ABSTRACT

INTERNATIONAL CONFERENCE ON BIODIVERSITY

SOCIETY FOR INDONESIAN BIODIVERSITY

Bandung, 7-8 July 2018

THEME:

Challenging new perspective: Interdisciplinary approach for sustainable management of biodiversity

SECRETARIAT ADDRESS
Sekretariat Masyarakat Biodiversitas Indonesia, Kantor Jurnal Biodiversitas, Jurusan Biologi, FMIPA UNS, Jl. Ir. Sutami 36A Surakarta 57126, Jawa Tengah, Indonesia. Tel./fax.: +62-271-663375. Email: biodiversitas@gmail.com. Website: biodiversitas.mipa.uns.ac.id/snmbi.html
## TIME SCHEDULE

**International Conference on Biodiversity**  
**Society for Indonesian Biodiversity (SIB)**  
**Bandung, Indonesia, 7-8 July 2018**

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Note: A. Genetic Diversity, B. Diversity of Species, C. Diversity of Ecosystem, D. Ethnobiology and Socioeconomics, E. Bioscience (Life Science and Technology); O. Oral, P. Poster; AA. Keynote speech
**ABSTRACT**

International Conference on Biodiversity
Society for Indonesian Biodiversity (SIB)
Bandung, Indonesia, 7-8 July 2018

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**Genetic diversity**

**AO-01**

Morphological characterization and organoleptic test of apple velvet (*Diospyros blancoi*) in Germplasm Collection Garden of LIPI Cibinong, Indonesia

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Apple velvet (*Diospyros blancoi*) is one of the rare plants that have high economic value, because apple velvet stem is used as raw material for roof of house and handicraft and its fruit has vitamins content that is useful for health. The apple velvet plants have different characteristics, so it needs selection diversity of different characteristics so it will be known the type of apple velvet which has the most superior nature and has a high productivity. The purpose of this research was to know the diversity of the apple velvet plant morphology in Germplasm Collection Garden of LIPI in Cibinong, West Java, Indonesia. This research was conducted on September 2017 until January 2018 in the Germplasm Collection Garden and Laboratory of Agriculture, Universitas Nasional, Jakarta. The type of this research is qualitative and quantitative research. The research procedure includes several techniques are observation technique, characterization technique, organoleptic test, and document review. The results obtained from the characterization of apple velvet plant morphology is there are diversities in apple velvet plants in LIPI Cibinong Germplasm Collection Garden. According to organoleptic test results from thirty panelists, if threes B3 and A2 are put together it is likely to get good quality fruit.

Apple velvet plants, characterization, organoleptic

**AO-02**

Genetic population of the widespread spiny lobster (*Palinuridae*) in Pacitan waters (East Java, Indonesia) based on mitochondrial DNA

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²Department of Biology, Faculty of Mathematics and Natural Sciences, Universitas Negeri Malang, Jl. Simpang Bogor No.19, Sumbersari, Lowokwaru, Kota Malang 65145, East Java, Indonesia

The spiny lobster is one of the most economic value in fisheries in Indonesia, especially in Java. There are six species of spiny lobster of the genus *Panulirus* found in Indonesian marine, but in this study will compare four species, i.e., *Panulirus homarus*, *P. versicolor*, *P. longipes*, and *P. ornatus*. This research conducts to investigate the genetic diversity of the wide range population of the spiny lobster (*Panlinuridae*) in Pacitan marine using mitochondrial DNA (mtDNA) sequences. The mitochondrial DNA which Cytochrome C Oxidase I sub-gene (CO-I) used as molecular marker to estimating the genetic population of spiny lobster in Pacitan marine. A little data investigated in this study, but ecologically and economically important for marine fisheries and conservation management. The genetic population showed the haplotype diversity of the spiny lobster in this study is high (h, 0.926), but contrarily the nucleotide diversity is low (π, 0.201). This genetic diversity in the four population

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Note: In order to avoid improper conduct of third parties against authors by using email addresses, starting on 2018 correspondence emails (*) are not listed. Colleagues can communicate with the author by mail or contact us at biodiversitas@gmail.com
was indicated the overexploitation of the spiny lobster in the southern sea of Java

Haplotype diversity, mtDNA, nucleotide diversity, population, spiny lobster

**AO-03**

**Phylogenetic relationship among Anabantoidae (Anabantariformes) fish collected from South Kalimantan (Indonesia) based on protein profiles using SDS-PAGE analysis**

Mabrur*, Rani Sasmita, Ummy Shaliha Aulia Rahmy, Badruzsaufari, Ika Oksi Susilawati
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Protein profiles is a molecular marker for diversity and phylogenetic analysis of germplasm, including Anabantoidae fish which is abundance in freshwater ecosystem of South Kalimantan. The aim of this research is to determine soluble protein content, identify protein profiles and construct phylogenetic relationship among Anabantoidae fish from South Kalimantan. Protein extracted from muscle tissue using Tris EDTA buffer and precipitated using Ammonium sulfate salt. Soluble protein content determined using Bradford assay and then separated based on molecular weight using SDS-PAGE method. Phylogenetic relationship constructed using PAST software based on UPGMA method. The results showed soluble protein content ranging from 1,342 to 3,338 mg g⁻¹. 141 protein bands separated from 10 freshwater fish samples which molecular weight ranging from 28.08 to 196.61 kDa. 61 protein bands are unique (only found in one sample) and 5 protein bands are band monomorphic characteristic. Based on phylogenetic analysis, fish sample clustered into two clusters (cluster I and II). Cluster I consist seven freshwater fish species (T. trichopterus, T. pectoralis, A. testudineus, H. temminckii, Osphronemus gouramy, Pristolepis grootii and Belontia hasselti), which is belong to sub order Anabantoidae and cluster II consist one freshwater fish species (C. striata) which used as outgroup in this study.

