietas di Kabupaten Blora***/ Ruskandar, A.; Wahyuni, S. [Proceedings of the national seminar on rice research results in 2009. Book 3]. Prosiding seminar nasional hasil penelitian padi 2009. Sukamandi (Indonesia), 28 Oct 2009. Buku 3/ Setyono, A.; Indrasari, S.D.; Agus, S.Y. (eds.). Sukamandi (Indonesia): Balitpa, 2010: p.1197-1206, 5 tables; 7 ref. 633.18-115.2/SEM/p bk3

RICE; VARIETIES; DISTRIBUTION; QUALITY; ECONOMIC ANALYSIS; JAVA.

Improved rice variety, as one of the technology components, is the easiest technology to be adopted in the rice production system in Indonesia. Nevertheless, it still needs time for a new rice variety to be adopted and distributed by the farmers. Through Poor Farmer Project, effort to disseminate 10 new improved rice varieties have been conducted at Kedungtuban Subdistrict of Tuban District in 2007. Seeds of these 10 rice varieties, i.e. Ciherang, Cibogo, Cigeulis, Situ Bagendit, Bondoyudo, Mekongga, Situ Patenggang, Batutegi, Limboto, and Singkil were planted in the demonstration area. During planting period, the researcher in collaboration with the farmers observed the performance of the rice plants during the vegetative and generative stages, grain quality, and the cooked rice quality through organoleptic test. These observations revealed that Cibogo was the most preferred variety and its spread was faster than other varieties. One year after varieties demonstration in Kedungtuban, Cibogo variety has been planted by farmers in Blora District covering the area of up to 1,515 ha. Cibogo adoption has spread over Kedungtuban, Cepu, Jepon, Blora, Ngawen, and Kunduran Sub-districts in area of 350 ha, 200 ha, 115 ha, 150 ha, 550 ha, and 150 ha, respectively; or equivalent to 0.49%, 7.0%, 3.4%, 7.6%, 8.6%, and 1.5% from total area of rice field available in Blora, respectively. Although the current spread of Cibogo is still limited as compared to that of Ciherang variety, but based on its vegetative growth, yield performance, and farmers' preferences, the probability of Cibogo to spread over a larger area than Ciherang is high in the near future.

040 SIAGIAN, V.

Analysis of factors affecting the use of certified seed in deep water rice crops in South Sumatra [Indonesia]. ***Analisis faktor-faktor yang mempengaruhi penggunaan benih bersertifikat di Lebak Rawa Sumatera Selatan***/ Siagian, V. [Proceedings of the national seminar on rice research results in 2009. Book 3]. Prosiding seminar nasional hasil penelitian padi 2009. Sukamandi (Indonesia), 28 Oct 2009. Buku 3/ Setyono, A.; Indrasari, S.D.Agus, S.Y. (eds.). Sukamandi (Indonesia): Balitpa, 2010: p.1207-1221, 5 tables; 10 ref. 633.18-115.2/SEM/p bk3

ORYZA SATIVA; SEED CERTIFICATION; VARIETIES; SUMATRA.

A total of 314.71 ha of deep water land are available in South Sumatra Province. The objectives of this experiment were to evaluate the potency, prospect, and constraints on the development of seed industry in such deep water ecosystem. The experiment was also expected to obtain information on rice seeds required in South Sumatra as well as the factors influencing its adoption in the deep water ecosystem. Sampling was carried out through the method of simple random sampling. Results of this experiment revealed that a total of 75% of farmers in deep water areas of South Sumatra were commonly grown certified rice seeds of 37.6 kg/ha. It was observed that through the adoption of certified rice seeds, the grain yields reached 4.25 t/ha, 60% higher as compared to that harvested from crops without certified seeds. The business of multiplying certified rice seeds seems to be profitable and has a good prospect since South Sumatra still needs at least a total of 14,813 t/year. Factors that significantly influencing the demand of certified seeds during the dry season-1 of 2007 were price of non-certified rice seeds, price of potassium fertilizer, and size of the land being managed.

041 SUHENDRA, T.

Institution initiating for the rice seed farming system of new rice high yielding variety at Prima Tani location in Tulakan Village, Jepara District [Indonesia]. ***Inisiasi kelembagaan perbenihan padi varieties unggul baru di lokasi Prima Tani Desa Tulakan Kabupaten Jepara***/ Suhendra, T.; Kushartanti, E (Balai Pengkajian Teknologi Pertanian Jawa Tengah, Ungaran (Indonesia)). [Proceedings of the national seminar on rice research results in 2009. Book 3]. Prosiding seminar nasional hasil penelitian padi 2009. Sukamandi (Indonesia), 28 Oct 2009. Buku 3/ Setyono, A.; Indrasari, S.D.; Agus, S.Y. (eds.). Sukamandi (Indonesia): Balitpa, 2010: p.1145-1156, 1 ill., 3 tables; 7 ref. 633.18-115.2/SEM/p bk3

RICE; FARMING SYSTEMS; SEED; VARIETIES; QUALITY.

High yielding varieties and good quality rice seeds play a very important role in increasing productivity, production, and yield quality of rice. This assessment was aimed to study the possibility of establishing institutional producer of the quality rice seeds and to study the prospect of its development. The assessment was carried out at Tulakan Village, Jepara District during the wet season 2 (March-July) of 2008. The rice varieties of Mekongga, Cibogo, Conde, and Cigeulis were grown and maintained through the integrated crop management (ICM) approach. Seeds of the crops were harvested and processed during August- October 2008. Results of this assessment indicated that the institutional model of the rice quality seeds has been established, in which farmers of the farmers' group played as the seed grower and the union of the farmers' groups (Gapoktan) Margo Utomo was as the producer. Economical analyses indicated that such model of collaboration earned the benefit as much as Rp 8,186,000/ha/season with the RC ratio value of 2.3 and Rp7,154,580/ha/season with RC ratio value of 1.57 for the grower and the producer, respectively. The rice seeds produced were classified as the seed class of stock seed (SS) and were reached the amount of 5.34 t (32.16%), 4.30 t (25.89%), 4.21 t (25.38%), and 2.75 t (16.58%) for Mekongga, Cibogo, Conde, and Cigeulis, respectively.

042 SUSILAWATI, P.N.

Performance and financial analysis of rice seed growers in Banten Province [Indonesia]. ***Keragaan dan analisis finansial petani penangkar benih padi, kasus di penangkar benih binaan BPTP Banten***/ Susilawati, P.N.; Wulandari, R.; Kardiyono; Kurniawati, S. (Balai Pengkajian Teknologi Pertanian Banten (Indonesia)). [Proceedings of the national seminar on rice research results in 2009. Book 3]. Prosiding seminar nasional hasil penelitian padi 2009. Sukamandi (Indonesia), 28 Oct 2009. Buku 3/ Setyono, A.;

Indrasari, S.D.; Agus, S.Y. (eds.). Sukamandi (Indonesia): Balitpa, 2010: p.1185-1196, 1 ill;6 tables; 6 ref 633.18-115.2/SEM/p bk3

ORYZA SATIVA; RICE; SEED; HIGH YIELDING VARIETIES; QUALITY; PRODUCTION; ECONOMIC ANALYSIS.

The availability of the high yielding varieties (HYVs) of rice and their quality seed was definitely needed by the farmers in such an intensive rice production system. Unfortunately, the HYV and their quality seed were still rarely adopted by the rice farmers in Banten Province. Until present, the rice crops in Banten areas were dominated by IR64 and Ciherang varieties. An experiment to analyze the performance of production, the financial, and the farmers preference was conducted in three districts of Banten Province, namely Serang, Pandeglang, and Lebak in the year of 2007. The descriptive analysis and cross tabulation method was adopted to evaluate both quantitative and qualitative data. Results of this experiment indicated that the rice production were different among locations and varieties. The seed production in Lebak, Pandeglang, and Serang Districts were 4.48, 4.44, and 3.27 t/ha, respectively. The yields of Bondoyudo, Mekongga, Cigeulis, Gilirang, Ciherang, Situ Bagendit, Cibogo, and Ciapus were 4.85, 4.76, 4.73, 4.31, 3.94, 3.84, 3.66, and 2.26 t/ha, respectively. The farmer's income reached between Rp 4,980,000 to Rp 15,210,000 with the highest BCR of 2.30 was observed on Bondoyudo and the lowest of 0.96 was on Ciapus, which means that the quality of rice seed farming system was financially feasible. The rice varieties of Cigeulis, Gilirang, and Ciherang, were prospectively feasible to be developed as quality seed industry.

043 UDIN, S.

Compatibility of room germinator with standard germinator cabinet in seed testing. ***Kompatibilitas kinerja ruang penguji daya berkecambah dengan standard germinator cabinet dalam pengujian mutu benih***/ Udin, S.; Nugraha; Astanto. [Proceedings of the national seminar on rice research results in 2009. Book 3]. Prosiding seminar nasional hasil penelitian padi 2009. Sukamandi (Indonesia), 28 Oct 2009 Buku 3/ Setyono, A.; Indrasari, S.D.; Agus, S.Y. (eds.). Sukamandi (Indonesia): Balitpa, 2010: p.1111-1123, 4 ill., 3 tables; 8 ref. 633.18-115.2/SEM/p bk3

ORYZA SATIVA; GERMINATION; SEED TESTING; QUALITY; CHEMICOPHYSICAL PROPERTIES; YIELDS.

Testing for compatibility of room germinator with standard germinator was carried out contemporaneously at Indonesian Center for Rice Research (ICRR) and Maros Cereal Research Institute (MCRI) laboratories. The testing was aimed at verifying conformity of room germinator performance to the requirements of standard germination test method. Two activities have been completed, i.e (1) modification of room germinator to improve energy efficiency, and (2) evaluation on compatibility of room germinator's functional performance with those of standard germinator's. Modification in humidifier was carried out at ICRR laboratory, Sukamandi by inserting thermal insulation (styrofoam) between inner and outer walls of humidifier, and removing one out of two units heater and blower, respectively. Evaluation on compatibility of room germinator functional performance's was done by comparing the results of germination test in room germinator at MCRI laboratory to those in standard germinator at ICRR Sukamandi. Germination test at both MCRI and ICRR was carried out in accord to ISTA standard method. The results of activity showed that modification on room germinator has been reducing power input by 53% from 3,250 watt to 1,540 watt without decreasing its mechanical performance. Change over time from 20^{o}C to 30^{o}C or vice versa, and relative humidity achieved in room germinator during 85 hours observation were conformed to standard method requirements. However, functional

performance of room germinator found to be compatible only for rice and corn seed germination tests. It means MCRI laboratory has been able to produce seed germination data of rice and corn by using room germinator that comparable to those by using standard germinator cabinet. For germination data of other seeds (timothy, celery and chili) were incompatible. The most probable cause for incompatibility were merely variaton in seed analyst's competence and quality seed testing substrates, definitely, incompatibility problem was not caused by room germination performance.

044 WAHYUNI, S.

Study on the chemical solution for breaking dormancy of rice seeds. ***Evaluasi konsentrasi dan jenis larutan kimia untuk pematahan dormansi benih padi***/ Wahyuni, S. [Proceedings of the national seminar on rice research results in 2009. Book 3]. Prosiding seminar nasional hasil penelitian padi 2009. Sukamandi (Indonesia), 28 Oct 2009. Buku 3/ Setyono, A.; Indrasari, S.D.; Agus, S.Y. (eds.). Sukamandi (Indonesia): Balitpa, 2010: p.1081-1091, 4 tables; 16 ref 633.18-115.2/SEM/p bk3

ORYZA SATIVA; SEED; VARIETIES; CHEMICALS; SOAKING; DORMANCY BREAKING; GERMINABILITY.

Although dormancy occurred naturally on seeds of various crops including rice crop serves as the mechanism to protect the seeds from being germinate while they are still in the field, but it could be a problem for seeds when the farmers expect them to grow soon. Effective method, therefore, is needed to overcome the problem on rice seeds dormancy which is useful not only for seed analysts but also for the seed growers. An experiment to evaluate the methods of breaking dormancy of rice seeds has been carried out at the Seed Laboratory of the Indonesian Centre for Rice Research in 2007. Rice seeds of Gilirang, IR64, and Way Apo Buru varieties showing low normal seedlings were selected and used in the experiment. Prior to germinating, the seeds were soaked in: (1) 1% solution of KNO_3 (p.a.), (2) 3% and 5% solutions of compound fertilizers, (3) 0.25%, 0.50%, and 1% solution of plant growth regulator (PGR), and (4) untreated check. Results of the experiment indicated that 1 % solution of KNO_3, 3% and 5% solutions of compound fertilizers, and 0.25%, 0.50%, and 1% PGR, increased the germination of rice seeds of Gilirang, IR64 and Way Apo Buru. Rates of solutions were not significantly affected the seed germination. This experiment concluded that 3% solution of N and K compound fertilizers, 3% solution of N, K, Na, and B compound fertilizers, 0.25% solution of PGR containing active ingredient of natrium nitrophenol and natrium guaiacol, and 0.25% PGR of GA3 was suggested to break the dormancy of rice seeds.

F04 FERTILIZING

045 ADIANDRI, R.S.

Effect of fertilizers on the production, recovery, and the quality of milled rice: a case study of two farmer's group in Grobogan District, Central Java Province [Indonesia]. ***Pengaruh pupuk terhadap produksi rendemen, dan mutu beras giling, studi kasus di dua kelompok tani di Kabupaten Grobogan Jawa Tengah***/ Adiandri, R.S.; Nugraha, S. [Proceedings of the national seminar on rice research results in 2009. Book 3]. Prosiding seminar nasional hasil penelitian padi 2009. Buku 3. Sukamandi (Indonesia), 28 Oct 2009/ Setyono, A.; Indrasari, S.D.; Agus, S.Y. (eds.). Sukamandi (Indonesia): Balitpa, 2010: p.1033-1046, 4 tables; 13 ref.; Appendix 633.18-115.2/SEM/p bk3

ORYZA SATIVA; FERTILIZER APPLICATION; NPK FERTILIZERS; PRODUCTION; QUALITY; YIELDS.

Besides for the food security purpose, increasing rice production was also aimed to improve farmer's income and job opportunity for the people. The efforts to increase rice production done by the GOI, were not only emphasizing the quantity aspect but also the rice quality. Fertilizer is one of the production components that play an important role in increasing rice production and its quality. An experiment to evaluate the effect of fertilizers to the production, recovery, and the quality of milled rice was conducted by involving two groups of farmers, Mergo Utomo and Tani Makmur, in Grobogan District, Central Java. At every location four combinations of NK, NP, PK, and NPK fertilizers were assigned as treatments. Rates of fertilizers applied were 250 kg/ha urea, 100 kg/ha SP36, and 100 or 75 kg/ha KCl. Checks were plots fertilized as usually done by farmers. Treatments were carried out in plots of 5 m x 5 m in size. Results of this experiment indicated that combination of fertilizers significantly affected rice production, recovery of milled rice over the rice grain, and quality of milled rice. The rice quality produced from all of the treatments was still below the SNI's standard. Considering the Indonesian rice quality standard (SNI 6128:2008), the rice quality produced by the Margo Utomo farmer's group, from plots fertilized with the combination of NPK and NK, was classified as quality IV and those from plots fertilized with the combination of PK, NP, and farmers practice were classified as quality V; while those produced by Tani Makmur farmer's group, from all of the treatments combination were classified as quality V.

046 DJAZULI, M.

[Fertilizer and microbia application as growth promoting agent to increase artemisinin production on *Artemisia annua* L.]. ***Penggunaan pupuk dan mikrobia sebagai growth promoting agent untuk meningkatkan produksi artemisinin pada Artemisia annua L./*** Djazuli, M.; Gusmaini; Maslahah, N.; Nurhayati, H. [Research technical report of Indonesian Medicinal and Aromatic Crops Research Institute in year of 2007]. Laporan teknis penelitian T.A. 2007 Balai Penelitian Tanaman Obat dan Aromatik. Bogor (Indonesia): Balittro, 2008: p. 319-336. ISSN 0853-9456, 10 tables; 23 ref. 633.88/BAL/l

ARTEMISIA ANNUA; NPK FERTILIZERS; FERTILIZER APPLICATION; MICROORGANISMS; ARTEMISININ; PRODUCTION; AGRONOMIC CHARACTERS; GROWTH; PLANT GROWTH SUBSTANCES.

Artemisia annua L. contains an active compound artemisinin which is known as antimalarial drug efficacious against drug-resistant strains of Plasmodium, the malarial parasite. The objective of this study is to find out the optimal fertilizer dosage and effective microbia which is able to improve growth, production, and quality of *Artemisia annua* L. The experiment consists two subactivities, first trial is the study on fertilizer application for improving production and artemisinin content, and the second is the endophyte microbial as growth promoting agent for increasing artemisinin content. Those trials were conducted at Gunung Putri Experimental Station (1.500 m asl) from January - December 2007. The first trial was conducted at polybag containing 10 kg soil/polybag. Experimental design used was RBD factorial with three replications. First factor was three levels of N fertilizer, second factor was three levels of P fertilizer, and third factor was three levels of K fertilizer application. In the second activity, RBD factorial was used with four replications. First factor was two accessions of Artemisia collected from BPTO and Kimia Farma. The second factor was three microbial application treatments, (1) without microbial application, (2) with microbe collected from BPTO, (3) the microbe collected from Kimia Farma artemisia plant. The experiment results showed that at relatively fertile soil, application of N fertilizer was not effective for improving growth component especially plant height and number of branch.

Leaf fresh weight at 4 MAP were varied from 157 to 625 g/plant. P fertilizer application was able to increase leaf production significantly. N and P fertilizers application were correlated to N and P contents in plant tissue. High level of NP fertilizers application reduced artemisinin content in the leaf. Artemisinin content in the leaf was varying from 0.25 to 0.87%. Growth and production of artemisia collected from BPTO was better than those from Kimia Farma. Endophyte microbial collected from artemisia plant was able to improve dry matter production of leaf of 34.4 - 37.1% and total biomass from 31.9 to 36.8%. Endophyte microbia was able to increase artemisinin content. The highest artermisinin content was found at artemisia collected from Kimia Farma. Endophyte microbia consisted of *Bacillus* sp., especially *Bacillus cereus* containing 125 ppm IAA, 182 ppm GA3, and 72.5 ppm kinetin.

047 JAUHARI, S.

Effect of amine solution fertilizer application on the maize production performance on dryland. ***Efektivitas penggunaan pupuk cair amina pada tanaman jagung di lahan kering***/ Jauhari, S.; Pramono, J. (Balai Pengkajian Teknologi Pertanian Jawa Tengah, Ungaran (Indonesia)). [Proceedings of the seminar on agricultural technology innovation and transfer for development of rural industrial agribusiness in marginal areas: innovation of production technology. Book 2. Prosiding inovasi dan alih teknologi pertanian untuk pengembangan agribisnis industrial pedesaan di wilayah marginal: inovasi teknologi produksi. Semarang (Indonesia), 8 Nov 2007. Buku 2/ Muryanto; Prasetyo, T.; Prawirodigdo, S.; Yulianto; Hermawan, A.; Kushartanti, E.; Mardiyanto, S.; Sumardi (eds.). Bogor (Indonesia): BBP2TP, 2007: p.398-404, 7 tables; 8 ref. 631.17/BAL/p bk2

ZEA MAYS; LIQUID FERTILIZERS; AGRONOMIC CHARACTERS; SOIL CHEMICOPHYSICAL PROPERTIES; ECONOMIC ANALYSIS; PRODUCTION INCREASE; DRY FARMING.

An experiment was performed to evaluate the effect of amine solution fertilizer (ASF) on maize (*Zea mays* L.) production performance on dryland. The experiment used completely randomized design with 4 treatments and 5 replicates. The treatments were application of 250 kg/ha Urea + l00 kg/ha ZA + 100 kg/ha SP-36 + 100 kg/ha KCl (Free ASF); 100 kg/ha SP-36 + 100 kg/ha KCl + 3000 l ASF (ASF1); 150 kg/ha Urea + 100 kg/ha SP-36 + 100 kg/ha KCl + 1500 l ASF (ASF2); dan 3000 l ASF (ASF3). Results showed that the use of ASF to substitute for other source of nitrogen or for the main N source improved corn yield. It was determined that application of sole ASF (ASF3 only) improved the yield (7%) and corn farming efficiency. Application of ASF for one planting season tended to increase the organic C and total N soil. In conclusion, ASF is useful for an alternative fertilizer source as alternative N source for maize farming. However, further investigation is needed to determine the impact of long period ASF application on the chemical characterstic of soil.

048 MURNI, A.M.

Nitrogen phosphorus and potassium fertilizer use efficiencies in maize. ***Efisiensi penggunaan pupuk nitrogen, fosfor dan kalium pada tanaman jagung (Zea mays)/*** Murni, A.M. (Balai Pengkajian Teknologi Pertanian Lampung, Bandar Lampung (Indonesia)). [Proceedings of the seminar on agricultural innovation and technology transfer for development of rural industrial agribusiness in marginal areas : innovation of production technology. Book 2]. Prosiding inovasi dan alih teknologi pertanian untuk pengembangan agribisnis industrial pedesaan di wilayah marjinal: inovasi teknologi produksi. Semarang (Indonesia), 8 Nov 2007. Buku 2/ Muryanto; Prasetyo, T.; Prawirodigdo, S.; Yulianto;

Hermawan, A.; Kushartanti, E.; Mardiyanto, S.; Sumardi (eds.). Bogor (Indonesia): BBP2TP, 2007: p.147-152, 3 tables; 8 ref. 631.17/BAL/p bk2

ZEA MAYS; NITROGEN FERTILIZERS; PHOSPHATE FERTILIZERS; POTASH FERTILIZERS; APPLICATION RATES; EFFICIENCY; YIELDS.

Maize needs a lot of nitrogen (N), phosphorus (P) and potassium (K) nutrients for growth and produce high grain, in spite of the use of high fertilizer rate which will not efficient without consider the soil fertility and plant nutrients requirement. To evaluate and understand the efficiency of nutrient use in maize, an omission plot trial was conducted in five sites, i.e Sidowaras, Binjai Ngagung, and Watu Agung, Balai Rejo Village, Central Lampung District and Trimulyo Village, South Lampung District during the wet season of three years (2005-2007). The experiment was designed in omission plot including without N fertilizer (only P and K = PK), PK + lime, without P (only N and K = NK), NK + lime, no K (only N and P = NP), NP + lime, complete fertilizers (NPK), and NPK + lime, those were conducted in each site as replication. The amount of lime (dolomite) applied was 1.1 t per ha per crop (season). Grain yield was measured from each treatment to calculate the nutrient use efficiencies. The results showed that the nutrient use efficiencies were N = 18 ± 4, P = 43 ± 20 and K = 19 ± 4 kg grain per kg nutrient of fertilizer. Nutrient use efficiencies in the lime treatments were lower than that of without lime, i.e. N + lime = 14 ± 4, P + lime = 28 ± 11, K + lime = 8 ± 4, indicated that the rate of fertilizer must be decreased when lime is applied.

049 PRIYONO, J.

Effect of ball milling under various conditions on several physicochemical properties of rock phosphate fertilizers. ***Pengaruh penggilingan dengan ball mill dalam beragam kondisi terhadap beberapa sifat fisik-kimia pupuk fosfat alam***/ Priyono, J. (Universitas Mataram (Indonesia). Fakultas Pertanian). *Jurnal Tanah dan Iklim (Indonesia)*. ISSN 1410-7244 (2007) (no. 25) p.37-44, 1 ill., 4 tables; 20 ref.

MILLING; ROCK PHOSPHATE; FERTILIZERS; CHEMICOPHYSICAL PROPERTIES; AGGLOMERATING.

A laboratory study was conducted to identify the effects of milling under various conditions, including use of water and potassium as milling lubricants, on several physicochemical properties of rock phosphate fertilizer. The identified properties were the XRD patterns, particle size distribution, surface area, and $NaHCO_3$-extractable P of the fertilizer. Milling for 2 hours significantly reduced particle size, promoted amorphization, increased surface area and amount of extractable P in 1N $NaHCO_3$ of rock phosphate fertilizer, with those effects for dry milling were much greater than for wet milling. Wet milling and use of additives (KCl and K-feldspar) minimized the occurrence of agglomeration during milling process. Although further tests in soil-plant system are required, dry milling may be recommended as a simple method for manufacturing an agronomically effective P + K fertilizers.

050 RAHARDJO, M.

[Response of promising Javanese turmeric number on nitrogen, phosphate, and kalium fertilizer application combination]. ***Respon nomor harapan temulawak terhadap kombinasi pemupukan nitrogen, fosfat dan kalium***/ Rahardjo, M.; Rosita S.M.D.; Djauhariya, E.; Bermawie, N.; Pribadi, E.R.; Nurhayati, H.; Kosasih; Enjang. [Research technical report of Indonesian Medicinal and Aromatic Crops Research Institute in year of 2007]. Laporan teknis penelitian T.A 2007 Balai Penelitian Tanaman Obat dan Aromatik.

Bogor (Indonesia): Balittro, 2008: p.233-250. ISSN 0853-9456 2007, 4 ill., 10 tables; 10 ref. Appendices. 633.88/BAL/l

CURCUMA XANTHORRHIZA; VARIETIES; FERTILIZER APPLICATION; PHOSPHATES; NITROGEN; POTASSIUM; SOIL CHEMICOPHYSICAL PROPERTIES; AGRONOMIC CHARACTERS; PLANT PRODUCTION; ESSENTIAL OILS; NUTRIENTS; ABSORPTION; COST BENEFIT ANALYSIS.

Java turmeric (*Curcuma xanthorrhiza* Roxb.) is an Indonesian indigenous medicinal plant and as raw material mostly used by the Indonesian traditional-herbs companies. The productivity and quality of java turmeric in Indonesia are still low. The balanced fertilization especially macronutrients of N, P and K can increase productivity and quality of java turmeric rhizomes. The objective of the research was to increase plant growth, production and quality of java turmeric on effect of N, P and K fertilizer application. The experiment was conducted in Sukamulya Experimental Station from 2006 – 2007 and arranged in two steps. The first step was conducted in 2006 to obtain plant growth and the second step was conducted in 2007 to obtain production and quality of java tumeric. The experiment used three factors and three replications which was arranged in a randomized block design. There were three factors studied in the experiment, i.e the combination of the rate of urea (100, 200, 300 kg/ha), SP36 (100, 200, 300 kg/ha), and KCl (100, 200, 300 kg/ha). The plant spacing used was 75 cm x 50 cm, the plant population was 40 plants/plot, the size of plots was 3.75 m x 4 m. The first research was conducted in 2006 to obtain plant growth data and the second one in 2007 to obtain productivity and quality of rhizomes. Parameter observed were growth component, accumulation of biomass, rhizomes productivity and quality, absorption of plant nutrient of N, P and K, active materials (curcuminoid and xanthorhizol). The result of research showed that fertilizer application of 300 kg/ha urea at soil with lower N had effect on increasing growth component of java turmeric, fresh rhizomes and dry matter of rhizomes per plant. Fertilizer combination of 300 kg/ha urea, SP36 and of KCl each 200 kg/ha gave highest fresh rhizomes (25.46 t/ha), followed by quality of rhizomes which have fulfilled standard of MMI. The result showed that treatments of 300 kg/ha urea + 200 kg/ha SP36 + 200 kg/ha KCl increased rhizome production. The highest of net income and B/C ratio was gained by fertilizer treatments of 300 kg/ha urea + 200 kg/ha SP36 + 200 kg/ha KCl.

051 SANTI, L.P.

Organo-chemical fertilizer for oil palm seedling fertilization. ***Pupuk organo-kimia untuk pemupukan bibit kelapa sawit***/ Santi, L.P.; Goenadi, D.H. (Balai Penelitian Bioteknologi Perkebunan, Bogor (Indonesia)). *Menara Perkebunan* (Indonesia). ISSN 0215-9318 (2008) v. 76(1) p. 36-46, 4 ill., 3 tables; 13 ref.

ELAEIS GUINEENSIS; SEEDLINGS; ORGANIC FERTILIZERS; FERTILIZER APPLICATION.

The availability of high quality and quantity of oil palm seedling needs consistent support of fertilization programs for economic production. Organo-chemical fertilizer with rock phosphate and urea added was initiated to increase economic value of agriculture and estate crops residues. The prototype of organo-chemical fertilizer contains 10% organic-C, 11% N, 8% P, 1% K and 4% humic acid. Based on greenhouse experiments. organo-chemical fertilizer treated to oil palm seedlings tends to provide a better vegetative growth of the seedlings. Dry weights of leave, stem, and root of the seedlings applied with 100 g organo-chemical fertilizer plus 10 g KCl to each seedling were significantly different compared to the standard dosage of conventional fertilizer. This organochemical fertilizer could be applied as conventional fertilizer substitute.

