

Abstract Book

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“The Role of Biological Research in The Development
of Science, Technology and Sustainability of Natural
Resource Management”

Medan October 17th 2015

Editor:

Prof. Shih Yen Lo (Univ. Tzu Chi, Taiwan)

Yaya Rukayadi, Ph.D (Univ. Putra Malaysia)

Prof. Erman Munir, Ph.D (Univ. Sumatera Utara)

Prof. Dwi Suryanto, Ph.D (Univ. Sumatera Utara)

Prof. Syafruddin Ilyas, Ph.D (Univ. Sumatera Utara)

Salomo Hutahaeon, Ph.D (Univ. Sumatera Utara)

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PREFACE

We give thanks to God Almighty, this seminar can be accomplished. All of this can not be separated from the good cooperation of the committee, both lecturers and students of the Department of Biology, Faculty of Mathematics and Natural Sciences, University of North Sumatra. Abstract book was created as a brief guide on the overall content of the oral presentation and poster presenters. We wish all the participants able to follow the whole event very well and enjoy the seminar. We all organizers, sorry if there are any flaws in this abstract book.

Medan, October 2015

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Biodiversity

B-1

**BIOECOLOGY OF PLANT AND LEAFHOPPERS
(AUCHENORRHYNCHA: HEMIPTERA)
IN PADDY ECOSYSTEM IN TAPANULI
AREA-NORTH SUMATERA**

Binari Manurung¹, Puji Prastowo¹, and Erika Rosdiana²

¹Biology Department, State University of Medan (UNIMED), Jln. Willièm Iskandar Psr V, Medan, Indonesia

²Senior High School (SMA Negeri 1) Perbaungan, Jln. Mayjen H. T. Rizal Nurdin, Perbaungan, Indonesia
E-mail: binari44@hotmail.com

ABSTRACT

The research aimed to find out bioecology data (diversity, abundance and distribution) of plant and leafhoppers (Hemiptera: Auchenorrhyncha) in paddy ecosystem in Tapanuli area-North Sumatera has been conducted. The research was carried out monthly intervals for six months from May to October 2014 in three districts of Tapanuli area (Toba samosir, Tapanuli Tengah and Samosir). Field survey for hopper sampling both in vegetation and stubble field periods was done, 400 nets for every sampling, followed by curation and identification of species. Research result showed, there was 12 species hoppers in paddy ecosystem in Tapanuli area, namely *Nephotettix virescens*, *Nephotettix nigropictus*, *Nilaparvata lugens*, *Cofana spectra*, *Reciliadorsalis*, *Thaiaghauri*, *Nisia nervosa*, *Cicadellid sp.*, *Sogatella furcifera*, *Empoasca sp.*, *Cicadulina bipunctata* and *Siphanta sp.* Hopper abundance in stubble field period (1152 ind.) was higher than in vegetation period (657 ind.). The abundance of hopper in Samosir district was highest than in Toba samosir (572 ind.) and in Tapanuli Tengah districts (488 ind.). Dominant hoppers in Tapanuli area were *Thaiaghauri*, *Nephotettix nigropictus*, *Cofana spectra* and *Reciliadorsalis*. Species *Nisia nervosa* and *Siphanta sp.* were distributed only in Samosir district, whereas *Cicadulina bipunctata* only in Tapanuli Tengah.

Keywords: *bioecology, leaf and plant hoppers (Auchenorrhyncha), Tapanuli*

B-2

**COMPOSITION OF SEaweEDS IN KASIak GADANG
ISLAND, NIRWANA BEACH, PADANG,
WEST SUMATERA, INDONESIA**

Faisal Hadi, Indra Junaidi Zakaria, and Zuhri Syam
Biology Department, Andalas University, Padang, Indonesia
E-mail: faisalhadibiologi@gmail.com

ABSTRACT

This research aimed to know the composition of seaweeds in Kasiak Gadang Island, Nirwana Beach, Padang, West Sumatera, Indonesia. This research had been conducted at October to December 2014. The method of this research used Line Transect and Belt Transect with research location divided into 4 stations. A perpendicular line was drawn from the shoreline then the squares placed along the line until it reached the lowest tide. The result of this research found there are 5 types of seaweeds in Kasiak Gadang Island. This seaweeds can be divided into 2 groups, Chlorophyta and Phaeophyta. In the Chlorophyta group, there was Halimeda opuntia. In the Phaeophyta group there were Padina minor, Sargassum crassifolium, Sargassum cristae-folium, and Turbinaria decurrens.

Keyword: *composition, Chlorophyta, Kasiak Gadang Island, Phaeophyta, seaweeds*

B-3

**STUDY ON FRUIT FLIES (INSECTA, DIPTERA,
TEPHRITIDAE) ATTACK ON MANGGOIN
BANDA ACEH, INDONESIA**

Husni¹, Saida Rasnovi², and Novita³

¹)Agrotechnology Department, Faculty of Agriculture, Syiah Kuala University,
Banda Aceh, 23111, Indonesia.

²)Biology Department, Faculty of Mathematics and Natural Science, Syiah
Kuala University, Banda Aceh, 23111, Indonesia.

³)Department of Home Economic, Faculty of Teacher Training and Education,
Syiah Kuala University, Banda Aceh, 23111, Indonesia.

E-mail : husnimusannif@yahoo.com

ABSTRACT

The diversity and abundance of fruitflies of the family Tephritidae on mango were studied in Banda Aceh, Indonesia. Male fruitflies were collected in the morning by using the attractants methyleugenol and cue-lure. Two species (*Bactrocera carambolae* and *Bactrocera dorsalis*) were present in two localities, with the former being more abundant than the latter in Banda Aceh. The two localities supported different species of fruitflies and different density of the common species.

Keywords: *abundance, Banda Aceh, diversity, fruitflies, manggo*

B-4

**CORRELATION BETWEEN WOOD DENSITY
AND RUNKLE RATIO SOME SUMATRAN TREES
SPECIES OF FABACEAE**

Linda Syofyan, Mansyur din, Syamsuar di, and Tesri Maideliza

Biology Department, Faculty Mathematics and Science, Andalas University,
Padang, Indonesia

ABSTRACT

Wood density average of Fabaceae in present study range from category of medium density to medium-high density. Two species belong to category low density i.e *Phithecelobium jiringa* and *Miletia pinnata* have value density of 0.28 g/cm^3 and 0.32 g/cm^3 respectively. While remaining three species namely *P. ellipticum*, *G. sepium* density and *S. sumatrana* have value was 0.60 g/cm^3 , 0.73 g/cm^3 and 0.61 g/cm^3 respectively. Based on value of runkle value included quality class II and III .

Keyword: *Fabaceae, runkle ratio, species, wood, wood density*

B-5

**FORAGING ACTIVITY OF OPEN-AIR
PROCESSIONAL COLUMN TERMITE *Hospitalitermes*
hospitalis (HOMLGREN) FROM BETUNG KERIHUN
NATIONAL PARK, BORNEO**

M. Ali Sarong¹ and Syaukani²

¹Biology Department, Faculty of Teacher Training and Education, Syiah
Kuala University,
Banda Aceh, 23111, Indonesia

²Biology Department, Faculty of Mathematics and Natural Science, Syiah
Kuala University,
Banda Aceh, 23111, Indonesia
E-mail: syaukani@gmail.com

ABSTRACT

The open-air procesional column termite *Hospitalitermes hospitalis* forages on the open ground on leaf litter. Its monomorphic worker scarry back foodballs in their mandibles while dimorphic soldiers defensively surround the marching columns and the foraging patches. When mechanically disturbed, workers hide under the litter, whereas antennating soldiers face as closely as possible the source of disturbance. Soldier behavior and column organization (returning workers in the center lanes, outgoing workers in the two flanking lanes) are similar to those in the related genera *Longipeditermes* and *Lacessititermes*, which, however, tend to forage above ground. Several biological aspects on foraging activity and nesting sites also reported for the first time on the park.

Keywords: *Borneo, Hospitalitermes, nestingsite, open-air procesional column termite.*

B-6

**SIMILARITY OF MACROZOOBENTHOS IN BABURA
RIVER MEDAN**

Sinambela, M and Sipayung, M

Department of Biology, Mathematic and Science Faculty, University Negri of
Medan.

Jl. Willem Iskandar Pasar V Medan Estate Unimed, Medan, 20221, Indonesia

E-mail: masdianasinambela@gmail.com

ABSTRACT

This paper reports the similarity of macrozoobenthos in Babura River of Medan. The research has been conducted in May 2015. The measured parameter is the similarity of macrozoobenthos in all research station. That abiotic factors are chemical and physical factors. Macrozoobenthos were taken using a Eckman grab in 5 stations. The similarity of macrozoobenthos in the Babura River is *Tubifex sp.* Chemical and physical factors measurement are temperature: 28,3⁰C to 30⁰C, a current flow 2,33m/sec to 3,80m/sec, pH: 5.29 to 7.16, DO: 0,57 to 4.91, BOD: 5.80 to 16.20, and posphat 0.19 to 0.44. The results of measurements of BOD factors can be known that the tolerance limits of the *Tubifex sp* wide enough.. Ex post de facto research initial, it can be used as a baseline.

Keywords: *macrozoobenthos, parameters, physics, chemistry*

B-7

THE DENSITY OF MOSQUITO LARVAE IN VILLAGES SEI KERA HILIR I, MEDAN PERJUANGAN, MEDAN, NORTH OF SUMATERA, INDONESIA

Merina Panggabean

Department of Parasitology, Faculty of Medicine, University of Sumatra Utara, Indonesia

ABSTRACT

Mosquitoes are small insects as vectors of diseases such as malaria, chikungunya, filariasis, yellow fever, Japanese Encephalitis and dengue fever. Mosquito larva is one of the stages in mosquito life cycle. A survey was conducted to study the density of mosquito larvae. This study was descriptive method by cluster random sampling. The objectives of this study was to determine the density of mosquito larvae in Villages Sei Kera Hilir 1, Medan Perjuangan, Medan North of Sumatera, Indonesia. Mosquito larvae survey was conducted with a single larval method. The population in this study is mosquito larvae inside and around house at Villages Sei Kera Hilir 1. Sample are mosquito larvaes consist of 100 houses. The samples were examined using microscope to identify the species with identification books and journals. The result showed that type of mosquito larvae were *Aedes aegypti*, *Aedes albopictus* and *Culex sinensis*. The density of mosquito larvae were the larva-free rate (ABL) was 34%, Container Index (CI) were 58.8%, House Index (HI) were 62% and Breteau Index (BI) 74% respectively. It can be concluded that the risk of transmission of diseases caused by mosquitoes as vectors is high in this study place.

Keywords: *mosquito larvae, ABL, CI, HI, BI*

B-8

***Asplenium adiantoides* (Linn.) C.Chr AND *Asplenium pellucidum* Lam OF MOUNT MARAPI, WEST SUMATRA**

Mildawati, Ardinis Arbain, Mahfud Huda, Hermansyah

Department of Biology, Andalas University, Padang, Indonesia

E-mail: mildawatisaidina@gmail.com

ABSTRACT

Asplenium adiantoides (Linn.) C.Chr and *Asplenium pellucidum* Lam are species of ferns that classified into the genus of *Asplenium* and Family *Aspleniaceae*. In this research, have been done observation of morphological character and spores of *Asplenium adiantoides* (Linn.) C.Chr and *Asplenium pellucidum* Lam from Mount Merapi in West Sumatra. The method used in this research are observation and data collection in the field and then performed research at The Laboratory of Plant Taxonomy Department of Biology, Andalas University and Observations SEM (Scanning Electron Microscope) at The Laboratory of Mechanical Engineering, Andalas University. Based on the research that has been conducted *Asplenium adiantoides* (Linn.) C.Chr live as an epiphytes plants at an altitude of 1.672 meters above sea level, with characteristics of spore has length of polar axis (P) is 86.10 and Equatorial axis (E) is 64.84 with P/E ratio 1:32 and the type of spore Prolate. *Asplenium pellucidum* Lam liive as an epiphytes plants that found at an altitude of 2.004 meters above sea level. Characteristics of spore with length of Polar Axis (P) 30.02 and Equatorial axis (E) 33.12 with P/E Ratio is 1.1 and the type of spore Prolate spheroidal.

Keywords: *Asplenium, morphology, spores and Prolat, spheroidal Prolate*

B-9

**A STUDY OF ORNAMENTAL FLORA AND FAUNA ON
THE TRADITIONAL ACEHNESE HOUSE, INDONESIA**

Novita

Department of Home Economic, Faculty of Teacher Training and Education,
Syiah Kuala University

Darussalam, Banda Aceh, 23111, Indonesia.

E-mail: novita.modia@gmail.com

ABSTRACT

This study aims to explore motifs engraved on Traditional Acehese House (TAH) in Aceh Province. Data obtained by direct surveys to TAH and interviewed owners, carpenters, and community leaders. Secondary data were obtained from literatures, manuscripts, and visited museums. Motifs on the TAH are dominated by elements from flora, fauna and nature. Geometric patterns applied around the engravings. Nowadays very few people who understand the meaning of motifs on the TAH. A number of selected object are dominated by clouds, stars, mountains, curved lines, straightlines, geometry and others Carpenteris one of the most understandings of the motifs, carving techniques, and decorations.