Anabantoidae, Bradford, protein and phylogenetic, SDS-PAGE

**AO-04**

**Population genetics and ecology of Sumatran camphor (Dryobalanops aromatica Gaertn. f.) in natural and community-owned forests in Indonesia**

Faujiah Nurhasanah Ritonga¹, Fifi Gus Dwiyanti²,³, Cecep Kusmana², Iskandar Zulkarnaen Siregar³

Dryobalanops aromatica Gaertn. f. (Sumatran camphor) is a valuable tree species that produces borneol and good-quality timber. However, the population of this species has declined due to illegal logging and conversion of forests into plantations and has been classified as Critically Endangered by the International Union for Conservation of Nature. Therefore, this study aimed to examine the genetic variation and spatial distribution of this species in a community-owned forest (Barus) and two natural forests (Sinkohor and Danau Paris) in Indonesia using the Random Amplified Polymorphic DNA method and systematic random sampling in the field to better inform conservation strategies. Dryobalanops aromatica had moderate levels of genetic variation (expected heterozygosity [He] = 0.1760 [Barus population] to 0.2134 [Sinkohor population]) and genetic differentiation (Nei’s Gst = 0.1257). The genetic distance was the smallest between the Sinkohor and Danau Paris populations (Nei’s distance = 0.0363) and greatest between the Sinkohor and Barus populations (Nei’s distance = 0.0534). The spatial distribution of D. aromatica was grouped in both Barus and Danau Paris based on Morisita’s index of diversity (ip = 0.06 and 0.043, respectively). These findings indicate that genetic conservation may be performed in situ in combination with enrichment planting using locally propagated sources.

Conservation, Dryobalanops aromatica, genetic variation, RAPD, spatial distribution

**AO-05**

**The Cytochrome Oxidase-1 Gene of Catfish, Ompok hypophthalmus and Ompok eugeneiatus of Tapung River, Riau, Indonesia**

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Department of Biology, Faculty of Mathematics and Natural Sciences, Universitas Riau. Kampus Unri Bina Walya, Jl. H.R. Soebrantas Km 12,5, Panam, Pekanbaru 28293, Riau

The objective of the research was to study the cytochrome oxidase-1 gene of catfish, Ompok hypophthalmus, and Ompok eugeneiatus from Riau Province. Primer universal of the cytochrome oxidase-1 gene used for Polymerase Chain Reactions process. The results of Polymerase Chain Reactions is partial cytochrome oxidase-1 gene of 655 bp. The sequence of Polymerase Chain Reactions product of partial cytochrome oxidase-1 gene was done multiple alignments with other catfish from Genbank and analyzed using software MEGA of version 6.0. The genetic distance and the phylogenetic tree using Neighbor-Joining method
Information on genetic variability, heritability and character association between quantitative characters with yield are very important in a crop improvement. Eighteen genotypes of tomato (Solanum lycopersicum L.) were evaluated to study the quantitative genetic of yield and various yield attributing character under shading condition at Pasir Kuda Station, Bogor Agriculture University, West Java, Indonesia from August 2016 until January 2017. The result showed that plant height, dichotomous height, fruit weight, fruit length, fruit diameter, number of fruit per plant, and fruit set had broad genetic variability and high heritability. Characters with broad genetic variability and high heritability can be used as sources in shading tolerance tomato improvement. Fruit weight and fruit number per plant had significant positive correlation coefficient and direct positive effect. It is, therefore, recommended that fruit weight and fruit of number per plant should be given due importance in selection to develop shading tolerance variety in tomato.

Low light intensity, selection, shade tolerance

### AP-03

**Genetic diversity of IGF2 gene as a source of genetic marker for halal authentication**

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⁶Research Center for Biotechnology, Indonesian Institute of Sciences. Cibinong Science Center, Jl. Raya Bogor Km. 46, Cibinong, Bogor 16911, West Java, Indonesia.

The focus of halal authenticity issues is the availability of reliable and rapid analytical methods to identify animal species in raw and processed food. The most popular procedure for identifying the source of the meat was protein-based and DNA-based method, which includes mass spectroscopy (MS) using a peptide marker or PCR using a primer, respectively. This study aims to investigate the genetic diversity of insulin-like growth factor 2 (IGF2) gene, mainly from porcine (Sus scrofa) and bovine (Bos taurus) as a source of marker for halal authentication by in-silico analysis using bioinformatic tools. Multiple sequence alignment and phylogenetic tree construction from ten...
sequences of IGF2 showed the paraphyletic relationship between IGF2 protein of S. scrofa and B. taurus. Protein structure analysis showed a difference in helical structures near the carboxyl end of protein, while gene analysis showed the same number of exon but different number of motifs. By in-silico analysis, we have designed a peptide marker from amino acids at position of 93-107 (S. scrofa) and 93-112 (B. taurus) from peptide Preptin region that resulted in a different pattern of mass spectrum, as well as a primer from exon 6 that could be used to detect the presence of porcine amplicon in the samples. Thus, this study provides an alternative genetic marker to identify the source of meat for halal authentication.

Bos taurus, DNA marker, insulin-like growth factor 2, IGF2, peptide marker, Sus scrofa

### Diversity of Species

#### BO-01

**Characterization of Cucurbita moschata based on morphological character, isozyme banding pattern, and altitudes**

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2Department of Biology, Faculty of Mathematics and Natural Science, Universitas Sebelas Maret. Jl. Ir. Sutami 36A Surakarta 57126, Central Java, Indonesia
3Department of Biological Education, Faculty of Teacher Training and Educational Science, Universitas Sebelas Maret. Jl. Ir. Sutami 36A Surakarta 57126, Central Java, Indonesia

This aims of this research were to investigate whether or not any difference of the morphological character and isozyme banding patterns of *Cucurbita moschata* Duch plants growing at three different altitudes. The samples used in this study consisted of leaf, stem, and flowers. The method of looking at the morphological characters was conducted by direct observation in the field, while the analysis was performed descriptively, followed by one way ANOVA. Meanwhile, the method of polyacrylamide gel electrophoresis (PAGE) was chosen to look at the isozyme bands appearance of esterase and peroxidase employing leaf samples. Qualitative approach was used to analyse the presence and the absence of isozyme bands, and the movements of bands was a significant difference of the morphological characters of plants growing at high altitudes as compared to lower and middle habitats. There was a tendency of most plants grew at middle altitude (351-750 m asl) developed very well not only their length of leaves and stems but also the flowers. Accordingly, the isozyme banding pattern of peroxidase was also found varied at that middle altitudes and very unique bands were detected on the plants sampled from this area. Conversely, the band detected on the lower and the highest altitudes tended to be similar in term of number but different in the quality of the bands. This early result suggests altitudes as a crucial factor in contributing the expression of isozyme appearance which is useful in characterizing pumpkins.