052 SASMITA, E.R.

Result and quality of tomatoes with fruit treatment of KNO_3 and frequency giving of different water. ***Hasil dan kualitas buah tomat dengan perlakuan KNO_3 dan frekuensi air yang berbeda***/ Sasmita, E.R.; Lagiman (Universitas Pembangunan Nasional "Veteran", Yogyakarta (Indonesia). Fakultas Pertanian). [Proceedings of the 9th national congressess of Indonesian Soil Science Association: soil and water management. Book 3]. Prosiding kongres nasional ke-9 Himpunan Ilmu Tanah Indonesia: solusi miskelola tanah dan air untuk memaksimalkan kesejahteraan rakyat. Yogyakarta (Indonesia), 5-7 Dec 2007/ Radjagukguk, B.; Kertonegoro, B.D.; Shiddieq, D.; Sunarminto, B.H.; Wardoyo, S.S.; Nurcholis, M.; Purwanto, B.H.; Yuwono, N.W.; Partoyo (eds.). Yogyakarta (Indonesia): UPN "Veteran", 2007: p.1428-1433, 3 tables; 6 ref. 631.6.02/KON/s

LYCOPERSICON ESCULENTUM; POTASSIUM NITRATE; FERTILIZER APPLICATION; WATERING; DOSAGE EFFECTS; YIELDS; SUGAR; ASCORBIC ACID; QUALITY.

Tomato represents one of the preferred agricultural commodities because of its benefits and agronomic characters, such as colour which is very captivate. Some of factors supporting tomato crop growth and give good result are by applying fertilizer with K element and adequate water availability. Research method was carried out at field with polybag and designed in randomized completely block design factorial 3 x 3. First factor was dosage of KNO_3, consisted of 3 levels that were K1 = 4 g/plant, K2 = 7 g/plant, K3 = 10 g/plant. Second factor was frequency of watering, consisted of 3 levels that were: F1 = one day 2 times, F2 = one day once, F3 = two days once, and control which was watering one day once without KNO_3. Data collected were subjected to an analysis of variance, and mean separation was done through Duncan's New Multiple Range Test, all in 5%. To test the treatments with control used Contrast of Orthogonal. There were interaction between dosage of KNO_3 and frequency of watering on parameter tested, i.e on vitamin C and total sugar. Dosage of KNO_3 of 7 g/plant gave the best result on fruit weight parameter and uniformity of fruit size measure. Frequency of watering gave no different influence at all result parameters, except on fruit weight.

053 TUHERKIH, E.

[Effectiveness of liquid organic fertilizer and NPK fertilizer on paddy in Eutrudept Typic, Bogor (Indonesia)]. ***Efektivitas pupuk organik cair dan pupuk NPK pada padi sawah di Typic Eutrudept, Bogor***/ Tuherkih, E.; Purnomo, J. (Balai Penelitian Tanah, Bogor (Indonesia)). [Proceedings of the 9th national congressess of Indonesian Soil Science Association: soil and water management. Book 3]. Prosiding kongres nasional ke-9 Himpunan Ilmu Tanah Indonesia: solusi miskelola tanah dan air untuk memaksimalkan kesejahteraan rakyat. Yogyakarta (Indonesia), 5-7 Dec 2007. Buku 3/ Radjagukguk, B.; Kertonegoro, B.D.; Shiddieq, D.; Sunarminto, B.H.; Wardoyo, S.S.; Nurcholis, M.; Purwanto, B.H.; Yuwono, N.W.; Partoyo (eds.). Yogyakarta (Indonesia): UPN "Veteran", 2007: p.1434-1443, 3 ill., 7 tables; 9 ref. 631.6.02/KON/s

ORYZA SATIVA; IRRIGATED RICE; ORGANIC FERTILIZERS; LIQUID FERTILIZERS; NPK FERTILIZERS; FERTILIZER APPLICATION; DOSAGE EFFECTS; APPLICATION RATES; GROWTH; NUTRIENT UPTAKE; JAVA.

Inorganic fertilizer tends to expensive caused by non-subsidy fertilizers price by the government, so that use of organic fertilizers become increasing. Beside relatively cheaper, organic fertilizer could improve soil structure, had micronutrient and nutrition, as microorganism sources, and increased inorganic fertilizer efficiency. The purpose of this

study was to find out the influence of NPK and liquid organic fertilizer (LOF), application and to achieve optimum rates for rice Ciherang variety. Typic Eutrudept from Ciaruteun, Bogor was used as soil material for studying in glasshouse experiment. Randomized block design was used to arrange these treatments. The experiment was consisted of ten treatments including uncompleted combinations of five rates LOF (0, 250, 500, 750, and 1000 ml/ha) and five rates of NPK (0, 1/4; 1/2; 3/4; and 1 x NPK). Rate of 1 x NPK equivalent with 300 kg urea, 100 kg KCl, and 100 kg SP 36/ha based on P and K soil status. The result of the study showed that the soil had N, P, K deficiency so rice could response these fertilizers treatments. Application of NPK increased tiller number, dry straw, rice yield, and N, P, K uptake. Optimum rate was 3/4 x NPK equivalent with 225 kg urea, 75 kg SP-36, and 75 kg KCl/ha. Application of LOF did not significantly different to increase rice growth and yield.

054 UMARIE, I.

[Assessment of various fertilizing technological package on growth and production of rice (*Oryza sativa* L.)]. ***Pengujian berbagai paket teknologi pemupukan terhadap pertumbuhan dan produksi tanaman padi (Oryza sativa L.)***/ Umarie, I. (Universitas Muhammadiyah Jember (Indonesia)). Jember (Indonesia): UMJ, 2007: 12p. Br.Ind.633.18-18/UMA/p

ORYZA SATIVA; FERTILIZER APPLICATION; TECHNOLOGY; ORGANIC FERTILIZERS; INORGANIC FERTILIZERS; GROWTH; YIELDS; PRODUCTIVITY.

The purpose of this experiment was to obtain fertilizing technology package information about rice. Technology package tested was combining between chemical and organic fertilization. Twelve fertilization packages and one recommendation used on this experiment, these were: P0 = Recommendation of organic fertilization (control), P1 = Biofertilizer + 75% recommendation of organic fertilizer, P2 = Biofertilizer + 50% recommendation of organic fertilizer, P3 = Biofertilizer + 25% recommendation of organic fertilizer, P4 = Biofertilizer without an organic fertilizer, P5 = Pedagro + 75% recommendation of organic fertilizer, P6 = Pedagro + 50% recommendation of organic fertilizer, P7 = Pedagro + 50% recommendation of organic fertilizer, P8 = Pedagro without of organic fertilizer, P9= NASA + 75% recommendation of organic fertilizer, P10 = NASA + 5% recommendation of organic fertilizer, P11 = NASA + 25% recommendation of organic fertilizer and P12 = NASA without organic fertilizer. The experiment used randomized block design with three replications. Parameters observed were plant height, number of tiller, number of productive tiller, flowering, harvest time, 1000 seed weight, full grain percentage and production per block. This experiment showed that decreasing combination of P0-P2, recommendation of inorganic fertilizer until 0% in order to balance adequate organic fertilizer gave no significant effect on all parameters, but Pedagro with balance of 50-75% inorganic fertilizer showed better yields than recommended fertilizer.

F06 IRRIGATION

055 KASTONO, D.

[Effects of bentonite impermeable layers application, frequency and irrigation volume on the growth and yield of shallot in the coastal soils]. ***Pengaruh pemberian lapis kedap bentonit, frekuensi dan volume pengairan terhadap pertumbuhan dan hasil bawang merah di lahan pasir pantai/*** Kastono, D.; Shiddieq, D.; Tohari; Sulistyaningsih, E. (Universitas Gadjah Mada, Yogyakarta (Indonesia). Fakultas Pertanian); Saparso. [Proceedings of the 9th national congressess of Indonesian Soil Science Association: soil and water management. Book 3]. Prosiding kongres nasional ke-9 Himpunan Ilmu Tanah

Indonesia: solusi miskelola tanah dan air untuk memaksimalkan kesejahteraan rakyat. Yogyakarta (Indonesia), 5-7 Dec 2007. Buku 3/ Radjagukguk, B.; Kertonegoro, B.D.; Shiddieq, D.; Sunarminto, B.H.; Wardoyo, S.S.; Nurcholis, M.; Purwanto, B.H.; Yuwono, N.W.; Partoyo (eds.). Yogyakarta (Indonesia): UPN "Veteran", 2007: p.1632-1640, 1 ill., 4 tables; 10 ref. 631.6.02/KON/s

ALLIUM ASCALONICUM; BENTONITE; IRRIGATION METHODS; DEMAND IRRIGATION; CONTINUOUS IRRIGATION; APPLICATION RATES; SOIL WATER CONTROL; GROWTH RATE; YIELDS; COASTAL SOILS.

The result of the first stage research showed that application of bentonite as an impermeable layer at the depth of 15 cm and volume of surface irrigation 50-100% ET potential, produced dry bulb weight of 15.8-17.3 ton/ha, 50-70% above 10.5 ton/ha compared with untreated bentonite. These yields were obtained by (a) decreased and stabilized soil temperatures at optimum condition for shallot growth, (b) increased available soil moisture two-three times of 4.25% without bentonite during shallot growth, (c) bentonite application delayed irrigation frequency two-three day, and (d) optimum depth of bentonite obtained at 25 cm. These research gave good alternative choices for farmer to increase production of shallot annually according to farmers capability on coastal sandy soil.

F07 SOIL CULTIVATION

056 DJUFRY, F.
[Growth and yield of melon, pepper and tomato on mulches application]. ***Pertumbuhan dan hasil tanaman melon, cabai dan tomat pada penggunaan jenis mulsa***/ Djufry, F. (Balai Pengkajian Teknologi Pertanian Kalimantan Selatan, Banjarbaru (Indonesia)). [Proceedings of national seminar of technology innovation and agricultural institution in effort to improve community improvement. Book 1]. Prosiding seminar nasional inovasi teknologi dan kelembagaan pertanian dalam upaya peningkatan pemberdayaan masyarakat. Yogyakarta (Indonesia), 24-25 Aug 2007. Buku 1/ Wardhani, N.K.; Mudjisihono, R.; Mashudi, M.F.; Jamal, E.; Wirianata, H.; Suroso; Hartati, R.M.; Hermantoro; Sayekti, A.S. (eds.). Yogyakarta (Indonesia): BPTP Yogyakarta dan BBP2TP, 2007: p.53-57, 3 ill., 2 tables; 12 ref. 631.152/SEM/p bk1

CUCUMIS MELO; CAPSICUM ANNUUM; LYCOPERSICON ESCULENTUM; MULCHES; GROWTH; YIELDS.

The field study was conducted to assess the response of melon, red pepper and tomato crop to mulch application. This research was conducted in experimental field in Takalar District, South Sulawesi Province and arranged in split plot design with three replications. Three varieties of crops as main plot were: melon (T1), red pepper (T2), and tomato (T3). Four kinds of mulching as subplot were: no mulching (M0), straw (M1), husk mulch (M2), black and silver plastic (M3). Field measurements included crops characters (plant height, stem diameter, canopy area, flowering time, harvesting time and fruit yield). The result showed that mulch affected growth significantly by increasing plant height, stem diameter, leaf area index, and yield of melon, red pepper and tomato. Mulch application by using black and silver plastic and straw mulch showed increased growth and best yield crops compared to other treatments.

F08 CROPPING PATTERNS AND SYSTEMS

057 DJAZULI, M.
[Optimation of pruatjan planting area with cropping pattern systems]. ***Optimasi lahan pertanaman purwoceng melalui sistem pola tanam***/ Djazuli, M.; Maslahah, N.; Pribadi, E.R.; Syakir, M.; Nasrun; Kosasih. [Research technical report of Indonesian Medicinal and Aromatic Crops Research Institute in year of 2007]. Laporan teknis penelitian T.A. 2007 Balai Penelitian Tanaman Obat dan Aromatik. Bogor (Indonesia): Balittro, 2008: p. 366-373 ISSN 0853-9456, 3 ill., 2 tables; 7 ref. 633.88/BAL/l

PIMPINELLA; CROP MANAGEMENT; GROWTH; LAND PRODUCTIVITY.

Pruatjan (*Pimpinella pruatjan*) is one of native herbal for aphrodisiac purpose that only find in the highland of Dieng, Central Java area. For developing new production center, cultivation of pruatjan using multiple cropping system with vegetable crops is more easier to adopt by farmer in the highland of Cianjur-West Java than that of monoculture system. The objective of this experiment was to find out an optimal multiple cropping system based on pruatjan which able to improve land productivity and farmers' income. Ten combination treatments of multiple cropping were (1) Monoculture of pruatjan, (2) Monoculture of welsh onion (*Allium fistulosum* L.), (3) Monoculture of lettuce (*Lactuca sativa* L.), (4) Monoculture of chinese cabbage (*Brassica rapa* L.), (5) Multiple cropping of pruatjan + 1 row of welsh onion, (6) Multiple cropping of pruatjan + 1 row of lettuce, (7) Multiple cropping of pruatjan + 1 row of chinese cabbage, (8) Multiple cropping of pruatjan + 2 row of welsh onion, (9) Multiple cropping of pruatjan + 1 row of lettuce, and (10) Multiple cropping of pruatjan + 2 row of chinese cabbage. The observation result showed that biomass production of vegetable crops at monoculture treatments were highest followed by 2 rows and one row. Production and price of fresh welsh onion at the first harvest were highest and will be adopted potentially by farmer as alternative crop at multiple cropping system with pruatjan. The highest pruatjan production was found at monoculture treatment.

F30 PLANT GENETICS AND BREEDING

058 AIDI-DASLIN
Potency of promising rubber clones IRR 200 series from ortet selection. ***Potensi keunggulan klon karet harapan IRR seri 200 dari hasil seleksi pohon induk*** / Aidi-Daslin; Sayurandi; Pasaribu, S.A. (Pusat Penelitian Karet, Medan (Indonesia)). *Jurnal Penelitian Karet (Indonesia).* ISSN 0852-808 X (2010) v. 28(1) p. 1-10, 6 tables; 11 ref.

HEVEA BRASILIENSIS; CLONES; GENOTYPES; HIGH YIELDING VARIETIES; LATEX; WOODS; PLANT BREEDING.

Rubber breeding program in Indonesia has produced many superior clones as latex and timber yielders. Cultivation of superior clones has significantly increased productivity and national natural rubber competitiveness. Producing more superior rubber clones has been done through hand pollination and ortet selection programs at Sungei Putih Rubber Research Center since 1985 with the purpose of obtaining superior genotypes as high latex yielders with good secondary characteristics. The selection result of PBIG (Prang Besar Isolated Garden) seedling population in North Sumatra has produced some potential genotypes developed as superior rubber clones. The genotypes have been selected from this ortet, retested in further trials at the experimental garden of Sungei Putih Research Centre and then registered as IRR 200 series promising clones. The result of evaluation in further trials

indicated that two clones were potential as latex-timber clones, namely IRR 272 and IRR 284. These clones had vigorous growth before and after tapping. Girth growth in immature period (four years old) was around 46.1-47.5 cm. Girth increment before tapping was around 11.9-12.8 cm/year while after tapping around 4.8-4.9 cm/year. Average dry rubber yield over four years tapping of clones IRR 272 and IRR 284 was 66.56 g/tapping/tree and 65.48 g/tapping/tree, respectively. Total wood volume was 0.80m^3/tree and 1.24m^3/tree, respectively.

059 BERMAWIE, N.

[Characterization and evaluation of asiatic pennyworth (*Centella asiatica* (L.) Urban) germplasm]. *Karakterisasi dan evaluasi plasma nuftah tanaman pegagan (Centella asiatica (L.) Urban)/* Bermawie, N.; Purwiyanti, S.; Wahyuno, D. [Research technical report of Indonesian Medicinal and Aromatic Crops Research Institute in year of 2007]. Laporan teknis penelitian T.A. 2007 Balai Penelitian Tanaman Obat dan Aromatik. Bogor (Indonesia): Balittro, 2008: p.124-183. ISSN 0853-9456 2007, 9 ill., 33 tables; 42 ref. 633.88/BAL/l

CENTELLA ASIATICA; GERMPLASM; SHADING; PLANT ANATOMY; PLANT DISEASES; PESTS OF PLANTS; DISEASE RESISTANCE; PEST RESISTANCE; VARIETIES; LEAVES; FLOWERS; SAPONINS; TANNINS; CHEMICOPHYSICAL PROPERTIES.

Asiatic pennyworth (*Centella asiatica* (L.) Urban) is one of the medicinal plants used in "jamu" industries, so that it requires standardization in cultivation, through the use of superior variety. Characterization and evaluation of asiatic pennyworth germplasm is prerequisite for obtaining superior varieties. Two activities were conducted, namely (1) characterization and evaluation of yield and quality of 18 accessions and (2) evaluation of five asiatic pennyworth accessions for resistance to *Septaria* sp. The objectives of this study were to obtain the morphological characteristics, yield and quality of the 18 accessions at three agroecological conditions with and without shading and to obtain level of resistance of five asiatic pennywoth germplasm to *Septaria* sp. This study was undertaken from January - December 2007. Characterization was performed using split plot design with 2 factors, i.e shading (0 and 25%) as main factor and 18 accessions as sub-factor with two replications. Observations were made randomly on 10% of 100 plants per plot, with 30 cm x 40 cm plant spacing. Analyses of variance was made on each agroecological conditions. Parameters observed were quantitative and qualitative morphological characters at 1, 2 and 3 months after planting (MAP), yield and quality at two harvesting intervals 3.5 and 5.5 MAP. Evaluation of resistance observation was made by scoring 1 - 7 depend on disease severity. Results from this study indicated that asiatic pennyworth planted under shading were more vigorous, leaf more green, but lower active compound. There were variation among accessions on morphological characters, yield and quality. CASI 003 and CASI 014 differed from the other accessions in leaf shape. CASI 003 showed the highest active compound at lower altitude with and without shading, while at medium and high altitudes was performed by CASI 008. CASI 003 also produced the highest fresh and dry herb at three elevations with and without shading. At medium elevation the highest production was shown by CASI 005. CASI 010 produced the highest fresh weight at low altitude, but for dry weight was shown by CASI 003, which also produced the highest active compound at medium altitude under shading, while for medium elevation was shown by CASI 007 without shading. Pathogen causing leaf spot in asiatic pennyworth was *Septaria hydrocotilla*. All accessions showed similar reaction after being infected with *Septaria hydracotilla*. CASI 010 possessed higher number of stomata and tend to be more susceptible than the others, while CASI 008 tend to be more tolerant. The results from this experiment indicated that asiatic pennyworth can be grown from low to high altitude, with and without shading, but for better yield and quality it should use the most suitable accessions for each agroecological condition.

060 ERNAWATI, R.

Performance of hybrid rice varieties in two farmers group planting. *Penampilan padi hibrida pada pertanaman dua kelompok tani*/ Ernawati, R.; Irawati, A. (Balai Pengkajian Teknologi Pertanian Lampung, Bandar Lampung (Indonesia)). [Proceedings of the seminar on agricultural innovation and technology transfer for development of rural industrial agribusiness in marginal areas: innovation of production technology. Book 2]. Prosiding inovasi dan alih teknologi pertanian untuk pengembangan agribisnis industrial pedesaan di wilayah marjinal: inovasi teknologi produksi. Buku 2. Semarang (Indonesia), 8 Nov 2007/ Muryanto; Prasetyo, T.; Prawirodigdo, S.; Yulianto; Hermawan, A.; Kushartanti, E.; Mardiyanto, S.; Sumardi (eds.). Bogor (Indonesia): BBP2TP, 2007: p.170-173, 3 tables; 7 ref. 631.17/BAL/p bk2

ORYZA SATIVA; VARIETIES; HYBRIDS; CROP PERFORMANCE; PLANTING; FARMERS; YIELDS.

The increasing of rice productivity must be supported by new introduced technology. Planting hybrid rice varieties is very important to increase rice production of more than 10%. The trial of hybrd rice varieties, namely Bernas Prima, Pioner-l and Intani-2 was conducted at Rukun Maju and Rukun Sentosa farmers' group planting in Karang Endah Village, Central Lampung District on dry season 2007 (April-August 2007). The objective of the assessment was to find out performance of hybrid rice varieties on two farmers' group planting. Assessment was conducted in randomized block design with two replications. The result showed that there was a different response of the hybrid rice varieties by location, particularly on number of tiller, length of panicle and number of filled grain. Planting of hybrid gave different yields. The highest yield was obtained by Bernas Prima of 4.41-4.78 t dried milled grain/ha.

061 GUSMAINI

[Test of *Artemisia annua* adaptation on various agroclimatic zone]. *Pengujian adaptasi Artemisia annua pada berbagai agroklimat*/ Gusmaini; Bermawie, N.; Rizal, M.; Sudiman, A.; Nurhayati, H. [Research technical report of Indonesian Medicinal and Aromatic Crops Research Institute in year of 2007]. Laporan teknis penelitian T.A. 2007 Balai Penelitian Tanaman Obat dan Aromatik. Bogor (Indonesia): Balittro, 2008: p.311-318. ISSN 0853-9456, 4 tables; 13 ref. 633.88/BAL/l

ARTEMISIA ANNUA; ADAPTATION; AGROCLIMATIC ZONES; ARTEMISININ; SOIL CHEMICOPHYSICAL PROPERTIES; PRODUCTION.

Malaria disease caused by Anopheles sp's bite has to be overcome immediately because some areas in Indonesia are endemic area of it. The usage of quinine pill continually in treating malaria for more than 20 year has caused *Plasmodium falciparum* (microorganism caused malaria) become resistant. One of the alternatives to solve the problem is the utilization of *Artemisia annua* which contain artemisinin. It is proven that the plant can cure malaria effectively. *A. annua* is an introduced plant from subtropical area. Hence, there are some problems such as low yield and small content of artemisinin if it will be planted in tropical area. To support the development of *A. annua* in Indonesia, it is necessary to conduct preliminary research to examine the adaptability of *A. annua* in some different agroclimate. This examination will give the brief information about the most appropriate environment for its growth and the best accession which can be planted in Indonesia and will produce high yield with high artemisinin content. The research was conducted at two locations, i.e Gunung Puteri Research Installation (1500 m asl) and Manoko Research

Installation (1200 m asl). The research was arranged in randomized block design with six replications. The treatment was four accessions of *A. annua* viz. (A) Ad3, (B) Ad6, (C) Ad7, and (D) Ad8. The result showed that three accessions (Ad3, Ad6, and Ad7) were fast flowering types while Ad8 was delayed flowering type. The last one produced artemisinin content higher than others in both locations. The yield and quality parameters of Ad8 planted at 1500 m asl was higher than planted at 1200 m asl. At 1500 m asl, fresh weight of herb was 2.8 kg/plant (22.25 kg/plot) and dry weight was 1.25 kg/plant (10 kg/plot) with artemisinin content 0.55%. In another location (1200 m asl) fresh weight of herb was 2.6 kg/plant (20.64 kg/plot) and dry weight was 1.01 kg/plant (9.07 kg/plot) with artemisinin content 0.54%.

062 HADIPOENTYANTI, E.

[Characterization and evaluation of vetiver germplasm]. ***Karakterisasi dan evaluasi plasma nuftah tanaman akar wangi***/ Hadipoentyanti, E.; Hobir; Nuryani, Y.; Purwiyanti, S.; Ma'mun; Ermiati. [Research technical report of Indonesian Medicinal and Aromatic Crops Research Institute in year of 2007]. Laporan teknis penelitian T.A. 2007 Balai Penelitian Tanaman Obat dan Aromatik. Bogor (Indonesia): Balittro, 2008: p.91-101. ISSN 0853-9456, 4 tables; 11 ref. 633.88/BAL/l

VETIVERIA ZIZANIOIDES; DRUG PLANTS; GERMPLASM CONSERVATION; EVALUATION; CULTIVATION; AGRONOMIC CHARACTERS; ESSENTIAL OILS; CHEMICOPHYSICAL PROPERTIES.

Vetiver (*Vetiveria zizanioides* L.) is original plant from India. The main uses of the plants are for essential oil production, prevent soil erosion or soil rehabilitation. Indonesian vetiver is included in South India type and fertile. The famous name of Indonesian vetiver is Java vetiver which in all of vetiver oil production were exported. IMACRI have 40 numbers of vetiver germplasm where their potential of morphology, production and quality have not been known yet. The aim of research is to find out morphologycal characters, oil production and quality of 40 vetiver number. The research was conducted at Manoko Experimental Garden (1200 m asl) from January - December 2007. The research was arranged in a randomized block design with 2 replications. The treatment used was 40 numbers of vetiver, each treatment consisted of 20 stools, plant distance 100 cm x 50 cm. The parameters observed were plant height, tiller number, leave length, leave width, nodes length, root length, root diameter, stem diameter, lump diameter, fresh weight of plant, fresh weight of root, dry weight of root, oil content, total vetiverol, chemicophysical characters on harvest time (9 months). The results showed that the morphological characters of 40 numbers on 9 months were not significantly different, but the highest plant were on no. 37 (214 cm), the most tiller number were no. 4 (104.50), the highest root diameter were no. 1 (2.453 mm), fresh weight of root were no. 30 (430 g), dry weight of root were no. 3 (72.56 g). The oil content > 3% were no. 2, 5, 6, 7, 9, 27 and 28, each of 3 - 3.67% with total vetiverol 64.99 - 72.68%.

063 HADIPOENTYANTI, E.

[Genetic diversity improvement of patchouly through in vitro and irradiation mutation induction]. ***Peningkatan keragaman genetik nilam melalui induksi mutasi in vitro dan iradiasi***/ Hadipoentyanti, E.; Hartati, S.Y.; Amalia; Sirait, N.; Surachman, D.; Karyani, N.; Suryatna. [Research technical report of Indonesian Medicinal and Aromatic Crops Research Institute in year of 2007]. Laporan teknis penelitian T.A. 2007 Balai Penelitian Tanaman Obat dan Aromatik. Bogor (Indonesia): Balittro, 2008: p. 394-403. ISSN 0853-9456, 3 tables; 26 ref. 633.88/BAL/l

POGOSTEMON CABLIN; GENETIC VARIATION; MUTATION; IRRADIATION; IN VITRO; GROWTH CONTROL.

The one of main problem of patchouly (*Pogostemon cablin* Benth) plantation in Indonesia is bacterial wilt disease, caused lost 60 - 95%. Up to now the superior variety has not found yet. Sidikalang variety indicated tolerant to bacterial wilt disease. The genetic resource is being limited factor in patchouli breeding program due to Indonesian patchouly plant cannot flowering, has no seed and multiplication always by cuttings. One of effort to increase genetic variability is in vitro induced mutation and irradiation used somaclonal variation. The objective of research is to find 10 - 25 callus from in vitro induced mutation (plant growth regulators concentration) and irradiation. The research was conducted at Tissue Culture Laboratory IMACRI - Bogor. Material used as explants was young leaf from Sidikalang variety, the treatment used to callus induction were plant growth regulator concentration of 2,4 - dichlorophenoxy acetic acid (2,4 D) 0, 0.1, 0.5, 1 mg/l, single and combination with benzyl amino purine (BAP) 0, 0.1, 0.5, 1 mg/l. Basic media is Murashige and Skoog (MS). The treatment was arranged in randomized complete design, each 10 bottles, and each bottle 3 explants. The parameter observed were callus initiation, callus diameter, callus color, and callus structure. The result showed that the best of callus induction were media MS by added single 2,4 D plant growth regulator with concentration 0.1 mg/l, callus diameter 1.37 cm, callus color white-brown, and callus structure is crumpled. While the best plant regulator combination was 2,4 D + BAP with concentration each 0.1 mg/l and 0.1 mg/l, callus diameter 1.98 cm, callus color white green and callus structure is crumpled. The irradiation influenced callus performance, callus diameter and color. The increase of irradiation doses caused callus growth inhibition because merystem cell damaged.

064 HARYUDIN, W.

[Germplasm conservation of *Piper retrofractum* Vahl. in Cikampek (Indonesia) research station]. *Konservasi plasma nuftah tanaman cabe jawa di kebun percobaan Cikampek*/ Haryudin, W. [Research technical report of Indonesian Medicinal and Aromatic Crops Research Institute in year of 2007]. Laporan teknis penelitian T.A. 2007 Balai Penelitian Tanaman Obat dan Aromatik. Bogor (Indonesia): Balittro, 2008: p.12-19. ISSN 0853-9456, 4 tables; 12 ref. 633.88/BAL/l

PIPER RETROFRACTUM; GERMPLASM CONSERVATION; PLANT ANATOMY.

Germplasm conservation of long pepper plants was carried out to maintain its germplasm at Cikampek Research Installation. Long pepper is considered as plants producing active compounds having aphrodisiac effects. However, there is no any scientific proved concerning an aphrodisiac effect of this plant. Also, there is no superior varieties of that crop to be developed yet. The experiment was conducted in Cikampek Research Installation using direct observation method. The aim of these activities was to conserve numbers of long pepper selected as mother plant. Germplasm conservation of long pepper plants at Cikampek Research Installation included increasing of plant varieties, maintenance and observation. Observation result showed that young and old leaves characters had no variation by the length and the width of leaves. Stem and branch of long pepper plants usually were round with the variation of length. The shape of fruits consisted of conical, globular and foliform.