Keywords: *Traditional House of Aceh, or motifs, Aceh Tengah*

B-10

**PREDICTING DISTRIBUTION OF SMALL
CARNIVORES SPECIES IN JAVA**

Sena Adi Subrata

Faculty of Forestry, GadjahMada University

Jl. Agro No.1, Bulaksumur Yogyakarta 55281

E-mail :adisubrata@ugm.ac.id

ABSTRACT

Carnivore species plays the important role in the ecosystem as a top predator controlling prey population. In Java, most of the role is played by several small carnivore species due its high population size and abundance. Conservation actions are being initiated to protect their population from habitat degradation and hunting. The initiation is hampered by the lack of ecological data because very limited research has been conducted for this taxon. The goal of this study is to provide distribution map as guidance for effective field survey to collect more data. Achieving the goal, the study aimed to identify environmental factors contributing to the prediction of small carnivore species distribution and generating a prediction map of small carnivore distribution in Java. Three steps was involved in this study: collecting occurrence and spatial data, modelling species distribution and displaying model spatially. The occurrence data was collected by literature review, and spatial data at 1 km resolution was downloaded from online database. Data manipulation and display were conducted using ArcGIS, and modelling was conducted using MaxEnt. The review resulted in 19 scientific articles reporting occurrence of 12 small carnivore species in Java. From those articles, we identified 49 locations where those species were reported explicitly. We found 10 spatial data that were relevant to explain the species occurrence. Our model showed that only four of 12 species were qualified for the modelling. From 12 species, only three were successfully modelled with adequate validity (AUC>0.7): Common Palm Civet (*Paradoxurus hermaphroditus*), Small Asian Mongoose (*Herpestes javanicus*) and Banded Linsang (*Prionodon linsang*). This study also showed that environmental factors were species specific in predicting species occurrence.

Keywords: *Civet, Linsang, MaxEnt, Mongoos, occurrence*

B-11

**DIVERSITY OF INVASIVE PLANT SPECIES
IN BATANG PALUPUH NATURE RESERVE,
WEST SUMATRA AND THEIR IMPLICATION
FOR CONSERVATION *Rafflesia arnoldi* R.Br.**

Setria Usman, Syamsuardi, and Nurainas

Department of Biology, Faculty of Mathematics and Natural Sciences,
Andalas University, Padang, 25136, Indonesia.
E-mail: anes82@gmail.com

ABSTRACT

Invasion by alien plants species in the natural conservation forests can threaten biodiversity particularly the endangered plants. Corpse plant (*Rafflesia arnoldii* R. Br.) is an endangered plant species that lives in the natural habitat of Batang Palupuh Nature Reserve, West Sumatra. Assessment of invasive alien plant species in the natural habitat of Corpse plant is one of very important factor for conservation this endangered plant species. Here, we study the composition and dominance of invasive alien plant species in the natural habitat of Corpse plant. The direct observation study carried out in Batang Palupuh Nature Reserve, West Sumatra during May to August 2015. The purposive sampling method was applied for vegetation analysis of alien plant invasive species. The collection samples were identified and voucher specimens were kept at Herbarium Universitas Andalas (ANDA), Department of Biology, Faculty of Mathematics and Natural Sciences, Andalas University, Padang. The distribution of alien plant invasive species also was recorded by GPS. The results of the study indicated that twenty alien plant invasive species belong to ten families were clarified. The highest number of alien plant invasive species was detected at Compositae (9 species) followed by Rubiaceae, Verbenaceae (two species, respectively), and Lamiaceae, Leguminosae, Malvaceae, Melastomataceae, Piperaceae, and Poaceae (one species, respectively). From the vegetation analysis, *Coffearubusta* (Rubiaceae) has the highest the Species Important Value Index (ISVI=89,69%). The alien plant invasive species not only found at the periphery but also in the main of the conservation area. In

this paper we discussed the diversity of invasive alien plants species and their implication for conservation of *Rafflesia arnoldii* in natural habitat.

Keywords: *alien plant invasive species, conservation, diversity, Rafflesia arnoldii*

B-12

KEY TO TERMITE (ISOPTERA) ON THE SERTUNG ISLAND, THE KRAKATAUS, INDONESIA

Syaukani¹ and Samingan²

¹Biology Department, Faculty of Mathematics and Natural Science, Syiah Kuala University

Darussalam, Banda Aceh, 23111, Indonesia

²Biology Department, Teacher Training and Education Faculty, Syiah Kuala University

Darussalam, Banda Aceh, 23111, Indonesia

E-mail: syaukani@gmail.com

ABSTRACT

A key to the species of termite from Sertung island is presented for the first time based on morphological characters of the soldier and worker castes. The species so far known from the ecosystem are: *Cryptotermes sumatrensis*, *Prorhinotermes flavus*, *Schedorhinotermes tarrakanensis*, *S. medioobscurus*, *S. brevialetus*, *S. javanicus*, *Nasutitermes katangensis*, and *N. havilandi*. Only wood-feedings termites were collected from the island since catastrophic eruption in 1883.

Keywords: *Isoptera, Sertung islands, Krakataus, termite, taxonomy*

B-13

**ANIMAL DIVERSITY IN ORANGE CONVENTIONAL
FARMING SYSTEM AT SELOREJO VILLAGE,
MALANG REGENCY**

Zulfaidah Penata Gama, Galih E. F, Nasa, and Oki Polii
Biology Department, Faculty of Mathematics and Natural Sciences,
Brawijaya University, Malang, Indonesia
E-mail: zulfaidah@yahoo.com

ABSTRACT

This study aims to observe the diversity of animal that found in the orange conventional farming systems and to determine the difference of the number and abundance of animal before and after spraying of insecticide. Observations already conducted before the orange harvest season (April to September, 2015) at the Selorejo village, Malang Regency. Arthropod diversity were observed by visual and counter and pan trap methods. Observation of Arthropods was also carried out with pit fall traps methods. Bird watching was also carried out at the location of observation. Repetition is done for 3 times before harvest. Base on the results of pit fall traps and yellow traps indicated that there are three classes of arthropod (Insecta, Myriapoda, Diplura), 7 orders and 21 families were found prior to spraying. There are 3 classes, 7 orders and 20 families of arthropods after spraying. After spraying of insecticides showed that declines of abundance of each family. Myriapoda and Diplura can be found before spraying but after spraying did not find anymore. Before spraying the orange crop was obtained 5 orders, 11 families of Arthropods and in the refugia found 8 orders, 19 families of Arthropods while after spraying there was decline. Actually, the result of observation was only found 5 orders, 7 families Arthropods but on refugia increased to 9 orders, 20 families Arthropods. It can be assumed that before spraying so many arthropods exist in orange plants, but when oranges are sprayed with insecticides that some arthropods are moved and hidden to refugia to avoid odors and toxins from insecticides. Bird watching resulted that nine species of birds (Walet Sapi, tekukur Biasa, Cinenen Jawa, Cekakak Jawa, Cucak kutilang, Burung Gereja Eraisa, Ayam Hutan

Hijau, Wiwik Uncuing, Merbak Cerucuk), where the bird is just often fly near a pine forest, near the orange groves, it caused the birds to avoid odors and residues of the insecticide that used by farmer before harvest.

Keywords: *Arthropods, conventional system, diversity, orange*

B-14

**MACROZOOBENTOS DIVERSITY AS AN
BIOINDICATOR OF THE WATER QUALITY
IN THE SUNGAI BILAH DISTRICT
OF RANTAUPRAPAT**

Arman Harahap

University of Labuhanbatu, Rantauprapat, Indonesia

ABSTRACT

Sungai bilah is the largest river is of Rantauprapat, Labuhanbatu North Sumatra Province and is located right in the densely populated urban areas. There are so many community activities that take place such as the Baths, Water supply Company (PAM), san Mining, Agriculture, Transfortation and Fisheries. The purpose of this study was to determine the diversity makrozoobentos as an bioindicator of water quality in Rantauprapat blades, as well as determining the quality of the river flow by the blades Rantauprapat physical properties, chemistry and biology has. This study was conducted from January 2012 to March 2012, samples taken from five research stations. Decision point is determined by the method of purposive random sampling. Samples were taken by using a mesh surberner and then in the identification in the laboratory PSDAL Department of Biology, Faculty of Mathematics and Natural Sciences, University of North Sumatra, Medan. From the research results obtained makrozoobentos which consisting of 4 grade,s 7 orders, 11 families and 12 genera. The highest density value is a genus of Neanthes sp 18.519 individu/m² found at station 4 and genus of 18.519 individu/m² sp tubifex were found at station 1 while the genus with the lowest density of 1.235 sp Pleurocera individu/m² found at station 4 . The value of diversity index (H') highest makrozoobentos 1 found the station 1 at 2.052 and the lowest at station 5 at 0.965. Person correlation analysis of the results showed that the DO, BOD₅, Nitrate, Phosphate, COD, Substrate, Light Penetration, The solubility of oxygen, TSS, and TDS makrozoobentos diversity was positively correlated with pH and temperature while negatively correlated.

Keywords: *bioindicator, macrozoobenthos, sungai bilah*

Environmental Biology

EB-1

THE LIMNOLOGICAL STATUS OF PONDOK LAPAN LAKE, LANGKAT REGENCY, NORTH SUMATERA PROVINCE

Muhtadi, A, Yunasfi, Ma'rufi, M, Rizki, A, Rais, F.F, Azmi, N, and Ariska, D

Department of Aquatic Resources Management, Agriculture Faculty,
University of Sumatra Utara,
Jl. Prof. A. Sofyan No.3 Kampus USU, Medan, 20155, Indonesia
E-mail: ahmad.muhtadi@usu.ac.id

ABSTRACT

Water status can be determined by studying aspects Limnological these waters, including morphometric and physico-chemical parameters waters and biological aspects. This study aims to determine the status of the lodge limnological Pondok Lapan Lake (PLL) to see morphometry aspects, aspects of physics, chemistry, and biology waters. Morphometric measurements of the lake was conducted in January 2015. The measurement of water quality and biological sampling in February-April 2015. Results showed that the area of PLL is 63472.78 m² with a maximum depth of 4:15 m. PLL has Rt of 11-12 days and Q of 12963,456 m³ / day - 14111,712 m³ / day. Water quality status based methods Storet and pollution indices obtained PLL waters including waters are not polluted with the pollution load of 1.98 Pa kg / m³. PLL enumeration results in the plankton found 52 species of 10 classes. There are 6 classes of groups pitoplankton and 4 classes of zooplankton groups. Nekton found there are 7 types of two classes, namely Actinopterygii and Malacostrata. Benthos found only 3 species of gastropod class, namely Bithynia tentaculata, Pomacea canaliculata and Campeloma decisum. PLL trophic status of waters classified as waters oligotrofik - eutrophic.

Keywords: *Community Structure, lake, Morphometry, trophic statu, water quality*

EB-2

**MASS REARING OF *Phragmatocia castaneae* HUBNER
(LEPIDOPTERA: COSSIDAE) ON ARTIFICIAL DIETS**

**Erick S. Dongoran, Maryani Cyccu Tobing, and Suzanna Fitriyani
Sitepu**

Department of Agrotechnology, Agriculture Faculty, University of Sumatra
Utara, Indonesia

ABSTRACT

Phragmatocia castaneae is an important pest on sugarcane which borer the stem and also the host of some parasitoids and destroyed on sugarcane crop in North Sumatera. This research was to study the biology of *P. castaneae* on artificial diets. This research was carried out at Central Research and Development of Sugarcane Crop Sei. Semayang PTPN II Medan. The method of this research was Randomized Complete Design non factorial which consists sugarcane shoot powder variety PS 864 8,6g, mixture of sugarcane stem and shoot powder variety VMC 76-16 4,3:4,3g and mixture of sugarcane stem and shoot powder variety PS 864 4,3:4,3g with 10 replications. The results showed that the eggs period was 10-12 days, larval period was 110-125 days with 10 instars. 1st instar was 6-10 ($\pm 6,67$) days, 2nd instar was 8-14 ($\pm 9,83$) days, 3rd instar was 9-18 ($\pm 12,80$) days, 4th instar was 10-17 ($\pm 12,40$) days, 5th instar was 10-16 ($\pm 12,60$) days, 6th instar was 10-18 ($\pm 11,87$) days, 7th instar was 12-20 ($\pm 12,47$) days, 8th instar was 13-18 ($\pm 12,47$) days, 9th instar was 12-18 ($\pm 13,4$) days, 10th instar was not known. The highest mortality percentage was found on sugarcane shoot powder variety PS 864 8,6g (65%) and the lowest (35%) on mixture of sugarcane stem and shoot powder variety PS 864 4,3:4,3g and also be the best treatment, this showed by the long of larval stage was significantly faster, and the mortality was lower and the long of larval was longer than the other treatments from 1st instar until 10th instar.