Altitude, *Cucurbita moschata*, isozyme, morphology

#### BO-02

**Diversity of Ambrosia beetles (Coleoptera: Scolytidae) on teak forest (Tectona grandis) in Malang District, East Java, Indonesia**

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*Ambrosia* beetle plays an important role in temperate forest. *Ambrosia* beetle lives symbiotically with fungi that can cause plant wilt and death. In Java, *Ambrosia* beetle has been reported to attack teak (*Tectona grandis* L.) plantations in some regions. The aim of this research was to investigate the diversity of *Ambrosia* beetles in teak plant on monoculture and polyculture system in Malang District. Research was conducted in teak forest in Dampit and Sumbermanjung Wetan, Malang District on March to May 2017. *Ambrosia* beetles were trapped by using baited bottle trap with 95% ethanol. Diversity of *Ambrosia* beetles trapped was analyzed using Vegan package in R program to calculate the Shannon-Winner diversity index (H), Species Evenness index (E), and Simpson's dominance index (D). The results showed that *Ambrosia* beetles which were trapped in monoculture and polyculture teak plants system consist of 9 species, i.e., *X. crassiusculus*, *X. mrigerus*, *X. compactus*, *X. perforans*, *E. simillis*, *X. andrewesi*, *P. cavipennis*, *Ambrosiodimus* sp., and *Hypothenemus sp.* *Ambrosia* beetles in polyculture had higher Shannon Winner diversity index (H=1.40) than in monoculture (H=1.30), and both locations were categorized in medium diversity category. The Species Evenness index of *Ambrosia* beetles in polyculture (E=0.67) and monoculture (E=0.66) also were categorized in medium category. The Simpson's dominance index in both locations was middle dominance of species. *X. crassiusculus* was the dominant species in polyculture and monoculture teak plant system.

*Ambrosia* beetles, diversity, Scolytidae, teak forest

#### BO-03

The diversity of fungal Endophytes in *Piper nigrum* at tropical areas: A recent study from Batuah, Kutai Kartanegara, Indonesia

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*Ambrosia* beetle plays an important role in temperate forest. *Ambrosia* beetle lives symbiotically with fungi that can cause plant wilt and death. In Java, *Ambrosia* beetle has been reported to attack teak (*Tectona grandis* L.) plantations in some regions. The aim of this research was to investigate the diversity of *Ambrosia* beetles in teak plant on monoculture and polyculture system in Malang District. Research was conducted in teak forest in Dampit and Sumbermanjung Wetan, Malang District on March to May 2017. *Ambrosia* beetles were trapped by using baited bottle trap with 95% ethanol. Diversity of *Ambrosia* beetles trapped was analyzed using Vegan package in R program to calculate the Shannon-Winner diversity index (H), Species Evenness index (E), and Simpson's dominance index (D). The results showed that *Ambrosia* beetles which were trapped in monoculture and polyculture teak plants system consist of 9 species, i.e., *X. crassiusculus*, *X. mrigerus*, *X. compactus*, *X. perforans*, *E. simillis*, *X. andrewesi*, *P. cavipennis*, *Ambrosiodimus* sp., and *Hypothenemus sp.* *Ambrosia* beetles in polyculture had higher Shannon Winner diversity index (H=1.40) than in monoculture (H=1.30), and both locations were categorized in medium diversity category. The Species Evenness index of *Ambrosia* beetles in polyculture (E=0.67) and monoculture (E=0.66) also were categorized in medium category. The Simpson's dominance index in both locations was middle dominance of species. *X. crassiusculus* was the dominant species in polyculture and monoculture teak plant system.

*Ambrosia* beetles, diversity, Scolytidae, teak forest
Endophytic fungi are known as interesting microorganisms which live within the plant tissue in apparently healthy host. Despite the abundant studies on Endophytic fungi, the diversity of fungal Endophytes, in particular for *Piper nigrum* L. has not been widely explored. To contribute to the knowledge gaps, this research focuses the discussion on the analysis of Endophytic fungal communities of *Piper nigrum* Linn in tropical areas. This study aimed to identify the diversity of fungal Endophytes which harbored in the root and leaves of *Piper nigrum* Linn in Batuah, Kutai Kartanegara District, East Kalimantan, Indonesia. Two certain plots within the study area were selected based on the different characteristics of topographic contours. The locations, namely as Plot A is more characterized by ramps area, while plot B is more to a slope or hilly area. A total of 55 isolates were obtained from the root, and the leaves of healthy plants, with 35 isolated were collected from Plot A, and the other 20 isolates were generated from plot B. The samples are subjected to the Shannon index (H’), diversity (E’) and dominance index (C’) analysis. The result shows that the based on Shannon index (H’), though the diversity of plot B is higher than plot A, both of the plots correspond to the same genus; namely *Aspergillus* sp., *Fusarium* sp., *Nigrospora* sp., and *Trichoderma* sp, and categorized as medium diversity. Further, about the E’ index, the diversity of endophytic fungal communities is considered to have high uniformity. The dominance index also shows the similar result where the value of C’ index falls into the medium criteria. In this regards, this study confirms that the genus of *Aspergillus* sp. and *Fusarium* sp. represent a large part of the diversity of fungal Endophytes, and plot B indicated the higher result at different indices analysis.