065 HOBIR

[Increasing artemisinin level through genetic improvement of *Artemisia annua* L.]. *Peningkatan kadar artemisin dengan perbaikan genetik tanaman Artemisia annua L.*/

Hobir; Purwiyanti, S.; Melati; Bermawi, N. [Research technical report of Indonesian Medicinal and Aromatic Crops Research Institute in year of 2007]. Laporan teknis penelitian T.A. 2007 Balai Penelitian Tanaman Obat dan Aromatik. Bogor (Indonesia): Balittro, 2008: p.297-310. ISSN 0853-9456, 7 tables; 13 ref. Appendices. 633.88/BAL/l

ARTEMISIA ANNUA; ARTEMISININ; GENETIC IMPROVEMENT; GENETIC VARIATION; IRRADIATION; GROWTH; PRODUCTION.

Artemisia annua is a crop that produces artemisinin used as raw material of medicine for malarial disease. Study on increasing artemisinin content by genetic improvement was aimed at producing high yielding varieties of artemisia for supporting the development of the crop in Indonesia. Genetic improvement was initiated with increasing genetic variability by irradiating the seeds with gamma ray. The irradiated seed was planted in two generations. The first generation was planted in December 2006 and harvested in July 2007 (M1-seed) and the seed (M1) was planted in December 2007 to produce M-2 seed in 2008. The experiment was conducted in Manoko (Lembang) in a factorially randomized block design. The first factor was population (4 population) and the second one was irradiation intensity (3-levels) making up 12 treatments. Results for the first generation showed that there were interaction effects of irradiation intensities and population for plant height, stem diameter, number of secondary branches, and dry weight of stem. Different populations gave different responses to the doses of irradiations for those parameters. Result of the analyses of genetic variabilities and heritabilities for growth and yield component (plant height, stem diameter, number of primary and secondary branches, number of leaves for primary and secondary branches) showed that their coefficient of genetic variabilities were slightly low to low, while for yield component (total weight of fresh or dry biomass, fresh and dry weight of stems, fresh and dry weight of leaves, and artemisinin content) the coefficient of genetic variabilities were high to very high. Heritabilities for number of secondary branches and number of leaves on primary branches were moderate, while that for number of leaves on secondary branches was low and for artemisinin content was high. The high genetic variabilities and heritabilities for yield components, especially artemisinin, indicated that the chance for increasing yield and artemisinin content in *Artemisia annua* was high adequate. The observations on growth and yield components and artemisinin content a populations from Kimia Farma showed its superiority, producing about 3 t/ha dry herbs or about 17 kg/ha artemisinin. The yield of artemisinin in its producing countries ranged from 10 to 25 kg/ha.

066 HOBIR

[Medicinal and aromatic plants conservation in Sukamulya (Indonesia) experimental garden]. ***Konservasi tanaman obat dan aromatik di kebun percobaan Sukamulya***/ Hobir; Rudi T.S.; Purwiyanti, S. [Technical report of Indonesian Medicinal and Aromatic Crops Research Institute year 2007]. Laporan teknis penelitian T.A. 2007 Balai Penelitian Tanaman Obat dan Aromatik. Bogor (Indonesia): Balittro, 2008: p. 20-26. 2 tables; 7 ref. 633.88/BAL/l

CANANGA ODORATA; DRUG PLANT; ESSENTIAL OIL; CULTIVATION; GROWTH; PRODUCTION; FLOWERS; FRUITS.

Germplasm conservation of ylang-ylang, cananga and javanoni in Sukamulya experimental garden is needed for maintaining germplasm collection. The conservation was aimed at conserving 2 population of ylang-yLang (*Canangium odoratum f. genuinea*), 1 population of cananga (*Canangium odoratum f. macrophylla*), and 11 accessions of javanoni (*Morinda citrifolia*). The activities were carried out from January-Desember 2007 in Sukamulya experimental garden (Sukabumi). Total area for conservation of ylang-ylang was 2.5 ha,

cananga 0.25 ha and javanoni 0.2 ha. The activities during conservation were maintaining the plant collection and observing flower and fruit production on ylang-ylang, cananga and javanoni. Result showed that all of the plant maintaining was growing well. Weeding on ylang-ylang was only conducted twice a year. Because of limited budgeting, weeding on cananga was not optimal. Javanoni was growing well but the leaves of this collection were infected by the disease. Observation on production of ylang-ylang during one year showed that flower production varied among their populations. Two progenies of ylang-ylang (No 1 and 3) and Javanoni (M4 and M5) had the higher production. The plant from seed had the higher production compare to that from cuttings.

067 KRISNAWATI, A.

Agronomic character and isoflavone contents of F5 soybean lines. ***Karakter agronomik dan kandungan isoflavon galur kedelai F5*** / Krisnawati, A.; Adie, M.M. (Balai Penelitian Tanaman Kacang-kacangan dan Umbi-umbian, Malang (Indonesia)). *Jurnal Penelitian Pertanian Tanaman Pangan* (Indonesia) ISSN 0216-9959 (2009) v. 28(1) p. 23-28, 2 ill., 3 tables; 30 ref.

GLYCINE MAX; AGRONOMIC CHARACTERS; YIELDS; HIGH YIELDING VARIETIES.

Genotype selection for seed yield potential and followed by soybean isoflavone content is needed to obtain soybean variety with high yield and high isoflavone content. A total of 299 F5 soybean lines were selected for yield potential at Muneng Research Station in dry season of 2007. Wilis was used as check variety. Each line was planted 4.5 m single row with 0.4 m row distance. Seed yield, maturity and seed size were used as selection criteria. A total of 127 selected lines with high yield and three check varieties (lAC 100, G100H and Wilis) were analyzed for their isoflavone contents using HPLC following Vyn *et al.* (2002). The experiment plots showed optimal performance with an average yield of 2.02 t/ha (range of 1.10-3.86 t/ha), maturity average was 83 days (range of 77-85 days) and 100 seed weight ranged from 7.20-19.60 g (average 12.38 g). The seed yield of check variety Wilis was 3.48 t/ha. Selection based on seed yield, maturity and seed size resulting a total of 127 lines, with yields range from 2.03 to 3.86 t/ha. Total isoflavone contents of 127 lines ranged 78.77-175.57 mg/100 g (average 101.09 mg/100 g seed). Average of daidzein was 53.33 mg/100 g (range of 37.51-98.34 mg/100 g), glycetein ranged from 8.52 to 19.91 mg/100 g (average 14.54 mg/100 g), and genistein was from 20.45 to 60.25 mg/100 g (average 33.23 mg/100 g). The total isoflavone content of soybean seed was dominated by daidzein 52.75%, 14.28% glycetein and 32.87% of genistein. Variety Wilis and lAC 100 contained total isoflavone 106.86 and 105.40 mg/100 g, respectively, whereas G100H was 117.08 mg/100 g seed. By using isoflavone content on G100H as the limit for selection, 12 lines were selected. Line of lAC 100/SHR-W60 (6)-257(10)-285/34 had the highest isoflavone content of 175.57 mg/100 g, with 2.64 t/ha of seed yield. The twelve selected lines need to be further tested for their seed yield across locations of soybean production center.

068 KRISTINA, N.N.

[In vitro medicinal and aromatic plants germplasm conservation]. ***Konservasi plasma nuftah tanaman obat dan aromatik secara in vitro***/ Kristina, N.N.; Syahid, S.F.; Surachman, D.; Aisyah, S. [Research technical report of Indonesian Medicinal and Aromatic Crops Research Institute in year of 2007]. Laporan teknis penelitian T.A. 2007 Balai Penelitian Tanaman Obat dan Aromatik. Bogor (Indonesia): Balittro, 2008: p.27-36. ISSN 0853-9456, 10 tables; 4 ref. 633.88/BAL/l

DRUG PLANTS; ESSENTIAL OIL CROPS; GERMPLASM; GERMPLASM CONSERVATION; IN VITRO.

In vitro conservation in medicinal and aromatic plant was conducted to maintain plants in laboratory. Conservation was done by multiplication, collection and conservation in simple media. Collection plants were maintained by recommended medium from the research result. To find new collection, sterilization of new plant was done. Conservation was conducted in patchouli, mesona and stevia, with medium (1) dilution of the macro MS (1, 3/4, 1/2 and 1/4) to patchouli; (2) decrease the carbohydrate: MS + sugar (0, 10, 20, 30 g/l) and control (MS + sugar 30 g/l + BA 0,1 mg/l) and (3) addition of ancymidol (0, 0.5, 1 and 1.5) mg/l in mesona. The result of conservation in this year was less from the target, the plant was contaminated due to technical problems, so the number of collection maintained was only 40 species. MS + BA 0.1 mg/l is the best medium for multiplication of St. John's wort, in stevia, all of shoots can live in the medium, but the visualization was different. MS + ancymidol 1 mg/l is the best medium for conservation of mesona. The high concentration of ancymidol made the mesona shoots roset, while in patchouly the best medium for conservation was 3/4 MS.

069 KUSTIANTO, B.
Productivity of rice promising line for tidal swamp and "lebak" area. *Produktivitas galur harapan padi di lahan pasang surut dan rawa lebak*/ Kustianto, B. (Balai Besar Penelitian Tanaman Padi, Subang (Indonesia)). *Jurnal Penelitian Pertanian Tanaman Pangan* (Indonesia) ISSN 0216-9959 (2009) v. 28(1) p. 34-38, 7 tables; 10 ref.

ORYZA SATIVA; RICE; PRODUCTIVITY; AGRONOMIC CHARACTERS; YIELDS; QUALITY; SWAMPS; TIDES.

The rice breeding program at Indonesian Center for Rice Research (ICRR) obtained two elite lines B9852EKA-66 and B10214F-TB-7-2-3. Line B9852E-KA-66 is derived from crossing of Batang Ombilin variety and IR9884-54-3, while B10214FTB-7-2-3 is derived from three parental crosses of local variety Pucuk with Cisanggarung variety and local variety (Sita). Pedigree plant selection from F2 to F5 of B9852E-KA-66 was conducted at Muara, Bogor and the pedigree nursery was planted at Taman Bogo experimental station, Lampung. Observation nursery and preliminary yield trial were conducted at Karangagung and Kayuagung, South Sumatra. The multilocation yield trials were conducted at Karangagung, South Sumatra; Dadahup, Central Kalimantan (tidal swamp area), and Kayuagung, South Sumatra (lebak area) from 2005 to 2007. Results showed that lines B9852E-KA-66 and B10214F-TB-7-2-3 produced an average yield of 5.65 t/ha and 5.49 t/ha, respectively. The texture of cooked rice of line B9852EKA-66 was hard, while B1 0214F-TB-7-2-3 was medium. These two lines showed medium tolerant to Fe toxicity. B9852E-KA-66 and B1 0214FTB-7-2-3 were released as new variety, named INPARA-1 and INPARA-2, respectively.

070. QOSIM, W.A.
[Establishment of somatic embryo on formation on in vitro culture mangosteen]. *Pembentukan embrio somatik pada tanaman manggis kultur in vitro*/ Qosim, W.A.; Karuniawan, A.; Amien, S. Bandung (Indonesia): UNPAD, 2008: 31p. 634.71:581.3/QOS/p

GARCINIA MANGOSTANA; IN VITRO CULTURE; SOMATIC EMBRYOS; CALLUS; EMBRYONIC DEVELOPMENT; GENETIC TRANSFORMATION; SOMACLONAL VARIATION.

Mangosteen (*Garcinia mangostana* L.) is one of the tropical fruit tree species with promising economic value, some medical properties and has good prospect to be developed as export commodity in global market. Breeding program of mangosteen with hybridization technique and selection is impossible, because of lack of fertile pollen and rudimentary. The seeds of mangosteen are formed apomictically (obligate apomicts), in the group seed that is called recalcitrant. All mangosteens are believed to be genetically identical or homogenous, and genetic variability of mangosteen is very limited. Alternative approach to increase genetic variability of perennial and apomicts crops is biotechnology. Nevertheless, plant regeneration of mangosteen is inefficient. Somatic embryogenesis is efficient plant regeneration to promote biotechnology program of mangosteen, because regenerant or mutant is solid. The research was designed for two years. The first year was induction of somatic embryo of mangosteen in vitro, while second year induction of rooting on somatic embryo of mangosteen. The aim of long term research was to obtain somatic embryo of mangosteen. It is important to promote biotechnology program of mangosteen, for examples genetic transformation, in vitro induced mutation and somaclonal variation of mangosteen, while the aim of short term research was to improve somatic embryo protocol of mangosteen in vitro. The expected result of first years was to obtain embryogenesis somatic protocol of mangosteen in vitro, while second years was rooting induction on somatic embryo of mangosteen. The method was arranged as experiment in tissue culture laboratory. Somatic embryogenesis was carried out indirectly through embryogenic callus. The formation of mangosteen somatic embryo in vitro was carried out through callus embryogenic from excised leaf explants. The research was conducted to improve protocols formation of somatic embryo derived from callus embryogenic that was used as protocol mutation breeding of mangosteen in vitro or biotechnology. The embryogenic callus was induced from excised leaf explants on MS (Murashige and Skoog, 1962) medium with 2.22 micro M BAP (benzylaminopurine) and 2.27 micro M TDZ (thidiazuron) combination, 1.39 micro M polyvinylpyrolidon (PVP), 30 g/l white sugar, 8 g/l agar. The medium of plant regeneration was woody plant medium (WPM) supplemented with 1.39 micro M polyvinylpyrolidon (PVP), 30 g/l white sugar, and 8.30 g/l agar, concentration BAP (0.0;1.1; 2.2; 3.3; 4.4) micro M as treatment. The results showed that basal medium WPM with 2.2 micro M BAP concentration indicated the highest percentage of embryogenic callus formed shoot embryo somatic was 34.7%, average number shoot per callus embryogenic was 7.8 shoot, average number of pair leaf 1.10, average time to form shoot 13.5 weeks and number of shoot length 1-5 mm was 11.06, shoot length 6-10 mm was 2.61 and shoot length >10 mm was 0.61.

071. ROSTIANA, O.

[Characterization of collection number on pruatjan (*Pimpinella pruatjan* Molk.)]. ***Karakterisasi nomor-nomor koleksi purwoceng***/ Rostiana, O.; Haryudin, W.; Rosita S.M.D.; Syahid, S.F.; Aisyah, S.; Nasrun. [Research technical report of Indonesian Medicinal and Aromatic Crops Research Institute in year of 2007]. Laporan teknis penelitian T.A. 2007 Balai Penelitian Tanaman Obat dan Aromatik. Bogor (Indonesia): Balittro, 2008: p.337-344. ISSN 0853-9456, 3 tables; 15 ref. 633.88/BAL/l

PIMPINELLA; GERMPLASM; AGRONOMIC CHARACTERS; CHEMICAL CONTENT.

Pruatjan is well known as Indonesian indigenous herbal medicine for aphrodisiac properties. This endangered species grows at a limited area in Dieng, Central Java. Study on active compound and the efficacy of pruatjan as an aphrodisiac has been widely explored recently. However, the superior variety and information on its valuable characteristic were still limited. Characterization on the accession numbers of pruatjan were performed at Gunung Putri, Cipanas, West Java, from January - December 2007, with the emphasize on observing the pureline of each population of certain collected accession numbers, either the Red or

Green populations of Pipru-01, -02, -03, -04, -05 and -06. To identify both qualitative and quantitative characters, six collection numbers of pruatjan (Pipru 01, 02, 03, 04, 05 and 06) both of Red and Green populations, were planted in 50 cm polybag, with 100 cm x 100 cm spacing, and 100 plants per accession number. Results showed that plant diameter, number of leaves, length of leaves and length of petiole of green population of Pipru-01, -02 and -03 found to be higher than that of the red population from the same accessions number. The highest herbal weight (50.10 g) was found in the red population of Pipru-04 and statistically different to five others accession numbers. Further, the highest weight of root (11.11 g) was found in the green population of Pipru-05. The quality of each accession number was different, i.e. the highest sitosterol (15.9 ppm) was found in the root of Pipru-06, stigmasterol (13.6 ppm) in the root of Pipru-03, saponin (18.8 ppm) in Pipru-06 herba, bergapten (6.9 ppm) in Pipru-03 herba. The highest water soluble extract and alcohol soluble extract (22.06 and 7.58%) were performed in Pipru-04 herba, meanwhile in the root, the highest water soluble extract (22.61%) was found in Pipro-04 and alcohol soluble exctrat (8.5%) in Pipru-02.

072 SETIYONO, R.T.

[Multilocation test of promising javanese turmeric number planted on various agroecological conditions]. ***Uji multi lokasi nomor-nomor harapan temulawak pada berbagai kondisi agroekologi***/ Setiyono, R.T.; Indrawanto C.; Ermiati; Pribadi, E.R. [Research technical report of Indonesian Medicinal and Aromatic Crops Research Institute in year of 2007]. Laporan teknis penelitian T.A. 2007 Balai Penelitian Tanaman Obat dan Aromatik. Bogor (Indonesia): Balittro, 2008: p. 220-232.ISSN 0853-9456, 15 tables; 11 ref. 633.88/BAL/l

CURCUMA XANTHORRHIZA; VARIETIES; AGROECOSYSTEMS; ADAPTATION; AGRONOMIC CHARACTERS; PLANT PRODUCTION; FARMING SYSTEMS.

The discovery and release of superior varieties both in term of productivity and yield quality are the first important step to support the success of the national javanese turmeric plantation development. To achieve the goal, a multilocation test on six promising javanese turmeric numbers together with a landrace was carried out in three locations of javanese turmeric production center in West Java and Central Java Provinces. The sites used for the study were located at the West Java Province, i.e., Cipenjo Village located in the Cileungsi Subdistrict and within the Bogor District that represents the lowest altitude (200 m asl) and the Ganjar Resik Village located in the Wado Subdistrict and the Sumedang District representing the highest altitude (800 asl). Another location was located in Central Java Province which was in Kragilan Village of the Mojosongo Subdistrict and the Boyolali District representing medium altitude (450 asl). Soil sample of each test site was analyzed at the IMACRI Soil Laboratory. The experiments were arranged in a randomized completely block design using four replications. Treatments consisted of six promising numbers and one landrace making of seven treatments per location. Experiments unit were plots of size 4 m x 3.75 m each, plant spacing was 0.75 m x 0.50 m and each plot can accomodate 40 plants. The inter plot spacing was 1 m and the inter replication spacing was 1.5 m. Thus a total of 1,000 m^2 land was needed per location to carry out the experiments. The second planting was done in 2006/2007. Treatments consisted of six promising numbers and two landraces. Experiments unit were plots of size 5 m x 6 m each, plant spacing 0.75 m x 0.50 m and within each plot can accomodate 80 plants. The experiments were arranged in a randomized completely block design using four replications. The interplot spacing was 1 m and the inter replication spacing was 1.5 m. Thus a total of 2,000 m^2 land was needed per location to carry out the experiments. The plant materials used were the lateral rhizome which is the ones originated from the mother rhizome, the homogenous ones were selected and planted only one rhizome per hill. Plants were fertilized with dung manure (20 t/ha) and 200 kg/ha urea, 200 kg/ha SP36 and 200 kg/ha KCl. The dung manure, SP36 and KCl fertilizers were given at the same

time as planting the rhizomes, while urea was given three times one-third dosage each at one, two, and three months after planting the rhizomes. Yield of rhizome per hectare of A, B, D, E, and F was higher than that of local variety.

073 SUBEKTI, N.A.

Yield performance of ten parent diallel crosses of maize population on acid soil. ***Keragaan hasil biji sepuluh genotipe jagung dan hibrida dialel keturunannya pada lahan masam*****/** Subekti, N.A. (Balai Penelitian Tanaman Serealia, Maros (Indonesia)); Mangoendidjojo, W.; Nasrullah; Shiddieq, D. *Jurnal Penelitian Pertanian Tanaman Pangan* (Indonesia) ISSN 0216-9959 (2009) v. 28(1) p. 1-6, 7 tables; 13 ref.

ZEA MAYS; GENOTYPES; DIALLEL ANALYSIS; SEEDS; YIELDS; TOXICITY; ALUMINIUM; TOLERANCE; ACID SOILS.

Breeding for Al tolerance of maize requires a preliminary identification of the type of gene action controlling the trait. It is important to understand the gene action before one could decide the most appropriate breeding method for tolerance to Al toxicity. The present study was aimed to estimate the predominant gene action controlling the tolerance to Al toxicity in maize population developed from partial diallel crosses involving 5 tolerant and 5 sensitive inbred lines and were evaluated at Sitiung acid soil. The tolerance was assessed based on grain yield performance per se. Results based on analysis of combining ability showed that AST 1042-69 was the best general combiner or tester for population improvement towards Al tolerance. Specifically for the hybrid resulted from the cross of AST 1042-22 x AST 1042-70 could be improved further as promising tolerant hybrid to Al, based on its estimate of specific combining ability.

074 SUMARNO

[Integrated plant germplasm management through breeding program]. ***Pengelolaan plasma nutfah tanaman terintegrasi dengan program pemuliaan***/ Sumarno (Pusat Penelitian dan Pengembangan Tanaman Pangan, Bogor (Indonesia)); Zuraida, N. *Buletin Plasma Nutfah* (Indonesia) ISSN 1410-4377 (2008) v. 14(2) p. 57-67, 2 ill., 2 tables; 20 ref.

GERMPLASM; PLANT BREEDING; PLANT GENETIC RESOURCES; VARIETIES.

Plant breeding, as an applied plant genetics, is based and supported by various subdisciplines of genetic sciences, including plant germplasm, classical genetics, molecular genetics, cytogenetics, and gene-transformation techniques, etc. Linkage and team work system between plant germplasm management and plant breeding program is most required, since the success of plant breeding may be obtained from the contribution of gene donor parents, derived from the germplasm management. Without the flow of genes from the germplasm collection, varieties produced by the plant breeder would suffer a narrow genetical based or a bottle-necking genetic based. Plant germplasm research is an integral part of the germplasm management, aimed to (1) evaluate the genetic variation of the germplasm collection, to be readily available for the breeding program and to be used for scientific publications, (2) tracing the origin of plant species, and (3) officially release a selected germplasm, containing new economic gene (s). The linkage between germplasm management and plant breeding research program could be facilitated through the following activities: (1) identifying an elite germplasm for varietal release, (2) selection and stabilization of a promising germplasm accession for possible varietal releases, (3) use of germplasm accession as a gene donor parent to incorporate adaptive genes into improved variety, (4) use of germplasm accession for a specific donor gene, (5) use of germplasm to broaden the genetical base of varieties through an introgression and nobilization, (6) use of germplasm to improve the genetic value

of the breeding population, and (7) to develop multiple crosses involving many parents to broaden the genetical base of the breeding population. Another important function of the germplasm management is to conserve accessions carrying genes which may be useful in the future, to anticipate the dynamic changing of biological and environmental stresses on crop. Germplasm management is considered successfully conducted when it is continuously supplying donor gene parents to breeders for parental crosses on their breeding program, conversely, breeding program in considered successfully managed, when it uses the rich genetic variability available on the germplasm collection. Separating the organizational units among the breeding program, germplasm management and molecular genetics research, is only for enhancing the intensity of the research, but should not separate the linkage program of the research.

075 SYUKUR, C.

[Exploration of medicinal and aromatic plants germplasms]. ***Eksplorasi plasma nuftah tanaman obat dan aromatik***/ Syukur, C. [Research technical report of Indonesian Institute for Medicinal and Aromatic Plants in year of 2007]. Laporan teknis penelitian T.A. 2007. Balai Penelitian Tanaman Obat dan Aromatik Bogor (Indonesia): Balittro, 2008: p.1-11. ISSN 0853-9456, 4 tables; 2 ref. 633.88/BAL/l

DRUG PLANTS; ESSENTIAL OIL CROPS; GERMPLASM; PLANT INTRODUCTION.

The exploration of germplasm was conducted to collect accessions of medicinal and aromatic germplasms which are not available in IMACRI, including wild families, wild species, local or cultivated varieties in the center of variabilities. The activities were conducted from January - Desember 2007. Before the exploration, information was collected through desk study to collect and support data and information about the variabilities of medicinal and aromatic crops in West Java and Central Java, Yogyakarta and East Java from related institutions such as LIPI, Estate Crop Extension Services, Forestry Extension Services, and AIAT. Field exploration activities included interviewing local people or the involved instutions having knowledge in medicinal and aromatic crops followed with direct visit to collect accession of the crops. Samples in the form of seeds, rhizomes, cuttings and stolons were packed with appropriate materials such as soil, moss, tissues paper or wetted news paper to maintain humidity and then put in plastic bags. New collections obtained were 137 accessions, including 28 accessions from the Central Java, Yogyakarta (17 accessions), West Java (72 accessions of medicinal crops and 65 accessions of aromatic crops) and from East Java (l2 accessions of medicinal crops). All new accessions were kept in Bogor (IMACRI). Plant materials in the forms of cuttings, stolons or rhizomes were planted in the nursery batch or plastic bags containing the mixture of soil and stable manure, while those in the form of seeds were planted in the sand batch. The new germplasms collection were acclimatized in the glass house and are going to be planted in the collecting gardens of IMACRI according to their environment growth condition.

076 TAKDIR M., A.

Genetic distance estimation of waxy corn lines based on microsatellite marker and its correlation to morphology characters. ***Estimasi jarak genetik galur jagung pulut berbasis marka mikrosatelit dan korelasinya dengan karakter morfologi*** / Takdir M. A. (Institut Pertanian Bogor (Indonesia)); Aswidinnoor, H.; Trikoesoemaningtyas; Koswara, J. *Jurnal Penelitian Pertanian Tanaman Pangan* (Indonesia). ISSN 0216-9959 (2009) v. 28(1) p. 7-22, 6 ill., 4 tables; 24 ref.

ZEA MAYS; GENETIC DISTANCE; MICROSATELLITES; PLANT ANATOMY; AGRONOMIC CHARACTERS.

Maize breeding program for high yielding hybrid varieties requires the availability of pair populations having different heterotic pattern. The present study was aimed to estimate genetic distance among 39 waxy corn lines based on SSRs (single sequence repeats) markers or microsatellites and its correlation with the morphology characters. The research was carried out at ICERI Molecular Biology Laboratory, Maros, South Sulawesi and Cikeumeuh Experimental Farm, Bogor, West Java from January to April 2008. The data were analyzed by PIC (polymorphism information content) and Jaccard's coefficient. Results showed that total of 64 alleles were detected with an average allele number of 3.20 alleles per locus, ranging 2-5 alleles/locus. The genetic distance values ranged from 0.18 to 0.99 indicating the broad genetic variability among lines. Construction of dendrogram differentiates among lines, and divides the lines in three clusters with coefficient cofenitive value (r) 0.87 indicating a good fit based on genetic similarities and consistent with the pedigree data. Estimate of simple correlation value (r) between genetic distance value and morphology characters of the line performance was positive, suggesting there was relation between both characters. While correlation between similarity matrices SSR-based and similarity matrices morphological based using goodness of fit criteria is very weak.

077 WAHYUNI, S.

[Evaluation of king bitter selection number in various locations]. ***Evaluasi nomor-nomor sambiloto di berbagai lokasi***/ Wahyuni, S. [Research technical report of Indonesian Medicinal and Aromatic Crops Research Institute in year of 2007]. Laporan teknis penelitian T.A. 2007 Balai Penelitian Tanaman Obat dan Aromatik. Bogor (Indonesia): Balittro, 2008: p. 81-91. ISSN 0853-9456, 9 tables; 14 ref. 633.88/BAL/l

DRUG PLANTS; ACANTHACEAE; GROWTH; AGRONOMIC CHARACTERS; PRODUCTION; BIOCHEMISTRY; VARIETIES; EVALUATION.

King bitter is one of medicinal plants which widely used for curing allergenic, diabetes, dysentery, digestion infection, exhalation infection and pneumonia. Genetic variability of king bitter was low. Variability was higher if the plant are domesticated, selected naturally based of their preference, and made new plant varieties. Up to recently king bitter was mostly grown wildly and uncultivated yet, plant variations are based on locality. Collection of king bitter from West Java and Central Java have been obtained 11 accession numbers. Their morphology are most similar but they have variations in yield and herb quality. Five numbers have been selected and used for further test. Experiment were conducted at 2 locations (Cimanggu and Karanganyar) for two season (wet and dry season), and was arranged in randomized block design and 4 replications. Result showed that the performance among accessions were similar both in seedling stage and mature plant. Growth of plant such as plant height, numbers of branch, and branch height of mature plant were similar. The average herb yield across location of genotype Cmg-2 was 79.16 g/plant and the genotype Blali (71.16 g/plant). Herb yield of wet season (7.58 - 11.34 kg/100 plant) was higher than herb yield of dry season (3.42 kg/100 plant). Among genotypes value of extract soluble in water was similar but between season were different. Plant cultivated in dry season has extract soluble in water (24.46 - 32.02%) higher than that in wet season (25.39-26.39%). The extract soluble in water of plant cultivated in dry season (20.22 - 23.06%) was higher compare to wet season (12.89 - 17.42%). Genotype Cmg-2 and Blali has a higher total andrographolide (30.989 g/plot and 25.523 g/plot).