Keywords: *artificial diets, mass rearing, P. castaneae, sugarcane powder, sugarcane variety*

EB-3

LOCAL WISDOM IN MANAGEMENT OF MANGROVE ECOSYSTEM UPON COASTAL COMMUNITIES ON THE EAST COAST OF NORTH SUMATRA

Farid Aulia¹, Badaruddin², R. Hamdani Harahap³, and Budi Utomo⁴

¹ Natural Resources and Environment Graduate School of the University of North Sumatra

² Department of Sociology, Faculty of Social and Political Sciences, University of North Sumatra

³ Department of Anthropology, Faculty of Social and Political Sciences, University of North Sumatra

⁴ Faculty of Forestry, University of North Sumatra
Jl. Prof. T. Maas, Kampus USU Medan 20155
E-mail: faridaulia79@gmail.com

ABSTRACT

Study of the management of mangrove ecosystems and the existence of local communities in the current changing environment (demographic, economic and political) become an interesting issue, among others, local communities have wisdom in managing the forest, high poverty around the woods, the demands of participatory, food security, climate change and etc. The purpose of this research is to identify the condition of the mangrove ecosystem in the area of the east coast of North Sumatra, to analyze the extent to which the activities of stakeholders involved in the management and utilization of mangrove coastal areas on the east coast of North Sumatra has met the principles of sustainable development and to analyze the forms of local wisdom still used which can be developed as an integrated mangrove ecosystem management strategies. This research uses the theory of cultural ecology Steward (1955) became a reference in describing the public response to environmental changes in mangrove ecosystem management in coastal communities on the east coast of North Sumatra. Cultural adaptation ecology operationally explained through the concept of population pressure, changes in economic, political dynamics, and the adaptation of society. Weeks to achieve

these objectives, the method used in this study used a qualitative approach with in-depth interview, observation and participation Focus Group Discussion

Keywords: *Cultural Ecology, Ecosystem Management, Integrated mangrove, Mangrove Ecosystem, Local Wisdom*

EB-4

**THE USE OF VARIOUS SUGARCANE STEM POWDERS
AS ARTIFICIAL DIETS FOR MASS-REARING *Chilo
sacchariphagus* Boj (LEPIDOPTERA: CRAMBIDAE)**

Herliza Lestari, Darma Bakti, and Maryani Cyccu Tobing

Department Agrotechnology, Faculty of Agriculture, University of Sumatra
Utara, Indonesia

ABSTRACT

Chilo sacchariphagus was an important pest of sugarcane which can made the damage until 97%, but *Chilo sacchariphagus* are the host of parasitoids. The objectives of the research were to study the best varieties of sugarcane stem powders as artificial diets for mass-rearing *Chilo sacchariphagus*. The research was held at Laboratory of Sugarcane Research and Development Sei Semayang, Binjai, Medan, North Sumatera. The research used a Non Factorial Randomized Complete Design with four treatments, the first treatment was a variety of VMC 76-16 with a 6.42 g stem powders, the second treatment was a variety of VMC 76-16 with a 8.52 g stem powders, the third was a variety of PS 862 with a 6.42 g stem powders, and the fourth treatment was a variety of PS 862 with a 8.52 g stem powders. The results showed that a variety of VMC 76-16 with a 8.52 g stem powders significantly affected the length of larvae in instars 1 (± 3.35 mm), 2 (± 7.25 mm), 3 (± 13.45 mm), 5 (± 23.22 mm), it also significantly affected the mortality of pupae by 20%. Variety of VMC 76-16 with a 6.42 g sugarcane stem powders significantly affected the larvae stadia in instars 1 (± 8.70 days), 2 (± 6.30 days), 3 (± 7.45 days), 4 (± 8.05 days), 5 (± 11.70 days), it also significantly affected the mortality of larvae in instars 1, 2, 3 (0.00%), 4 and 5 (5.00%), and it also significantly affected the length of pupae (± 12.90 mm) and the weight of pupae (± 66.60 mg).

Keywords : *artificial diet, Chilo sacchariphagus, stem powder, variety of sugarcane*

EB-5

**STUDY OF BIOLOGICAL ASPECT *Coccinella* sp.
(Coleoptera: Coccinellidae) AS POTENTIAL PREDATOR
ON APHID IN KARO HIGHLAND**

Lamria Sidauruk and Ernitha Panjaitan

Faculty of Agriculture, Methodist University, Indonesia

E-mail: lamriasidauruk@yahoo.com, ernitha2005@yahoo.co.id

ABSTRACT

The objectives of this research were to study and described the morphological and biological characteristic of *Coccinella* sp. as a potential natural enemy of potato pest on Karo Highland. Through knowledge of the biology and morphology of these insects, the conservation of natural enemies on potato ecosystem can be done, so that pest control can occur naturally without using of pesticides. The study was conducted at laboratory of Plant Pests and Diseases Faculty of Agriculture, Methodist University of Indonesia and the sample of insect collecting from Kuta Gadung, Berastagi, Kabupaten Karo. The results showed that egg stage was 3.2 ± 0.66 days. Larva stage consist of first, second, third and fourth instars were 2.65 ± 0.45 , 2.30 ± 0.40 , 3.29 ± 0.55 , 3.42 ± 0.54 days respectively. Prepupae and pupae stages were 2.21 ± 0.50 and 2.7 ± 0.66 . According to adult stage, there are different between female and male. Duration of female stage was 28.67 ± 3.68 days and weight 28.56 mg and male stage was 25.28 ± 2.50 days and weight 24.78 mg. Fecundity was 89.86 ± 15.65 eggs and fertility 81.5%. Predation potential for aphid at larva stage, female and male were 92.7 ± 14.78 ; 190.30 ± 15.44 ; 184.10 ± 23.39 a days respectively.

Keywords : *Biology, Coccinella* sp.

EB-6

**COMMUNITY DEVELOPMENT IN REDUCING
EMISSIONS FROM DEFORESTATION AND FOREST
DEGRADATION (REDD) AND REDD + PROGRAMME
IN ACEH PROVINCE (A PRELIMINARY STUDY)**

Monalisa

Agribusiness Department of Agriculture Faculty of Syiah Kuala University,
Jl. Tgk. Nyak Arif Kopelma Darussalam, Banda Aceh, 23111, Indonesia
E-mail : nonies2 _ lisa@ yahoo.com

ABSTRACT

Reducing Emissions from deforestation and forest degradation (REDD) is one form of international policy in order to reduce carbon emissions in the world by way of compensation for developing countries in protecting their forest. In the case of Aceh province area, there are still some obstacles encountered for the implementation of REDD and REDD +. The concept of REDD is not fully understood yet by the local peoples. The community empowerment aspect is still very weak. There are some issues of such as land ownership, less contribution of indigenous peoples, concept of monitoring and also about the unclearness of amount of compensation. Therefore, it takes numerous attempts , one of them by strengthening the capacity of communities to promote the smooth and sustainability of REDD and REDD+ programs in the province area.

Keywords: *Community Development, Community Capacity, REDD ,
REDD +.*

EB-7

**CHANGES IN ENVIRONMENT FACTORS AFFECTING
THE SPAWNING PERIOD OF THE INTERTIDAL
POPULATION OF BLOOD COCKLE *Anadara granosa*
IN THE LHOKSEUMAWE TIDAL MUDFLAT**

Munawar Khalil

Aquaculture Department, Malikussaleh University, Aceh, Indonesia.

E-mail: khalil.id@live.com

ABSTRACT

The aim of this study was to evaluate the changes in the gonadal development of intertidal population of cockle *Anadara granosa* at Lhokseumawe, East coast of Sumatera, Indonesia in relation to the daily fluctuation of water qualities. To determine spawning period of population, condition index (CI) analysis was conducted. Samples were collected from July 2009 until September 2011 and water qualities parameters were measured periodically. The highest condition index of the cockle population from Lhokseumawe was observed in September 2009 (CI: 14.15 ± 3.14) while the lowest CI was found in January 2010 (CI: 6.76 ± 1.13). Spawning period for *A. granosa* was continuously throughout the year, with spawning peaks occurring in October 2009 until January 2010 and May 2010 to August 2010. Daily water temperature and salinity at the study site ranged from 17-33⁰ C and 27-33 ppt. The spawning period of the intertidal population species *A. granosa* coincided with the drastic daily fluctuation in temperature and salinity. Analyses demonstrated that temperature and salinities are the main modulators of reproductive events. When temperature fluctuated, sporadic spawning was detected in this species, possibly inducing a survival strategy whereby the spawning period is extended to increase reproductive success. The results had indicated that the spawning period and recruitment in cockle population of Lhokseumawe depended on the environment conditions of the areas.

Keywords: *East Coast of Sumatera, condition index, habitual spawning period, intertidal species, modulators, Water quality parameters*

EB-8

**THE ROLE OF TREES ON THE GREEN BELT
IN MEDAN CITY AS AN EFFORT TO CLIMATE
CHANGE MITIGATION**

Pindi Patana, Siti Latifah, and Rahmawaty

Forestry Study Program, Faculty of Agriculture, University of Sumatra Utara,
Jl. Tri Dharma Ujung No. 1 Kampus USU, Medan, 20155, Indonesia

E-mail: pindipatana@gmail.com; sitalatifah164@yahoo.co.id;

rahmawaty1974@gmail.com

ABSTRACT

Climate change is one of the important issues in North Sumatra, especially in Medan city. In order to mitigate climate change, the study aimed to analyze the number of trees and to determine the role of trees in term of mitigates the climate change in Medan city. This study was conducted in 32 sub-districts in Medan City. Based on data obtained from various samples of the green belt on the secondary arterial roads in Medan city, showed that Angsana (*Pterocarpus indicus*) had the highest total number of individuals that were planted (3,097 trees or 51.29 %), followed by Palembang Raja (*Oreodoxa regia*) (1,244 trees or 20.60 %) and Mahoni (*Switenia macrophylla*) (1,100 trees or 18.21 %) of the total of trees on the green belt. Angsana trees have a good absorber of pollution, also serves as a shade and wind breaker and Palembang Raja which has a steering function of view on the street, especially with the kind of trees that grow straight up without having branches, making it safe for vehicle and the type that is not easily uprooted. Mahoni is one of tree that has a high CO₂ absorption. In order to mitigate climate change in Medan City, it is important to preserve the trees and take care of the trees that are on the green belt.

Keywords: *climate change, green belt, Medan City, mitigation*

EB-9

**CHARACTERISTICS COMPOSTS BIOCHAR WITH
AND WITHOUT ADDITION CHICKEN MANURE**

Martos Havena¹ and Syarifa Mayly²

¹Department of Agroecotechnology, Faculty of Agriculture, Pembangunan
Panca Budi University, Medan, Indonesia

²Department of Agroecotechnology, Faculty of Agriculture, Al Washliyah
Medan University, Medan, Indonesia
E-mail: syarifamayly@yahoo.com

ABSTRACT

Biochars are low in nutrients, depending on feedstock and pyrolysis temperature. This limited supply of nutrients implies additional fertilization if biochar is applied for agricultural purposes. The addition of biochar combined with organic fertilizers such as compost to soil improves C sequestration, soil fertility and plant growth. The objective of this research was to evaluate characteristics compost biochar with and without addition chicken manure. The Experimental design used randomized block design with 2 factors and three replications. The first factor were rice hull biochar, sawdust biochar, oil palm empty fruit bunch biochar, rice straw biochar. The second factor were no addition chicken manure, addition chicken manure. Compost input material consisted of 25% biochar and 75 % manure. Then compost raw material was added nutrient solution then mixed every two day and composted together for four weeks. Type biochar, chicken manure addition and its interaction had significant effect on compost temperature, compost pH, compost moisture content. The treatment combination from chicken manure addition with each biochar type increased compost temperature and compost pH, but decreased compost moisture contents for all recorded days compared with the combination biochar type with no chicken manure addition.

Keywords: *Biochar, compost, manure, moisture content, pH, temperature*

EB-10

**EFFECT OF DIFFERENT BIOCHAR TYPE AND DOSE
ON SOYBEAN SEED GERMINATION IN SOIL-LESS
PETRIDISH BIOASSAY**

Zamriyetti¹, Serikamila Parinduri², Syarifa Mayly²

¹Department of Agroecotechnology, Faculty of Agriculture, Pembangunan
Panca Budi University, Medan, Indonesia

²Department of Agroecotechnology, Faculty of Agriculture, Al Washliyah
Medan University, Medan, Indonesia
E-mail: syarifamayly@yahoo.com

ABSTRACT

The objective of this research was to determine the effect of biochar type and dose on soybean seed germination in soil less petridish bio assay. The study used randomized block design with 2 factors and three replications. First factor were biochar type application: B₁(Rice hull biochar/RHB); B₂(Maize Stover Biochar/MSB); B₃ (Rice straw biochar/RSB); B₄ (Bagasse Biochar/BB); B₅ (Tapioca residue Biochar/TRB); B₆ (Coconut peat biochar/CPB). Second Factor were biochar rate application : 0,5 g/petridish (M₁); 1,0 g/petridish (M₂); 1,5 g/petridish (M₃); 2,0 g/petridish (M₄). The results of this research showed biochar type and doses of application significantly affected soybean germination and root length total in the soil-less petri dish bioassay. Rice hull biochar at 10 t/ha showed the highest soybean germination percentage and tapioca residue at 20 t/ha showed the highest root length total in soil-less petridish bioassay. Ricehull biochar, tapioca residue biochar and baggasse biochar were suitable for seed germination but not for maize strover biochar, rice straw biochar and coconut peat biochar.