Diversity index, dominance index, endophytic fungi, pepper

**BO-04**

Protein and fatty acid profile of marine fishes from north sea of West Java, Indonesia

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Indonesia is the second largest producer of capture fisheries products in the world and the most capture fisheries production comes from marine fisheries. Marine fish is a source of protein, amino acid, saturated and unsaturated fatty acids which important component of diet. The objective of the study was to investigate the protein and fatty acids profile of nine marine fish samples from North Sea of Indramayu, West Java, Indonesia. The analysis data showed that the total protein content of fish samples ranged from 61.07 % (*Pampus argenteus*) to 86.56 % (*Tetradontidae*). Meanwhile, total lipid content of fish samples ranged from 1.73 % (*Tetradontidae*) to 9.82 % (*Leiognathus equulus*). The concentration of α-Amino Nitrogen (AN) of fish protein hydrolysate was ranging from 31 mM (*Nemipterus hexodon*) to 69 mM (*Mystacoleucus padangensis*) and % Degree of Hydrolysis (DH) was ranging from 9.33% to 20.39%. The molecular weight of protein fish samples was shown has similar profile primarily for almost all samples which have typical band around 49 kDa. The saturated fatty acid (Σ SFA) compositions of fish species ranged from 1094.03-4233.03 µg/g. Oleic acid (MUFA) content of all fish species ranged from 257.91-1216.06 µg/g. However, only three fish species contain Poly Unsaturated Fatty Acid (PUFA) linoleic acid as the following: Selaroides leptolepis (171.36 µg/g), Oxyleeotris marmorata (249.40µg/g) and Tetraodontidae (140.35 µg/g). The highest SFA content was found in Selaroides leptolepis with palmitic acid (C16:0) as the dominant saturated fatty acid (2320.88 µg/g). Selaroides leptolepis also contain high oleic acid (1216.06 µg/g) and linoleic acid (171.36 µg/g).

Fatty-acid, Indonesia, marine fish, protein

**BO-05**

Potency *Echinodorus radicans* and *Sagittaria lancifolia* as wastewater phytoremediator in Purwodadi Botanic Garden, East Java, Indonesia

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Indonesia is a tropical country well known as rich in biodiversity, but a small part is known and utilized. Predicate as a mega biodiversity country, now augmented with predicate of a hot spot country, a term that high levels of forest destruction and loss biodiversity. Add with high development efforts that ignore of environmental aspects, the impact of improving the quality and quantity of various types of pollutants, which directly or indirectly will greatly affect the environment. Water pollutants in wastewater from domestic, agricultural and industrial waste into water/riders. While the condition of handling of waste water is still directly discharged into the drainage channel that will lead to water bodies without processing. The center plants role concept in the natural technologies framework to solve environmental problems are known as phytotechnology. One of phytotechnology application is phytoremediation. Phytoremediation is the use of plants process in restoring environmental quality from pollutants that contaminate environmental media. Given the potential of aquatic plants as phytoremediators, the effort to conserve the aquatic plants diversity in Purwodadi Botanic Gardens, Pasuruan, Indonesia is very important. Therefore,
research related to phytoremediation using aquatic plants needs to be done. This study aims to determine the ability of aquatic plants Echinodorus radicans and Sagittaria lancifolia in phytoremediation of organic wastewater (detergent) and inorganic wastewater (heavy metals). This research is descriptive with observation and experimental, descriptive based on literature study, observation or direct at Purwodadi Botanic Gardens, sampling on aquatic plants collection, green house experiment in Botanic Garden, and laboratory analysis in Universitas Brawijaya, Malang, Indonesia. Aquatic plants from Purwodadi Botanic Garden, Echinodorus radicans and Sagittaria lancifolia based on previous studies are known to have potential in wastewater treatment, not only form river quality but also used in household treatment, leachate, water treatment plant installation, industrial leather waste, slaughterhouses, tofu industry, even hospital wastewater. While the test results of heavy metal content such as Cd, Cr, Cu, Hg, and Pb is known to exist and accumulated in plant leaf tissue in fields. Also evidenced by results of morphological and experimental observations in Purwodadi Botanic Gardens greenhouses using both species of aquatic plants, has demonstrated its ability in phytoremediation against organic contaminants and heavy metal.

Echinodorus radicans, Sagittaria lancifolia, phytoremediation, wastewater

BO-06

Distribution and species of root-knot nematode which infect on seed potato in Central Java, Indonesia

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Root-knot nematodes are considered as one of the most destructive pathogens of potatoes, especially on tuber seed. Infected seed cause tuber malformation and as the main source spreading of Meloidogyne spp. from one to another field. The aim of this research was to know the distribution and species of root-knot nematode which attacks the potato seed. Survey was conducted on four areas of potato production center in Central Java, Indonesia. Two methods for species identification were done by molecular detection using PCR assay and morphological character using perennial pattern. Results showed that root-knot nematodes were distributed with prevalence percentage 14.28-88.23% on three of four sampling area and Meloidogyne javanica, M. incognita, and M. arenaria were identified on potato seed.

Meloidogyne, potato, seed tuber, species

BO-07

Population dynamics of some prominent tree species of West Kalimantan Tropical Peatland Forest, Indonesia

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Tropical peatland forests have received considerable recent attention because they are containing large volumes of carbon especially on soil proportion and are increasingly exposed to forest disturbance from anthropogenic activities that release CO2; and other greenhouse gases. However, it is lack of robust empirical measures on their recent dynamic such as growth and natural losses through tree mortality in order to estimate the forest productivity, as well as their carbon stocks of recent, relatively degraded tropical peatlands. Such measurements are critical for baselining peatland forest restoration needs and refining estimates of carbon pools in living biomass. A study was conducted to measure some prominent species survived in forested peatland of West Kalimantan. Among approximately 103 species, twenty tree prominent species were selected and had been annually measured and monitored for their growth and conditions for 6 years. Tree stems >5 cm dbh were mapped, tagged, identified to species and monitored for diameter growth annually and analized for their biomass changes. Tree registration results show that tree population of each species vary range from the highest among other were Litsea gracilipes, Pometia pinnata, and Litsea resinosa with 33.5, 26.6, and 25.8 trees ha-1 respectively and the lowest such as Choriophyllum malayanum (0.3 trees ha-1), and Actinodaphne sphaerocarpa (4.7 trees ha-1). Post six years of annual growth and mortality monitoring, L. gracilipes and P. pinnata increased their population by 63% and 32%, whereas Eugenia sp. and Syzygium sp. decreased 46% and 47% respectively. These results indicate that tree species in peatland forest adapted to their recent condition. Further analysis demonstrates that tree population could not predict tree biomass and growth, yet the tree basal area significantly undertake it.