F60 PLANT PHYSIOLOGY AND BIOCHEMISTRY

078 MIFTAKHUROHMAH

Effect of ginger oil on the growth of *Phytophthora capsici* and *Fusarium oxysporum*. *Pengaruh minyak jahe terhadap pertumbuhan Phytophthora capsici dan Fusarium oxysporum*/ Miftakhurohmah; Manohara, D.; Noveriza, R.; Suhirman, S. (Balai Penelitian Tanaman Obat dan Aromatik, Bogor (Indonesia)). [Proceedings of the national seminar on pest and disease integrated control of ginger and patchouli]. Prosiding seminar nasional pengendalian terpadu organisme pengganggu tanaman jahe dan nilam, Bogor (Indonesia), 4 Nov 2008/ Rizal, M.; Wahyuno, D.; Sukamto; Wiratno; Saleh, A.; Hamidi, E.; Wizati, F. (eds.). Bogor (Indonesia): Balittro, 2008: p.61-66, 1 table; 6 ref. 633.825-293/SEM/p

GINGER; OILS; ESSENTIAL OILS; PHYTOPHTHORA CAPSICI; FUSARIUM OXYSPORUM; PESTICIDAL PROPERTIES; GROWTH; INHIBITION; VOLATILE COMPOUNDS.

Ginger has been used as a spice and traditional medicine. Beside that, ginger produced essential oil as a secondary product. Many essential oil have been reported having antifungal activity. The experiment aimed to study the effect of ginger oil on vegetative growth of *P. capsici* and *F. oxysporum*. The research was conducted from September to October 2008 at Phytopathology Laboratory of Indonesian Medicinal and Aromatic Crops Research Institute (IMACRI). Ginger oil was prepared by distiller in Tested Laboratory of IMACRI. Tween 80 was used as emulsifier. This experiment used two methods: (1) Poisoned food method; (2) Vapor phase method. The treatment of poisoned food method tested several concentrations: 0.1; 0.2; 0.3; 0.4 and 0.5% (*P. capsici*) and 0; 0.5; 1.0; 1.5 and 2.0% (*F. oxysporum*). Vapor phase method tested 20, 60, and 100 micron l (*P. capsici*), and 100 and 400 micron l (*F. oxysporum*) ginger oil. Sterile water is used for control plate. Ginger oil showed an inhibitor activivity against *P. capsici* and *F. oxysporum*. At 0.5%, *P. capsici* colony growth was completely inhibited. *P. capsici* growth inhibition was 32.88 - 96.9% at 0.1 - 0.4% of ginger oil. Growth inhibition of *F. oxysporium* was 53.86 - 81.09% at 0.5 - 2% of ginger oil. Volatile compound of ginger oil also showed an inhibitory activity.

079 PITONO, J.

Selection of drought resistant on some patchouly somaclones numbers]. *Seleksi ketahanan terhadap stres kekeringan pada beberapa nomor somaklon nilam*/ Pitono, J.; Mariska, I.; Syakir, M.; Ragapadmi; Nurhayati, H.; Setiawan; Kuswadi; Zaenuddin; Santoso, T. [Research technical report of Indonesian Medicinal and Aromatic Crops Research Institute in year of 2007]. Laporan teknis penelitian T.A. 2007 Balai Penelitian Tanaman Obat dan Aromatik. Bogor (Indonesia): Balittro, 2008: p.384-393. ISSN 0853-9456, 4 ill., 16 ref. 633.88/BAL/l

POGOSTEMON CABLIN; SELECTION; CLONES; TRANSPIRATION; DROUGHT RESISTANCE.

The drought tolerant variety is required to expand the plantation program in patchouly. The previous research based somaclone irradiation technique, resulted 6 somaclones which indicate drought tolerance under PEG treatment. The objective of this study is to evaluate whether the transpiration control varied among the 6 somaclones (BIO-1, BIO-2, BIO-3, BIO-4, BIO-5, BIO-6, and Tapak Tuan as a control plant) when subjected to drought stress. The drought stress was induced by withholding irrigation. The results showed there were genetic variations in transpiration control among the somaclones. The somaclone BIO-3 and BIO-4 were stronger than the others in transpiration control either in sufficient or shortage soil water conditions. Due to the ability in transpiration control closely correlated to soil water conservation and low risk in xylem disfunction, it suggested that BIO-3 and BIO-4

may be drought tolerant. However, that phenomenon should be clarified in the further field experiment.

080 TILAAR, M.
Safety and efficacy evaluation of ginger extract (*Zingiber officinale*) as a cosmetic ingredient. *Evaluasi keamanan dan manfaat ekstrak jahe (Zingiber officinale Rosc.) sebagai bahan baku kosmetik*/ Tilaar, M.; Wong, L.W.; Ranti, A.S.; Suryaningsih; Maily; Junardy, F.D. (Martha Tilaar Innovation Center, Jakarta (Indonesia)); Wasitaatmadja, S.M. [Proceedings of the national seminar on integrated pest and disease control of ginger and patchouli]. Prosiding seminar nasional pengendalian terpadu organisme pengganggu tanaman jahe dan nilam. Bogor (Indonesia), 4 Nov 2008/ Rizal, M.; Wahyuno, D.; Sukamto; Wiratno; Saleh, A.; Hamidi, E.; Wizati, F. (eds.). Bogor (Indonesia): Balittro, 2008: p.83-88, 2 tables; 12 ref. 633.825-293/SEM/p

GINGER; EXTRACTS; USES; SAFETY; ANTIOXIDANTS; MUCOUS MEMBRANE; CLINICAL TRIALS.

As impact of back to nature trend, consumer demand for natural products is continuously increasing, especially products contained plant ingredients. In Indonesia, plant research is extensively conducted for medical purposes. But, nowadays not much research has been conducted for cosmetical purposes. The objective of this study was to test the safety and efficacy of ginger (*Zingiber officinale*) extract for use in cosmetics. This research studies antioxidant effect as well as its safety aspects in cosmetic preparation. The study was carried out using DPPH scavenging activity for antioxidant property. Whereas, the dermatological safety test was conducted using repeated opened patch test (RaPT) followed by single closed patch test (SCPT), involving 50 selected healthy volunteers. As for evaluating its irritation properties to mucous membrane, HETCAM test was performed. It was shown that ginger extract has antioxidant activity and safe dermatologically as well as at ocular level.

081 TRISILAWATI, O.
[Effect of drought stress on formation of pruatjan secondary metabolism]. *Pengaruh stres kekeringan terhadap pembentukan bahan aktif pada purwoceng (Pimpinella pruatjan Molk.)/* Trisilawati, O.; Pitono, J.; Emmyzar; Rohimat, I.; Nasrun; Noviar. [Research technical report of Indonesian Medicinal and Aromatic Crops Research Institute in year of 2007]. Laporan teknis penelitian T.A. 2007 Balai Penelitian Tanaman Obat dan Aromatik. Bogor (Indonesia): Balittro, 2008: p. 345-358. ISSN 0853-9456, 14 ill., 11 ref. 633.88/BAL/l

PIMPINELLA; DROUGHT STRESS; CHEMICAL COMPOSITION; STIGMASTEROL; STEROIDS; SAPONINS; SOIL WATER.

Cultivation and development of pruatjan was limited in Dieng area, Wonosobo, Central Java. Cultivation technology for increasing pruatjan quality by regulating water availabillity is not available yet. The research was conducted in Gunung Putri experimental garden, with the objective was to clarify the relationship between drought stress and the formation of several secondary metabolic of pruatjan simplisia. For that purpose two models were used, consisted of (1) effect of increasing the level of drought stress to the secondary metabolic formation at three growth stages (3, 5, and 7 months) and (2) secondary metabolic content at several field capacity levels: 80% field capacity (FC) (S0), 60% FC (S1), 50% FC (S2), and 40% FC (S3). Completely randomized design with 6 replications under 45% light intensity was used. Result showed that: (a) drought stress in 10-38 days significantly affected content of steroid, saponin and bergapten, (b) drought stress in 10-38 days at 3 months after planting resulted

the highest content of stigmasterol and sitosterol, (c) drought stress at leaf between 5-12 bar resulted the highest steroid and saponin content at 7 MAP, (d) drought stress treatment at 60-65% FC resulted the highest stigmasterol and sitosterol content at 5 MAP, whether at 7 MAP, 60-70% FC gave the highest content of stigmasterol and sitosterol.

F61 PLANT PHYSIOLOGY – NUTRITION

082 NUGROHO, P.A.

Effect of *Mucuna bracteata* on nutrient status and growth of immature rubber trees. *Pengaruh penanaman Mucuna bracteata terhadap status hara dan pertumbuhan tanaman karet belum menghasilkan*/ Nugroho, P.A.; Istianto; Siagian, N.; Karyudi. (Pusat Penelitian Karet, Medan (Indonesia)). *Jurnal Penelitian Karet (Indonesia)*. ISSN 0852-808X (2010) v. 28(1) p. 44-54, 1 ill., 7 tables; 12 ref.

HEVEA BRASILIENSIS; LEGUMINOSAE; MUCUNA; COVER PLANTS; GROWTH; BIOMASS; SOIL FERTILITY.

At present, most of rubber plantation in Indonesia is using *Mucuna bracteata* as LCC (legume cover crop). *M. bracteata* has some advantages compared with the other LCC. The aims of this research were to find out potential nutrient return of *M. bracteata* into the soil and to observe the influence of *M. bracteata* planting on immature rubber. This research comprised two activities and was done at two rubber estates in North Sumatra. The first activity was to collect the shoots and litter of *M. bracteata* at 1-3 years after planting from 1 m^2 plot with three replicates for biomass analysis and nutrient return to the soil The second activity was to compare the immature rubber growth of PB 260 clone at 43 months after planting which used *M. bracteata* and conventional LCC. The growth parameters observed were girth, bark thickness and crown. One hundred trees samples were taken from different area topography, namely lowland, flat and undulating and then T-Test was done for the data. The result showed that the potency of biomass produced by *M. bracteata* at one year old was 2.5 -7 times higher than that by other LCC such as serelium, conventional legume (mix of *Peuraria javanica* (Pj), *Calopogonium mucunoides* (Cm) and *Centrosema pubesens* Cp) and *Paspalum conjugatum*, respectively. The number of nutrient potency which was returned to the soil by *M. bracteata* at three years after planting was higher than that of the other LCC. Girth growth and bark thickness of rubber covered by *M. bracteata* indicated better performance than those of rubber covered by the other LCC. The number of tappable plants in area covered by *M. bracteata* was higher than those of rubber covered by the other conventional LCC, with the percentage of 15%/ha and 7%/ha, respectively.

H10 PESTS OF PLANTS

083 DARWIS, M.

Controling *E. hypholeuca* insect using solid and liquid forms of fungi *M. anisopliae*. *Pengendalian hama lundi E. hypholeuca dengan menggunakan cendawan M. anisopliae dalam formula padat dan cair*/ Darwis, M.; Wahyono, T.E. (Balai Penelitian Tanaman Obat dan Aromatik, Bogor (Indonesia)). [Proceedings of the national seminar on integrated pest and disease control of ginger and patchouli]. Prosiding seminar nasional pengendalian terpadu organisme pengganggu tanaman jahe dan nilam. Bogor (Indonesia), 4 Nov 2008/ Rizal, M.; Wahyuno, D.; Sukamto; Wiratno; Saleh, A.; Hamidi, E.; Wizati, F. (eds.). Bogor (Indonesia): Balittro, 2008: p.123-129, 2 tables; 12 ref. 633.825-293/SEM/p

CROPS; PHYLLOPHAGA; METARHIZIUM ANISOPLIAE; PATHOGENS; FORMULATIONS; PATHOGENICITY; MORTALITY.

About 200 species of insect pests, especially live in soil, can be infected by pathogenic fungus. One of them is fungi *Metarrhizium anisopliae*. The multiplication technique usually uses solid formula (medium), but it needs to find out a new innovation, so that it is easy for fungus conidia to infect *E. hypholeuca*. Therefore, solution of *M. anisopliae* conidia on aquades medium was studied. *E. hypholeuca* is one of important pest on patchouli at Sukabumi Experimental Farm, which caused damage up to 80%. This experiment was carried out at the pest and disease laboratory of Indonesian Medicinal and Aromatic Crops Research Institute Bogor. Experiment had been done from June up to August 2007. Pathogenic fungus was isolated from contaminated pest and selected also multiplicated in corn medium (solid) and then dissolved in aqua medium for liquid formula. Experiment was designed using completely randomized design (CRD) with 5 treatments and 5 replications. The treatments were 2.5 g, 5.0 g, 7.5 g, 10 g of *M. anisopliae* and control. Percentage of pest mortality was observed. The result of experiment showed that the degree of mortality on 10 days after treated was 56-76%. The liquid formula was done by dissolving and stirring *M. anisopliae* in aquades. At the same time it was also carried out by using pathogenic *B. bassiana* as control. The result showed that liquid formula was more effective compare to solid formula, where the mortality was up to 100% on 10 days after treatment.

084 KARDINAN, A.

[Test of essential oil application as mosquitto repellent]. ***Pengujian pemanfaatan minyak atsiri sebagai anti nyamuk***/ Kardinan, A.; Ma'mun; Tarigan, B.T.; Wahyono, T.E.; Ahyar. [Research technical report of Indonesian Medicinal and Aromatic Crops Research Institute in year of 2007]. Laporan teknis penelitian T.A. 2007 Balai Penelitian Tanaman Obat dan Aromatik. Bogor (Indonesia): Balittro, 2008: p. 280-285. ISSN 0853-9456, 2 tables; 12 ref. 633.88/BAL/l

ESSENTIAL OILS; CULICIDAE; INSECTS; REPELLENTS; CHEMICOPHYSICAL PROPERTIES.

Haemorrhagic dengue fever disease transmitted by *Aedes aegypti* mosquito occurring every years is a serious problem in Indonesia. A lot of efforts have been done to overcome the problem. One of the efforts is by using mosquito repellent containing synthetic chemical agent called diethyltoluamide which is dangerous especially for kids. A series of research has been conducted in the Indonesian Medicinal and Aromatic Crops Research Institute to evaluate the use of aromatic crops as mosquito repellent. Some essential oils have been obtained, such as fennel oil (*Foeniculum vulgare*), clove oil (*Syzigium aromaticum*) and patchouli oil (*Pogostemon cablin*). Eighteen formulations have been obtained from the three essential oils and ready to be tested against *Aedes aegypti* mosquito which has been reared in the Entomology Laboratory, Veterinary Faculty, IPB. Testing of some formulas has been conducted in the laboratory. The result showed that all formulations tested possessed repellent effect against *Aedes aegypti* mosquito, although the repellent ability of each formula tested was not same. Lotion formula of clove oil showed better result compared to other formulas tested, however its protection ability (having > 90% protection ability, lasting for two hours only) was not accordance with the regulation or standard according to the Pesticide Commission (protection ability must be minimum of 90%, lasting for six hours). However, since those formula in the market consisted of synthetic chemical ingredient (DEET) which is dangerous to the human being in long term use, hence, formula based on natural active ingredient such as essential oil should be continuously developed.

085 MARSUDI

Study on technical performance of vapor heat treatment unit to control the fruit fly larvae of apple. *Kajian teknis unit perlakuan panas metode uap (VHT) untuk pengendalian larva lalat buah pada apel*/ Marsudi (Balai Besar Pengembangan Mekanisasi Pertanian, Serpong (Indonesia)); Suroso, H.; Rokhani, H. *Jurnal Enjiring Pertanian* (Indonesia). ISSN 1693-2900 (2007) v. 5(1) p. 27-34, 11 ill., 2 tables; 12 ref.

APPLES; TEPHRITIDAE; LARVAE; HEAT TREATMENT; STORED PRODUCTS; PEST CONTROL.

Recently there has been increasing interest in the use of heat treatments (VHT) for maintaining postharvest quality, disease control, and as a quarantine technology of fruit and vegetable. The treatment is a quarantine requirement for export to certain destination in Japan, US and other countries. Since 1988, Indonesian fruits were exported to United States and Japan after treated by hot water quarantine treatment in order to destroy the fruit fly larvae. VHT is heat treatment technology that can be used for postharvest insect control for perishable commodities such as fresh fruits, fresh vegetables, tubers, and cut flowers. The objective of this research was to assess the technical performance of the vapor heat treatment unit and the heat effect on fruit quality of 'manalagi' apples. The treatment was at temperature of about 47.5ºC until a fruit core temperature reached 46.5ºC and held for 30 minutes, while the control fruit were not treated. Based on the results the VHT unit was effective for the disinfestations test. The fruit core temperature of 46ºC was reached after 128 to 140 minutes. The manalagi apple tolerated up to 30 minutes at core temperature of 46.5ºC without any visible signs of heat ijury. The populations of dominant fungi, namely *Acremonium strictum*, *Cladosporium cladosporioides* and *Gloesporium fructigenum* were effectively reduced by 95.8-100%.

H20 PLANT DISEASES

086 HARTATI, S.Y.

Control of wilt disease on patchouli plant by biopesticides. *Pengendalian penyakit layu bakteri pada tanaman nilam dengan biopestisida*/ Hartati, S.Y.; Supriadi; Karyani, N. (Balai Penelitian Tanaman Obat dan Aromatik, Bogor (Indonesia)); Udarno, L. [Proceedings of the national seminar on integrated pest and disease control of ginger and patchouli]. Prosiding seminar nasional pengendalian terpadu organisme pengganggu tanaman jahe dan nilam. Bogor (Indonesia), 4 Nov 2008/ Rizal, M.; Wahyuno, D.; Sukamto; Wiratno; Saleh, A.; Hamidi, E.; Wizati, F. (eds.) Bogor (Indonesia): Balittro, 2008: p. 153-162, 2 tables; 28 ref. 633.825-293/SEM/p

POGOSTEMON CABLIN; PSEUDOMONAS SOLANACEARUM; BIOPESTICIDES; BIOLOGICAL CONTROL AGENTS; BACILLUS; PSEUDOMONAS FLUORESCENS; CLOVES; OILS; TRICHODERMA; BIOFERTILIZERS.

One of the most destructive pathogens on patchouli plant is *Ralstonia solanacearum*, the cause of wilt disease. The disease is a threat on patchouli cultivation, since it is capable of causing significantly yield reduction. Several control technology components have been developed such as biopesticides (microbial antagonism, plant pesticides, and biofertilizers). The research was aimed to study the effect of those microbial antagonisms (*Bacillus* sp. and *Pseudomonas fluorescens*), formulated clove-oil, and fertilizer riched with microbial decomposers *Bacillus pantotkenticus* and *Trichoderma lactae*) against wilt disease on patchouli. Patchouli plants were grown on diseased experimental field at randomized block design (5 treatments, 5 replicates). The treatments were microbial antagonisms, formulated clove-oil, biofertilizer, combination of microbial antagonisms + biofertilizer, and 5 control. The results of this experiment showed that application of microbial antagonisms was not

effective to reduce disease intensity. Formulated clove-oil was effectivelly reduce 17% of the disease. Application of biofertilizer and its combination with microbial antagonisms successfully reduced the disease intensity up to 59 and 61%, respectively.

087 NURYANI, Y.

[Evaluation on resistance of bacterial wilt diseases (*Ralstonia solanacearum*) on patchouli somatic hybrid]. ***Evaluasi ketahanan hibrida somatik nilam terhadap penyakit layu bakteri (Ralstonia solanacearum)/*** Nuryani, Y.; Nasrun; Nurmansyah; Idris, H.; Denian, A.; Jamalius; Yudarfis; Refianyo; Burhanudin; Zulkarnain; Hasnawati. [Research technical report of Indonesian Medicinal and Aromatic Crops Research Institute in year of 2007]. Laporan teknis penelitian T.A. 2007 Balai Penelitian Tanaman Obat dan Aromatik. Bogor (Indonesia): Balittro, 2008: p.110-123. ISSN 0853-9456, 7 tables; 15 ref. 633.88/BAL/l

POGOSTEMON CABLIN; PSEUDOMONAS SOLANACEARUM; DISEASE RESISTANCE; SOMATIC HYBRIDS.

Bacterial wilt disease is one of the most serious diseases on patchouli plant farming that may reduce production. Until now, there is no controlled technology that is statisfied. Using the resistant or tolerant varieties is one of the most effective methods to control this disease to increase productivity of patchouly plant. Results of protoplast fusion between Jawa and Girilaya patchouly plant that resistant to bacterial wilt disease and Aceh patchouly plant (TT 75 and Sikalang) that have the high production and quality of oil has found some numbers of somatic hybrid. To find the resistant or tolerant variety to *R. solanacearum* and has the high productivity and quality of oil, it is needed to evaluate the resistance of some numbers of patchouly somatic hybrid generated from fusion protoplast results to bacterial pathogen infection (*R. solanacearum*). The objective of this study was to find the somatic hybrid numbers of patchouly plant that resistant to bacterial wilt disease. The study was conducted in green house of KP. Laing Solok from January - December 2008. The activities were collection of patchouli plant that infected by bacterial wilt disease in field, isolation and culture of the bacterial pathogen were in the laboratory and virulence test of bacterial pathogen on patchouli plant in the green house. In addition, subculture of the hybrid somatic seeds of patchouly plants and inoculation of these seeds by bacterial pathogen and incubation of them were carried out at green house. The study used some numbers of somatic hybrid as treatments that arranged in completely randomized design (CRD) with three replications. As parameters assessment were incubated period that showed the first symptom disease for pathogenicity test of bacterial pathogen. Incubation period showed the first symptom and plant death also diseases intensity. In addition plant growth and leaf production were observed for the study of resistance of patchouli somatic hybrid numbers to bacterial pathogen. According of type and stability of bacterial pathogenic colony, 14 bacterial pathogenic isolates were found. The results of pathogenicity test of the bacterial pathogens showed 9 bacterial isolates that could infect patchouly plant seeds with incubated period of the first symptom of bacterial wilt disease were 10.2-26.4 day after inoculation (his). According the fastest first incubated period, one of the best isolate of bacterial pathogen was *R. solanacearum* Rs 09. According the study of resistance of patchouly somatic hybrid to bacterial wilt disease showed that hybrid somatic 2 IV/4 and 9 II/21 and Girilaya varieties until final assessment did not show any symptom. However, somatic hybrid 9 II/23; 9 II/35; 9 II/34; 2 IV/9; 9 IV/3; 2 IV/1; 9 IV/6 and 2 IV/S showed the first symptom and longest died period and the lowest disease intensity than another somatic hybrid of 0.00 – 35.5%. Lowest xylem vessel obstruction by bacterial pathogen was 0.00-9.50% on root, but no xylem vessel obstruction found on base stem and shoot. The growth and leaf production were higher than that of other patchouly somatic hybrid with plant height of 75.00-104.00 cm; shoot number 1-9; leaf number 66-112 leaves and wet leaf production 55.00-99.19 g. However, somatic

hybrid 9 IV/4; 9 II/23;9 II/33;9 IV/14; 2 IV/6 and 2 IV/1 showed quicker first disease symptom and seed die and had higher disease intensity (75 - 100%) than other somatic hybrid including Sidikalang variety, followed by xylem obstruction by bacterial pathogen of 24.58 -31.25% on the root, 14.49-22.50% on the stem and 4.17-6.25% on shoot. The growth and leaf production were lower than that of other somatic hybrid with plant height of 42.20-50.50 cm; shoot number 1; leaf number 24-37 leaves and wet leaf production 18.00-27.11 g. According to these results 6 best somatic hybrid number that resistant to bacterial pathogen has been selected, that are 2 IV/4; 9 II/21; 9 IV/6; 9IV/3; 9II/34 and 2 IV/6 , and they will be used for resistance test to bacterial wilt disease of patchouly in field.

088 ROSTIANA, O.

[Induction of ginger resistance to bacterial wilt]. ***Induksi ketahanan jahe terhadap penyakit layu bakteri***/ Rostiana, O.; Syahid, S.F.; Supriadi; Hartati, S.Y.; Hami, R.; Haryudin, W.; Koerniati, S.; Aisyah, S.; Surahman, D.; Karyani, N. [Research technical report of Indonesian Institute for Medicinal and Aromatic Plants in year of 2007]. Laporan teknis penelitian T.A. 2007 Balai Penelitian Tanaman Obat dan Aromatik. Bogor (Indonesia): Balittro, 2008: p.195-213. ISSN 0853-9456, 12 ill., 11 tables; 25 ref. 633.88/BAL/l

ZINGIBER OFFICINALE; SELECTION; CALLUS; TISSUE CULTURE; PLANT DISEASES; BACTERIAL DISEASES; PSEUDOMONAS SOLANACEARUM; DISEASE RESISTANCE.

Bacterial wilt caused by *R. solanacearum* is a main constraint in ginger cultivation. Various experiments had been carried out to eliminate the economic losses. An effective method for controlling the disease has not been appropriately established due to the unavailability of resistant variety. Limited genetic variability and physiological constraint, i.e. low pollen fertility and self-incompatibility are the main problems in creating disease resistant variety of ginger. Hence to achieve newly genetic sources, in vitro selection by using selective medium and transformation of gene inducing mutation were performed. In order to obtain resistant calli of ginger, filtrates of pathogen and nonpathogen bacteria (*R. solanacerum* and *Pseudomonas* sp.) and chemical agents, acibenzolar-S-methyl, were applied, as well as insertion of gene inducing mutation through transformation by using *Agrobacterium tumefaciens*. Results showed that the use of filtrates of pathogen and nonpathogen bacteria as well as chemical agents, decreased the growth of calli, i.e. callus weight and diameter and the development of somatic embryo, and the necrotic response was also observed at the perifer cell. The optimum concentrations of ASM for inducing the resistance of ginger calli were >20 micro meter, *R. solanacearum* filtrate was 0.4-2% during the first stage of selection and 4-20% at the second stage of selection. While for *Psuedomonas* sp., 0.3-0.5% at the first stage of selection and 3-5% at the second stage. At those range of concentrations, decrease on qualities of calli were observed, in line to the increase of salicylic acid accumulation. However, those callus was capable to redifferentiate. Amongst those three selection agents applied, ASM was more capable in supporting the development of somatic embryo.

089 SUPRIADI

[Application of biofertilizers and bio agent to control bacterial wilt on ginger]. ***Pemanfaatan pupuk bio dan agen hayati untuk pengendalian penyakit layu pada jahe***/ Supriadi; Hartati, S.Y.; Gusmaini; Harni, R.; Rostiana, O.; Maslahah, N.; Karyani, N.; Gumelar, W. [Research technical report of Indonesian Medicinal and Aromatic Crops Research Institute in year of 2007]. Laporan teknis penelitian T.A. 2007 Balai Penelitian

Tanaman Obat dan Aromatik. Bogor (Indonesia): Balittro, 2008: p.214-219. ISSN 0853-9456, 3 tables; 7 ref. 633.88/BAL/l

ZINGIBER OFFICINALE; BIOLOGICAL CONTROL AGENTS; FERTILIZER APPLICATION; BIOFERTILIZERS; PSEUDOMONAS SOLANACEARUM; BACTERIAL DISEASES.

Bacterial wilt caused by *Ralstonia solanacearum* has long been to be one of the constraints on ginger cultivation throughout Indonesia. Many efforts have been tried, but none was successfull because there is no resistant variety available. Application of biological agents such as antagonistic bacterial showed inconsistent result in field condition. The study was aimed to evaluate several antagonistic bacteria such as root colonizing and endophytic bacteria which induce plant resistance on other crops. The experiment was conducted in endemic field of bacterial wilt using split-split plot design with 12 treatments and 3 replicates. The main plots were animal manure (A0) and animal manure fermented with BIOTRIBA, a fermentor containing microorganisms (A1). The minor plots were antagonistic bacteria (C0), endophytic bacteria (C1 and C2). Parameters observed were disease intensity and rhizome yield. The result showed that antagonistic bacteria did not affect disease intensity. However, type of organic manure, i.e. animal manure previously fermented with BIOTRIBA significantly reduced disease intensity up to 8.83% compared to the animal manure (19.23%). Rhizome yield was not significantly affected by the treatments. This study indicated that application of fermented animal manure was potential to control bacterial wilt. However, one of the limiting factors of using BIOTRIBA fermented manure is more expensive than the ordinary animal manure.

090 SUPRIADI

[Evaluation of medicinal and aromatic essential oil characteristic as antimicrobial agent]. ***Evaluasi karakteristik minyak atsiri dari tanaman obat dan aromatik yang berpotensi sebagai antimikrobia***/ Supriadi; Hartati, S.Y.; Karyani, N. [Research technical report of Indonesian Medicinal and Aromatic Crops Research Institute in year of 2007]. Laporan teknis penelitian T.A. 2007 Balai Penelitian Tanaman Obat dan Aromatik. Bogor (Indonesia): Balittro, 2008: p. 276-279. ISSN 0853-9456, 2 tables; 4 ref. 633.88/BAL/l

ESSENTIAL OILS; ANTIMICROBIALS; BACTERICIDES; RALSTONIA SOLANACEARUM; ESCHERICHIA COLI; BACILLUS CEREUS.

Essential oil has been used in food and beverage industries as well as in medical industries due to, among others, is their ability to control microorganisms. Export of Indonesian essential oils is mainly in the form of primary product of the oils. An effort to find alternative uses of the essential oils, such as for controlling microorganisms is essential because of the use of synthetic pesticides which may harm the environment. Initial effort to test in vitro activity of essential oils against pathogenic microorganism is therefore important. The study shows that all the 10 essential oils tested, such as cinnamon oil, clove leaf oil, citronella oil, patchouli oil, lemon grass oil, turmeric oil, galangal oil, curcuma (temulawak) oil, ginger, and fennel oil have antibacterial activity against *Escherichia coli* and *Bacillus cereus* (food contaminants), as well as *Ralstonia solanacearum* (bacterial wilt plant pathogen). Therefore, it is necessary to develop product-based essential oils, individual or in combination, for controlling microorganism. Such effort is expected to have positive impact in more friendly controlling microorganism.