Key words: *Biochar, seed germination, soybean, rice hull biochar*

EB-11

**IN SEARCHING OF TREES NATURAL VIBRATION
FREQUENCY BASED ON GRANULAR PARTICLES
INTERACTIONS**

**Sparisoma Viridi, Siti Nurul Khotimah, Mikrajuddin Abdullah,
and Pindi Patana**

Nuclear Physics and Biophysics Research Division, Institute Technology of
Bandung
Jalan Ganesha 10, Bandung 40132, Indonesia

ABSTRACT

Inspiring by Leonardo's formula regarding cross section of trees from trunk to branches, Eloy (2011) found that Leonardo's exponent is between 1.8 and 2.3, instead of exact 2. In this work another aspect is investigated, tree branches natural frequency. It is already usual that in a nearly no-windy condition, some branches vibrated alternatively due to wind movement passing their leaves. This could explain why in a very windy situation a tree may survive, while a power line construction not. It could be addressed to their natural vibration frequency. We develop a tree based on granular particle interaction according to Eloy's parameter ranges and then vibrate some parts to investigate which other part will be vibrated. Few branches trees and many ones gives different responses. From the results a prevention may be designed to conserve our forestry resources.

Keywords: *Cross section, granular model, natural frequency, tree*

EB-12

**IMPACTS OF OIL PALM PLANTATION
ON RAMBUTAN INSECT POLLINATORS
DIVERSITY AND ABUNDANCE**

**Syarifuddin, Cicik Suryani, Khairiza Lubis, and Eliida Hafni
Siregar**

Department of Biology, Universitas Negeri Medan, Indonesia

ABSTRACT

The massive conversion of rain forest to oil palm plantation in Sumatra is a main threat to biodiversity including insect pollinators. However, its effect on the ecology of insect pollinators is still poorly studied. In this study we investigated the impact of oil palm plantation on the biodiversity, abundance and the presence of the main rambutan, *Nephelium lappaceum* L., insect pollinators. Visitors of flowers were compared between rambutan adjacent to forest and the one close to oil palm plantation. The visiting insects on each panicle were counted for ten minutes with one hour interval. The results showed that number of insect species, abundance, and all social bees, *Trigona* and *Apis* were significantly higher on rambutan flowers located near forest compared to rambutan trees grown close to oil palm plantation. In addition, the social bee pollinators were observed only on rambutan located in proximity to forest. In contrast, rambutan near the monoculture oil palm plantation mainly pollinated by *Chrysomia* fly. In general the insect pollinators including *Chrysomia* were more active in the morning and peaked around eleven, However, *Chrysomia* visited the rambutan flowers near the forests showed similar abundance in all periods from morning to afternoon. This suggest, that oil palm plantation not only has caused the loss of most important pollinators but also change the behavior available insect pollinators, thus has further reduced the chance of flowers to be pollinated.

Keywords : *Oil palm, Nephelium lappaceum*

EB-13

MANAGEMENT OF *Ganoderma philippii* in *Acacia mangium* PLANTATION FORESTS

**Abdul Gafur, Aswardi Nasution, Syaffiary, Ching Yong Wong,
Mukesh Sharma**

AAA Group Research and Development
Pangkalan Kerinci, 28300, Indonesia

E-mail: abdul_gafur@aprilasia.com; gafur@uwalumni.com

ABSTRACT

The wide scale establishment of plantation forests including the fast growing species *Acacia mangium* Willd. in South East Asian countries is aimed at anticipating the ever-increasing global demand for wood. It is expected through the program that sustainability of forest products is maintained and the natural forests remain undisturbed. One key factor in the management of plantation forests is tree health. Disease infection has often occurred following their establishment. Currently red root rot caused by *Ganoderma philippii* (Bres. et Henn. ex Sacc.) Bres. is considered as an economically important disease of *A. mangium*. Research on field management has indicated that incorporation of tolerant genotypes, application of biological control agents, inoculum reduction, and silviculture practices have to be integrated to manage the disease in the field. This presentation discusses in detail integrated management of red root rot disease in *A. mangium* plantations with the emphasis on screening for tolerant materials and development of biological control agents.

Keywords: *acacia, biological control, disease management, plantation forest, red root rot, resistance*

EB-14

**USE OF VARIOUS DOSES MANURE ON GROWTH
BREADFRUIT (ARTOCARPUS COMMUNIS. FORST)
IN THE CATCHMENT AREA OF LAKE TOBA**

**Afifuddin Dalimunthe, Budi Utomo, and Chaerul Parsaulian
Ginting**

Faculty of Forestry, University of Sumatra Utara, Medan, 20155, Indonesia
E-mail: Utomobud@yahoo.co.id

ABSTRACT

This research aims to know the best dose of fertilizer (chicken manure) in the growth of breadfruit as land rehabilitation efforts) in the catchment area of Lake Toba Haranggaol Horison countryside. The method used in this study was a randomized block design (RBD) non factorial with 11 treatments and 4 replications. The parameters used in this study are as height, diameter, leaf area. The results showed the addition of manure can provide good growth response to breadfruit plant. In various parameters showed dose of chicken manure 700 and 800 gr give a better effect than the other doses. Analysis of variance ANOVA showed dose of chicken manure does not provide significant effect on the growth of breadfruit plant.

Keywords: *critical land, breadfruit, dose of chicken manure, Lake Toba Catchment Area*

Microbiology

MG-1

**LOCAL INDONESIA PROBIOTIC ISOLATES
FOR AQUACULTURE; POTENTION,
PROBLEMS AND HOPE**

(A Review)

It Jamilah, Nunuk Priyani, Erman Munir dan Dwi Suryanto

Department Biology, Faculty of Mathematics and Natural Sciences,
University of Sumatera Utara

Jl. Bioteknologi No. 1 Kampus USU Padang Bulan, Medan, 20155, Indonesia.

Email: it_jamilah@yahoo.com

ABSTRACT

In line with the development of probiotic bacteria for the study of animal aquaculture since last 3 decades, Indonesia has done much research on the potential of local isolates that are ready to be applied. As one of the countries with the title of "megabiodiversity country" including microbes, the superior isolat already widely found both as "probiotic candidate" or confirmed probiotics, but it is not easy to directly bring the results of basic research to applied research applications. The issue is the lack of cooperation between basic science researchers with apllied science researchers and industrial societies. As a result of overlap of research by a variety of fields who have defected from the "golden zone" zone to the "gray". In keeping with the theme of the seminar "The Role of Biological Research in the Development of Science, Technology and Sustainability of Natural Resource Management", the author discusses the development of probiotic research in aquaculture, potential, problems and expectations, thus ithe superior isolates has been obtained correctly-right can be maintained, empowered and harvested. Research results that have been obtained by the authors presented briefly and then coupled with the results of research experts from the regions of Indonesia to share. The types of isolates that have been obtained by the authors include *Bacillus cereus*, potential as probiotic candidate in shrimp aquaculture, focus on water cleaning. The isolate was origin from Karawang, West Java. In Medan, North Sumatera we found *Bacillus* sp. TBUH was also as water cleaning and recently we have found *Lactobacillus*

plantarum, *L. acidophilus*, *L. Agilis*, Lactic acid bacteria isolated from fresh water fish pond as biocontrol agents. Some isolates which have not been identified, were also found as biocontrol agent candidates.

Keywords : *aquaculture, bacteria, Indonesia, probiotic*

MG-2

**ANTIBACTERIAL ACTIVITY OF ETHYL ACETATE
AND ETHANOL EXTRACTS OF BAWANG BATAK
(*Allium chinense* G. Don.) BULBS FROM
NORTH SUMATERA, INDONESIA**

Adrian Hartanto¹, Frans Grovy Naihaho², It Jamilah¹, and Nunuk Priyani¹

¹)Department of Biology, Faculty of Mathematics and Natural Science,
University of Sumatra Utara, Medan, Indonesia

²)Department of Biochemistry, Faculty of Mathematics and Natural Science,
Bogor Agriculture Institute, Bogor, Indonesia

ABSTRACT

Extracts of bawang batak bulbs were examined for its antibacterial potency against selected clinical isolates: *Staphylococcus aureus*, *Staphylococcus epidermidis*, *Acinetobacter baumannii*, and *Klebsiella pneumoniae*. The plant used in this research was from Berastagi city, Karo district, North Sumatera and identified as *Allium chinense* G. Don., origins of Chinese region. Maceration technique was chosen as extraction protocol using two solvents: ethyl acetate and ethanol subsequently. Antimicrobial activity was tested using disc diffusion method by series concentration of 50, 100, 250, and 500 mg/mL. Dimethylsulfoxide was used as negative control while chloramphenicol disk was used as positive control. Phytochemical screening showed that both extracts contained sulphure and saponin compound. The highest antibacterial activity was shown by ethanol and ethyl acetate extract at concentration of 500 mg/mL against *S. aureus* and *K. pneumoniae* with 13.84 and 12.09 mm diameter zone of inhibition respectively. Identification of ethanolic extract using Gas Chromatography-Mass Spectra (GC-MS) analysis found 25 compounds and most of them known as antimicrobial compound. The highest percentage of compound detected from GC-MS analysis was furan compounds, which was 2-Furancarboxaldehyde, 5-(hydroxymethyl), contributing 18.23% of total compounds identified. This study revealed that *Allium chinense* G. Don contained biologically active compounds as antimicrobial agent particularly as anti *S. aureus* and *K. pneumoniae*.

Keywords: *Allium chinense*, antibacterial activity, bawang batak, North Sumatera

MG-3

**ANTIBACTERIAL AND ANTIFUNGAL ACTIVITIES OF
TAWANGMANGU SWEET ORANGE (*Citrus sinensis* L.)
PEEL ESSENTIAL OIL AT DIFFERENT ALTITUDE**

Ari Susilowati¹, Eva Sri Handayani¹, and Es tu Renaningtyas²

¹Department of Biology, Faculty of Mathematics and Natural Sciences,
Sebelas Maret University.

²Department of Pharmacy, Faculty of Mathematics and Natural Sciences,
Sebelas Maret University.

Jl. Ir. Sutami No. 36A, Surakarta, 57126, Indonesia

Email: suzy_soegito@yahoo.com

ABSTRACT

Staphylococcus aureus and *Candida albicans* are human pathogenic microbes caused skin infections. Essential oils are biologically active as an antibacterial and antifungal. Environmental factors, e.g., temperature, lighting and altitude influence on the synthesis of essential oil. The purposes of this study were to determine the highest yield of essential oils of Tawangmangu sweet orange peel in different altitude and to know the activity of essential oils of Tawangmangu sweet orange peel against bacteria *S. aureus* and fungi *C. albicans*. This study used essential oil of Tawangmangu sweet orange peel taken from four different altitudes of 1.000 ± 50 ; 1.200 ± 50 ; 1.400 ± 50 and 1.600 ± 50 m above sea level (asl). A total of 150 grams of the peel is distilled using the Stahl method with 500 ml of distilled water for 6 hours at the temperature of 95°C. The yields of essential oil were calculated as the volume of essential oil (ml) divided by the weight of sweet orange peel (gram) multiplied by one hundred percent. Antibacterial and antifungal were tested using Kirby-Bauer method against *S. aureus* and *C. Albicans*. The diameter zones of inhibition were determined. The results showed that Tawangmangu sweet orange peel at the altitude of 1,000; 1,200; 1,400 and 1,600 m asl produced a different yield of essential oil. Tawangmangu sweet orange peel at the altitude of 1.600 m asl produced essential oil with the highest yield was 0.55%. Essential oil of Tawangmangu sweet orange peel at every altitude had different antimicrobial activity against bacteria *S. aureus*

and fungi *C. albicans*. Essential oil from the altitude of 1.600 m asl in 100% concentration had the greatest antimicrobial activity with diameter zone of inhibition 23 mm against *S. aureus* and diameter zone of inhibition 19 mm against *C. albicans*.

Keywords: *antibacterial, antifungal, different altitude, essential oil, peel, Tawangmangu sweet orange (Citrus sinensis L.).*

MG-4

**THE EFFECT OF DOSAGE OF ARBUSCULAR
MYCORRHYZA FUNGI AND WATERING INTERVALS
ON OIL PALM IN ULTISOL**

**Ashabul Anhar¹, Syahrizal¹, Fikrinda¹, T. Arabia¹, and N.F.
Mardatin²**

¹⁾ Fakultas Pertanian, Universitas Syiah Kuala, Banda Aceh, Indonesia

²⁾ Institut Pertanian Bogor, Bogor, Indonesia

E-mail: ashabul.anhar@unsyiah.ac.id

ABSTRACT

Individually, arbuscularmycorrhizal fungi (AMF) and drought stress can alter plant performance. AMF can improve water relations and colonization by these root symbionts, and may increase the host's tolerance of drought. However, the performance of AMF is affected by the number of AMF in rhizosphere. This research aimed to characterize the role of AMF on oil palm seedling growth under different levels of drought stress in Ultisol in Aceh. This randomized complete block design study examined different dosages of AMF (0, 5, 10 or 15 g/polybag) and watering intervals (watered every 1, 3, or 5 day) on oil palm seedling grown in polybag filling with Ultisol in main nursery. Dosage of AMF significantly affected height, root length, leaf wet- and dry-weight of oil palm 90 days after transplanting (DAT). Watering intervals significantly affected height, stem diameter, root length, leaf wet- and dry-weight of oil palm 90 DAT. There are interactions between dosage of AMF and watering intervals on root length and leaf wet- and dry-weight of oil palm 90 DAT. Application of 5 g/polybag improved oil palm growth even under 5 days watering interval. Overall results suggest that AMF colonization affects positively on growth of oil palm and thereby alleviates the stress imposed by water with holding.