Forest productivity, growth, and mortality, tree biomass, tree population

BO-08

Bacterial isolation and identification from mongoose’s feces using enriched caffeine medium

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Mangoes and breadfruit have a prominent role in the process of producing mango’s coffee, where it eats high-quality coffee, digests it, and excretes it in the form of coffee beans. Related to the issue of animal protection and halal coffee, it appears the effort to process coffee beans by in vitro fermentation method using xylanolytic bacteria, cellulolytic, and proteolytic isolated from mongoose feces. The isolation and identification of bacteria potentially degrading caffeine have been done to prove the hypothesis of the role of bacteria capable of grading caffeine to produce a typical flavor of civet coffee. In this study, the identification using 16s rDNA in isolated colony isolates showed that isolates originated from the genus Klebsiella, Pseudomonas, Shigella, Raoultella, Methylobacterium, and Stenotrophomonas.

Caffeine, in vitro fermentation, isolation, media M9, mango’s coffee

**BO-09**

Habitat distribution of endemic fruit tree and exotic coastal Samboja Subdistrict, Kutai Kartanegara, Indonesia

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This habitat study aims to determine the B and ability to adapt the fruit trees. Place of implementation in the coastal area of Samboja Sub-district Kutai Kartanegara District, East Kalimantan Province, Indonesia. Data collection from July 2015 to December 2016. The method used is a survey on fruit trees endemic and exotic tree stages in the yard and garden residents. Result of research the B on the coast of Samboja amounts to 38 species of 54 types of survey list. Distribution of fruit trees is influenced by tribes that occupy the area. The results showed that the habitat of fruit plants grown in the yard and the garden is dominated by fruits that are generatively propagated have morphological advantages and can be aged more than 50 years. The conclusion that the diversity of 38 species of endemic and exotic fruits survey results, there are five types of endemic fruits are always found that Durio zibethinus, Nephelium lapaceum, Arthocarpus champeden, Mangifera odorata, and Durio kutejensis. Furthermore, two types of exotic fruit namely; Mangifera indica and breadfruit Arthocarpus altilis. The recommendation of this research is the cultivation of fruit plants should use superior generative propagation pattern.

Adaptation, endemic fruit, exotic fruit, habitad, species diversity

**BO-10**

Effect of fertilizer on Chlorella and Scenedesmus microalgaes growth in water polluted with nitrogen compound

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The wastewater sometimes contains high concentration of nitrogen which needs a treatment before being thrown into the surface water bodies. Some microalgae can live and grow in the water environment that contains high concentration of nitrogen. However, microalgae need other nutrients to grow, by which not all wastewater can provide. Fertilizer has been known as a source of nutrients. This study intended to find correlation between fertilizer and microalgae growth in high concentration of nitrogen. This research compared Chlorella and Scenedesmus growth in three concentrations of fertilizer (0.01% (g/L); 0.02%; and 0.03%) with the average 80 ppm concentration of ammonium and nitrate. The Chlorella and Scenedesmus microalgae used in this experiment were isolated from the contaminated water of Cideng River in Central Jakarta. After 30 days observation, Scenedesmus in 0.03% concentration of fertilizer had shown the best growth among others with the absorbance value in 680 nm was 1,169. Thereby in Scenedesmus culture, fertilizer concentration had affected the microagal growth. Thus the result of our experiment can be considered important for management of Indonesian microalgal biodiversity in the future as well, especially if we want to utilize the wastewater as the cultivation media for several types of beneficial microalgae.

Biodiversity, fertilizer, growth, microalgae, nitrogen

**BO-11**

Rapid expansion and biodiversity impacts of the red devil cichlid (Amphilophus labiatus, Günther 1864) in Lake Sentani, Papua, Indonesia

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¹ABS SOC INDON BIODIV, Bandung, 7-8 July 2018, pp. 79-111
The red devil cichlid is one of ten exotic fish species inhabiting Lake Sentani. It is believed to be one of the most important threats to the fish of Lake Sentani, Papua, Indonesia. This study aims to document the distribution of the cichlids in Lake Sentani and the impacts of this species on native fish fauna. Fish were sampled in six locations in Lake Sentani using gill nets during February-March 2018. Fish species and abundance were recorded and used to calculate the relative abundance, dominance, species evenness and diversity index. A total of 836 fish belonging to 12 species were recorded across Lake Sentani. Mean fish diversity ($H^' = 0.63$) and evenness ($E = 0.25$) were low. The cichlid is the most abundant fish recorded during our surveys (87.2% of total fish collected) and is now the most dominant fish ($C = 0.76$). One endemic fish, Glossogobius sentaniensis was found to be very rare in the lake (0.60%). Four native fish were also found to have low abundance in the lake: *Oxyeleotris heterodon* (2.52%), *Neoarius velutinus* (1.79%), *Giuris margaritaceus* (0.24%) and *Glossamia beauforti* (0.12%). The conservation of rare endemic and native fish in Lake Sentani is now seriously threatened by the presence of the red devil cichlid.