J10 HANDLING, TRANSPORT, STORAGE AND PROTECTION OF AGRICULTURAL PRODUCTS

091 NUGRAHA, S.

Evaluation of yield loss at harvest through conventional and wooden plate methods. ***Evaluasi susut panen dengan metode konvensional dan metode papan***/ Nugraha, S. [Proceedings of the national seminar on rice research results in 2009. Book 3]. Prosiding seminar nasional hasil penelitian padi 2009. Buku 3. Sukamandi (Indonesia), 28 Oct 2009/ Setyono, A.; Indrasari, S.D.; Agus, S.Y.(eds.). Sukamandi (Indonesia): Balitpa, 2010: p.1057-1067, 5 ill; 8 ref. 633.18-115.2/SEM/p bk3

RICE; HARVESTING LOSSES; IRRIGATED LAND; DRY FARMING.

Harvesting loss value is very important in relation to production value either in the farmer level, regional level, or national level. An accurate harvesting loss value also will affect very much to the national food stock of the country. During the period of 1985-2000, harvesting loss value was predicted by comparing the yields of the control plots and that of the treatment plots. Currently, the value was being evaluated to be estimated through the method of nine wooden plates. An experiment to evaluate methods of harvesting loss values in rice yields was conducted in irrigated and rainfed rice ecosystems in dry season of 2005 and wet season of 2005/2006. In each location, three farmers were involved in the evaluation of the tested methods which were replicated 5 times. Results of the experiment indicated that the nine-wooden plate method was observed to be the best method to estimate the harvesting loss values. It was shown by the value of harvesting loss of 1.18-1.52% and 1.37-1.54%, during the dry and wet season, respectively.

J11 HANDLING, TRANSPORT, STORAGE AND PROTECTION OF PLANT PRODUCTS

092 JUMALI

Study of packaging materials on several rice varieties to the shelf life and quality of rice. ***Studi bahan pengemasan pada beberapa varietas padi terhadap daya simpan dan mutu beras***/ Jumali; Handoko, D.D.; Setyono, A. [Proceedings of the national seminar on rice research results in 2009. Book 3]. Prosiding seminar nasional hasil penelitian padi 2009. Buku 3. Sukamandi (Indonesia), 28 Oct 2009/ Setyono, A.; Indrasari, S.D.; Agus, S.Y. (eds.) Sukamandi (Indonesia): Balitpa, 2010: p.1019-1932, 7 tables; 10 ref 633.18-115.2/SEM/p bk3

RICE; VARIETIES; STORAGE; PACKAGING MATERIALS; KEEPING QUALITY; ORGANOLEPTIC ANALYSIS.

The objective of the experiment was to study the effect of packaging materials to the storability and the quality of milled rice. Treatments were different types of packaging materials (HDPP, HDPE, PP + sack, and sack only) and rice varieties (Ciherang, the mixture of Maro + Rokan, IR42, and Lusi). Milled rice was stored in the storage room of the Eligibility Team of Technology of ICRR for 10 months in which the storage room was cleaned and disinfected prior the usage. Rice was harvested and milled in July 2007, and packed in July 31 to August 1, 2007. The physical quality, cooking quality, organoleptic, and amylose content of the stored milled rice were observed since the first month and being continued at one month interval. Results of the experiment revealed that in general, the milled rice of all rice varieties and packed in all packaging materials were still in a good quality after being stored for 10 months. There were an increase in moisture content and

number of insects on the stored milled rice of Ciherang, mixture of Maro + Rokan, IR42, and Lusi. During the storage, the value of whiteness, degrees of milling, transparencies, NPA, NPV, alkali spread, and amylose content of the milled rice of all rice varieties were not significantly changed. Higher moisture content and number of insect pests were observed on the milled rice packed in plastic sacks or PP + plastic sacks as compared to those of milled rice packed in HDPP and HDPE. A slightly higher number of insect pests was observed on the milled rice packed in a plastic sack as compared to those of milled rice packed in PP + plastic sacks. Double packaging of PP and plastic sacks did not affect the stored milled rice. The values of organoleptic test and rice quality decreased in line with storage period. The rice quality of IR42 variety was the least accepted by most panelists. The whitest and not transparently milled rice of Lusi (the sticky rice), was easily changed into pale yellow or yellowish. The packaging materials of HDPE and HDPP were slightly better in slowing down the rate of the increase in moisture content and number of insect pests as compared to the packaging materials of plastic and PP.

L02 ANIMAL FEEDING

093 BINTANG, I A.K.

Inclusion of garlic in the diet for chicken. ***Penggunaan bawang putih (Allium sativum L.) dalam pakan ayam***/ Bintang, I A.K.; Ananda, S. (Balai Penelitian Ternak, Ciawi (Indonesia)). [Proceedings of the seminar on agricultural innovation and technology transfer for development of rural industrial agribusiness in marginal areas: innovation of production technology. Book 2]. Prosiding inovasi dan alih teknologi pertanian untuk pengembangan agribisnis industrial pedesaan di wilayah marginal: inovasi teknologi produksi. Semarang (Indonesia), 8 Nov 2007. Buku 2/ Muryanto; Prasetyo, T.; Prawirodigdo, S.; Yulianto; Hermawan, A.; Kushartanti, E.; Mardiyanto, S.; Sumardi (eds.). Bogor (Indonesia): BBP2TP, 2007: p. 376-381, 4 tables; 25 ref. 631.17/BAL/p bk2

CHICKENS; GARLIC; USES; FEEDS; DIET; BODY WEIGHT; FEED CONSUMPTION; CARCASSES.

Commonly, antibiotic, a feed additive, is included in the poultry feed as growth promoter to improve feed efficiency. Recently, the use of antibiotic has been questioned since it may risk to human consuming animal product fed such diet. In Indonesia, native plants (herbs) have traditionally been used for traditional medicine. It is possible that garlic contains some bioactive usefull for antimicrobe properties. It was determined that introduction of garlic in the broiler chicken diet increased feed intake, body weight gain, carcass percentage, and improved IOFCC. Furthermore, addition of garlic paste in the diets of laying hens reduced serum and yolk cholesterol concentration. Nevertheless, there were no differences in egg weight, egg mass, feed consumption, and feed efficiency between the chicken fed diet containing garlic paste and free garlic diet.

094 BINTANG, I A.K.

Performances of broiler supplemented with antibiotic and *Morinda citrifolia* waste as sources of bioactive compounds. ***Penambahan antibiotik dan ampas mengkudu sebagai sumber senyawa bioaktif terhadap performan ayam broiler***/ Bintang, I A.K.; Sinurat, A.P.; Purwadaria, T. (Balai Penelitian Ternak, Bogor (Indonesia)). *Jurnal Ilmu Ternak dan Veteriner (Indonesia).* ISSN 0853-7380 (2008) v. 13(1) p. 7-12, 2 tables; 29 ref.

BROILER CHICKENS; ANTIBIOTICS; RUBIACEAE; WASTES; SUPPLEMENTS; FEED INTAKE; BODY WEIGHT; FEED CONVERSION EFFICIENCY; CARCASS COMPOSITION; ANIMAL PERFORMANCE.

A study on the use of zinc bacitracin antibiotic (ZnB) and dried *Morinda citrifolia* waste as feed additive in broiler ration was conducted. Two hundred and sixteen day old chicks (DOC) was allocated into 4 treatments: control; control + 50 ppm ZnB, and control + *M. citrifolia* waste at 2 levels (5 and 10 g/kg ration) with 9 replications. Each replication consisted of 6 birds. The treatments were allocated in a completely randomized design. Variables measured were feed intake, live weight, feed conversion ratio (FCR), percentages of carcass and internal organs (liver, gizard, abdominal fat, and thickness of intestine). The results showed that feed intake of *M. citrifolia* waste was significantly (P<0.05) lower than that of control. Live weight and live weight gain of *M. citrifolia* waste treatments did not significantly different (P>0.05) from that of control. The use of *M. citrifolia* waste (5 and 10 g/kg) gave significantly lower (P<0.05) live weight than the use of antibiotic. FCR of *M. citrifolia* waste 5 g/kg ration and antibiotic was not significantly different (P>0.05), but was significantly lower (P<0.05) than that of control and *M. citrifolia* waste 10 g/kg. Carcass and internal organ percentages were not affected by antibiotic and *M. citrifolia* waste. Liver percentages with *M. citrifolia* waste 10 g/kg was significantly ((P<0.05) higher and abdominal fat was lower (P>0.05) than that of control, control + antibiotic ZnB and *M. citrifolia* waste 5 g/kg. It is concluded that the supplementation of *M. citrifolia* waste (5 g/kg) could substitute ZnB to improve feed eficiency in broiler ration.

095 ISBANDI

Potency of agriculture byproducts for supporting integrated food crop livestock system in Blora District, Central Java (Indonesia). ***Potensi limbah pertanian tanaman pangan untuk mendukung sistem integrasi tanaman-ternak di Kabupaten Blora Jawa Tengah***/ Isbandi (Balai Penelitian Ternak, Ciawi (Indonesia)). [Proceedings of the seminar on agricultural innovation and technology transfer for development of rural industrial agribusiness in marginal areas: innovation of production technology. Book 2]. Prosiding inovasi dan alih teknologi pertanian untuk pengembangan agribisnis industrial pedesaan di wilayah marginal: inovasi teknologi produksi. Semarang (Indonesia), 8 Nov 2007. Buku 2/ Muryanto; Prasetyo, T.; Prawirodigdo, S.; Yulianto; Hermawan, A.; Kushartanti, E.; Mardiyanto, S.; Sumardi (eds.). Bogor (Indonesia): BBP2TP, 2007: p. 364-369, 5 tables; 14 ref. 631.17/BAL/p bk2

FOOD CROPS; RUMINANTS; FARMING SYSTEMS; PRODUCTIVITY; AGRICULTURAL WASTES; POPULATION STRUCTURE; JAVA.

Livestock production is depended up on genetic and environment. Within environment factors, feed is the most important one. Although, the genetic quality is good, if fed by insufficient low quality diet the animal productivity will be low. The potency of food crop in Blora District is quite high. Therefore, it is expected to contribute adequate agricultural byproducts for livestock feedstuff, particularly from rice and corn. Certainly, integrated crop-livestock farming system concept has long been applied in Indonesia. Various animals, especially ruminants are reared for supporting farming at the villages, for example, for soil ploughing, agricultural harvesting transportation, and providing organic fertilizer. Moreover, livestock is the source of animal protein for human consumption and live saving that available to market any time when the farmers requires cash money. On the other hand, ruminant is capable to utilize agricultural byproducts for feeds.

096 KUSNADI, E.

Alleviation of oxidative stress, carcass fat and plasma cholesterol in broiler chickens consuming antanan (*Centella asiatica*) and vitamin C. ***Peredaman cekaman oksidatif ayam broiler yang diberi antanan (Centella asiatica) dan vitamin C serta kaitannya dalam***

menurunkan kadar lemak karkas dan kolesterol plasma/ Kusnadi, E. (Universitas Andalas, Padang (Indonesia). Fakultas Peternakan). *Jurnal Ilmu Ternak dan Veteriner (Indonesia)* ISSN 0853-7380 (2008) v. 13(1) p. 1-6, 3 tables; 25 ref.

BROILER CHICKENS; VIOLA; APIACEAE; ASCORBIC ACID; RATIONS; OXIDATION; STRESS; HEAT TOLERANCE; LIPID CONTENT; CARCASS COMPOSITION; CHOLESTEROL.

Oxidative stress (a condition where oxidant-free radical-activity dominates the antioxidant activity) in poultry may be caused by heat stress from high environmental temperature. In this research, antanan (*Centella asiatica*) and vitamin C was utilized as anti heat-stress agents for broilers. One hundred and twenty male broilers of 2-6 weeks of age were kept at 31.98 ± 1.94ºC poultry house temperature during the day and 27.36 ± 1.31ºC at night. The treatments consisted of two kinds: two levels of vitamin C (0 and 500 ppm) and three levels of antanan (0; 5 and 10% of diets). The data collected was analyzed for variance with a factorial in completely randomized design of 2 x 3 (2 levels of vitamin C, 3 levels of antanan) and continued with contrast orthogonal test when applicable. The results indicated that the treatments of antanan 5% without vitamin C (A5CO), antanan 10% without vitamin C (A10C0), vitamin C 500 ppm without antanan (A0C500), combination of A5 and C500 (A5C500), and combination of A10 and C500 (A10C500) significantly (P<0.05) decreased the level of liver malonaldehida (MDA), carcass lipid and plasma cholesterol.

097 NUSCHATI, U.

Introduction of proper diet formulation for fattening ongole generation beef cattle in marginal region. ***Teknologi perbaikan ransum untuk penggemukan sapi peranakan ongole (PO) pada wilayah marjinal***/ Nuschati, U.; Subiharta (Balai Pengkajian Teknologi Pertanian Jawa Tengah, Ungaran (Indonesia)). [Proceedings of the seminar on agricultural innovation and technology transfer for development of rural industrial agribusiness in marginal areas: innovation of production technology. Book 2]. Prosiding inovasi dan alih teknologi pertanian untuk pengembangan agribisnis industrial pedesaan di wilayah marginal: inovasi teknologi produksi. Semarang (Indonesia), 8 Nov 2007. Buku 2/ Muryanto; Prasetyo, T.; Prawirodigdo, S.; Yulianto; Hermawan, A.; Kushartanti, E.; Mardiyanto, S.; Sumardi (eds.). Bogor (Indonesia): BBP2TP, 2007: p. 370-375, 3 tables; 14 ref. 631.17/BAL/p bk2

BEEF CATTLE; BREEDS; FATTENING; RATIONS; MARGINAL LAND; BODY WEIGHT; CONSUMPTION.

A feed trial for improving ongole generation (OG) beef cattle productivity under the feed lot fattening management was conducted in marginal region. Six OG beef cattles having average initial body weight of 244 kg were fed diet containing concentrate feed; fermented rice straw, and elephant grass (introduced diet). The concentrate feed contained 88% dry matter, 14% crude protein, and 70% total digestible nutrient. The experimental diets were formulated using Excel Program based on the expected body weight gain and its nutrient requirement. Whereas, investigation of the growth rate of 5 OG beef cattles fed by using traditional diet (formulated by the farmer) were also performed. During the three months period, measurements were made for body weight gain, feed consumption, and feed efficiency. Data were analyzed using descriptive analysis. Results showed that introduction of concentrate feed in the diet of OG beef cattle resulted in better average growth rate compared to those consuming traditional diet (0.86 vs 0.33 kg/d). Introduced diet was also better than traditional diet in the average intake of dry matter: (0.77 vs 0.67 kg/d), crude protein (4.22 vs 3.92 kg/d), and feed efficiency (10.86 vs 4.25%), respectively. It was concluded that the introduced diet feed was suitable to improve OG beef cattle productivity in marginal region.

098 SOERIPTO
Efficacy of tiamulin hydrogen fumarat 10 % in the feed to prevent chronic respiratory disease in broiler chickens. ***Efikasi tiamulin hidrogen fumarat 10 persen pada pakan untuk pencegahan chronic respiratory disease pada ayam potong***/ Soeripto (Balai Besar Penelitian Veteriner, Bogor (Indonesia)*). Jurnal Ilmu Ternak dan Veteriner (Indonesia).* ISSN 0853-7380 (2008) v. 13(1) p. 67-74, 1 ill., 6 tables; 15 ref.

BROILER CHICKENS; FEED ADDITIVES; TIAMULIN; DISEASE CONTROL; CHRONIC COURSE; RESPIRATORY DISEASE; WEIGHT GAIN; FEED CONVERSION EFFICIENCY.

Up to present chronic respiratory disease (CRD) of chickens is still causing economic losses against poultry industries in the world. The purpose of this trial is to determine the efficacy and safety of a compatible dose of tiamulin hydrogen fumarat 10% in combination with monensin for the control of CRD in broilers. A number of 630 day-old broilers were divided into 3 groups and each group was divided again into 7 subgroups of 30 equally sexed birds. Each subgroup was placed randomly in 2 chicken houses. Up to 3 weeks of age, chickens in Group I were fed with starter feed (SPI) containing 100 ppm monensin only without other treatment and used as control. Chickens in Group II were fed with SPI feed containing 30 ppm tiamulin hydrogen fumarat (3-6 mg/kg BW) and 110 ppm amoxicillin, this feed is called SP1+, where as chickens in Group III were administered with SP1 feed and treated with enrofloxacin liquid formulation 10% with a dose 0.5 ml/l in drinking water for the first 5 days of life. Started from 22nd day until the end of the experiment at 32 days of age, all chickens in Groups I, II and III were fed with SP2 finisher feed containing neither monensin nor tiamulin hydrogen fumarat. The results of the experiment showed that no statistical difference in body weight and feed conversion among the groups at 32 days of age but feed conversion in Group II was statistically different compared to those in Groups I and III at week 2. No clinical signs of toxic interaction of monensin combined with tiamulin were observed. Lesions of airsacculitis and ascites occurred only in dead chickens of Groups I and III but not in chickens of Group II. The incidence of pneumonia in Group I occurred in all dead birds which is statistically different to Group II that had one lesion of pneumonia. *Mycoplasma gallisepticum* and *Escherichia coli* organisms were able to be isolated from the chickens that had pneumonia and ascites in Groups I and III only. The results of the experiment showed that combination of 30 ppm tiamulin hydrogen fumarat + 110 ppm amoxicillin is effective for preventing CRD in broilers and save if it is combined with 100 ppm monensin.

L10 ANIMAL GENETICS AND BREEDING

099 INOUNU, I.
Growth characteristics of garut sheep and its crossbred. ***Karakteristik pertumbuhan domba garut dan persilangannya***/ Inounu, I. (Pusat Penelitian dan Pengembangan Peternakan, Bogor (Indonesia)); Mauluddin, D.; Subandrio. *Jurnal Ilmu Ternak dan Veteriner* (Indonesia). ISSN 0853-7380 (2008) v. 13(1) p. 13-22, 2 ill., 5 tables; 15 ref.

SHEEP; CROSSBREDS; GROWTH RATE; SEXUAL MATURITY; BODY WEIGHT; REPRODUCTIVE PERFORMANCE.

Based on previous study it is agreed that Von Bertalanffy model is the best fitted growth curve model with highest accuracy compared to Gompertz or Logistic models. For that

reason in this study Von Bertalanffy model was used to study growth characteristics of garut sheep and its crossbred. Relative superiority of crossbred sheep compared to garut sheep in mature size parameter (A) based on Von Bertalanffy model were respectively, M. charolain X Garut = 19.26%; Hair sheep X Garut = 8.08% and MG X HG or HG X MG = 4.22%. While relative superiority of crossbreds compared to Garut in rate of maturing (k) were MG = -4.91%; HG = -1.34% and MHG/HMG=6.05%, respectively. Based on its relative superiority in mature size parameter (A) and rate of maturing (k) MHG sheep had prospect for more developed due to its performance in term of high mature body weight, faster in reaching standard of slaughter body weight (35 kg) at 440 days, and it is considered as more efficient biologically and economically.

100 MURYANTO

Prospect of crossbred chicken between native chicken and layer hen as a source of poultry meat similar to native chicken. ***Prospek ayam hasil persilangan antara ayam kampung dengan ras petelur sebagai sumber daging unggas mirip ayam kampung***/ Muryanto; Paryono, T.; Ernawati (Balai Pengkajian Teknologi Pertanian Jawa Tengah, Ungaran (Indonesia)); Hardjosworo; Setiyanto, H.; Graha, L.S. [Proceedings of the seminar on agricultural innovation and technology transfer for development of rural industrial agribusiness in marginal areas: innovation of production technology. Book 2]. Prosiding inovasi dan alih teknologi pertanian untuk pengembangan agribisnis industrial pedesaan di wilayah marginal: inovasi teknologi produksi. Semarang (Indonesia), 8 Nov 2007. Buku 2/ Muryanto; Prasetyo, T.; Prawirodigdo, S.; Yulianto; Hermawan, A.; Kushartanti, E.; Mardiyanto, S.; Sumardi (eds.). Bogor (Indonesia): BBP2TP, 2007: p.390-397, 4 ill., 3 tables; 21 ref. 631.17/BAL/p bk2

CHICKENS; CROSSBREDS; LAYER CHICKENS; POULTRY MEAT; MEAT TEXTURE; CARCASSES; ORGANOLEPTIC ANALYSIS.

A study was conducted to evaluate a prospect of chicken crossbreed between native chicken and layer hen as a source of poultry meat that similar to native chicken. There are three locations in this study, rearing chicken in BPTP Central Java, analysis of meat histology (development of muscle fiber) in IPB, Bogor, West Java, taste test of fried chicken in Temanggung District, Central Java, traditional market test in 'Rumah Makan lbu Elli" in Karangjati District Semarang, and modern market test in "Rumah Makan Wong Solo" in Semarang Distrisct, Central Java. This study used 74 crossbreed chickens and 74 kampung chickens. The body parts and carcass parts were evaluated at 2, 4, 6, 8, 10 and 12 weeks of age, each age were represented by 8, 8, 10, 16, 16 and 16 birds. To measure of the development of muscle fiber were taken the above ages. Ten crossbreed chickens and 10 kampung chickens were used to taste test. Traditinal market represented by 10 crossbreeds and 10 kampung chinkens and modern market test represented by 15 fresh crossbreed chickens, 5 frozen crossbreed chickens and 15 kampung chickens. The result showed that with the same management and feeding, the diameter of muscle fiber, breast muscle texture of the crossbreed at 12 weeks old should not differ from the kampung chickens. The responses of 30 panelists asked that the physically of carcass and the taste of fried chickens were similar between crossbreeds and kampung chickens. Based on market test showed that the quality of meat cooking of crossbred and kampung chickens were similar.

101 PRIHANDINI, P.W.

Improvement of artificial insemination management rising frozen semen in beef cattle, in Blora District (Indonesia). ***Usaha perbaikan tatalaksana IB semen beku sapi potong pada agroekologi berbeda di Kabupaten Blora***/ Prihandini, P.W.; Affandhy, L. (Loka Penelitian Sapi Potong). [Proceedings of the seminar on agricultural innovation and

technology transfer for development of rural industrial agribusiness in marginal areas: innovation of production technology. Book 2]. Prosiding inovasi dan alih teknologi pertanian untuk pengembangan agribisnis industrial pedesaan di wilayah marginal: inovasi teknologi produksi. Buku 2, Semarang (Indonesia), 8 Nov 2007/ Muryanto; Prasetyo, T.; Prawirodigdo, S.; Yulianto; Hermawan, A.; Kushartanti, E.; Mardiyanto, S.; Sumardi (eds.) Bogor (Indonesia): BBP2TP, 2007: p. 311-315, 3 tables; 18 ref. 631.17/BAL/p bk2

BEEF CATTLE; SEMEN; ARTIFICIAL INSEMINATION; AGROECOSYSTEMS; LIVESTOCK MANAGEMENT; JAVA.

Low management and improper artificial insemination (AI) system affected high service per conception, low conception rate and long calving interval. This research was conducted to evaluate the effect of AI improvement management for beef cattle in the villages with different agroecology. This research was conducted by survey method in the village farm under the farmer management on dry and wet land of Blora District, Central Java for 12 month (January to December 2007). Observations were made for frozen semen and reproduction performances by ex and post ante analysis (80 acceptors). Results showed that the thawing and weaning of calves before and after improvement of AI management were different (P<0.05); where as the AI time was different. After improving of AI management (thawing and AI time) it was documented that the SIC decreased from 2.7- 2.8 time become 1.1%, 0.3 time (dry land of Tunjungan Subdistrict) and 1.3% 0.4 time (wet land of Blora Subdistrict), Blora District. Thus, there was an increase CR from < 60% to 70% on dry land and 65% on wet land. Moreover, feed condition on dry season during the experimental period was similar which were dry matter (DM) 4.8 to 4.4 kg/day and crude protein (CP) 0.3 to 0.3 kg/day (dry land) and DM 6.9 to 6.9 kg/day and CP 0.3 to 0.5 kg/day (wet land). In conclusion, improvement of thawing and time of straw introduction to the cow reduced SIC, increased NNR, and CR.

102 RIZAL, M.

[Effect of priangan ram seminal plasma on viability of Peranakan Etawah buck spermatozoa preserved at 3-5ºC. ***Pengaruh plasma semen domba priangan terhadap daya hidup spermatozoa kambing peranakan Etawah yang disimpan pada suhu 3-5ºC*** **/** Rizal, M. (Universitas Pattimura, Ambon (Indonesia). Fakultas Pertanian); Herdis; Surachman, M.; Mesang-Nalley, W.M. *Jurnal Ilmu Ternak dan Veteriner (Indonesia).* ISSN 0853-7380 (2008) v. 13(1) p.23-29, 1 ill., 2 tables; 19 ref.

GOATS; SHEEP; CROSSBREDS; SEMEN; SPERMATOZOA; VIABILITY; SEMEN PRESERVATION; STORAGE; DURATION; SURVIVAL.

In processing of buck semen, seminal plasma is a problem because it contains a phospholipase A enzyme produced by the cowper gland. If this enzyme interacts with egg yolk, it causes semen coagulation, and consequently death of spermatozoa. The purpose of this research was to examine the effect of priangan ram seminal plasma on viability of Peranakan Etawah (PE) buck spermatozoa preserved at 3-5ºC. Semen was collected using artificial vagina once a week. Fresh semen was divided into three tubes then centrifuged at 3,000 RPM for 30 minutes. Supernatant of the first tube was mixed again with Pasteur pipette (treatment A or control). Supernatant of the second tube was removed (treatment B or without seminal plasma). Supernatant of the third tube was removed and changed with priangan ram seminal plasma in the same volume (treatment C). Semen was diluted with Trisextender containing 20% egg yolk and stored in refrigerator at 3-5ºC. Quality of diluted-semen including percentages of motile spermatozoa (MS), live spermatozoa (LS), and intact plasma membrane (IPM) was evaluated every day during storage at 3-5ºC. for three days. Results of this study showed that mean volume was 0.68 ml, cream colour, thick

consistency, pH 7, mass activity ++/+++, spermatozoa concentration 4,148.57 million cell/ml, MS 70%, LS 83.89%, abnormal spermatozoa 7.12%, and IPM of PE buck fresh semen was 84%. At day-4 of storage, percentages of MS, LS and IPM for treatment C (40; 52.2 and 51.6%) was significantly ($P<0.05$) higher than that of treatment B (31; 44.8 and 45.2%) and treatment A (11; 15.6 and 14.8%). In conclusion, seminal plasma of priangan ram could maintain the quality of PE buck semen preserved at 3-5ºC for three days and it prevents semen from coagulation.

103 SUBEKTI, D.T.

Cloning and clone analysis of GRA1 gene from local isolate *Toxoplasma gondii* tachyzoite. *Kloning dan analisis hasil kloning Gen GRA1 dari takizoit Toxoplasma gondii isolat lokal*/ Subekti, D.T. (Balai Besar Penelitian Veteriner, Bogor (Indonesia)); Artama, W.T.; Sulistyaningsih, E.; Poerwanto, S.H.; Sari, Y.; Bagaskoro, F. *Jurnal Ilmu Ternak dan Veteriner (Indonesia).* ISSN 0853-7380 (2008) v. 13(1) p. 43-52, 4 ill., 12 ref.

TOXOPLASMA GONDII; MOLECULAR CLONING; GRANULES; ISOLATION TECHNIQUES; PATHOGENICITY; GENE EXPRESSION.

The GRA1 gene of *Toxoplasma gondii* encodes protein called GRA1 protein. GRA1 protein is known to be immunogenic and essentially involved in modification of parasitophorus vacoule which has role in immune evasion and virulency of organism. The local isolate of *T. gondii* is successfully isolated and known as highly pathogenic isolate similary as its RH strain. Unfortunately, the homology sequence of GRA1 gene between those isolates still unknown. The purpose of the research was to clone the GRA1 gene and to analyze the homology from pathogenic *T. gondii* isolate and RH strain. Tachyzoite of *T. gondii* was grown in mice peritoneum by intraperitoneal injection. Then, total mRNA was isolated and purified. cDNA was synthesized from mRNA and then amplified using F1 and R1 primers to obtain clone of GRA1 from local isolate. Homology analysis was performed using several bioinformatic softwares. The result showed that cDNA of GRA1 from local isolate has 84% homologs with RH strain of *T. gondii*. However, when subsequently editing performed to parts of suspected non coding sequence of cDNA GRA1 to get CDS of GRA1, the homology increased to 100% compare to CDS of GRA1 of RH strain.

L50 ANIMAL PHYSIOLOGY AND BIOCHEMISTRY

104 NINDHIA, T.S.

Lipoprotein profile and serum cholesterol level of chicken fed with chitosan feed supplement. *Profil lipoprotein dan kadar kolesterol serum ayam yang diberi suplementasi khitosan*/ Nindhia, T.S.; Susari, N.N.W.; Suarsana, I N. (Universitas Udayana, Denpasar (Indonesia). Fakultas Kedokteran Hewan). *Jurnal Veteriner (Indonesia).* ISSN 1411-8327 (2007) v.8(2) p.84-88, 2 ill., 15 ref.