Keywords: *drought stress, mycorrhiza, oil palm.*

MG-5

**MODIFICATION PRODUCT OF MICROBIOLOGICAL
PROCESS TO INDUSTRIAL APPLICATION
OF ITACONIC ACID TO POLYESTER**

**Atmanto Heru Wibowo, Ninis Makhnunah, Ryan Crysandi,
Silami, and Henning Storz**

Chemistry Department, Sebelas Maret University, Jl. Ir Sutami 36A,
Surakarta, 57126, Indonesia

E-mail: aheruwibowo@staff.uns.ac.id

ABSTRACT

Itaconic acid is nowadays developed via microbiological process instead of petroleum-based process. This process is promising due to the fossil-sources descending in the future and affording the selective process from carbohydrate sources as regenerative raw material. For the application, itaconic acid is able to be condensed with diols with the present of titanium (IV) butoxide catalyst and in the vacuum atmosphere. The product properties of polyester yielded from the synthesis depending on the diol used for the synthesis. Long aliphatic linear-chain diols reacted with itaconic acid show different physical properties of polyester, if reacted with short chain or branch chain of diols. The polycondensation product from itaconic acid is able to be applied in some applications such as coating materials and resin products

Keywords: *coating, itaconic acid, microbiological process, polycondensation, resin*

MG-6

**POTENTIAL OF KHAOMAK AS A SOURCE
OF PROBIOTIC BACTERIA**

**Charoen Charoenchai, Sathirat Rattanawongpal, and
Pali da Tanganurat**

Department of Food Science and Technology, Faculty of Agricultural
Technology, Rajamangala University of Technology Thanyaburi, Paholyothin
87, Thanyaburi, Pathumthani, 12130, Thailand
E-mail: c_charoen@yahoo.com

ABSTRACT

Khaomak is a Thai fermented food made from cooked sticky rice mixed with traditional mold starter called lukpang. This starter contains *Rhizopus* or *Amylomyces* molds that convert starch into sugar. Although the molds are mainly responsible for khaomak production, lactic acid bacteria are also found during fermentation and in the final product. However, the potential of khaomak as a source of probiotic bacteria has not been investigated. In this study, lactic acid bacteria were isolated from two brands of commercially available khaomak obtained from local supermarkets. Nine isolates of lactic acid bacteria were obtained and assayed for catalase production. Isolates P1 – P4 were cocci and catalase negative while isolate R1 was rod shaped and catalase positive, R2 was coccus and catalase positive and R3 – R5 were cocci and catalase negative. All isolates grew in media at pH 3.0 but not at 2.5 except isolate R2. All isolates survived after 60 min of incubation in gastro-intestinal model media at pH 3.0 – 7.0 but not at pH 2.0. After incubation for 120 min all isolates survived at pH 4.0 – 7.0 but not at pH 2.0 and 3.0. All isolates tolerated ethanol concentrations up to 4 % for 2 days except isolate R1 which tolerate 6 % ethanol for 4 days. These results suggested that lactic acid bacteria found in khaomak could survive in the digestive system and contribute to probiotic activities.

Keywords: *bacteria, khaomak, probiotic, rice*

MG-7

**ANTIBACTERIAL ACTIVITY OF BAY LEAVES
EXTRACT (*Syzygium polyanthum* Wight)
AGAINST NOSOCOMIAL PATHOGEN
BACTERIAL (POSTER)**

**Cut Yulvizar, Yulia Sari Ismail, and Aryana Debbie Three Shinta
Azwin**

Departement of Biology, Syiah Kuala University, Aceh, Indonesia

ABSTRACT

Medicinal plants are tremendous natural richness in Indonesia with at least 2039 species from Indonesian forest. Bay leaves (*S. polyanthum* Wight.) is one of traditional medicine and an Indonesian native plant which are found in the forest. Indonesia people have been used of Bay leaves to treat of antidiarrhea, cholesterol, hypertension, gastritis, and diabetes mellitus. Bay leaves have active compound such as saponins, tannins, flavonoids, β -sitosterol and niacin those can be used as antibacterial. *Klebsiella pneumonia* is one of pathogenic bacteria that caused nosocomial infection in hospital environment. This research aims to study antimicrobial activity of extract Bay leaves against *K. pneumonia* clinic isolate. This research used Complete Random Design (CRD), consisting 6 treatments and 4 replications. Treatments used are 6 variations concentration of Salam leaves extract 35%, 50%, 65%, and 80% and 2 controls (positive control using ciprofloxacin and negative control using methanol). The result showed that methanol extract of Bay leaves affect *K. pneumonia* growth with inhibition zone forming diameter 11,5 mm at 35% concentration; 12,5 mm at 50%; 8 mm at 65%; and 10,7 mm at 80%, meanwhile positive control shows diameter bigger than 25 mm.

Keywords: *antibacterial, clinically isolate, Klebsiella pneumonia, Syzygium polyanthum* Wight

MG-8

**POTENTIAL OF FUNGI ISOLATED AROUND
THE UNIVERSITY OF SUMATERA UTARA
IN DECOLORIZATION OF DYE**

**Erman Munir, Dewi Olivia, Zulfatun Naimah, Khairissa T.
Asmara, Ella Ramadayani Nasution, Nunuk Priyani**

Departement of Biology, Faculty of Mathematics and Natural Science,
University of Sumatra Utara
Jl. Bioteknologi No. 1, Medan, 20155, Indonesia

ABSTRACT

Environmental contamination has been a serious concern for the last century. Hundred of thousands of dangerous and toxic pollutants including chemical dye has been reported to exist in soil, water and air environments. An effort to minimize the risk of compounds to the environment has been intensively done all over the world through physical, chemical and biological approaches. This preliminary study reported the ability of fungi isolated from soil in University of Sumatera Utara in decolorizing of dye. Four selected isolates were tested to decolorize methylene blue, crystal violet, malachite green, and safranine both in plate and broth cultures, and each fungus showed different ability of decolorization. The highest clear zone formed in plate culture was found for malachite green which was consistent with the highest reduction of absorbance value in broth culture. Isolate Sp.1 was best for malachite green, Sp.2 for safranine, Sp.3 for crystal violet, and Sp.4 for methylene blue on the bases of the reduction of absorbance value of each dye after nine days cultivation. The result suggests that soil fungi are potential alternative agents to reduce accumulation of toxic dye in the environment.

Keywords: decolorization, metilen blue, soil fungi, toxic compound

MG-9

**ARBUSSCULAR MYCORRHYZA FUNGI
ASSOCIATION IN RHIZOSPHERE OF
SMALLHOLDER FARMER OIL PALM PLANTATION
IN ACEH TAMIANG**

**Fikrinda¹, Ashabul Anhar¹, T. Arabia¹, N.F. Mardatin², Z.
Ritaqwin¹, and Syakur¹**

¹Fakultas Pertanian Universitas Syiah Kuala, Banda Aceh, Indonesia

²Institut Pertanian Bogor, Bogor, Indonesia

E-mail: fikrinda@unsyiah.ac.id

ABSTRACT

Arbusscular mycorrhizal fungi (AMF) associate with many plants and its occurrence was affected by the plant's age. A survey was conducted to determine the AMF spore population in rhizosphere soils and its root colonization of oil palm belonging to four age class (5 months, 5 years, 10 years, and 20 years) at local plantation in Aceh Tamiang. The methods used were direct isolation and trapping culture with maize as host. The result showed that AMF spore population isolated from trapping culture was higher than direct isolation, while the 5 year oil palm rhizosphere of trapping cultures supported the highest population. There were one AMF spore type (*Glomus*) found in direct isolation and two types (*Glomus* and *Acaulospora*) from trapping culture. *Glomus* was the most number of AMF spore found in rhizosphere of smallholder oil palm plantation in Aceh Tamiang. The AMF colonization in oil palm roots was 22% whereas in maize ones was 78%.

Keywords: *isolation, mycorrhiza, oil palm, trapping*

MG-10

POTENCY OF BULB EXTRACT OF *Allium chinense* G. DON AGAINST *Escherichia coli* AND EXTEND SELF LIFE OF TILAPIA FISH (*Oreochromis niloticus* L.)

Grace E. M. Lumbantoruan, Nunuk Priyani, and It Jamilah

Department of Biology, Faculty of Mathematics and Natural Sciences,

University of Sumatra Utara,

Jl. Bioteknologi no.1, Medan, 20155, Indonesia

ABSTRACT

Bawang Lokio (*Allium chinense* G. Don) grows extensively in North Sumatera, Indonesia, so called as “Bawang Batak” by the Batak tribe. Exploration of the natural compound potency of this plant in fresh food preservation is rarely reported. The aim of this research were to determine the most effective concentration of bawang lokio bulb extract with ethanol againsts *Escherichia coli* isolated from Tilapia fish and to extend the self life of fresh Tilapia fish during storage. Antimicrobial activity was examined by disc diffusion method in concentration of 0, 7.5, 10, 20, 30, 40 and 50% (w/v). The gutted of Tilapia fish were soaked in concentration of 100% bawang Lokio bulb extract for preservation. Tilapia fish were stored for 36 hours at room (27 °C) and cold (4 °C) temperatures by 6 hours interval of observation. The observation parameters were sensory analysis, Total Bacterial Count (TBC) and Total Volatile Base Nitrogen (TVBN). The Minimum Inhibition Concentration (MIC) of ethanol extract of bawang Lokio bulb was 10% against *Escherichia coli* that produced inhibition zone 8 mm. The sensory analysis of Tilapia fish was still accepted until 30 hours of storage while TBC and TVBN 18 hours based on Standard Nasional Indonesia (SNI), if it was compared by control (without added of extract) which could stay for 6 hours. The activities of antimicrobial compound and temperature of storage influenced fish quality. It could be concluded that ethanol extract of bawang lokio bulb was effective against *Escherichia coli* in minimum concentration of 10% and crude ethanol extract of Bawang Lokio bulb extended self life of Tilapia fish stored at room temperature.

Keywords: *Bawang Lokio, North Sumatera, self life, Tilapia fish*

MG-11

**DIVERSITY OF LACTIC ACID BACTERIA AND
NUTRITION CONTENT OF “YOGUKU” DURING
STORAGE**

Tri Ardyati and Mafruhatus Ni'mah

Biology Department, Faculty of Mathematics and Natural Sciences, Brawijaya
University, Malang, Indonesia

ABSTRACT

Yoguku is a kind yoghurt produced by one of the famous factory PT. Kusumasatria Agrobio Taniperkasa in Malang. Processing of this product need activity of lactic acid bacteria as starters. The number and the activity of lactic acid bacteria depend on nutrition content of raw materials and the condition during storage. The objectives of this research were to observe the diversity and the number of lactic acid bacteria and also nutrition content of the product during storage. After processing, Yoguku yoghurt were store at refrigerator at temperature range 4°C to 10°C for two months. Every two weeks, four bottles of sample were analyzed the nutritional content (protein, fat, and lactic acid) and lactic acid bacteria number. Isolation of lactic acid bacteria was done using MRS agar and diversity was measured using diversity index and dominance index of Simpson. Identification of lactic acid bacteria was performed using API test kit 50CHL continued by 16S rDNA. Six isolates were obtained from Yoguku yoghurt and the number of cells were not significantly different during storage. The highest diversity index 0.7 was observed at 0 week of storage, then after 8 weeks storage the diversity index decreased to 0.41. Identification of three isolates BYY1, BYY5 and BYY6 using API test kit 50CHL resulted *Lactobacillus paracasei* ssp *paracasei* with similarity of 99%. However, other isolate BYY2 was identified as *Lactobacillus brevis* with similarity of 65.4%. Identification using 16S rDNA, resulted that isolate BYY2 identified as *Lactobacillus plantarum* ssp *plantarum* ZZU 283 and isolate BYY5 as *Lactobacillus casei* MGB65-2 with 100% of similarity. The nutrition content of Yoguku yoghurt for lactic acid and fat content after 6 to 8 weeks

storage still appropriate according national standart of Indonesia. However, the protein content during storage did not appropriate with the satndart.

Keywords: *diversity, identification, lactic acid bacteria, nutrition content*

MG-12

**ANALYSIS OF MICROORGANISMS POPULATION
DURING FERMENTATION AND QUALITY
OF SMALLHOLDER COCOA BEAN**

**Yusya Abubakar, Murna Muzaiifa, Eti Indarti, Heru Prono Widayat,
and Faitzal Haris**

Department of Agricultural Product Technology, Faculty of Agriculture,
Syiah Kuala University, Aceh, Indonesia
E-mail: yusya@yahoo.com

ABSTRACT

Fermentation process is one of the most crucial steps in the formation of flavor and aroma of the cocoa beans. The fermentation process involves a number of specific microorganisms that play a role during fermentation. The aim of this research was to analyze microorganism population during fermentation of cocoa bean. Fermentation was conducted for 6 days with two different aerations (agitation every 24 and 48 hours). The result showed that growth profile of microorganism during fermentation had similarities though had differences. Yeast dominated on the early fermentation, lactic acid bacteria reached the highest population on third day and acetic acid bacteria on the fourth day. A better quality of fermented cocoa bean (with 70,19 % degree of fermentation) was resulted from 24 hours of agitation interval. Therefore, the microorganism from this treatment is recommended to be isolated and then, propagated to be introduced as starter to improve cocoa quality.