*Amphiliopus labiatus*, conservation, fish community, invasive species, Lake Sentani

**BO-12**

Echinoderms community, distribution and habitat utilization on the intertidal area of Ambon Island, Maluku, Indonesia

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Echinoderms samples were collected in Ambon Island as part of the marine resource inventories designed to study the biodiversity of Maluku Islands, Indonesian Archipelago. The purpose of this works is to investigate the abundance and genus richness of echinoderms within the five sampling sites using single transect orthogonal to the coast consisted of 10 quadrat plot of 5x5m, distance between plots was 10m at each site. Furthermore, this study also aims to understand the relation of substrate type and community composition within those five sites. The substrate was classified into four types (sea-grass, macroalgae, sand, rocks and/or dead coral) that noted by presence/absence mark at each plot. A total of 910 individuals of echinoderms belonging to 19 genera was successfully observed. Total abundance of echinoderms was different significantly among sites ($p<0.05$). The most abundant echinoderms were collected from Tanjung Tiram, approximately 68.71 individuals/quadrat, which was almost 1.4 times than those in Liang and even 4 times than those in Suli. The genus composition between sites was significantly different ($p<0.05$), otherwise the composition of substrate types among sites was not significantly different ($p>0.05$). In conclusion, some genus of Echinodermata prefers to live in a particular area in the intertidal zone, which may provide a better location for larvae settlement and growing up.

Echinoderms, liang, suli, Tanjung Tiram

**BO-13**

Echinoderms of Maluku, Indonesia: An inventory and 350 years of research history review

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Many advances in the taxonomy of the Maluku echinoderms occurred during the last 350 years since Georgius Everhardus Rumphius discovered the extraordinarily diverse marine fauna at this site. A comprehensive review and analysis of the literature on echinoderms records for Maluku indicates 326 species in total (45 crinoids, 72 asteroids, 66 ophiuroids, 47 echinoids and 96 holothuroids) which tabulated herein. Out of five echinoderm classes listed, crinoids only recorded from publications before 1990 and never have been listed in any publications afterward up to now. In addition, the trend of species discovery based on a review of 350 years research publication seems to decrease along with the number of taxonomic publications. Furthermore, echinoderm publications beside taxonomy (i.e. ecology, checklist report) remained greater in number currently. Research history and research map of Maluku echinoderms are briefly discussed here. Vast areas of Maluku remain relatively unexplored biologically and it is likely that additional records or new species await discovery.

Echinoderms, Indonesia, research history, research map, species list

**BO-14**

Ethnomicrobiology: Enhancing land "lengkob" and "pasir" Karangwangi, Cianjur through *Paraserianthes falcata* inoculated by *Rhizobium sp.* and Endomyccorrhiza

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Discussed.

The role of stomata in determining the stomatal characters are important in supporting generic distribution. In the fern genus *Diplazium*, six different stomatal types are recognized and the arrangement of epidermal cells adjoining the mature stomatal patterns might shed light on the systematic significance on the fern genus *Diplazium*. The research used experimental method with Completely Randomized Design (RAL) single factor with 8 treatment level each treatment was repeated 4 times. Parameters which was analyzed were nitrogen, phosphate and potassium content. The results showed that each combination of treatments had an effect to increase the nitrogen and potassium on "lengkob" and "pasir" land kinds. The research used experimental method with Completely Randomized Design (RAL) single factor with 8 treatment level each treatment was repeated 4 times. Parameters which was analyzed were nitrogen, phosphate and potassium content. The results showed that each combination of treatments had an effect to increase the nitrogen and potassium on "lengkob" land after planting *Parasenianthes falcata* L. amount 10.53% and 93.13%. Use of *Rhizobium* sp. and endomycorrhiza had an effect to increase the phosphate amount 97.38 %, plant height amounted 25.93 cm, the number of root nodules was 7.25 and percentage of endomycorrhiza infection was 100%. Slightly difference in fertility between lengkob and pasir.

Ethnomicrobiology, Lengkob, pasir, soil fertility

**Stomatal patterns in Diplazium**

Titien Ngatim Prapotosuwiryo


On going research on leaf epidermal morphology and its systematic significant on the fern genus *Diplazium* (Athyriaceae) are reported. The stomata as occurring on the fronds of the sporophytes of 17 species of *Diplazium* are investigated using Light Microscope (LM). The goals of the study are: (i) to recognize the stomatal types distribution in *Diplazium*, (ii) to determine whether stomatal characters are important in supporting generic delimitation in *Diplazium*, (iii) to determine whether the mature stomatal patterns might shed light on the relationships among species of the *Diplazium*. On the basis of the arrangement of epidermal cells adjoining the stomata, six different stomatal types are recognized and described. The role of stomata in determining the taxonomic position of each species group of the genus are discussed.

*Diplazium*, leaf epidermal morphology, stomatal type

**Diversity of epiphytic plankton on host plants Padina australis and Thalassia hemprichii in the intertidal zone of Pangandaran, Jawa Tengah**

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Epiphytic plankton often cover the host plant such as macroalgae and seagrass, thus disturb their growth. However, the significant effect of covering on host plant based on its diversity is not yet well explored. This study is aimed to investigate the diversity of epiphytic plankton on host plants of *Padina australis* and *Thalassia hemprichii*, which abundantly live in associated along intertidal zone of Pasir Putih Beach, Pangandaran. Sample were taken from plots along coastline of 3 line transect of 100 m each. There were 28 species of epiphytic plankton had been found, with 27 species were phytoplankton from families of Bacillariophyceae, Cyanophyceae, Coscinodiscophyceae, dan Flagillariophyceae, and 1 species was zooplankton. There were 5 species of Bacillariophyceae epiphyted on both macroalgae and seagrass. Cyanophyceae only found in *T. hemprichii*, while Coscinodiscophyceae dan Flagillariophyceae in *P. australis*. Bacillariophyceae was
the most abundant with 89.6% and 86% on P. australis and T. hemprichii, respectively. The different species of plankton epiphytic in both host plants might have certain role, which needs further observation.