CHICKENS; LIPOPROTEINS; CHOLESTEROL; FEEDS; CHITOSAN; SUPPLEMENTARY FEEDING; BLOOD SERUM.

A study to evaluate the profile of lipoprotein and the level of serum cholesterol in chickens fed with chitosan feed supplement was carried out. The experimental design used was completely randomized design with 4 treatment groups. Group K (as a control, without cholesterol and chitosan), group A (treated with cholesterol 1% without chitosan), group B (treated with cholesterol 1% and chitosan 15%), and group C (treatment with cholesterol 1% and chitosan 30%). The result showed that treatment with egg yolk powder (group A) could

cause hyperlipidemia in chickens and the level of the total cholesterol was significantly higher (P<0.05) than control group (K). Treatment with 30% chitosan significantly reduced the concentration of total cholesterol, triglyceride, very low density lipoprotein (VLDL), and low density lipoprotein (LDL) as compared to those of control group (egg yolk powder without chitosan), but did not reduce the concentration of high density lipoprotein (HDL). It was concluded that the supplementation of chitosan up to 30% in the chicken feed could reduce the total serum cholesterol level in chickens with hyperlipidemia.

105 UTOMO, B.

Effect of lactation period, live weight and free nitrogen extract consumption on the milk production of PFH dairy cattle. *Pengaruh periode laktasi bobot badan dan konsumsi bahan ekstrak tanpa nitrogen terhadap produksi, susu sapi perah PFH*/ Utomo, B; Subiharta; Jauhari, S. (Balai Pengkajian Teknologi Pertanian Jawa Tengah, Ungaran (Indonesia)) Sudjatmogo. [Proceedings of the seminar on agricultural innovation and technology transfer for development of rural industrial agribusiness in marginal areas: innovation of production technology. Book 2]. Prosiding inovasi dan alih teknologi pertanian untuk pengembangan agribisnis industrial pedesaan di wilayah marginal: inovasi teknologi produksi. Buku 2, Semarang (Indonesia), 8 Nov 2007/ Muryanto; Prasetyo, T.; Prawirodigdo, S.; Yulianto; Hermawan, A.; Kushartanti, E.; Mardiyanto, S.; Sumardi (eds.) Bogor (Indonesia): BBP2TP , 2007: p. 272-275, 8 ref. 631.17/BAL/p bk2

DAIRY CATTLE; BODY WEIGHT; LACTATION DURATION; MILK PRODUCTION.

Experiment was addressed to evaluate the effect of lactation period. live weight, and free nitrogen extract (FNE) consumption on the milk production of Friesian Holstein dairy cows. The study was conducted at Cepogo Village of Boyolali District, used 10 dairy cows. The experimental cows fed diet containing elephant grass and concentrate feed. Measurements were made for lactation period, body weight, FNE consumption, and milk production. Data were analyzed using multiple and simple linear regression analyses. Results showed that under multiple regression determination. milk production was influenced by lactation period. bodyweight. and NFE consumption. Whereas, under the simple regression analysis. milk production was significantly affected by body weight. (P<0.05) and FNE consumption (P< 0.01). However, milk production was not significantlv affected by lactation period. The present experiment concluded that in partial 17.1% of milk production was affected by lactation period, while body weight and FNE consumption was influenced 55% and 75.8%, respectively.

L53 ANIMAL PHYSIOLOGY – REPRODUCTION

106 PEMAYUN, T. G.O.

Concentration of prostaglandin F2 alpha in seminal vesicle fluid and product of seminal vesicle monolayer cells of bali cattle. *Kadar prostaglandin F2 alpha pada cairan vesikula seminalis dan produk sel monolayer vesikula seminalis sapi bali*/ Pemayun, T.G.O. (Universitas Udayana, Denpasar (Indonesia). Fakultas Kedokteran Hewan). *Jurnal Veteriner* (Indonesia) ISSN 1411-8327 (2007) v. 8(4) p.167-172, 1 table; 32 ref.

CATTLE; VESICULAR GLANDS; PROSTAGLANDINS; BODY FLUIDS; CELL CULTURE; HORMONES.

In this study, the concentration of prostaglandin F2 alpha (PGF2alpha) in seminal vesicle fluid and seminal vesicle monolayer cell cultures of bali cattle was determined. The seminal

vesicle fluid was aspirated and the epithelial cells of the seminal vesicles were cultured in tissue culture medium (TCM) 199 growth medium containing 10% fetal calf serum (FCS) and 10% oestrus mares serum (EMS) with a density of 1.9 x 10^6 cells/ml medium. Following an incubation at 38.5^{o}C in 5% CO^2 atmosphere for 6 days, the level of PGF2 alpha in the original seminal vesicle fluid and in the cell culture medium were determined by radioimmunoassay techniques (RIA). The results showed that the level of PGF2 alpha in the non-extracted monolayer culture of seminal vesicle (1287.50 ± 3.39 pg/ml) was significantly higher than that of detected in non-extracted seminal vesicle fluid (1.23 ± 0.79 pg/ml). In contrast, after extraction the level of PGF2 alpha in seminal vesicle monolayer cell cultures (218.33 ± 2.87 pg/ml), significantly decreased as compared to seminal vesicle fluid (1750.83 ± 2.71 pg/ml). In conclusion, the highest level of PGF2 alpha was found in the extract of seminal vesicle fluid.

107 RIZAL, M.

Quality enhancement of epididymal spermatozoa of spotted buffalo cryopreserving with various sucrose concentrations. ***Peningkatan kualitas spermatozoa epididimis kerbau belang yang dikriopreservasi dengan beberapa konsentrasi sukrosa***/ Rizal, M. (Universitas Pattimura, Ambon (Indonesia). Fakultas Pertanian); Herdis; Yulnawati; Maheshwari, H. *Jurnal Veteriner (Indonesia).* ISSN 1411-8327 (2007) v. 8(4) p. 188-193, 1 table; 40 ref.

WATER BUFFALOES; SPERMATOZOA; TESTES; BIOLOGICAL PRESERVATION; FREEZING; SUCROSE; MOVEMENT; THAWING; SURVIVAL; MEMBRANES.

The objective of this study was to improve the quality of spotted buffalo epididymal spermatozoa during the cryopreservation process. The diluters were AndroMed as control (AM) and the combination of AndroMed with 0.2% sucrose (SO.2) and AndroMed 0.4% sucrose (S0.4). The result showed that the percentage of motility after thawing in AM (41%) was significantly (P<0.05) lower than S0.2 (46 %) and S0.4 (46 %). The same thing was happened with the percentage of live spermatozoa after thawing. The percentage of live spermatozoa after thawing in AM, S0.2, and S0.4 were 52.2, 59.8, and 60.8% (P<0.05), respectively. However, there was no significantly difference (P<0.05) in the percentage of membrane integrity between the three extenders. The percentage of membrane integrity after thawing in AM, S0.2, and S0.4 were 68, 68.8, and 66.8%, respectively. In conclusion, the addition of sucrose as external cryoprotectant into basic extender could increase the quality of spotted buffalo epididymal spermatozoa after thawing.

108 YUDI

Viability of fresh and extended semen of stallion with different sperm concentration in Dimitropoulos-modified extender. ***Daya tahan semen segar dan kualitas semen cair kuda dengan konsentrasi spermatozoa berbeda dalam pengencer Dimitropoulos yang dimodifikasi/*** Yudi; Arifiantini, I.; Purwantara, B; Yusuf, T.L. (Institut Pertanian Bogor (Indonesia). Fakultas Kedokteran Hewan). *Jurnal Ilmu Ternak dan Veteriner (Indonesia).* ISSN 0853-7380 (2008) v. 13(1) p. 35-42, 4 tables; 22 ref.

STALLIONS; SEMEN PRESERVATION; SPERMATOZOA; SEMEN; QUALITY; MOVEMENT; VIABILITY; KEEPING QUALITY; DURATION.

The objective of the experiment was to study the motility and viability of spermatozoa of fresh semen, and the quality of extended semen with different sperm concentration in Dimitropoulos- modified extender. Semen was collected using artificial vagina from three 4-8 year old stallions (different breed). Semen characteristics and quality was evaluated macro

- and microscopically. For longevity evaluation, semen was stored at room and chilled temperature, and was evaluated for motility and viability every 3 hours. Prior extension, semen was centrifuged at 3000 rpm for 20 minutes. The condensed sperm was resuspended in Dimitropoulos (DV) supplemented with 50 mM fructose with the concentration of 200, 100 and 50 x 10^6 spz/ml. All samples were stored at room and chilled temperature, and was evaluated for motility and viability every 3 h and 12 h for room and chilled temperature. Results of the experiments indicated that fresh semen characteristics was fairly good. For longevity evaluation, semen with motility of 48.33 and 10.42% was observed at 3 h and 12 h after the onset of storage. The extended-semen with 50 x 10^6 spz/ml showed significantly higher in term of motility and viability ($P<0.05$) than that with 200 x 10^6 spz/ml, but not for that of 100 x 10^6 spz/ml. It is recommended that sperm concentration should be 50 x 10^6 spz/ml for a long period storage with reasonable good quality.

109 YULNAWATI

Quality of spotted buffalo epididymal sperm with addition of raffinose as external cryoprotectant. ***Kualitas spermatozoa epididimis kerbau belang pada penambahan raffinosa sebagai krioprotektan ekstraseluler***/ Yulnawati (Pusat Penelitian Bioteknologi-Lembaga Ilmu Pengetahuan Indonesia, Bogor (Indonesia)); Herdis; Maheshwari, H.; Rizal, M. *Jurnal Ilmu Ternak dan Veteriner* (Indonesia). ISSN 0853-7380 (2008) v. 13(1) p. 30-34, 2 tables; 18 ref.

WATER BUFFALOES; SPERMATOZOA; TESTES; QUALITY; RAFFINOSE; CRYOPROTECTANTS; BODY FLUIDS; THAWING; MOVEMENT.

The aim of this research was to obtain the quality of spotted buffalo epididymal sperm in different kind of extender in the three stages of cryopreservation (after dilution, post equilibration and post thawing). Spermatozoa was collected with combination of slicing and pressure method into the epididymal tissue in Adromed extender. Soon after diluted and equilibrated, epididymal spermatozoa was cryopreserved in liquid nitrogen (-196^{o}C). The result showed that the percentage of motility after thawing in Andromed + raffinose 0.4% (47.0 ± 2.4%), was significantly different ($P<0.05$) from that of control (41.0 ± 2.0%) but there was no significantly different ($P>0.05$) from that of Andromed + raffinose 0.2% (46.0 ± 2.0%). The percentage of live sperm after thawing in control (52.2 ± 2.5%), was the lowest and significantly different ($P<0.05$) from that of Andromed + raffinose 0.2% (59.2 ± 2.6%) and Andromed + raffinose 0.4% (58.8 ± 3.1%). Moreover, the percentage of membrane integrity after thawing in control, Andromed + raffinose 0.2% and Andromed + raffinose 0.4% was 68.0 ± 1.1%; 67.2 ± 1.6% and 67.6 ± 1.2%, respectively. There was no significantly different in the percentage of membrane integrity from all treatments. In conclusion, the addition of 0.2 and 0.4% raffinose into Andromed extender could improve the percentage of motility and viability of postthawing spotted buffallo epididymal spermatozoa.

L73 ANIMAL DISEASES

110 ASTAWA, N.M.

Reactivity of anti-capsid monoclonal antibodies with native and recombinant protein of jembrana disease virus. ***Reaktivitas antibodi monoklonal anti-capsid dengan protein natif dan protein rekombinan virus penyakit jembrana***/ Astawa, N.M. (Universitas Udayana, Denpasar (Indonesia). Fakultas Kedokteran Hewan). *Jurnal Veteriner* (Indonesia). ISSN 1411-8327 (2007) v.8(2) p.54-62, 2 ill., 2 tables; 21 ref.

CATTLE; ANIMAL DISEASES; LENTIVIRUS; MONOCLONAL ANTIBODIES; RECOMBINANT PROTEINS.

Reactivity of anti-capsid monoclonal antibodies (mAbs) with both native and recombinant protein of jembrana disease virus (JDV) was examined. The monoclonal antibodies were produced by fusion of myeloma cells with lymphocytes of bali mice immunized with JDV antigen. Ten mAbs were produced and designated as CC12, BB7, AH7, BD2, DB2, AF9, BC10, AG7, AH4, and CB11. In ELISA test, all mAbs reacted with recombinant proteins (glutation-S-tranferase-capsid/GST-Ca and histidine tagged capsid/His-Ca) but not with GST alone. In western blotting, all mAbs reacted with GST-Ca, His-Ca and also with JDV-infected lymphocytes of bali cattle but not with GST and normal lymphocyte antigen. In the JDV-infected lymphocytes, anti-capsid mAbs recognized the protein bands with the molecular weight of 42 and 26 kDa which were typical for the capsid protein of JDV. The result showed that the mAbs against the capsid protein produced in this study were specific against the viral protein. The anti-capsid mAbs were therefore very potential to be used in the development of a rapid and accurate diagnostic methods for JD especially those which could detect JDV antigen in the acute stage of the disease.

111 DAMAYANTI, C.S.

Snake venom enhances the phagocytic capability of peritoneal macrophages of mice against the group *B. streptococcus*. *Bisa ular meningkatkan daya fagositosis makrofag peritoneum mencit terhadap kuman streptokokus grup B*/ Damayanti, C.S. (Institut Pertanian Bogor (Indonesia). Fakultas Kedokteran Hewan). *Jurnal Veteriner* (Indonesia) ISSN 1411-8327 (2007) v. 8(2) p. 96-102, 1 ill., 4 tables; 22 ref.

RATS; LABORATORY ANIMALS; BACTERIA; STREPTOCOCCUS; PERITONEUM; MACROPHAGES; PHAGOCYTES; VENOMS; ANIMAL HEALTH.

This study was conducted to examine the effect of venom derived from three different snake species on the phagocytic capability of peritoneal macrophages in mice inoculated with Streptococcus group B. The venom derived from Malayan pit viper (*Calloselasma rhodostoma*), Malayan cobra (*Naja naja sputatrix*), and banded kraits (*Bungarus fasciatus*) snakes. The mice were treated orally for 7 consecutive days or 3 times intravenously with 3 day-interval at several different doses of venom. At the end of the treatment, 510^8 CFU/ml Streptococcus group B was injected into the peritoneal cavity of mice. Peritoneal macrophages were collected and examined under microscope to determine their phagocytic capacities after staining with Giemsa. The phagocytosis capacity of peritoneal macrophages in mice treated venom of malayan pit viper snake at the doses of 6.352 micron g (1486.2), 0.6352 micron g (1414) and 0.06352 micron g (1527.6) were significantly higher than in untreated mice (843.8). Similarly, the phagocytosis capacity of peritoneal macrophages in mice treated with the venom of banded kraits snake at the doses of 1.191 micron g (1414.7) and 0.1191 micron g (1415.8) were higher than that of the untreated mice (843,8). It clearly showed that snake venom was capable of enhancing nonspecific immune response in mice by increasing the phagocytic capacity of peritoneum macrophages against Group B *Streptococcus*.

112 DHARMA, D.M.N.

Gastro-intestinal parasites in sumatra elephant (*Elephas sumateraensis*) at Elephant Safari Park, Taro, Gianyar Bali (Indonesia). *Parasit gastro-intestinal pada gajah sumatera (Elephas sumateraensis) di Elephant Safari Park, Taro, Gianyar, Bali*/ Dharma, D.M.N.; Mastra, I K. (Balai Besar Veteriner, Denpasar (Indonesia)). *Buletin Veteriner (Indonesia).* ISSN 0854-901X. (2007) v. 19(70) p. 27-36, 2 ill., 1 table; 27 ref.

ELEPHANTS; DIGESTIVE SYSTEM DISEASES; MORBIDITY; STRONGYLIDAE; FASCIOLA; HELMINTHOSES; BALI.

Surveillance has been carried out to determine the type and prevalence of gastrointestinal parasite infection in sumatra elephant (*Elephas sumateraensis*) in the Elephant Safari Park (ESP), Taro, Gianyar to find out more effective and efficiency ways of treating and controlling the parasites. Faecal samples from 27 elephants were obtained periodically (every 3 months) from year 2003 to 2007. Samples were tested for gastrointestinal parasites using floating and sedimentation techniques at the Regional Veterinary Laboratory, Denpasar. The results showed that the elephants at ESP were infected by gastrointestinal parasites namely nematode (Strongyle) and trematode (*Fasciola* sp.) with 3.7% - 52.9% and 3.7% - 55.5% prevalence and 40-80 egg/gram (EPG) and 10-70 EPG infection intensity, respectivelly.

113 HANAFIAH, M.

Examination of leucocytozoonosis in broilers and ducks using organ mashed methods and blood smear. *Pemeriksaan leucocytozoonosis pada broiler dan itik dengan metode gerusan organ dan hapusan darah*/ Hanafiah, M.; Sulaiman, R.; Latif, N. (Universitas Syiah Kuala, Banda Aceh (Indonesia). Fakultas Kedokteran Hewan). *Jurnal Veteriner* (Indonesia). ISSN 1411-8327 (2007) v.8(2) p.78-83, 2 ill., 1 table; 15 ref.

BROILER CHICKENS; DUCKS; ANIMAL DISEASES; LEUCOCYTOZOON; ZOONOSES; CLINICAL TRIALS; BLOOD PLASMA; GAMETES.

This study was carried out to determine the prevalence of leucocytozoonosis in broiler chickens and ducks examined by organ mashed and blood smear methods. Organ and blood samples of broiler chickens and ducks were obtained from slaughter house in Banda Aceh, Nanggroe Aceh Darussalam. Blood samples were collected before those animals were killed and blood smears were then prepared to examine the merozoites and gametosites of the parasite. After the animal were killed, smashed organs were prepared to examine the schizont of the parasite. The data on the prevalence of leucocytozoonosis were presented descriptively. Result showed that prevalence of leucocytozoonosis in broiler chickens and ducks was higher when examined by organ mashed method as compared to those examined by blood smear method. The prevalence of leucocytozoonosis examined by blood smear method was 30% and 24%, respectively, whereas that examined by organ smashed methods was 58% and 54%, respectively. It clearly showed that examination of leucocytozoonosis in broiler chickens and ducks by organ smashed method is more sensitive than that by blood smear methods.

114 HAYATI, Z.

Hyaluronidase activity of group B Streptococcus in hyaluronic acid substrate. *Aktivitas hialuronidase bakteri Streptococcus grup B pada substrat asam hialuronat*/ Hayati, Z.; Karmil, T.F. (Universitas Syiah Kuala, Banda Aceh (Indonesia)); Putranto, W.S.; Wibawan, I W.T.; Poerwanto, S.B. *Jurnal Veteriner (Indonesia)*. ISSN 1411-8327 (2007) v.8(2) p.47-53, 2 ill.; 2 tables; 11 ref.

ANIMAL DISEASES; BACTERIA; STREPTOCOCCUS; ENZYMES; ENZYME ACTIVITY; HYALURONIC ACID; CHROMATOGRAPHY.

Recently, *Streptococcus agalactiae* or generally known as group B streptococcus (GBS) is the causal agent of pneumonia, septicemia and neonatal meningitis in man and animal.

Hyaluronidase is an extracellular product of GBS which is closely related to the virulence factor of the bacteria. This study was conducted to screen the hyaluronidase activity of GBS isolated from patient with obstetric complication, to purify and to characterize the hyaluronidase activity of GBS SV-14 in hyaluronic acid substrate. The activity of GBS hyaluronidase was screened by a rapid and easy method, i.e. plate-agar hyaluronidase method. Purification of the enzyme was conducted by precipitation in ammonium sulfate, dialysis and gel filtration chromatography. The result showed that the 10 GBS isolates showed hyaluronidase activity, indicated by the presence of a clear zone around the bacterial colony. The purified hyaluronidase of GBS SV-14 also showed a specific hyaluronidase activity of 0.32 µ/mg with the protein concentration of 2.3 mg/ml. It had an optimal activity at pH 6.4 and at 37^{o}C. The molecular weight of hyaluronidase determined by sodium dodecyl sulfate-polyacrylamide gel electrophoresis (SDS-PAGE) was about 100 kDa. The result indicates that hyaluronidase produced by GBS, is the virulent factor of the bacteria since it was able to destroy hyaluronic acid which facilitates the bacterial infection.

115 MAHATMI, H.

Detection of *Coxiella burnetii*, the causal agent of Q fever in cattle, sheep and goats in Bogor and Bali (Indonesia). *Deteksi Coxiella burnetii penyebab Q fever pada sapi, domba dan kambing di Bogor dan Bali*/ Mahatmi, H. (Universitas Udayana, Denpasar (Indonesia). Fakultas Kedokteran Hewan); Setiyono, A; Soejoedono, R.D.; Pasaribu, F.H. *Jurnal Veteriner (Indonesia).* ISSN 1411-8327. (2007) v. 8(4) p.180-187, 2 ill., 1 table; 27 ref.

CATTLE; SHEEP; GOATS; COXIELLA BURNETII; Q FEVER; ZOONOSES; PCR; DNA; RAPD; JAVA; BALI.

A study to detect *Coxiella burnetii*, an intracellular bacterium causing Q fever in human and livestock animals, was carried out in several ruminants in Bogor and Bali. The methods used for the detection was Nested-Polymerase Chain Reaction (Nested-PCR). Two pairs of primers, the first (OMP1 and OMP2) and the second (OMP3 and OMP4) were used to detect the genomic sequences and the conserved specific sequences of *Coxiella burnetii*, respectively. Organ samples such as liver and lung from 410 livestock ruminants, consisting of cattle (245 samples), sheep (105 samples), and goats (60 samples) were collected from several slaughter houses in Bogor and Bali. As many as 15 (6.12%) out of 245 cattle, 6 (5.71%) out of 105 sheep and none from goat were infected by *Coxiella burnetii*. Interestingly, 3 out of 15 infected cattle were bali cattle. The result clearly indicate that Q fever is likely to be widespread among ruminant animals in Indonesia.

116 SETIYONO, A.

Seroprevalence of Q fever in sheep and goat in West Java area. *Seroprevalensi Q fever pada domba dan kambing di wilayah Jawa Barat*/ Setiyono, A.; Handharyani, E. (Institut Pertanian Bogor (Indonesia). Fakultas Kedokteran Hewan); Mahatmi, H. *Jurnal Ilmu Ternak dan Veteriner (Indonesia).* ISSN 0853-7380 (2008) v. 13(1) p. 61-66, 1 ill., 2 tables; 23 ref.

SHEEP; GOATS; Q FEVER; ZOONOSES; COXIELLA BURNETII; MORBIDITY; IMMUNOFLUORESCENCE; ENDEMICS; JAVA.

Q fever is a zoonotic disease caused by *Coxiella burnetii*, a species of bacteria that is distributed globally. Ruminant especially sheep and goats may play an important role in the transmission of the disease to human. The research of seroprevalence of Q fever in sheep and goats was carried out from August 2006 to March 2007 in West Java area. A total of 138 sera were colleted; 69 sera from sheep and 69 sera from goats. The indirect

immunoflourescent antibody test was used to determine the seroprevalence of Q fever. The seropositive based on the dilution of serum starting from 1:16. Seropositive were observed in 22 samples (31.88%) of sheep and 14 samples (20.28%) of goats. The highest titer of 1:128 was observed in 3 pregnant sheep. The results of the present study suggested that Q fever was endemic in West Java area.

117 SUARDANA, I W.

Isolation and identification of acid lactic bacteria from bali cattles gastric fluid as a potential candidate of a biopreservative. ***Isolasi dan identifikasi bakteri asam laktat dari cairan rumen sapi bali sebagai kandidat biopreservatif***/ Suardana, I W.; Suarsana, I N. (Universitas Udayana, Denpasar (Indonesia). Fakultas Kedokteran Hewan); Sujaya, I N.; Wiryawan, K.G . *Jurnal Veteriner (Indonesia).* ISSN 1411 - 8327 (2007) v. 8(4) p.155-159, 3 ill., 1 table; 17 ref.

CATTLE; RUMEN FLUID; LACTIC ACID BACTERIA; RUMEN MICROORGANISMS; BIOLOGICAL PRESERVATION; ISOLATION TECHNIQUES; ANTIMICROBIALS; LACTOCOCCUS LACTIS; LACTOBACILLUS BREVIS.

A study was conducted to isolate and identify lactic acid bacteria originated form gastric fluid of bali cattle, and to determine their potential as the candidates of biopreservative. Lactid acid bacteria were isolated by culturing the gastric fluid of bali cattle in de Mann, Rogosa, Sharpe (MRS) medium; screening the bacteria, and identification of bacteria species by analytical profile index (API) 50 CHL Kit. The results showed that the new species of lactic acid bacteria were isolated and identified as *Lactococcus lactis* spp. lactis 1 (SR21 isolate) and *Lactobacillus brevis* 1 (SR54 isolate) that have broad spectrum antimicrobial activities. It is clear from this study that a potential lactic acid bacteria producing antimicrobial agent could be isolated from the gastric fluids of bali cattle.

118 SUARTHA, I N.

Neutralization potency of anti-tetanus immunoglobulin Y isolated from chicken eggs. ***Potensi netralisasi dari imunoglobulin Y antitetanus yang diisolasi dari telur ayam***/ Suarta, I N. (Universitas Udayana, Denpasar (Indonesia). Fakultas Kedokteran Hewan); Wibawan, I W.T.; Soejoedono, R.D.; Lay, B.W. *Jurnal Veteriner (Indonesia).* ISSN 1411-8327 (2007) v.8(2) p.63-70, 3 ill., 1 table; 21 ref.

ANIMAL DISEASES; TETANUS; IMMUNOGLOBULINS; EGGS; IMMUNE SERUM; ISOLATION TECHNIQUES.

The purpose of study was to explore the neutralization potency of anti-tetanus IgY derived from eggs yolk as a possible substitute for anti-tetanus serum (ATS) raised in horses. The eggs were collected from chickens which have previously been immunized with tetanus toxoid. Neutralization potency of anti tetanus IgY was determined by Spearman-Karber method. The highest mean titer of anti-tetanus IgY in egg yolk was 80.16 ± 33.55 IU/ml and the lowest was 1.69 ± 0.63 IU/ml. The concentration of purified IgY was 1.644 ± 0.424 mg/ml. The anti-tetanus potency of the IgY was 35 IU/ml. The result clearly showed that chicken eggs were potential to be used as the source of anti-tetanus IgY.

119 SUARTINI, I G.A.A.

Activities of antitetanus IgY and IgG following treatment with different level of pH, temperatures and proteolytic enzymes. ***Aktivitas IgY dan IgG antitetanus setelah perlakuan pada berbagai pH, suhu dan enzim proteolitik***/ Suartini, I G.A.A.; Suarta, I N. (Universitas Udayana, Denpasar (Indonesia). Fakultas Kedokteran Hewan); Wibawan, I

W.T; Suhartono, M.T.; Supar, I N. *Jurnal Veteriner (Indonesia)*. ISSN 1411-8327 (2007) v. 8(4) p. 160-166, 7 ill., 13 ref.

CHICKENS; ANTIBODIES; INSULIN; TETANUS; IMMUNIZATION; PROTEOLYSIS; HEAT TREATMENT; PH; ENZYME ACTIVITY; ELISA.

A study was carried out to find out an alternative method of producing antitetanus antibody (IgY) in chicken and to evaluate its activity at different levels of pH, temperature and proteolytic enzymes. Antitetanus IgY was produced by immunization of chickens with tetanus toxoid, three times weekly at gradual dosages of 100, 200, and 300 Lf, respectively. Serum samples were collected 4 weeks following the last immunization. IgY was purified by ammonium sulfat precipitation and gel filtration chromatography (Sephadex G. 120). The purified IgY was then treated at different levels of temperature and pH as well as proteolytic enzymes. Commercial antitetanus IgG was used as control. The activities of treated IgY and IgG were tested by enzyme linked immunosorbent assay (ELISA). IgY and IgG activities were significantly reduced at 80^{o}C and compeletely destroyed at 90^{o}C. Treatment with pepsin significantly reduced IgY and IgG, whereas trypsin slightly reduced IgY activities and has no effect on IgG activities. IgY and IgG activities were reduced significantly at pH <3 and only slightly reduced at pH >10. It is evident that heating at >90^{o}C, activities of antitetanus IgY and IgG following treatment with different levels of pH, temperatures and proteolyic enzymes at pH <3 and treatment with pepsin significantly reduced IgY activities and it appeared that IgG was more resistant to the effect of temperature, pH and proteolytic enzymes.

120 SURPARTIKA, I K.E.

Sub-clinical avian influenza H5N1 on layer chicken, a case report. ***Avian influenza H5N1 subklinis pada ayam petelur*****/** Surpartika, I.K.E.; Budiantono, A.; Dharma, D.M.N.; Dibia, N.; Armana, W.B.; Sudiarka, W.; Sudira, W. (Balai Besar Veteriner, Denpasar (Indonesia)). *Buletin Veteriner (Indonesia)*. ISSN 0854-901X (2007) v. 19(70) p. 14-20, 6 ill., 1 table; 11 ref.