Keywords : *aceh cocoa, fermentation, microorganism, quality*

MG-13

THE EFFECTS OF ETHANOL EXTRACTS OF BAWANG BATAK (*Allium chinense* G. Don.) BULBS AGAINST ACNE CAUSING BACTERIA

Maretta Fitriani, Imelda Rosulina Sitorus, Risda Panjaitan, Zetty Nurmaya Gultom, Samuel Alfredo, and It Jamilah

Department of Biology, Faculty of Mathematics and Natural Science,
University of Sumatera Utara, Medan Indonesia

ABSTRACT

Bawang batak (*Allium chinense* G. Don) is a commercially important plant species in the North Sumatera, use as food seasoning. Ethanol extracts of bawang batak bulbs were examined for its antibacterial potency against acne causing bacteria including *Staphylococcus aureus*, *Staphylococcus epidermidis*, and allegedly *Propionibacterium acne*. The purpose of this study was to test ability of bawang batak bulb against acne bacteria in vitro and in vivo. Maceration technique was chosen as extraction protocol using ethanol solvent. Phytochemical screening showed that the ethanol extracts contained sulphure, saponin and glycoside compound known as antifungal, antimicrobial, antiinflammatory, and hypocholesteremic influences. Capability extracts of bawang batak bulb against skin pathogenic bacterial had been done by agar well diffusion method. Dimethylsulfoxide was used as negative control while chloramphenicol disk was used as positive control. Their effect antibacterial activity was found at concentration 100 mg/ml against *S.aureus*, *S.epidermidis* and *P.acne* with diameter of inhibition are 8,17; 8,53 and 8,05 mm respectively. The result indicated that *Allium chinense* has inhibitory effect on acne bacteria. Then, we made the ethanol extract *Allium chinense* into gel ethanol extracts with base form Na-CMC, and their antimicrobial activity was tested in vivo. The gel of ethanol extract *Allium chinense* was tested their homogeneity until 32 days. The result of in vitro and in vivo tested showed that the ability of *Allium chinense* to cure of pimple.

Keywords : *acne causing bacteria, Allium chinense, antimicroba.*

MG-14

**POTENTIAL OF PHILOSOPHERE BACTERIA
ORNAMENTAL PLANTS (*Dieffenbachia* sp., *Syzigium
oleina* and *Spathiphyllum* sp.) INHIBITING MICROBIAL
BIO-AEROSOL POTENTIALLY PATHOGENIC
FROM HOSPITAL ENVIRONMENT (POSTER)**

Grace Sonia, It Jamilah, and Nunuk Priyani

Department of Biology, Faculty of Mathematics and Natural Science,
University of Sumatra Utara,
Jl. Bioteknologi no.1, Medan, 20155, Indonesia
E-mail: grace.sonia15@yahoo.co.id

ABSTRACT

The existence of microorganisms potentially pathogenic in the air in a certain amount, can be detrimental to health and enabling nosocomial infection. Hospital as a treatment and care of the sick is the most important place that allows the occurrence of nosocomial infections, and that need attention to control air quality in hospitals. This study aims to look for potential bacteria filosfer in controlling microorganisms potentially pathogenic in the air, isolated from ornamental plants that are often found in hospitals. Isolation air sampling by using sattle plate technique, where a petri dish containing media MSA, MC, SDA and PCA placed at 3 locations: in patient rooms, corridors and waiting room for 15 minutes and then incubated for 15 minute at room temperature. Microorganisms are the most dominant in select and identified by Bergeys Manual Identification, obtained the most dominant microorganisms include *Bacillus* sp., *Staphylococcus aureus*, *Staphylococcus epidermidis*., *Pseudomonas* sp., *Aeromonas* sp., *E. coli*, *Fusarium* sp., *Penicillium* sp., *Aspergillus* sp., and *Neurospora* sp. Isolation of bacteria filosfer performed on 3 types of plants ornamental (*Dieffenbachia* sp., *Syzigium oleina*, and *Spathiphyllum* sp.) at 3 different locations obtained 9 isolates, then antagonist test 9 isolates filosfer bacteria against some dominant microorganism s potentially pathogenic get some isolates with the code SO2, DF3 and SP1 are most able to inhibit microorganisms potentially pathogenic growth in vitro.

Keywords: *Bio-aerosol, Nosocomial Infections, Ornamental Plants, Philosphere Bacteria*

MG-15

**POTENTIAL OF PHILOSHERE BACTERIA FROM
ORNAMENTAL PLANT AS CONTROL PATHOGENIC
BIOAEROSOL MICROORGANISM GROWTH
FROM HOSPITAL (POSTER)**

Imelda Margaretha Aritonang, It Jamilah, and Dwi Suryanto

Department of Biology, Faculty of Mathematics and Natural Science,
University of North Sumatera,

Jl. Bioteknologi no. 1, Medan, 20155, Indonesia

E-mail: aimeldamargaretha@yahoo.com

ABSTRACT

This study presents the antimicrobial effect of phyllosphere bacteria isolated from some common ornamental plants leaves (*Ficus elastica*, *Philodendron bipinnatifidum* and *Aglonema simplex*) against some pathogenic bacteria and fungi isolated from bioaerosol of government hospital in Medan. This research aims to determine the potential of phyllosphere bacteria in suppressing the growth of potential microbe in hospital bioaerosol. Fifteen species of bacterial bioaerosol and eleven species fungi were identified. The most common organism were *Staphylococcus aureus*, *S. epidermidis*, *Bacillus*, *Pseudomonas* and found to be the most common fungi were *Aspergillus*, *Mucor*, *Penicillium* and *Fusarium*. The most potential pathogenic bioaerosol inoculated to MHA medium for *in vitro* antagonistic assay against phyllosphere bacteria. It was concluded that some of phyllosphere bacteria exhibited various inhibitory effects by inhibition zone of bacteria and suppress the growth of mycelium fungi. This study concluded the uses of ornamental plants to control the growth of pathogenic bioaerosol microorganism in hospital and problems of nosocomial infection.

Keywords: antimicrobial, bioaerosol, Ornamental plants, phyllosphere

*Molecular Biology,
Biotechnology and Genetics*

MB-1

**PROSPECTS OF USING TROPICAL PLANT BIOMASS
RESOURCES FOR POTENTIAL BENEFITS
IN SUSTAINABLE BIOTECHNOLOGY**

**Hunsa Punnapayak, Sehanat Prasongsuk, Wichanee Bankeeree,
and Pongtharin Lotrakul**

Plant Biomass Utilization Research Unit, Department of Botany, Faculty of
Science,

Chulalongkorn University, Bangkok, 10330, Thailand

E-mail: phunsa@chula.ac.th

ABSTRACT

Plant biomass is recognized as the very abundant and important organic renewable resources. It comprises mainly of cellulose, hemicellulose, lignin and some other components such as cutin and suberin. Fungi capable of the degradation of these biomass components were isolated from various habitats in Thailand. Among the notable fungi isolated were *Aureobasidium pullulans*, *Acrophialophoranainiana*, *Trametes versicolor* and *Fusarium solani*. Fungal enzymes responsible for the degradation of these compounds were characterized. These enzymes include cellulase, hemicellulase (xylanase), ligninase (peroxidase and laccase), cutinase, and suberinase. The prospects of using these enzymes, their degradative products, microbial products, and plant biomass components for potential benefits in biotechnology were investigated. Beginning with the tropical resources, various weeds were subjected as substrates for bioethanol production. Cattail and guinea grass were found to have the considerable potential with the prospects of producing ethanol of 22.36 kg 100 kg⁻¹ and 18.75 kg 100 kg⁻¹, respectively. *Aureobasidium pullulans* is one of the outstanding epiphytic yeast. It is a good xylanase producer with negligible cellulase activity. Moreover, *A. pullulans* produces the pullulan polymer and a variety of products with potential use in biotechnology applications such as antimicrobial agents and heavy oil. *Fusarium solani* is a cellulase producer with the capability to produce cutinase and suberinase. These enzymes have potential application in fabric industry. The products and process from the association and degradation of various tropical plant

biomass resources have led to several potential applications for the development of sustainable biotechnology industry which are important for the future progress. This report presentation describes the accomplishment at the Plant Biomass Utilization Research Unit which is a part of the Department of Botany, Chulalongkorn University, Bangkok, Thailand, some of which were previously supported by the DAAD(Germany).

Keywords: *bioethanol, biomass degradation, ligninocellulolytic enzymes, pullulan*

MB-2

**GENETIC DIVERSITY OF ANDALIMAN (*Zanthoxylum
acanthopodium* DC.) GERMPLASM IN INDONESIAN
BASED ON OPD-13 AND OPI-20 PRIMERS**

Lollie A P Putri and Indri

Department of Agrotechnology, Faculty of Agriculture, University of Sumatra
Utara, Jln. Prof. A. Sofyan No. 3 Kampus USU, Medan, Indonesia
E-mail : lollie_agustina@yahoo.com

ABSTRACT

We used 2 polymorphic RAPD markers in *Zanthoxylum acanthopodium* to characterize 30 accessions from three district of North Sumatera. Our principal objectives are to study the genetic diversity of the genitors. The RAPD analyse was used with 2 random primer: OPD-13 and OPI-20 markers. The preliminary results showed that 30 accessions of *Z. acanthopodium* were showed 9 bands from two primers. The 30 accessions of three regions from different altitudes. From which, we draw preliminary conclusion on this germplasm for breeding purposes.

Keywords: *genetic diversity, North Sumatera, RAPD marker, Zanthoxylum acanthopodium*

MB-3

**THE ROLE OF HEAT SHOCK PROTEIN 70
EXTRACELLULER IN CLINICAL OF MANIFESTASION
DENGUE**

Nurfadly¹, Suhartono T. Putra², Umar Zein³, Herman Hariman⁴

¹ Departement of Tropical Medicine, Faculty of Medicine, Muhammadiyah
University of North Sumatera

Jl. Gedung Arca no. 53, Medan, 20217, Indonesia

² Departement of Patobiologi, Faculty of Medicine, Airlangga University,
Surabaya, Indonesia

³ Departemen of Internal Medicine, Faculty Medicine, Islamic University of
North Sumatera, Medan, Indonesia

⁴ Departemen of Clinical Pathology, Faculty of Medicine, University of
Sumatra Utara, Medan, Indonesia

ABSTRACT

Dengue haemorrhagic fever is a serious health problem in tropical and subtropical areas in the world. The main pathogenesis of DHF is loss of endothel integrity which caused by abnormal immum respons and disregulation of immune system. Elevated levels of several cytokines and chemical mediators causing capillary leak. extraselluler Heat Shock Protein 70 can act as chaperokine, that can stimulate synthesis proinflammatory cytokines, chemokine, increase expression of antigen molcul on Antigen Precenting Cell (APC) and Natural Killer cell migration. Objective is explain the differences in levels of extraselluler Heat Shock Protein 70 in dengue patients. This is a analytic observational study with case control design. The population in this study were all dengue patients. Samples were taken by using consecutive sampling with a sample size 42 people case group and 20 people control group. There is a significant ($p < 0.05$) increased mean level of extraselluler Heat Shock Protein 70 in DHF patients compared to in DF patients and control group, but there is no increase in mean levels of extraselluler Heat Shock Protein 70 in DF patients than control group. Extraselluler Heat Shock Protein 70 are involved in the pathogenesis and clinical manifestasion of dengue.

Keywords : dengue, extraselluler Heat Shock Protein 70

MB-4

**THE IMMUNOHISTOCHEMICAL STUDY OF c-Myc
PROTEIN IN MOUSE LIVER TISSUES USING IgY
SECONDARY ANTIBODY DEVELOPED IN JAPANESE
QUAIL (*Coturnix coturnix japonicum*)**

Salomo Hutahaean¹ and Ade Candra²

¹Departemen of Biology, Faculty of Mathematics and Natural Sciences,
University of Sumatra Utara,

Jl. Bioteknologi No. 1, Medan, 20155, Indonesia

²Faculty of Computer Sciences, University of Sumatra Utara,

Jl. Alumni No. 9, Medan, 20155, Indonesia

E-mail: salomo@usu.ac.id

ABSTRACT

Antibodies which are produced in the body of mammals are relatively expensive, and when used to detect protein in mammals tissue the results are often unsatisfactory. In this paper we report the production of antibodies in quail, using anti-cMyc IgY antibodies produced in chickens as an antigen. After extracting the antibody from quail eggs, we labelled the product with HRP enzyme, and tested it as a secondary antibody to detect the c-Myc protein in the liver tissue of mice in immunohistochemical system. The result showed, Coturnix anti-chicken IgY labelled with HRP can be used as secondary antibody in paired with IgY chicken anti-c-Myc as primary antibody in detecting c-Myc expression in mouse liver tissue.