Epiphytic plankton, Padina australis, Pangandaran, Thalassia hemprichii

BO-18

The effects of endophytic bacteria from potato roots and tubers on potato growth and bacterial wilt disease (Ralstonia solanacearum)

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Potato roots and tubers contain bacterial inhabitants that do not cause any disease symptom, called endophytic bacteria. These bacteria may have beneficial, detrimental or neutral effects on the host plant. This paper discusses the effects of endophytic bacteria from potato roots and tubers on potato growth and bacterial wilt disease caused by Ralstonia solanacearum. In this study, the endophytic bacteria were isolated from potato tubers obtained from six locations in West Java. The bacterial isolates were tested for their effects on potato growth. The isolates that had no detrimental effects on potato plants were further tested for their abilities to inhibit R. solanacearum in vitro. The isolation from potato tubers resulted in 35 bacterial isolates, in which 11 isolates have inhibition of growth of potato plants, and therefore they were excluded from further test. The other 24 isolates tended to increase early growth of the potato plants. In addition to the isolates from potato tubers, 14 isolates of bacterial endophytes from potato roots (obtained from previous study) were also examined for their effects on the pathogen, R. solanacearum in vitro. Among 38 bacterial isolates tested, only four isolates that inhibited R. solanacearum with inhibition zone 0.13-0.43 cm. In the greenhouse experiment, the isolates suppressed bacterial wilt in potato by 30.1-76.7%. The isolate that showed highest disease suppression was bacterial endophyte CKU-3 isolate (Lysinibacillus sp.), while the isolate that increases the growth of potato relatively better than other isolates was PGA-6 isolate (Bacillus sp.).

Bacillus, disease suppression, inhibition zone, Lysinibacillus

BO-20

Potency and distribution pattern of pasak bumi (Eurycoma longifolia) at Batang Lubu Forest, Padang Lawas, North Sumatra

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Eurycoma longifolia Jack or locally known as Pasak bumi is one of popular medicinal plant that has long history for its medicinal use in traditional way. Phenomenal myth among indigenous and traditional community related to its aphrodisiac effect has put the species to be one of the most hunted nontimber forest product to be extracted. The objective of this research was to identify the habitat condition, potency and determine tree association of Pasak bumi with other species occurred together in similar habitat at Batang Lubu Forest, Padang Lawas, North Sumatra, Indonesia. Purposive sampling technique by line transect was used based on the local people knowledge of the suspected path where Pasak bumi may occur. We did analysis vegetation in four line transect each consisted of five plots. Twenty plots each for tree, pole, sapling, and seedling stage, sized each of 20 m x 20 m, 10 m x 10 m, 5 m x 5 m and 2 m x 2 m, totaling 80 plots for all the stages. Result showed that Important Value Index for Pasak bumi...
Diversity and abundance of termites along an altitudinal gradient and slopes in Mount Slamet, Central Java, Indonesia

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A study of diversity and abundance of termites along an altitudinal gradient and different slope has been done in plantation forest of Mount Slamet, Central Java. The aims of this research were to define the species composition along altitudinal gradient and slope, also to define the environmental factors affect it. Sampling of termites followed a standardized belt transect (100 m x 2 m) laid vertically on the altitude 700 up to 1300 m asl on four slopes. Each 100 m length of the belt transect divided into 20 section (5 m x 2 m), termites were taken in each section, from the trees, branch, bark and the ground. Data of termites composition were analyzed by diversity index (Shanon-Wiener, H') and domination index (Simson, D); the correlation of among environmental factor with the diversity and abundance of termites. Total 7349 individuals belonging to 11 species in nine genera, five subfamilies, and two families were recorded. Four wood feeder species are Schedorinotermes javanicus, Macrotermes gilvus, Odontotermes javanicus and Microtermes insperatus, while humus feeder is Capritermes samarangi, Procapritermes stiger, Nasutitermes matangensis, N. matangensiformis and Bulbitermes spp, then soil feeder is Pericapritermes javanicus and P. dolicocephalus. Based on the Shanon-Wiener index, the Western Slope is the highest one in diversity with five main environmental factor (altitudes, maximal rain fall, N content, manure application and light intensity) mostly affect it, while the CCA ordination showed that the canopy close and light intensity are the most associated factor to the diversity and abundance of termites. The conclusion is the slopes cause the species richness differently with the most associated environmental factors are the canopy close and light intensity.

Altitude, plantation, Mount Slamet, slope

Giant mudskipper is one of important biological diversity that potential as bio-indicator in environment assessment including heavy metal contamination. These fish are very sensitive to ambient environment, that affects to their physiological mechanism including protein synthesis and expression. This research aims to identify protein profiles of giant mudskipper and review its potential application as biomarker for heavy metal contamination in Barito estuary zone of South Kalimantan. Proteins were isolated from muscle using Tris EDTA buffer and then precipitated using Ammonium sulfate salt. The protein concentration was measured using Bradford assay and then protein separated based on molecular weight using SDS-PAGE method. The result showed muscle proteins of giant mudskipper can precipitate on optimum condition at Ammonium sulfate saturation 60-70% which protein concentration 5,11 mg/mL. The protein separated into 20 bands for raw and precipitated proteins which molecular weight ranging from 33 into 184 kDa. Further study needed for protein identification based on amino acids sequence of separate protein using GC-MS analysis and study about correlation between proteins to heavy metal accumulation in fish muscle.

Biomarker, protein, giant mudskipper, Bradford, SDS-PAGE

Morphological characteristic of apple velvet (Diospyros blancoi) at germplasm collection Garden of LIPI Cibinong, West Java, Indonesia

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Apple velvet (Diospyros blancoi) is one of the local fruits which classified as a rare plant even it has high economic value. Apple velvet has various morphology that needs selection from any various characters to identify the most superior character and has high potential to be developed. The analysis of diversity from one population can be identified to know the morphology character of the plant. The commonly used characteristics include tree trunks,
leaves, flowers, fruits, and seeds. This study was conducted using the quantitative and qualitative methods the result of the characterized plants showed that the apple velvet plants in Germplasm Collection Garden of LIPI Cibinong, Bogor, Indonesia has the average height between 3.5-15 m, stem diameter between 14.1-72.2 cm has no shapes of leaves such as oval and wide oval. White flower crown, 2 shapes of fruits such as round and oval pattern, 2 shapes of seeds such as elliptic and biconvex.