LAYER CHICKENS; AVIAN INFLUENZA VIRUS; LATENT INFECTIONS; DIAGNOSIS; PATHOLOGY; ANTIGENS; IDENTIFICATION.

Subclinical avian influenza H5N1 was diagnosed on three layer chickens, aged 33 weeks which were necropsied at Pathology Laboratory, Animal Health Laboratory Region VI Denpasar, Bali in February 7, 2007. Clinically, the chickens were healthy. However, drop in egg production was noticed. Grossly, petechial haemorrhages were found on the caecal tonsil, and the air sacks were cloudy. The ovaries were congested and haemorrhagic. There were no changes found on other organs. Microscopically, infiltration of mononuclear cells was found on comb, liver, kidney and proventriculus. Bronchioles and alveoli were infiltrated by heterophyll and mononuclear cells. Serosa of small intestine and caecal tonsils were also infiltrated by heterophyll and mononuclear cells. Mild vasculitis was found on the cerebrum. Avian influenza viral antigen was demonstrated on the vascular stroma of the ovary from one of the three layer chickens. The isolated virus was identified as highly pathogenic avian influenza H5N1.

L74 MISCELLANEOUS ANIMAL DISORDERS

121 WRESDIYATI, T.

Effect of alpha-tocopherol on the profiles of superoxide dismutase and malondialdehyde in the liver of rats under stress condition. ***Pengaruh alpha-tokoferol***

terhadap profil superoksida dismutase dan malondialdehida pada jaringan hati tikus di bawah kondisi stres/ Wresdiyati, T.; Adnyane, I K.M.; Novelina, S.; Aryani, S. (Institut Pertanian Bogor (Indonesia). Fakultas Kedokteran Hewan); Astawan, M.; Fithriani, D. *Jurnal Veteriner (Indonesia).* ISSN 1411-8327 (2007) v. 8(4) p.202-209, 3 ill., 2 tables; 19 ref.

RATS; TOCOPHEROL; SUPEROXIDE DISMUTASE; LIVER; STRESS; ANTIOXIDANTS; LIPID PEROXIDATION; IMMUNOLOGICAL TECHNIQUES; LABORATORY ANIMALS.

The present study was conducted to observe the effect of alpha-tocopherol on the profile of superoxide dismutase (SOD) and malondialdehyde (MDA) in the liver of rats under stress condition. A total of twenty five male Wistar rats were used for this study. They were divided into five groups, i.e. (1) alpha control group, without treatment of both stress and alpha-tocopherol, (2) alpha stress group was treated by stress only, without alpha-tocopherol treatment, (3) treated with stress condition followed by treatment with alpha-tocopherol, (4) treated with alpha-tocopherol followed by stress condition, and (5) treated with alpha-tocopherol before and after stress condition. The stress condition was achieved by five days fasting accompanied by swimming for 5 min/day and only drinking water *ad libitum*. Alpha-tocopherol was orally administrated at a dose 60 mg/kg/BW/day for seven days. The stress condition decreased SOD activity and Cu, Zn-SOD level, and increased MDA level in the rat liver of stress group as compared to those of control group. Treatment with alpha-tocopherol increased SOD activity and Cu,Zn-SOD level. The best result was obtained in rats treated with alpha-tocopherol before and after stress condition which increased both SOD activity (3.7 times) and Cu,Zn-SOD content, and decreased MDA level to 80.69%.

N20 AGRICULTURAL MACHINERY AND EQUIPMENT

122 AKBAR, A.R.M.

Study of ergonomic design of hand tractors for operators in paddy field of South Kalimantan. ***Studi desain traktor tangan ergonomis untuk operator di lahan sawah Kalimantan Selatan/*** Akbar, A.R.M. (Universitas Lambung Mangkurat, Banjarmasin (Indonesia) Fakultas Pertanian); Herodian, S.; Ali, S. *Jurnal Enjinering Pertanian (Indonesia).* ISSN 1693-2900 (2007) v. 5(1) p. 45-56, 12 ill. 9 ref.

TRACTORS; HAND TOOLS; ERGONOMICS; DESIGN; EQUIPMENT PERFORMANCE; RICE FIELDS; KALIMANTAN.

This study aimed to obtain ergonomic factors which influence working productivity and workload of operators in primary tillage according specific land condition, environmental condition and tradition in South Kalimantan area. Artificial neural network models was used to formulate the nonlinear relationship among ergonomic factors of hand tractor. The ergonomic factors where anthropometry (height of hand tractor steer, age and weight of operators), environment (temperature and humidity) and noise of tractors. The measurement on field to determine working productivity of primary tillage used moldboard plow of hand tractors implement. Result showed that working productivity in a range of 453 m^2/h and 1284 m^2/h and workload in a range of 106 p/m and 169 p/m. The model have accuracy of 89% for output model of working productivity and 96% for output model of workload in soil tillage. The optimum result for height of steer in a range of 104-112 cm.

123 LOPPIES, J.E.

Design and performance testing of a cocoa bean roaster with variable temperature control. *Rancang bangun dan uji unjuk kerja alat sangrai kakao biji dengan kontrol temperatur*/ Loppies, J.E.; Thamrin, I. (Balai Besar Industri Hasil Perkebunan, Makassar (Indonesia)). *Jurnal Industri Hasil Perkebunan (Indonesia)*. ISSN 0126-0170 (2007) v. 35(1) p.14-19, 5 ill; 2 tables; 10 ref.

COCOA BEANS; PERFORMANCE TESTING; ROASTING; TEMPERATURE; EQUIPMENT PERFORMANCE.

Design and performance testing of cocoa bean roaster with variable temperature control has been conducted. The roasting temperature can be set at 80 to 180ºC according to the temperature required by the final roasted beans. In the performance testing it was found that temperatures were stable at 120 to 180ºC. At temperatur below 120ºC the deviation temperature was around 5 to 10ºC. The capacity of the roaster was 10-15 kg roasted beans /hours.

P06 RENEWABLE ENERGY RESOURCES

124 HANDOYO, R.

Biodiesel from kapok seed oil. *Biodiesel dari minyak biji kapok*/ Handoyo, R.; Angraini, A.A.; Anwar, S. (Universitas Gajah Mada, Yogyakarta (Indonesia). Fakultas Teknologi Pertanian)). *Jurnal Enjinering Pertanian (Indonesia)*. ISSN 1693-2900 (2007) v. 5(1) p. 57-64, 1 ill., 7 tables; 25 ref.

KAPOK; SEED; OILS; BIOFUELS; DIESEL ENGINES.

Declining trend of mineral oil production in Indonesia has forced the Indonesian government and public to consider alternative energy resources such as plant oil. Some plant oils can be used in their original form or after processed into biodiesel. Research on processing kapok seed oil to produce biodiesel has been conducted by transesterification technique using methanol. The properties, such as viscosity, flash point, and cetane number, of the biodiesel product changed to be more similar to the mineral diesel oil compared to its previous original form. So the kapok seed oil was able to be a susbstitute for mineral diesel fuel. The testing of the biodiesel for fueling diesel engine proofed that the power and the efficiency was not greatly different from the one fueled by mineral oil, and even, the CO, HC, NOx emission were reduced.

P10 WATER RESOURCES AND MANAGEMENT

125 ARSADI, E.M.

[Mapping of water springs in Belu Regency, East Nusa Tenggara (Indonesia)]. *Pemetaan mata air di Kabupaten Belu, Nusa Tenggara Timur*/ Arsadi, E.M.; Bakti, H. [Water resources and environment: potential, degradation and the future]. Sumber daya air dan lingkungan: potensi, degradasi dan masa depan/Delinom, R.M.; Marganingrum, D. (eds.). Jakarta (Indonesia): LIPI Press, 2007: p.153-176, 5 ill., 1 table; 5 ref. appendices 631.92/LEM/s

WATER SPRINGS; RAIN; WATER QUALITY; FRESHWATER; NUSA TENGGARA

Geological condition and lack of rain fall intensity are the main factor in Belu District, East Nusa Tenggara Province, therefore it is classified as problematic clean-water area. Spring water is commonly used by people. Spring water mapping have been conducted at Belu District in order to conserve and keep sustainable of spring water resources. Ninety seven locations of spring water have been identified during field works based on land satellite images interpretation as guidance. Identification of hydrogeological aspects, measurement of physical and chemical water characteristic, and laboratory works have been done. Belu District is covered by clay of Bobonaro formation and other formation consists of marl, shale, sandstone and limestone. Locations of spring water show good correlation with geological structure as lineament pattern and other patterns at study area. Annual rainfall map (1993-2003) showed that the rainfall at southern part of Belu District has rate of 1,500 mm and increasing to the north become 2,500 mm. This rainfall rate is classified as a middle category, therefore geological condition is main control for water resources at Belu District. Springs water distribution are mostly found in limestone (coral reef unit, Ql) area at north-eastern part and southern part of study area. Abundance of cracks and channels in limestone caused by leaching of carbonate (secondary porosity) should be responsible for the spring water system. The aquitard layer of spring water is clay of Bobonaro formation or marl-sandy Noele formation. Generally, the type of this spring water had significant discharge which can be used as source of drinking water, irrigation, or industry. Some spring water have discharge > 40 liter/second such as spring 'water Lahurus, Wetihu, Webot and Wehalek and can be used for micro-hydro electrical power. Beside it appears from inter bedding-plane, the spring water is also common, controlled by faults which can be clearly identified from satellite imagery as lineament. It is often that spring water appears following the straight line of fault zone. The fault is a weak zone which allowed the rain seeping and running following this channel and come out as spring water Major elements of water chemical which are collected from Belu District show generally below the maximum rate of standard fresh water requirement. The slightly high parameter is hardness, eventhough it is still below the maximum rate.

126 ARSADI, E.M.

[Optimizing water resources in coastal areas: a case study at northern part of Karawang District coastal area, West Java (Indonesia)]. ***Optimalisasi sumber daya air di Wilayah Pesisir: studi kasus pantai utara Kabupaten Karawang, Jawa Barat/*** Arsadi, E.M.; Bakti, H.; Suherman, D. [Water resources and environment: potential, degradation and the future] . Sumber daya air dan lingkungan: potensi, degradasi dan masa depan/ Delinom, R.M.; Marganingrum, D. (eds.). Jakarta (Indonesia): LIPI Press, 2007: p. 47-82, 13 ill., 9 ref. Appendices. 631.92/LEM/s

JAVA; WATER RESOURCES; FRESHWATER; COASTAL WATERS; INFILTRATION WATER; GROUNDWATER; WATER QUALITY; HYDROGEOLOGY; GEOCHEMISTRY.

Fresh water resources optimalization has been conducted at northern part of Karawang district coastal area, West Java as case study. The optimalization was done by interpretation of land satellite images, geo electrical and hydrochemical investigations, test pit, electrical conductivity (EC) logging, measurement of sea-tide and water infiltration rate. A fresh water installation using optimalization well concept has been built at the selected area (Kampung Kalimati) as a pilot model. Based on interpretation of land-satellite images, ten geomorphological units can be recognized at the study area. The shallow groundwater condition (depth < 30 m) is mostly brackish to salty with EC value of more than 2,500 micro S/cm. Sea water intrusion to main land through Citarum River gives impact to freshwater quality at beach ridge and paleo cannels of Citarum River Water temperature, pH, major-chemical elements of water except Na and Cl and some of heavy metal elements, are in normal values. Geoeletrical investigation until 250 m of depth shows three layers of low

resistivity layers 5.0 ohm.m. The fresh water aquifer; however; could not less than be found. silt, clay and fine sand which is dominated the study area yield very low value of infiltration rate, 0.17-0.23 mm/minute. Fresh water potential has been found at Kalimati Village which is one of paleo-channel of Citarum River. These areas do not show change of water quality even during the dry season. The resistivity value of this area until 6.0 m of depth is about 8.0 to 10.0 ohm.m with EC value of 1,000 to 1,100 micron/cm with thickness of water column 2.0 m. The well-optimalization was built in this location.

127 MARIA, R.

[Influence of hydromorphology and groundwater density in coastal areas Karanganyar, Kebumen, Central Java (Indonesia)]. ***Pengaruh hidromorphologi dan keterpadatan air tanah di pesisir pantai Karanganyar, Kebumen, Jawa Tengah***/ Maria, R.; Hadi I.S. [Water resources and environment: potential, degradation and the future]. Sumber daya air dan lingkungan: potensi, degradasi dan masa depan/ Delinom, R.M.; Marganingrum, D. (eds.). Jakarta (Indonesia): LIPI Press, 2007: p. 35-46 , 5 ill., 2 tables; 5 ref. 631.92/LEM/s

JAVA; COASTAL WATERS; SOIL MORPHOLOGICAL FEATURES; HYDROLOGY; ALLUVIAL SOILS; GROUNDWATER; FRESHWATER; GEOMORPHOLOGY

Kebumen is one of the uniqueness region, this area have a lot of landscape, there are ridge of hill, limestone hill and coastal region. These coastal area consist of a wide alluvial land that spreads from the west of Citanduy to the south of Kulonprogo. Based on field monitoring and groundwater drilling, there are three pattern of hydro morphology, i.e coastal ridge, fluvial ridge and fluvio lacustrine ridge. The uniqueness from this area is water availability that is not same between hydromorphology pattern. The big potential freshwater in this area is located in coastal ridge in the south in depth of d" 30 m. Spreading of brackish/marine water which flow in the region happen together with form of fluvio lacustrine ridge. There are two possibilities which cause the origin of water types. First, there were interaction event which influenced mutually between freshwater and brackish/marine water. Second, the enrichment of Na and K ions in freshwater and Ca and Mg ion in brackishwater were from the rain water. In this case, historical geology might influence the condition, there is a possibility that fluvial ridge is sand bar of alluvial system, where freshwater is in a thick sand. Fluvio lacustrine ridge has thin sand layer and not homogeny, therefore the fresh water could be found locally. While the flow of brackish water might be from sea water intrusion or surface flow from water formation.

128 SUDARYANTO

[Assessment of water resources of Bontang Sub-watershed in East Kalimantan (Indonesia)]. ***Kajian sumber daya air sub DAS Bontang Kalimantan Timur***/ Sudaryanto; Wibowo, Y.S. [Water resources and environment: potential, degradation and the future]. Sumber daya air dan lingkungan: potensi, degradasi dan masa depan/ Delinom, R.M.; Marganingrum, D. (eds.). Jakarta (Indonesia): LIPI Press, 2007: p.135-152 , 6 ill., 1 table; 11 ref. 631.92/LEM/s

WATER RESOURCES; WATER SUPPLY; WATERSHEDS; MINING; WATER POLLUTION; KALIMANTAN.

As one of the water supplier sources in the Bontang region, East Kalimantan, the sub Bontang watershed system was experiencing the conflict interests of utilization and conservation. Geographically whether was realised or not, the location of the mining of coal was in the water catchment of sub Bontang watershed. At the location that administratively

was in the Marangkayu Subdistrict, the Kutai Kertanegara Regency, it was seen the karst hill, the protected forest and the production forest that decreased its vegetation, where hydrologically are able to penetrate and keep water. Results of the study indicated that the quality of the ground water either well, spring or river water should be considered to maintain its nature conservation. The river water that had not polluted could be used for drinking water; agriculture and freshwater fisheries as well as the other needs. The upstream of sub Bontang watershed as the protected forest region and also as the source of the spring should be maintained its existence beside as buffer of the Kutai National Park. The activity of nature resources exploitation in the upstream area resulted in several disturbances to the soil surface.

P33 SOIL CHEMISTRY AND PHYSICS

129 HIKMATULLAH

Evaluation of soil properties of the Alluvial landform in three locations of Donggala Regency, Central Sulawesi (Indonesia). ***Evaluasi sifat-sifat tanah pada landform Aluvial di tiga lokasi di Kabupaten Donggala, Sulawesi Tengah*****/** Hikmatullah; Sukarman (Balai Besar Penelitian dan Pengembangan Sumberdaya Lahan Pertanian, Bogor (Indonesia). *Jurnal Tanah dan Iklim* (Indonesia) ISSN 1410-7244 (2007) (no. 25) p.69-82, 4 ill., 6 tables; 22 ref.

SULAWESI; ALLUVIAL SOILS; SOIL CHEMICOPHYSICAL PROPERTIES; SOIL FERTILITY; MINERALS.

Alluvial landforms in Donggala Regency, Central Sulawesi are main agricultural land, but information of soil properties has not yet been studied and published. The objectives of the study were to evaluate soil physical, chemical and mineralogical properties of Alluvial landform and potential fertility for agriculture. Five pedons from Palu Valley, five pedons from north coast and three pedons from west coast of Donggala Regency were selected for laboratory analyses. The pedons represent dominant soil groups, consisting of Ustiluvents, Haplustepts, Eutrudepts, and Endaoquepts. To evaluate soil property differences among the locations, a paired test comparison was applied. To compare clay or organic carbon contents with CEC soils, a multiple linear regression was applied. The results indicated that the soils of the areas had loamy sand to sandy clay loam textures, slightly acid to slightly alkaline, low to very low organic carbon contents, high P_20_5 and K_20 (extracted by HCl 25%) contents, medium to high available P_20_5 (extracted by Olsen), low soil CEC, high clay CEC and base saturation. The soil properties showed wide variation with coefficient variation (CV) ranging from 23 to 98%, except for pH and base saturation (CV<20%). The results of pair test comparison indicated that sand content, total K2O, and available P205 were differ very significantly for all pairs, whereas clay, silt, and organic carbon contents, CEC soil and CEC clay were differ very significantly only for two pairs of the locations that was between Palu Valley and north coast and west coast. The results of multiple linear regression analyses showed that clay content had closer relationship to CEC soil rather than organic carbon content. Composition of sand mineral fraction was dominated by quartz and rock fragments, but it showed relatively high weatherable minerals (12-46%), while clay mineral was a mixture of smectite and illite. The potential fertility of the soils was relatively good, with main contraints of low organic matters and low soil CEC. Incorporation of organic matters, such as green manure and crop residues, is suggested to improve and increase CEC soils and nutrient availability.

130 PRASETYO, B.H.

Influence of volcanic materials on the properties of paddy soils. ***Pengaruh bahan volkan pada sifat tanah sawah/*** Prasetyo, B.H. (Balai Besar Penelitian dan Pengembangan Sumberdaya Lahan Pertanian, Bogor (Indonesia)); Suganda, H.; Kasno, A. *Jurnal Tanah dan Iklim (Indonesia).* ISSN 1410-7244 (2007) (no. 25)p. 45-58, 1 ill., 6 tables; 40 ref.

PADDY SOIL; VOLCANIC MATERIALS; MINERALS; SOIL CHEMICOPHYSICAL PROPERTIES; SOIL MORPHOLOGICAL FEATURES.

Three pedons of paddy soils classified as Oxyaquic Eutrudepts from Pati, Typic Endoaquarts from Ngawi and Vertic Endoaquepts from Klaten have been studied pedogenetically based on their physical, mineralogical and chemical properties. For this purpose as many as 15 soil samples were analyzed in laboratory. The results indicated that all pedons were influenced by different materials. The top soil of paddy soil from Pati was covered by sediment material which was dominated by quartz, while subsoils were influenced by volcanic materials consisting of association of labradorite-hornblende minerals. Paddy soil from Ngawi was continuously influenced by volcanic materials in all profiles with association of labradorite-hornblende, while paddy soil from Klaten which was derived from volcanic alluvium showed domination of primary mineral in their association, e.g. labradorite-hornblende-augite-hypersten. The clay mineral composition in all paddy soils were dominated by smectite, with a lesser extends kaolinite and halloysite. The higher content of kaolinite in the top layer of paddy soil from Pati was formed from sediment materials, while in all subsoils kaolinite and haloisite were formed from weathering of labradorite from volcanic materials. Chemically, all pedons are fertile, the main difference is on the ratio of Ca/Mg. Paddy soils from marl (Pati and Ngawi) have Ca/Mg ratio ranging between 5:1 and 12:1, while paddy soil from alluvium (Klaten) is about 2:1. The influence of volcanic materials gives a positive impact on paddy field properties, especially in the source of nutrients but could not modify the Ca/Mg ratio.

131 SUHARTA, N.

Characteristic of soil developed from felsic sediments in West Kalimantan Province (Indonesia) and its implication to land management. ***Sifat dan karakteristik tanah dari batuan sedimen masam di Provinsi Kalimantan Barat serta implikasinya terhadap pengelolaan lahan/*** Suharta, N. (Balai Besar Penelitian dan Pengembangan Sumberdaya Lahan Pertanian, Bogor (Indonesia)). *Jurnal Tanah dan Iklim (Indonesia).* ISSN 1410-7244 (2007) (no. 25)p. 11 - 26, 3 ill., 10 tables; 22 ref.

KALIMANTAN; SEDIMENT; SOIL CHEMICOPHYSICAL PROPERTIES; LAND MANAGEMENT; SOIL CLASSIFICATION.

Reconnaisance soil survey at 1:250,000 scale in West Kalimantan Province has been done covering 5.5 million hectares. Result showed that parent material governs formed soil properties. This research aimed at discussing soil properties developed from felsic sediment parent material in West Kalimantan Provinces and its implication to land management. As much as 100 pedons from felsic sediment parent material has been investigated in the field and in the laboratory for particle size distribution and chemical properties. Results showed that particle size distribution or soil texture depended on parent material (sandstone, siltstone or claystone). Developed soil shown acid soil reaction, ion organic material, ion P and K, ion exchangeable bases, ion base saturation, variable cation exchange capacity. Meanwhile, Al saturation was high and correlated positively with clay content. Soil properties that influenced land management were particle size distribution and chemical properties. Land management showed be directed to increase soil pH, to decrease Al reactivity, to increase soil P and K, organic matter and exchangeable bases.

132 SUKARMAN

Landsat-7 ETM imagery spectral relationship with soil characteristics. *Hubungan spektral citra landsat-7 ETM dengan beberapa sifat tanah/* Sukarman; Hidayat, A. (Balai Besar Penelitian dan Pengembangan Sumberdaya Lahan Pertanian, Bogor (Indonesia)); Hardjowigeno, S.; Ardiansyah, M. *Jurnal Tanah dan Iklim (Indonesia)*. ISSN 1410-7244 (2007) (no. 25) p. 1-10, 7 ill., 2 tables; 13 ref.

SATELLITES; IMAGERY; SPECTROMETRY; SOIL CHEMICOPHYSICAL PROPERTIES.

A research for determining the relationship between Landsat-7 ETM imagery spectral with several soil characteristics was carried out in Cisarua, Cigudeg, and Cibinong, Bogor District. The aim of this research was to find out the use of Landsat-7 ETM imagery in assisting delineation and identification of semi detailed soil unit elements with Tesseled cap transformation. Imagery analysis used Tesseled cap transformation that is compressed data of six band (1, 2, 3, 4, 5, and 7) become three components of imagery. The results of transformation were brightness, greenness, and wetness index. Relation of each soil characteristics and three components of imagery was carried out with discriminant analysis. Three components of imagery were made from independent variables and soil characteristics were made of dependent variables. The result of this research showed that heterogenous vegetation area with analysis of the Landsat-7 ETM imagery used Tesseled cap only being capable to discriminate category, suborder category in soil taxonomy classification, especially for aquic and non aquic characteristics. In areas that have homogenous vegetation, combination of brightness, and wetness can be used to determinate for subgroup category in soil taxonomy classification, especially to determine Oxyaquic Dystrudepts and Oxic Dystrudepts or Typic Dystrudepts and Oxic Dystrudepts/Hapludox.

133 WAHYUNI, S.

Rainfed lowland rice management to reduce nitrous oxide gas emission. *Pengelolaan lahan sawah tadah hujan dalam menekan emisi gas nitro-oksida (N_2O)/* Wahyuni, S.; Wihardjaka (Balai Penelitian Lingkungan Pertanian, Pati (Indonesia)). *Jurnal Sumberdaya Lahan (Indonesia)*. ISSN 1907-0799 (2007) v. 1(3) p. 1-12, 3 ill., 10 tables; Bibliography: p.10-12

IRRIGATED RICE; RAINFED FARMING; NITROUS OXIDE; NITROGEN FERTILIZERS; IRRIGATION METHODS; DIRECT SOWING.

Alternate wet and dry soil condition changes of rainfed lowland rice in long period influences source-sink pattern of greenhouse gases (GHGs) emission. The agricultural activity contributes 94% of nitrous oxide emission, which consist of 41% from plant burned residue and 18% from inorganic N fertilizer used, respectively. Nitrous oxide is produced through microbial nitrification-denitrification processes in rice field that depends on soil conditions. Nitrous oxide emission through denitrification is one of N losses forms from rice field hence cause low N fertilizer efficiency. Based on research results, the appropriate rice cultivars, fertilization, irrigation method could increase crop yields and reduce nitrous oxide emission. Improving fertilizer management in rainfed lowland rice culture such as controlled-release N fertilizer and N fertilizer contained sulfur also reduced nitrous oxide emission. However, the increase of N fertilizer and farmyard manure rates could enhance N_2O emission. The direct seeded rice with maximum soil tillage reduce more N_2O emission compared to transplanted rice with zero soil tillage. The IR 64 cultivar tends to emit higher N2O that Memberamo and Maros cultivars.

P36 SOIL EROSION, CONSERVATION AND RECLAMATION

134 TALA'OHU, S.H.

Innovation technology to reclaim buried coal mining land. ***Inovasi teknologi reklamasi lahan timbunan bekas penambangan batubara/*** Tala'ohu, S.H.; Erfandi, D. (Balai Penelitian Tanah, Bogor (Indonesia)). [Proceedings of the 9th national congressess of Indonesian Soil Science Association: soil and water management. Book 3]. Prosiding kongres nasional ke-9 Himpunan Ilmu Tanah Indonesia: solusi miskelola tanah dan air untuk memaksimalkan kesejahteraan rakyat. Yogyakarta (Indonesia), 5-7 Dec 2007. Buku 3/ Radjagukguk, B.; Kertonegoro, B.D.; Shiddieq, D.; Sunarminto, B.H.; Wardoyo, S.S.; Nurcholis, M.; Purwanto, B.H.; Yuwono, N.W.; Partoyo (eds.). Yogyakarta (Indonesia): UPN "Veteran", 2007: p.1533-1543, 3 tables; 16 ref. 631.6.02/KON/s

COAL; BURIED SOILS; RECLAIMED LAND; SOIL CHEMICOPHYSICAL PROPERTIES; SOIL CONDITIONERS; PLANT COVER; EROSION CONTROL; INNOVATION; TECHNOLOGY TRANSFER.

The coal mining process might be divided into two mining options either open or close mining. In order to have an approximately 1 part of coal and 3-6 other parts should be removed which called as non mining item. This non mining item then be buried or located in the surrounded mining area. This buried part must be improved chemically, physically, and biologically or in other words reclaiming must be done to prevent erosion and landslide that might be happened. This buried materials had several characteristics such as compact layers and slow water infiltration layer, acid to very acid (pH 2.9-4.8), high exchangeable cations (Al and Mg), while nutrients such as N and P were relatively low. The impacts of soil conditioner application on soil (0-20 cm depth) were soil aeration pore, permeability improvement and the pH increased. Several materials that might be used to reclaim were manure and calcium while *Centrocema pubescens*, *Peuraria javanica*, *Brachiaria decumbens*, *Vetiveria zizanioides* might be planted to prevent erosion and act as soil cover. Trees that might be used for regreening were lamtoro, sungkai, Gliricidia, bamboo, mahogany, *Ceiba pentandra*, albizia, rosewood, Arborea, breadfruit, and cashew nut.

P40 METEOROLOGY AND CLIMATOLOGY

135 SANTOSO, H.

[Impact of climate change on water balance of the Siberut Island (Indonesia)]. ***Dampak perubahan iklim terhadap neraca air Pulau Siberut*** / Santoso, H. [Water resources and environment: potential, degradation and the future]. Sumber daya air dan lingkungan: potensi, degradasi dan masa depan/ Delinom, R.M.; Marganingrum, D. (eds.). Jakarta (Indonesia): LIPI Press, 2007: p.1-19, 9 ill., 4 tables; 27 ref. 631.92/LEM/s

CLIMATE CHANGE; WATER BALANCE; TEMPERATURE; RAIN; SUMATRA.

Small islands like Siberut are vulnerable to threats caused by changes in nature such as climate change. The climate projection of Siberut Island as the result of 1ºC global warming modeled by general circulation model (GCM) HadCM2 shows an increase of annual average temperature in Siberut by 1.1ºC with monthly variation from 1.0ºC to 1.2ºC. Meanwhile, the annual precipitation increases by 2% with monthly change patterns range from -15% to 10%. The amount of water deficit doubles in North Siberut and increases by 14 times in South Siberut, which are due to an increase in the evapotranspiration. The annual total runoff

decreases as much as 6-8% due to the decrease in the indirect runoff as much as 37% to 69%, despite of an increase in the direct runoff by 2%. A graphical analysis and a sensitivity analysis by varying the coefficient of direct runoff show that with the climate change the total runoff becomes more sensitive with respect to precipitation. A greater attention should be addressed in the future on efforts for protecting and conserving existing land covers in order to avoid a potential increase of soil erosion.