Keywords: *avian antibody, antigen synthetic, Coturnix, epitope, IgY extraction*

MB-5

**NANO CALCIUM RESULTED FROM KLJING TAIWAN
Anodontawoodiana USING PRECIPITATION METHOD**

Sata Yoshida Srie Rahayu¹, Tri Aminingsih², and Mira Miranti³

¹ Study Program of Biology, Faculty of Mathematics and Natural Sciences,
Pakuan University

Jalan Pakuan Raya P.O. Box 452, Bogor, 16143, Indonesia

¹ Study Program of Chemistry, Faculty of Mathematics and Natural Sciences,
Pakuan University

Jalan Pakuan Raya P.O. Box 452, Bogor, 16143, Indonesia

¹ Study Program of Pharmacy, Faculty of Mathematics and Natural Sciences,
Pakuan University

Jalan Pakuan Raya P.O. Box 452, Bogor, 16143, Indonesia

ABSTRACT

Calcium is one of the essential mineral that plays an important role in the body, commonly consumed in the form of micro calcium. The size associated with the absorption of calcium by the body, usually only 50% that often causes a deficiency. Formation of calcium technology smaller size need to be developed to increase the absorption of calcium. Technology for calcium to be developed is nano technology. The source of calcium used mussels of aquatic animal was *Anodontawoodiana*. This study aims determined the yield of the resulting calcium and determine the characteristics of nano calcium included morphology, degree of white, mineral components, and particle size. This study included mussels sample preparation, mussels proximate test, and manufacture of nano calcium powder with a longer extraction treatment on yield and mineral content. The results showed that the optimal yield obtained in the extraction of treatment 1.5 hours is equal to 7.50%. Based on the analysis of the mineral, which is the highest level of mineral extraction is calcium that is equal to 92.0%. Nano calcium powder also contains other minerals were sodium (0.215%), potassium (0.03%), magnesium (0.10%), phosphorus (0.04%), zinc (8.00 %), manganese (3510 ppm), and iron (33.4 ppm). Whiteness value of nano calcium powder produced is 75.36% (100% scale). Particle measurement results using the SEM with 20.000x and

10.000x magnification showed that nano-sized particles of calcium powder produced range 121-430 nm. It tends to increase the calcium absorption by the body.

Keywords: *Anodontawoodiana, Nano Calcium, Precipitation method*

MB-6

**MUTAGENIC EFFECT OF FORMALDEHYDE ON
PARP-1 EXON 21 AND EXON 23 OF LIVER MICE
(*Mus musculus*)**

Sri Widiyarti and Susiati

Biology Department, Faculty of Mathematics and Sciences, Brawijaya
University, Malang, Indonesia
E-mail: swid@ub.ac.id

ABSTRACT

PARP (poly (ADP-ribose) polymerase) is a group of proteins involving mainly on DNA repair and programmed cell death. Formaldehyde is an extremely reactive chemical producing covalently cross-linked complexes with proteins and nucleic acids. The objective of this research is to observe mutation of *PARP-1* exon 21 and 23 on mice after exposure of formaldehyde 2 mg/kg BW for 3 months. DNA was isolated from mice liver. PCR was carried out using primer *PARP-1* ekson 21 forward 5'- GGAATGGTACTGTTGTAGGCT-3' and reverse 5'-CCATGGTATTATGACACGGGA-3', also *PARP-1* exon 23 forward 5'-GTTGTTTGTGGTTTGTCTTA-3' and reverse 5'-TTTTTAGCTCAAATGCTTAA-3'. The amplicons was sequenced by BigDye™ terminator and ABI Prism 3730xl Genetic Analyzer. The result show that formaldehtyde cause mutation on *PARP-1* exon-23 of mice liver. This mutation is point mutation CTG/GTG. However, *PARP-1* exon 21 is not mutated after formaldehyde exposure.

Keywords: formaldehyde, *PARP-1*

MB-7

**THE EXPRESSION OF METALLOTHIONEIN (Mt)
GENE ON THE ARK COCKLES *Anadara antiquata*
BY MERCURY INDUCTION**

Wahyu Prihatini

Department of Biology, Faculty of Mathematics and Natural Science,
University of Pakuan

Jl. Pakuan No. 1. Bogor, Indonesia

E-mail: wahyu_prihatini@yahoo.co.id

ABSTRACT

The ark cockles *Anadara antiquata* live in intertidal area, that had various toxic hazardous contamination from anthropogenic wastes. This condition could leads stress to biota, which will induce the synthesis a set of the stress protein. One of this stress protein is metallothionein (MT), an endogenous proteins which able to bind heavy metals that accumulated in the body. MT protein plays important role in the detoxification process of heavy metals. With the ability to bind the metals ion, MT protein could restrict the distribution of heavy metals to the places that are not desired, and provide body protection against metal toxicity. The synthesis of MT protein was regulated by the MT gene, that it's expression was induced by several factors, among others were heavy metals. This study aimed to identified the expression of MT gene in *A. antiquate* cockles, by mercury induction. Methods used in this study was the Reverse Transcription (RT) - PCR, from the total RNA of cockles gills. The primers used in this study was self designed, based on MT-2 mRNA sequences of blood cockles *Anadara granosa* (Gen Bank). This study managed to amplified the *house-keeping* gene GAPDH, and the MT gene from *A. antiquata*. The quantity of total RNA (196–521 ng/μl), and their purity (1,884 – 2,139) were classified as good.

Keywords: *Anadara antiquata*, heavy metals, metallothionein, reverse transcription.

MB-8

**NORMAL DISTRIBUTION OF AGRONOMIC
CHARACTERS AND PLANT HERITABILITY
OF SOYBEAN (*Glycine max* L.) F₂ HYBRIDIZATION
BETWEEN SALT RESISTANCE GENOTYPE
AND ANJASMORO VARIETY**

Ros mayati, Nini Rahmawati, and Retno P. Astari

Department of Agroecotechnology, Faculty of Agriculture, University of
Sumatra Utara, Indonesia

E-mail : tanjungrosmayati@ yahoo.co.id

ABSTRACT

The increase of soybean production should be pursued continuously, including utilization of marginal land such as saline soils. Selection for developing superior variety greatly influence the success of the plant's normal distribution. This study aimed to estimate the frequency of normal distribution and heritability of agronomic characters of soybean F₂ hybridization salt resistance genotype and Anjasmoro variety to support the expansion of planting area in saline land. The research was conducted at the Faculty of Agricultural land experiments using saline soil as planting media with salinity levels 5-6 mmhos/cm which was conducted in March 2015 to May 2015. The study was conducted without repetition, and the data were analyzed using chi-square test for suitability distribution normal. The results showed that the frequency of character tinggin plants, the number of productive branches, flowering dates follow a normal distribution, while the frequency distribution of harvesting, number of seeds/plant and seed weight/plant does not follow a normal distribution. Heritability F₂ belonging to the high criteria on plant height, number of productive branches, harvesting, while the flowering dates, number of seeds per plant and seed weight per plant belonging to the moderate criteria. The results showed genetic potential of plants to be developed in saline land in support of the expansion of soybean planting in saline soil.

Keywords: *F₂ generation, heritability, normal distribution, salt-tolerance, soybean*

MB-9

**MALARIA ATTRIBUTABLE-FEVER BASED ON RAPID
DIAGNOSTIC TEST (RDTs) IN PRIMARY HEALTH
CARE : DETECTION OF ASYMPTOMATIC MALARIA
AS A PROBLEMS IN MALARIA ELLIMINATION**

Lambok Siahaan

Department of Parasitology, Medical Faculty, University of Sumatera Utara,
Medan, Indonesia

E-mail : lambok_fkusu@yahoo.com

ABSTRACT

Malaria management policies currently recommend that the treatment should only be administered after laboratory confirmation or rapid diagnostic tests (RDTs) when microscopy is not available. In primary health care RDT commonly used to the patient with fever. Asymptomatic malaria, as an untreated malaria could potentially be a source of malaria transmission. The study was undertaken in Batubara district, North Sumatera Province, Indonesia, from May to September 2015. Data was collected from 3 subdistricts that had the highest cases of malaria. Diagnostic of malaria was done based on RDTs. This study aims to find the performance of the RDT as a predictor of malaria-attributable fever. The study sample included 660 patients and the overall sensitivity, specificity, PPV, NPV and malaria attributable fever of the RDTs for diagnosis of any malarial species were 84.5%, 40.9%, 60.6%, 29.0% and 66% respectively. Proportion of asymptomatic malaria is 15.5%. Prevalence of malaria is mainly due to *P. vivax* (75.8%), *P. falciparum* (13.7%) and combination of them (10.5%). Fever is not enough as an indicator for malaria screening. Periodic mass blood survey is required to detection asymptomatic malaria. Finding and treatment asymptomatic malaria is the way to successful malaria elimination.

Keywords : *asymptomatic malaria, fever, malaria elimination, RDTs*

*Structure and Physiology
of Plants and Animals*

SP-1

**THE ROLE OF SALIVARY CALCIUM
IN THE FORMATION OF PLAQUE BECOMES
CALCULUS ON THE TOOTH ENAMEL SURFACE**

Ameta Primasari, Yumi Lindawati, and Lisna Unita

Faculty of Dentistry, University of Sumatra Utara
Jl. Alumni No 2 Komplek USU, Medan, Indonesia

ABSTRACT

Saliva is source of calcium for enamel surface remineralization. It will reduces the possibility of tooth caries (tooth cavity). However, the increased of salivary calcium would increased the risk of plaque mineralizatin onto calculus. The formation process of plaque become calculus was caused by the maintenance of oral hygiene were inadequate. This study aims to know the average concentration of salivary calcium in normally individu. The salivary calcium concentration is expected to predict the risk of plaque becomes calculus on tooth enamel surface. The study used 55 samples of unstimulated whole saliva from patients in the periodontic Instalation of Dental Education Hospital, Faculty of Dentistry USU, with the criteria for inclusion and exclusion, by spitting method. Results showed salivary calcium Mean value was 1.3864 ± 1.0024 mmol/l whereas Median salivary calcium in each samples. The role of salivary calcium in the formation of calculus can be stated that an individually process which depend on salivary calcium concentration. The greater calcium concentration in saliva, so the greater formation of calculus risk.

Keywords : *Calcium, saliva, the risk of plaque and calculus*

SP-2

**MORPHOLOGICAL CHANGES OF BINAHONG PLANT
(*Anredera cordifolia* (Ten) Steenis) INDUCED
BY MUTAGEN COLCHICINE**

Eva Sartini Bayu¹, Diana, S. H¹, Rosida, M¹ and Olivia A. H²

¹Department of Agrotechnology, Faculty of Agriculture, University of
Sumatra Utara,

Jl. Prof. A. Sofyan no 3, Medan, 20155, Indonesia

²Department of Oral and Maxillofacial, Faculty of Dentistry, University of
Sumatra Utara, Medan, Indonesia
E-mail: tini.girsang@yahoo.com

ABSTRACT

Binahong known as a plant have spectacular advantages which contains saponin compound on all part of binahong plant, such as tuber, stem, leaves and roots could become as herbal therapy. Medical plant in domestic region become an alternative treatment for prevention or cure of various diseases. Binahong plant become one of potential medical plant as material resources in phyto-pharmaceutical industry. Low genetic variation in binahong plant therefore effort need improving the available species to meet the needs yields and good quality of binahong plant. One of the effort by using mutagenic chemical colchicine. Therefore, this study aimed at investigating the effect of colchicine on morphological changes of binahong plant. The result obtained from the effect of concentration colchicine 0,075% (K3) and 0.1% (K4) influenced number of leaves per plant at 4 weeks age, increased the weight of wet roots, weight of dry roots, and weight of shoot of binahong plant at concentration colchicine 0,05% (K2) had found morphology traits better than others.

Keywords: *colchicine, morphology binahong plant*

SP-3

**ROOTING OF PINEAPPLE (*Ananas comosus* L.)
IN VITRO WITH NAPHTALENEACETIC ACID
AND SUCROSE TREATMENT**

Fauziyah Harahap and Nusyirwan

Department of Biology, Faculty of Mathematics and Natural Sciences, State
University of Medan, UNIMED

Jln. Willem Iskandar Psr V, Medan, 20221, Indonesia

Telp : +6281376817918, Fax : +6261613319, E-mail:

fauziyahharahap@gmail.com

ABSTRACT

Pineapple (*Ananas comosus* L.). is one of subtropical fruit that can be growth well in Indonesia. The purposes of this research are to find the effect of Naphtalene Acetic Acid's (NAA) plant growth regulator and Sucrose treatment toward pineapple (*Ananas comosus* L.) rooting. Design of experiment is Completely Randomized Design factorial. Various concentration of NAA (0, 1, 2 ppm) and Sucrose (0, 30, 60 gram) were treated for root induction in MS medium that added with 0.2 ppm Indole Acetic Acid (IAA). These treatments were repeated until five times. The parameters of this research namely, percentage of contamination, number of live planlet, the time when the root is grown, the time when the bud is grown, number of bud, number of leave, number of root. The results of this research show that the highest of contamination is 33.3%, get from MS medium + 0.2 ppm IAA + 2ppmNAA + 30 gram of sucrose treatment. The highest percentage of died bud is 44.4%, get from 1) MS medium + 0.2 ppm IAA +1 ppm NAA + 0 gram of Sucrose and 2) MS medium + 0.2 ppm IAA + 2 ppm NAA + 0 gram of Sucrose. NAA plant growth regulator, Sucrosetreatment and interaction NAA with Sucrose affected to number of leave. NAA, interaction NAA with sucrose did not affected to number of root, while Sucrose affected to number of root.

Keyword : *Ananas comosus* L., *in vitro*, NAA, rooting, sucrose

SP-4

**SUBCULTURE FREQUENCY ON *IN VITRO*
PROPAGATION OF BRASTEPU CITRUS
(*Citrus nobilis* Brastepu)**

Isnaini Nurwahyuni

Departement of Biology, Faculty of Mathematics and Natural Science,
University of Sumatra Utara

Jl. Bioteknologi No.1, Medan, 20155, Indonesia

E-mail: isnaininurwahyuni@yahoo.co.id

ABSTRACT

Subculture frequency on *in vitro* propagation of Brastepu citrus (*Citrus nobilis* Brastepu) is explained. The study is aimed to obtain an optimum condition on the propagation of Brastepu citrus seedling via subculture technique. The study is carried out for meristemic shoot tip in four variation, they are: explant of meristemic shoot tip is planted in MS media enriched with auxin, 2,4-D (D) and cytokinin, BAP (B) without subculture as a control, and the explant of meristemic shoot tip is planted in MS media enriched with 2,4-D and BAP successively with one time subculture, two times subculture, and three times subculture, and the harvest are done after four months. The results have shown that variations in the growth stimulator for propagation without subculture gave different quality of callus, plantlet, plant shoot and embryo somatic of Brastepu citrus. The growth of callus is observed the best in a treatment condition of D1B1 (1.83 grams callus) by using the combination of 0.5 mg/L 2,4-D with 0.5 mg/L BAP. Somatic embryos are obtained the best in D1B2 (20.60 embryo somatic) by using the combination of 1.0 mg/L BAP with 0.5 mg/L 2,4-D. The best condition to produce shoot is observed in D1B3 (1.10 shoot) by using the combination of 0.5 mg/L 2,4-D with 1.5 mg/L BAP. In the subculture treatments, it was observed that that variation in the subculture frequency gave different quality of calli, plantlets, plant shoots and embryo somatics of Brastepu citrus. The best condition is obtained when the subculture is carried out two times (D1B1) by using 0.5 mg/L 2,4-D with 0.5-1.0 mg/L BAP, where callus is obtained 2.82 g. The highest somatic embryos is obtained in D1B2

by using 0.5 mg/L 2,4-D with 0.5-1.0 mg/L BAP with 24.80 embryo somatic. The best condition for development of shoot is obtained in D1B2 with 4.00 shoots. Duncan analysis (P 0.05) has proved that experimental treatment is significantly different on the growth of calli, somatic embryos and the number of shoots.

Keywords: *Brastepu citrus, Citrus nobilis, In Vitro, meristem, shoot tip, subculture.*

SP-5

**THE EFFECT ALCOHOLS EXTRACTOR ON YIELD
AND QUALITY OF GLUCOMANNAN FROM
*Amorphophallusmuelleri***

Nunung Harijati

Biology Department, Faculty mathematics and Natural Sciences, Brawijaya
University, Malang, Indonesia
E-mail : harijati@ub.ac.id

ABSTRACT

Amorphophallus muelleri is a Indonesia native plant and is a potential source of glucomannan. Glucomannan is a compound that has nutraceutical value. It causes long satiety therefore it is suitable for a diet to reduce weight. The glucomannan can be extracted from tuber using alcohols. There are two types of alcohol that can be used to extract, ethanol and isopropyl-alcohol. The objective of the research is to see extractor type on yield and quality of glucomannan which is directly extracted from fresh tubers. To extract glucomannan was performed at three different temperatures (35°C, 55°C and 75°C), followed by centrifugation 1500 rpm at 25°C for 30 minutes and the coagulated using ethanol 95% or 95% isopropyl-alcohol. The result showed that alcohol extractor gave glucomannan yield 40%, 45%, 48% per dry weight of tuber respectively for each temperature (35°C, 55°C and 75°C). Each of glucomannan yielding has a viscosity (Cp) 1772, 3425, 5067 respectively, and the brightness (L) 35.98, 35.62, and 34.46 respectively as well. Mean while isopropyl-alcohol extract or produce glucomannan yield 53% (35°C), 63% (35°C), 40% (75°C) with a viscosity (Cp) 49.5 (35°C), 1519 (35°C), 2654 (75°C) and brightness (L) 25.17 (35°C), 27.23 (35°C), 26.37 (75°C) for each produced glucomannan. The conclusion is isopropyl-alcohol extractor favorable for glucomannan yielding at 55°C, while ethanol extractor is good to Obtain high quality of glucomannan at 75°C.

Keywords : *alcohol, isopropyl-alcohol, viscosity (Cp), yield*

SP-6

**THE ROLE OF BIOLOGICAL RESEARCH
IN THE DEVELOPMENT OF SCIENCE, TECHNOLOGY
AND SUSTAINABILITY OF NATURAL RESOURCES
MANAGEMENT IN VITRO TECHNIQUE
FOR ESTABLISHMENT OF *Celosia* CULTURE
AS BETALAIN RESOURCE**

Retno Mastuti

Department of Biology, Faculty of Mathematics and Natural Sciences,
Brawijaya University

Jl. Veteran, Malang, 65145, Indonesia

E-mail: mastuti7@ub.ac.id ; rmastuti@yahoo.com

ABSTRACT

Celosia, member of Amaranthaceae, has a beautiful flower with various colors due to the content of betalain pigment. Betalain is red-violet and yellow-orange pigment which is only produced by some families from Caryophyllales. Pigment biosynthesis is restricted to certain organ or plant physiological age. In vitro technique provides an alternative method to produce secondary metabolite compounds including pigments which can be harvested anytime of the year. Therefore, the goal of the research is to know the dedifferentiation responses of *Celosia* leaf and petiole explants to induce callus containing betalain pigments. Explants derived from field were successively sterilized with tap water 60 min, alcohol 70% 30 sec, bayclean 10% 15 min and finally rinsed with aquadest steril three times for five min each. MS solid medium supplemented with combination of auxin and cytokinin were used to induced callus. The results showed that both of leaf and petiole explants were possible to dedifferentiate into high proliferated callus tissues. White, green or red callus indicating the betalaian content was produced in suitable concentration of BAP:NAA. The continue production of *Celosia* red callus containing betalains pigment will facilitates the availability of safe and healthy natural dyes.

Keywords: *Amaranthaceae, callus, explants, leaf, petiole*

SP-7

DORMANCY BREAKING OF PORANG (*Amorphophallus muelleri* Blume) BULBIL BY PHOTOPERIOD TREATMENT

Serafinah Indriyani and Wahyu Widoretno

¹⁾Department of Biology, Faculty of Mathematics and Natural Sciences,
University of Brawijaya
Jl. Veteran, Malang, 65145, Indonesia
E-mail: s.indriyani.ub.ac.id

ABSTRACT

The objective of the research was to obtain the technology of porang bulbil dormancy breaking. The source of porang bulbils were gained from Dusun Krajan Desa Rejosari Kecamatan Bantur Kabupaten Malang. The diameter and weight of porang bulbils were 2-3 cm and 3-5 g respectively. The research design was Completely Randomized Design. Porang bulbils were stored in the photoperiod cabinet during one month. The levels of photoperiod were 0, 8, 12, 16, 20, and 24 hours/day. The light intensity of TL lamp was 400 lux. As a control it was used porang bulbils that it was placed in the dark cabinet without light. Repetition was three times. The success of dormancy breaking was observed through the bulbil capacity to grow that it was identified by bud emerged. Data was analyzed by ANOVA that it was continued by Duncan test ($\alpha = 0.05$). The results showed that photoperiod 8, 12, 16, 20, and 24 hours/day during one month could stimulate porang bulbil dormancy breaking. Photoperiod 24 hours/day emerged buds of porang 8.83 ± 3.07 . Photoperiod 20 hours/day emerged the height of buds 3.42 ± 1.57 mm and the diameter of buds 3.75 ± 1.35 mm. The growth of height and diameter of buds were not significantly different among the treatments except the control.

Keywords: *Amorphophallus muelleri*, bud, bulbil, dormancy, photoperiod

SP-8

COMPARATIVE WOOD ANATOMY OF SOME SPECIES WEST SUMATRAN FABACEAE

Tesri Maideliza, Mansyur din, and Linda Sofyan

Biology Department, Faculty of Mathematics and Natural Science, Andalas University, Padang, Indonesia

ABSTRACT

The wood anatomy of 7 species of the Fabaceae from West Sumatera province, Indonesia was investigated by light microscopy. The wood was collected from various altitudes (0-1500M amsl). Several features in the secondary xylem occur varied *i.e* arrangement of vessel-ray pits, distribution of axial parenchyma and ray width. All of the 7 species of wood consist of *Phithecelobium jiringa*, *Parkia speciosa*, *Miletia pinnata*, *Peltophorum pterocarpum*, *Phithecelobium ellipticum*, *Sprithodea campanulata* and *Dalbergia sisso* showed diffuse porous. Species of *Phithecelobium jiringa*, *Miletia pinnata*, *Phithecelobium ellipticum*, *Sprithodea campanulata* and *Dalbergia sisso* are characterized by apotracheal type parenchyma hard wood while remaining species *i. e* *Peltophorum pterocarpum* and *Parkia speciosa* by paratracheal type parenchyma. Multy seriate ray founded in species of *Phithecelobium jiringa*, *Phithecelobium ellipticum*, *Sprithodea campanulata* and *Dalbergia sisso*, while species of *Parkia speciosa*, *Miletia pinnata* and *Peltophorum pterocarpum* are characterized by uniseriate ray. The category of long-fiber size founded at species of *Miletia pinnata*, while *Parkia speciosa* medium category and the remaining species was short category. All wood species structure quality III-IV level except *Millettia pinnata* classified quality II.

Keywords: *Anatomy, Fabaceae, fiber, ray, trachea, wood*

SP-9

**WATERMELON (*Citrullus vulgaris*): AN INNOVATIVE
PLANT THAT ACCELERATES THE HEALING
OF PULPAL WOUND**

Trimurni Abidin¹, Harry Agusnar², and Dennis²

¹Faculty of Dentistry, University of Sumatra Utara, Indonesia

²Faculty of Mathematical and Science, University of Sumatra Utara, Indonesia

ABSTRACT

Pulpal wounds are the result of injuries like iatrogenic procedures or traumatic to the pulp of teeth that disrupt the pulp. Healing of a wound is a complex and protracted process of tissue repair and remodeling in response to injury. In tooth with pulpal exposure, the healing is to reconstitute the lost continuum at the pulp-dentin border in order to effectively restoring lost dentin structure. This study conducted to know phytoconstituents derived from watermelon (*Citrullus vulgaris*) and to analyze the particle size of watermelon frost. The result was watermelon as the same of the other plants, contained triterenoid/steroid, alkaloid, flavonoid, glikosida and saponin, while the mean particle size is 12,34 μm . It is seen that watermelon has ability to promote wound healing as the result of injury.

Keywords : *phytoconstituents, pulpal wound, watermelon*

SP-10

**DEVELOPMENT OF CALYX AND SEED OF ROSELLA
(*Hibiscus Sabdariffa* L.) AT DIFFERENT STAGES
MATURITY**

Haryati, T. Chairun Nisa, Elisa Juliati, and M. Basyuni

Department of Agroecotechnology, Faculty of Agriculture, University of
Sumatera Utara, Medan, Indonesia

E-mail : atie.koto@yahoo.co.id

ABSTRACT

Plant growth and development is strongly influenced by the environment in which it grows. Therefore the time of harvest of a commodity will be different in the tropics and the subtropics. This is also the case for the plant which yield calyx. This study aims to determine the development of the calyx at different stages of maturity, in order to be able to determine the appropriate harvest time. Calyx and seed development were observed at the ages of 17, 21, 25, 29, 33 and 37 days after anthesis. The results showed that the appropriate harvest time was at the age of 33 days after anthesis where the weight of calyx and seeds reached 11.9 grams and 2.3 grams per flower.

Keywords: *calyx, Hibiscus sabdariffa* L., *seed, stages of maturity*

SP-11

**DEVELOPMENT OF AVOCADO (*Persea americana* Mill.)
FROM WEST JAVA FOR FRUIT AVAILABILITY
THROUGHOUT THE YEAR (POSTER)**

**Reni Lestari¹, L. Agus Sukamto², Winda Utami Putri¹, Popi
Aprilianti¹ and Sri Wahyuni¹**

¹Center for Plant Conservation Botanic Gardens-Indonesian Institute of
Sciences

²Research Center for Biology-Indonesian Institute of Sciences
E-mail : reni_naa@yahoo.com, reni001@lipi.go.id

ABSTRACT

Avocado (*Persea americana* Mill.) which belong to family Lauraceae is originated from lowland and highland tropical America region. On the 18th century, avocado was first introduced to Indonesia. Fruit of avocado contains high unsaturated or healthy fat compound and has other nutrition composition including high level of protein and energy. Fruit of avocado can be eaten freshly or use as additional ingredient to supplement cooking, and also use as base material for cosmetics. Avocado fruit, especially in the big cities in Indonesia and in its central fruit production areas has been available throughout the year but in high diversity and less obvious grouping in term of quality. In Indonesia this plant has not yet been planted on a big scale plantation system and usually can only be found in home-yards. Few varieties as result of research in government institutions are still planted in their research field as collection of germplasm. The purposes of this research were to evaluate and select West Java avocado germplasm to provide lowland and midland avocado varieties which were prominent and had period of harvesting distributed from January to December. The research was started on January 2011 until 2013 in several cities in West Java Province which are central for avocado fruit production in Indonesia. Observation and evaluation were conducted on field and on laboratory. Selection was done based on fruit characteristic using score system. There were 180 samples of avocado and 31 samples were chosen based on evaluation and selection on its fruit quality with harvest period distributed from January to December. The selected

plants has been propagated by shoot tip grafting and cultivated at Research Station of Indonesian Institute of Sciences in Cibinong, Bogor for further study.

Keywords : *avocado, evaluation, fruit availability, selection*