Q01 FOOD SCIENCE AND TECHNOLOGY

136 MA'MUN

[Standardization of pruatjan quality]. ***Standarisasi mutu purwoceng (Pimpinella pruatjan)*****/** Ma'mun; Manoi, F.; Sembiring, A.S.; Sukmasari, M.; Kurniati; Kustiwa, D. [Research technical report of Indonesian Medicinal and Aromatic Crops Research Institute in year of 2007]. Laporan teknis penelitian T.A. 2007 Balai Penelitian Tanaman Obat dan Aromatik. Bogor (Indonesia): Balittro, 2008: p.359-373. ISSN 0853-9456 1 table; 12 ref. 633.88/BAL/l

PIMPINELLA; QUALITY; CONTROLS; STANDARDIZING; STANDARDS; CHEMICOPHYSICAL PROPERTIES.

Indonesian Nasional Standard (SNI) of quality for pruatjan has not been made, although such standard is important for herbal production. The study was aimed to propose standar quality of pruatjan for national standard. The study was conducted in the Standar Laboratory of the Indonesian Medicinal and Aromatic Crops Research Institute (IMACRI) from January - December 2007. Plant materials used were dried simplicia of pruatjan from different sources, such representative farmers from production center in Dieng Highland, from representative home industry in Wonosobo and Banjarnegara, Central Java, and from representative jamu industry such as PT. Nyonya Meneer and PT. Sido Muncul. Plant samples were randomly choosen. Parameters analysed based on the standard of SNI and Materia Medica Indonesia (MMI). The results revealed the following standard quality of pruatjan simplicia: water content 9.0 - 14.0%; ash content 8.90 - 23.0%; water soluble extract 17.10 - 32%; ethanol soluble extract 6.50 - 18.0%,; sitosterol 0.03 -0.16%; stigmasterol 0.06 - 0.16%; saponin 0.14 - 0.20%; and bergapten 0.02 - 0.06%. These data should be submitted to the Indonesian Nasional Standard to be considered as an input for proposing the national standard of piuatjan.

Q02 FOOD PROCESSING AND PRESERVATION

137 ASSA, A.

Feasibility study of virgin coconut oil processing by fermantation method for small scale industri. ***Studi kelayakan pengolahan virgin coconut oil (VCO) skala industri kecil*****/** Assa, A.; La Teng, P.N (Balai Besar Hasil Perkebunan, Makassar (Indonesia)). *Jurnal Industri Hasil Perkebunan (Indonesia)*. ISSN 0126-0170 (2007) v.35(1) p.8-13, 1 ill; 1 table; 14 ref.

COCONUT OIL; PROCESSING; FERMENTATION; COTTAGE INDUSTRY; YIELDS; COST BENEFIT ANALYSIS.

A feasibility study of virgin coconut oil (VCO) processing for small scale industry viewed from economical aspect has been conducted. The processing method of VCO in this study

refers to the study results of La Teng P.N. and Mamang (2006), that is by fermentation method utilizing coconut milk as the source of microbe starter with vacuum multistage filtering system to reduce water content. The VCO quality by this method has complied with the CAC (codex alimentary commission) standards except for water content, i.e. 0.3%. The results of this study showed that the VCO project was very feasible indicated by BEP of 10.071 litres with sales revenue of Rp.20,000, B/C ratio of 1.18 and PBP of 2.75 years or 33 months.

138 MARTHEN, D.P.

Comparison of several methods for virgin coconut oil (VCO) processing. *Perbandingan beberapa metode pengolahan virgin coconut oil (VCO)/* Marthen, D.P. (Balai Besar Industri Hasil Perkebunan, Makassar (Indonesia)). *Jurnal Industri Hasil Perkebunan (Indonesia).* ISSN 0126-0170 (2007) v. 35(1) p.20-26, 2 tables; 20 ref.

COCOS NUCIFERA; PROCESSING; TEMPERATURE; FERMENTATION.

Virgin coconut oil (VCO) is produced from coconut fruits by several methods, i.e. traditional, multistage heating, enzymatic, acid supplement, centrifuge, inducement, fermentation and semi-wet press methods. The good quality and restorative properties of VCO is produced by enzymatic, acid supplement, centrifuge, inducement and fermantation methods. The method that produces VCO with water content that complied with APCC standard of 0.1 to 0.5% is the semi-wet pressing process with water content of 52.34% and capric acid content of 7.71%.

139 NOVERIZA, R.

[Test of essential oil application as fish preservatives]. *Pengujian pemanfaatan minyak atsiri sebagai pengawet ikan*/ Noveriza, R.; Ma'mun; Maslahah, N.; Karyani, N.; Sutrasman; Zulhisnain. [Research technical report of Indonesian Medicinal and Aromatic Crops Research Institute in year of 2007]. Laporan teknis penelitian T.A. 2007 Balai Penelitian Tanaman Obat dan Aromatik . Bogor (Indonesia): Balittro, 2008: p.286-296. ISSN 0853-9456 3 ill., 1 table; 14 ref. 633.88/BAL/l

ESSENTIAL OILS; FISHES; PRESERVATION; FOODS; ANTIMICROBIALS.

Essential oil has been known as antibacterial and antifungal for food borne microbials or spoilage bacterials. An experiment on the use of the essential oil for preservation of fresh mackerel had been conducted by dipping the fish in cinnamon oil, lemongrass oil, clove oil and rosemary oil at concentration of 0.1; 0.5 and 1% during 60 minutes, and kept the fish at room temperature until fish become spoiled. This study were done at Plant Pathologi Laboratory from January - November 2007. The result showed that cinnamon oil and lemongrass oil at concentration of 0.5% or their combination were able to reduce the growth of spoilage bacteria in that fish compared to control. Based on sensory value, cinnamon oil and lemongrass oil at concentration of 0.5% could maintain the fish freshness until 24 hours, which was 12 hours longer than control (without treatment).

140 PURWANINGSIH, H.

Usage of black rice, the local germplasm of Yogyakarta [Indonesia] functional food. *Pemanfaatan plasma nutfah beras hitam lokal Yogyakarta sebagai pangan fungsional/* Purwaningsih, H.; Kristamtini (Balai Pengkajian Teknologi Pertanian Yogyakarta (Indonesia)). [Proceedings of the national seminar on rice research results in 2009. Book 3]. Prosiding seminar nasional hasil penelitian padi 2009. Sukamandi (Indonesia), 28 Oct 2009

Buku 3/ Setyono, A.; Indrasari, S.D.Agus, S.Y. (eds.). Sukamandi (Indonesia): Balitpa, 2010: p.1271-1280, 6 il; 3 tables; 11 ref. 633.18-115.2/SEM/p bk3

RICE; GERMPLASM; VARIETIES; FOODS; PROCESSING; PROXIMATE COMPOSITION; CONSUMERS.

Wide range of climate in Yogyakarta Special Region brings about the diversities in agricultural germplasms. Among these were the red rice and the brown rice which were special to local Yogyakarta. Both red and brown rice contain one or more compounds which are important for human health. Results of the analysis of red and brown rice conducted in Postharvest Laboratory of Yogyakarta AIAT and Agricultural Technology Laboratory of Gadjah Mada University, Yogyakarta during the year of 2008, indicated that red rice contained protein, fat, amylose, amylopectin, and starch as much as 9.04,1.59,21.42,45.65, and 67.07%, respectively. Red rice also contained beta-carotene and anthocyanin as much as 158.29 mg/l00 g and 2.88 ppm, respectively. The brown rice contained protein, fat, amylose, amylopectin, and starch as much as 5.51,1.85, 22.97,51.54, and 74.52%, respectively. The brown rice also contained beta-carotene and anthocyanin as much as 804.16 mg/l00 g and 393.93 ppm, respectively. The low amylose and high amylopectin contained by red and brown rice meet the quality preference of most of the Indonesian. Red and brown rice also contained higher iron as compared to white rice. Red and brown rice can be prepared as steamed cake with an attractive taste and appearance. Organoleptic test indicated that consumers preferred the brown rice steamed cake more than the red rice steamed cake. The brown rice and the red rice steamed cake contained anthocyanin as much as 0.33 and 36.76 ppm, respectively.

141 YUNUS, M.R.

Optimum time periods of cooling shock pretreatments of soaking in water and draining of candle nuts for the shelling process. ***Waktu optimum perlakuan awal kejutan dingin perendaman di dalam air dan penirisan biji kemiri pada proses pengupasan kulit batok/*** Yunus, M.R.; Thamrin, I. (Balai Besar Industri Hasil Perkebunan, Makassar (Indonesia)). *Jurnal Industri Hasil Perkebunan* (Indonesia). ISSN 0126-0170 (2007) v. 18(2) p. 27-33, 1 ill; 4 tables ; 9 ref.

ALEURITES MOLUCCANA; SEED; COOLING; SHOCK; SHELLING; SOAKING.

The optimum time periods of nut cooling shock pretreatmens of soaking in water and draining of candle nuts for the shelling process have been investigated. Variables studied were soaking times in water with the levels of 5, 10, 15 minutes and draining time periods with the levels of 10, 15, 20, and 25 minutes. The nuts were taken randomly from the collector traders in Mamuju Regency of West Sulawesi and Maros (Camba) Regency of South Sulawesi. Before the soaking and draining steps the nuts were dried in two stages: sun drying for 4-6 days and drying in an electrical oven at 70-80^{o}C for five hours. The shelling step used a 3/4 HP centrifugal type of candle nut shelling machine. The results showed that for candle nut from Mamuju the optimum time periods for soaking in water and draining of the nuts were 15 and 20 minutes respectively with 61% whole kernels and 90% whole plus two split part kernels. For the Maros candle nuts which shell relatively thicker and harder and kernels relatively denser than the shell and kernel of the Mamuju candle nuts, the optimum time periods for soaking in water and draining were 10 and 15 minutes respectively with 65% whole kernels and 86% whole plus two part split kernels.

QO4 FOOD COMPOSITION

142 INDRASARI, S.D.

Physical quality, milling quality and anthocyanin content of West Java local black and red rice's. *Mutu fisik, mutu giling, dan kandungan anthosianin beras hitam dan beras merah lokal Jawa Barat*/ Indrasari, S.D.; Wibowo, P. [Proceedings of the national seminar on rice research results in 2009. Book 3]. Prosiding seminar nasional hasil penelitian padi 2009. Sukamandi (Indonesia), 28 Oct 2009. Buku 3/Setyono, A.; Indrasari, S.D.; Agus, S.Y.(eds.). Sukamandi (Indonesia): Balitpa, 2010: p.999-1009, 6 tables; 20 ref. 633.18-115.2/SEM/p bk3

RICE; PROXIMATE COMPOSITION; QUALITY; CHEMICOPHYSICAL PROPERTIES; ANTHOCYANINS.

Rice contains not only source of energy and nutrients, but also active component having physiological function that useful for human health. Black rice and red rice have not been as a staple food yet; but they are promising. It was reported that the pigment color of red, purple, and black were available in the pericarp layer and at the outer layer of the rice endosperm. Anthocyanin is the pigment which determines red, blue, and purple colors in flowers, fruits, and vegetables. In human health, it can function as antioxidant, anticancer, anti-LDL, and anti-coronary heart disease. An experiment to study physical quality, milling quality, and anthocyanin content of local black and red rice of West Java under several phase of processing was conducted on black rice obtained from Cibeusi area in Subang District and Jembar Beureum red rice from Kosambi Market in Bandung. Physical and milling quality were analyzed on grain and milled rice while anthocyanin was on brown rice, milled rice, and cooked rice, all with 80 and 100% milling degree. The results indicated that based on the presence of empty grain and unwanted materials, physical quality of black rice was not fulfilled the standard quality of rice grain as shown in SNI No. 0224-1987/SPI-TAN/Ol/0l/1993, while those for the red rice were fulfilled the quality standard class I. The grains shape of both rice were categorized as medium, while their milling quality were fulfilled the quality standard class III of SNI No. 01-6128-1999. The longer the time of milling process, the more the losses of anthocyanin. It was concluded that to obtain the optimum anthocyanin content in black and red rice, the milling process of brown rice should be up to 80% milling degree.

143 KRISTAMTINI

Mineral content of iron on red and black local rices of Yogyakarta [Indonesia]. *Kandungan besi beras merah dan beras hitam lokal Yogyakarta/* Kristamtini; Purwaningsih, H. [Proceedings of the national seminar on rice research results in 2009. Book 3]. Prosiding seminar nasional hasil penelitian padi 2009. Sukamandi (Indonesia), 28 Oct 2009. Buku 3/ Setyono, A.; Indrasari, S.D.; Agus, S.Y. (eds.) Sukamandi (Indonesia): Balitpa, 2010: p. 1011-1018, 1 table; 13 ref. 633.18-115.2/SEM/p bk3

RICE; VARIETIES; PROCESSING; DRYERS; MILLING; IRON; YIELDS.

Two cultivar types of rice, called red rice (Segreng, Mandel, Cempo Merah, Saodah Merah) and black rice (Cempo Ireng and Melik) are typical of Yogyakarta Province. These two types of rice contain iron mineral which is important for human health. A study was conducted to evaluate the iron content of these two local rices of Yogyakarta by previously planting two cultivars of the black rice (Cempo Ireng and Melik) and five cultivars of the red rice (Segreng, Mandel, Cempo Merah, and Saodah Merah) in the farmers' irrigated rice field. The rice grains harvested from this crop were then dried, milled, and analyzed for their iron

content. Data of the iron content were analyzed based on the completely randomized design. The difference among treatments were evaluated by DMRT test at 5% level of confidence. Results of this experiment indicated that high content of iron of 150.3 and 31.8 ppm were demonstrated by the cultivars of black rice Melik and Cempo Ireng, while iron content of 18.99, 16.09, 12.84, and 12.76 ppm were observed on the cultivars of Segreng, Cempo Merah, Saodah Merah, and Mandel, respectively. The iron content of these local cultivars typical of Yogyakarta was significantly higher as compared to that of common rice varieties which reached 11.7 ppm.

144 TRI-PANJI

Specific lipase of 1,3-glyceride from indigenous fungi for bioconversion of CPO to produce diacylglycerol. ***Lipase spesifik 1,3-gliserida dari fungi lokal untuk biokonversi CPO menjadi diasilgliserol/*** Tri-Panji; Suharyanto (Balai Penelitian Bioteknologi Perkebunan, Bogot (Indonesia)); Arini, N. *Menara Perkebunan* (Indonesia) ISSN 0215-9318 (2008) v. 76(1) p. 11-23, 6 ill., 2 tables; 23 ref.

TRIACYLGLYCEROL LIPASE; FUNGI; NEUROSPORA; PRODUCTION; INDIGENOUS ORGANISMS; BIOCONVERSION; YIELDS

Downstream industry of palm oil producing specialty oil with higher economic value compared to that of CPO in Indonesia is less developed due to technical obstacle and the availability of supporting materials. Specific lipase 1,3-glyceride for example which is used for oleochemical processing of healthy oil production is still imported with relatively high price. Healthy oil can be made from CPO bioconversion using the enzyme that produces oil rich in diacylglycerol (DAG). Although research on the production and the use of lipase has been well studied; production of specific lipase from microbes of local source is still very limited. This article reports one part of the series of the research activities on bioprocess and genetic engineering approaches to produce specific lipase for bioconversion of CPO i.e optimization of 1,3-glyceride-spesific lipase production from fungi selected from local sources. Based on the fluorescence zone on the screening media, of the twenty isolates collection, it was found that P6 isolate, thereafter identified as *Neurospora sitophila*, has the highest activity of 1,3-glyceride-specific lipase. The lipase of *N. sitophila* was able to catalyze glycerolysis of triacylglycerol (TAG) in CPO to produce DAG. The bioconversion products of lipase yielding ratio of DAG/TAG was higher than ratio of free fatty acids (FFAV/TAG (0.12 more than 0.08). The optimum condition of the enzymatic bioconversion was at 40^{o}C, pH 6, and 10-day incubation. The primary fatty acids on the DAG were oleic (56.2%), palmitic (40.0%), and myristic (2.7%) acids. The decrease of palmitic acid on DAG compared to on TAG indicated that the lipase of *N. sitophila* worked relatively specific at C1 or C3 of the TAG.

145 WIBOWO, P.

Physical, physicochemical, and cooking characters of aromatic rice. ***Karakteristik fisik, fisikokimia dan tanak beras beberapa varietas padi aromatik/*** Wibowo, P.; Kusbiantoro, B.; Indrasari, S. D.; Handoko, D.D. [Proceedings of the national seminar on rice research results in 2009. Book 3] . Prosiding seminar nasional hasil penelitian padi 2009. Sukamandi (Indonesia), 28 Oct 2009. Buku 3/ Setyono, A.; Indrasari, S.D.; Agus, S.Y. (eds.). Sukamandi (Indonesia): Balitpa, 2010: p.989-998, 3 tables; 16 ref 633.18-115.2/SEM/p bk3

RICE; VARIETIES; CHEMICOPHYSICAL PROPERTIES; QUALITY.

Several aromatic rice grains produced milled rice with physical, physicochemical, and cooking characters that support the aromatic rice of being the export quality rice. An

experiment to analyze and evaluate the physical, physicochemical and cooking characters of nine aromatic rice varieties, namely Sintanur, Gilirang, Batang Gadis, Situ Patenggang, Rojolele, Pandan Wangi, Mentik Wangi, Hipa 5 Ceva, and Segara Anak were conducted at ICRR during the year of 2008. The grain/milled ratio, the head milled rice, the chalky kernel, the size, and the shape of rice kernel were among physical characters evaluated. The physicochemical characters evaluated were gel consistency and gel temperature, amylose, and protein content. Cooking characters was identified as the cooking time, the expansion, and the water absorption ratio of cooking rice. The ratios of rice grain/milled rice of all the tested varieties reached 70% and the head rice recovery ranged 62-88%. Results indicated that except Pandan Wangi and Hipa 5 Ceva which contained white belly kernels, almost all of the rice varieties demonstrated fine translucent kernels and good looking in appearance. Eight varieties had medium grain size and slightly bold shape except Hipa 5 Ceva which had long grain and slender shape kernels. Amylose content of all the tested varieties were intermediate to high ranged 18-24%, sticky soft of cooked rice. The protein content of the varieties ranged from 7-9%, the cooking time varied of 17-20 minutes, expansion ratio of cooking rice were 3.0-3.8 times, and the water absorption ratio was 2.1-2.8 times. Some of the tested varieties have not physically indicated the premium rice quality as they contained <84 % head rice only. Based on the chemicals and the cooking characters it appeared that all of the aromatic rice tested were considered to be excellent in quality.

146 WIDIASTUTI, H.

Activity pattern of ligninolytic enzyme of *Pleurotus ostreatus* in sludge waste of paper factory. *Pola aktivitas enzim ligninolitik Pleurotus ostreatus pada limbah sludge pabrik kertas/* Widiastuti, H.; Tri-Panji (Balai Penelitian Bioteknologi Perkebunan, Bogor (Indonesia)). *Menara Perkebunan* (Indonesia) ISSN 0215-9318 (2008) v. 76(1) p. 47-60, 8 tables; 27 ref.

PLEUROTUS OSTREATUS; LIGNINOLYTIC MICROORGANISMS; ENZYME ACTIVITY; WASTES; PAPER; INDUSTRIAL WASTES; GROWING MEDIA.

Sludge is a solid waste abundantly available on paper factory that economically unutilized and tends to pollute environment. This waste can be used as growth media for oyster mushroom (*Pleurotus ostreatus*) as edible mushroom and ligninolytic enzymes production as well. A research has been conducted to study the activity pattern of ligninolytic enzymes of oyster mushroom grown on the sludge waste of recycle paper factory. Six treatments were examined which consisted of three media combinations (sawdust; sludge; sludge mixed with sawdust) with and without supplements of rice bran, lime, and gypsum, and two mushroom strains, i.e. Bogor oyster mushroom (JTB) and China Taipei oyster mushroom (JTT). Monitoring of ligninolytic enzyme activity consisting of laccase, mangan peroxidase (Mn-P) and lignin peroxidase (Li-P), was subsequently regularly started since inoculation, at vegetative phase (four and six weeks), primordial formation, phase of fruiting body formation, and two weeks after formation of fruiting body. Each treatment was repeated three times, so that 216 bag logs of oyster mushroom cultures were performed. The results showed that laccase, Mn-P, and Li-P activities could be observed on sludge or mixture of sludge + sawdust media inoculated with *P. ostreatus*. Generally, the highest activity of ligninolytic enzymes especially for laccase and Mn-P was observed at the first vegetative growth phase, i.e. before emerging primordial of fruiting body (1.697 2.113 µ/ml, 4.394 2.314 µ/ml respectively for JTB and JTT laccase and JTB JTT Mn-P). The highest Li-P activity was affected by the kind of media and strain of inoculum. In sludge medium, the highest Li-P activity was observed in vegetative growth phase (2.706 4.014 µ/ml respectively for JTB and JTT), while in a mixture of sludge + sawdust the highest activity of that enzyme was observed in primordial phase of growth (2.509 1.9 µ/ml respectively for JTB and JTT). Addition of supplement to the sludge increased ligninolytic activity, while

laccase activity of sludge was suggested could be more enhanced by mixing the sludge with sawdust and enrich with rice bran, gypsum, and lime.

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

147 FATHURROHMAN, M.I.

Epoxydation of natural rubber in latex phase using performic acid. ***Epoksidasi karet alam dalam fasa lateks menggunakan asam performat/*** Fathurrohman, M.I.; Syamsu, Y. (Pusat Penelitian Karet, Medan (Indonesia)). *Jurnal Penelitian Karet (Indonesia)*. ISSN 0852-808 X (2010) v. 28(1) p. 65-74, 8 ill., 1 table; 7 ref.

RUBBER; EPOXY COMPOUNDS; LATEX; TEMPERATURE; PROTEIN.

Natural rubber of *Hevea brasiliensis* is a natural polymer which has good physical properties and high elasticity. However, the natural rubber molecule is a non-polar hydrocarbon which easily swells in oil or grease. Epoxydation of double bond of natural rubber molecule is an effort to increase its polarity, so its resistance to oil or grease as well as several of its physical properties will increase. The aim of this experiment was to study the effect of reaction parameters, i.e duration of reaction, temperature, and protein content of natural rubber latex on rate of epoxydation reaction. Epoxydation experiments in the latex phase was conducted using performic acid 0.0035 mole/gram of rubber and hydrogen peroxide 0.01 mole/gram rubber as reactants. Natural rubber latex used were field latex, centrifuged latex, and DPNR latex, with 20% of dry rubber content at the epoxydation reaction. Epoxydized rubber obtained was analysed by FTIR spectroscopy for qualitative or quantitative analysis, The infrared spectra of epoxidized natural rubber obtained in this experiments had maximum absorption peaks at wave number of 1251 cm^{-1} and 874 cm^{-1}, which showed specific absorption peaks of symmetric and asymmetric of epoxide groups. The increasing of duration and temperature reaction increased the percentage of epoxyde groups formed. On the contrary, increasing protein content in the latex decreased the percentage of epoxyde groups formed, thus the rate of epoxydation reaction would also be affected.

148 MA'MUN

[Isolation, characterization, and formulation of essential oil]. ***Isolasi, karakterisasi dan formulasi minyak atsiri***/ Ma'mun; Hadipoetyanti, E.; Suhirman, S.; Gani, A.; Hayani, E.; Wahyudiono; Kustiwa, D. [Research technical report of Indonesian Medicinal and Aromatic Crops Research Institute in year of 2007]. Laporan teknis penelitian T.A. 2007 Balai Penelitian Tanaman Obat dan Aromatik. Bogor (Indonesia): Balittro, 2008: p.257-275. ISSN 0853-9456, 39 tables; 18 ref. 633.88/BAL/l

ESSENTIAL OILS; ISOLATION; FORMULATIONS; CHROMATOGRAPHY; DISTILLING; CHEMICOPHYSICAL PROPERTIES; FOOD COMPOSITION.

Essential oils can be found in the various plants. In general, essential oils consist of chemical compounds. So essential oils have multipurpose, among others as bactericide, insect repellent and preservative. The research of isolation, characterization and formulation of essential oils was conducted at the Postharvest Laboratory, Indonesian Medicinal and Aromatic Crops Research Institute, from January - December 2007. The direction of this

experiment were (1) to isolate 20 kinds of essential oils (cinnamon oil, lemon grass oil, citronella oil, patchouli oil, nutmeg oil, vetiver oil, clove leaf oil, bay oil, kafir lime oil, ginger oil, black pepper oil, galangal oil, cajeput oil, turmeric oil, curcuma oil, cananga oil, massoi oil, fennel oil, rosemary oil and bangle oil), (2) to Characterize those isolated oils, and (3) formulation of essential oils for fish preservative. Method of isolation is using water and steam distillation. Characterization are determination of physico chemical properties of essential oils including of specific gravity, refractive index, optical rotation, solubility in ethanol, acid number, ester number using the Indonesian National Standard method and identification of all chemical components by gas chromatography mass spectrometry (GCMS) method. Formulation of essential oils for fish preservation is blending those essential oils and water and emulsifier with 0.1; 0.5; 1.0% concentration of essential oils as active ingredients. The selected essential oils for preservative formulae are cinnamon oil, lemongrass oil, clove leaf oil, bay leaf oil and rosemary oil. Those isolated and characterized oils were also prepared for testing of mosquito repellent and as bactericides and for essential oils collection. The result of isolation showed that the oils yield of 20 kinds of essential oils were different. The characteristics of isolated oil were also different and met to the Indonesian National Standard (SNI). Formula of five essential oils was suitable for fish preservation.

Q70 PROCESSING OF AGRICULTURAL WASTES

149 KRESNAWATI, I.

Optimization of biogas production from concentrated-latex effluent with addition of metals. ***Optimisasi produksi biogas dari limbah cair lateks pekat dengan penambahan logam/*** Kresnawati, I.; Siswanto; Tri-Panji (Balai Penelitian Bioteknologi Perkebunan, Bogor (Indonesia)); Susanti, I. *Menara Perkebunan (Indonesia).* ISSN 0215-9318 (2008) v. 76(1) p. 23-35, 7 ill., 18 ref.

LATEX; WASTEWATER; BIOGAS; PRODUCTION; ENERGY RESOURCES; METALS.

The treatment of concentrated-latex effluent process presently applied in the field has not yet obtained optimum additional benefits. Besides, the technology of ponding system needs wide area and causes air pollution that often caused conflicts with society. The application of clean industry concept: reuse, reduction, recovery and recycling, makes the possibilities to convert the effluent to be usefull products. One of the alternative effluent process is by utilizing it as the source of renewable energy, that is in the form of biogas as an alternative energy. The preliminary research showed that the use of spontaneous latex skim coagulation, the addition of 1% manure as source of seed, and leaf biomass as the source of carbon could increase the biogas production. This research was carried out to optimize biogas production by adding metal ion and to observe the parameters which influenced every stage of biogas production. At the beginning of the process, pH showed increasing due to the hydrolysis process that generally occured in acid condition, but it remained stable (6.6-7.7) in the next steps, whereas, the VFA value as well as BOD value tended to increase. COD value had fluctuative inclination caused by the conversion of organic compounds to produce biogas and the hydrolysis process of leaf biomass to organic compounds that decomposed to further biogas. The best result of biogas production was showed by addition of Fe^{3+} with optimum concentration 0.50 mg/l effluent.

U40 SURVEYING METHODS

150 NUGROHO, K.

Detecting tidal flood pattern with Landsat TM remote sensing data in South Sumatra (Indonesia) coastal area. ***Perkiraan pola pasang dengan menggunakan data inderaja di pesisir Sumatera Selatan*****/** Nugroho, K. (Balai Besar Penelitian dan Pengembangan Sumberdaya Lahan Pertanian, Bogor (Indonesia)); Wiradisastra, U.S.; Pawitan, H.; Sudarsono. *Jurnal Tanah dan Iklim* (Indonesia) ISSN 1410-7244 (2007) (no. 25) p. 27-36, 8 ill., 2 tables ; 16 ref.

SUMATRA; TIDES; IMAGE ANALYSIS; SATELLITES; REMOTE SENSING; COASTAL PLAINS.

Detecting the availability of sufficient water in tidal land management is important for agriculture. Tidal flood pattern provides an information of area having tidal flood as well as drought by time and places. The objectives of this research are 1) to study the tidal flood spatial pattern by using real time data and digital data image processing, 2) to determine a tidal flood classification based on ground water level on a specific location and time, and 3) to study the hydrological factors affecting the flood. The tidal flood pattern can be classified within a block by their ground water fluctuation. The visual analysis with four images of different time, gives a clear differences between tidal flood pattern change and tidal fluctuation. The classification on the moist Landsat TM image after a Tesseled Cap transformation can produce classified image with similar flooded condition with the same range of ground water level. After the test, the tidal flooded pattern was found similar with the classification results. The tidal flood pattern is also recognized having a specific relationship with land use or land utilization type. The land use and land management affect the pattern. The application of geographical information system, especially remote sensing digital image data analysis, will help in determining tidal flood pattern as well as the ground water spatial pattern.

AUTHOR INDEX

CORPORATE BODY INDEX

SUBJECT INDEX

JOURNAL INDEX