Apple velvet, *Diospyros blancoi*, characterization, rare plant

**BP-03**

*Scutellaria discolor* and *Plectranthus galeatus* (Lamiaceae): Decreased populations on Mount Gede surrounding, West Java, Indonesia

**Sudarmono**


*Scutellaria discolor* Celebr and *Plectranthus galeatus* Vahl are herbs belonging to the mint family (Lamiaceae) which are potential to be used for medicinal purposes. However, their population is gradually declining. The population of the two species is now only found in the mountains or highlands or the edges of the forests that are still protected, i.e., Mount Gede and Telaga Warna Protected Forest, West Java Province, Indonesia. This research aimed to know the potential parent and seedling population of *S. discolor* and *P. galeatus* on Mount Gede and Telaga Warna vicinities. The research method used was parallel transect lines. Association of the existing plants in the vicinity of the area was also observed. In Mount Gede at altitudes above 1200 m asl. there are 203 seedlings and 167 parents of *S. discolor* species, meanwhile, there are 83 seedlings and 13 parents of *P. galeatus*. This is higher than the populations of less than 1200 m asl., i.e., there are 76 seedlings and 45 parents of *S. discolor* and 12 seedlings and 9 parents of *P. galeatus*. In Telaga Warna, *S. discolor* exist only at altitudes above 1500 m above sea level, e.g., 251 seedlings and 154 parents. While for *P. galeatus*, there are 71 seedlings and 90 parents at altitudes above 1500 m asl. At altitude below 1500 m asl., there are 18 seedlings and 8 parents, this is very rare. Populations of *S. discolor* and *P. galeatus* in Mount Gede at an altitude between 1100-1300 m asl. is a balance between the seedlings and its parent population. Likewise, for seedling populations of *S. discolor* in Telaga Warna at an altitude of 1526-1587 m asl., but for *P. galeatus* seedling number decreases altitude 1444 to 1599 m asl.

Mount Gede, Lamiaceae, Telaga Warna, West Java

**BP-04**

Biological aspects of bigeye scad (*Selar crumenophthalmus*) in the South China Sea Waters

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The Bigeye scad (*Selar crumenophthalmus*) is one of small pelagic fish that has important economic value. Bigeye scad in the South China Sea was caught by purse seine. The objective of the research was to investigate the reproductive biology of bigeye scad as a recommendation of fisheries management. This research was conducted from March to August 2014 in the Pemangkat Fishing Port, West Kalimantan, Indonesia. Analysis was conducted to examine the size structure, the length and weight relationship, sex ratio, maturity stage, and gonad somatic index (GSI). The results showed that the length of bigeye scad in range of 16.7-22.5 cmFL with an average was 19.5 cmFL for female and 17-23 cmFL with an average was 19.5 cmFL for male, the sex ratio male and female was balanced (1:1.12). The growth patterns of bigeye scad for male and female were negative allometric expressed by the following equation: \( W=0.1104 \times L^{2.4095}, r^2=0.8982 \) for male and \( W=0.0566 \times L^{2.6351}, r^2=0.9012 \) for female. Based on maturity stage and GSI data, it predicts that the spawning season of the bigeye scad takes place in April.

Biological aspect, big eye scad, South China sea waters

**BP-05**

Growth pattern and condition factor of giant catfish (*Arius thalassinus*) in the Cilacap Waters, Central Java, Indonesia

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Giant catfish (*Arius thalassinus*) is one of demersal fish that has important economic potential. In the Cilacap waters, this fish caught by gillnet. Study of giant catfish is still limited. The objective of this study was to determine the growth pattern and condition factor of giant fish in the Cilacap waters. This study was conducted from January to December 2015, in the Ocean Fishing Port of Cilacap, Central Java, Indonesia. A total number of 1126 individu of Arius thalassinus caught by gillnet was observed during the sampling periods. Total length and weight those fishes were analyzed. The result showed that growth pattern of giant catfish was positive allometric was expressed by equation \( W=0.0158 \times L^{3.0546}, r^2=0.9775 \). The size of giant catfish caught by gillnet ranged between 20.2-62.2 cmFL with an average was 40.2 cmFL and weight between 147-4,205 g with an average was 1,400.7 g. Condition factor of giant catfish was ranging from 1.8-2.1.
Condition factor, Cilacap waters, giant catfish, growth pattern

BP-06
Sequence variation of DREB2 gene as a potential molecular marker for identifying resistant plants toward drought stress
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Drought stress is the most destructive environmental factor affecting agricultural productions worldwide. Drought stress affects around 60 million hectares of agricultural land in Indonesia. Therefore, the selection of crops that can grow well and survive under drought is necessary to overcome the problem of decreased crop yield during stress conditions. DREB2 (Dehydration Responsive Element Binding) belongs to Transcription Factor (TF) gene families as master regulator of plant responses under stress. Due to increased expression by stress, this gene can be used as a molecular marker to identify resistant plants toward drought. However, study the sequence variation of DREB2 is required to understand the character of this gene related to its function at molecular level. The sequence of DREB2 in several crop plants was obtained from NCBI and then was aligned to determine the similarity region. Even though variations were found in N-terminal and C-terminal of DREB2 sequences studied, there was a high similarity of the sequences in the DNA binding domain. It has been predicted that this domain is part of conserved region in the sequence of DREB2 gene. This domain is then proposed to be used for primer designing purposes to study DREB2 gene expression between plant species.

DREB2, drought stress, sequence variation

BP-07
Biological aspect and fishing season of thresher sharks fish caught in Indian Ocean and landed in Cilacap, Indonesia
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Not only become as the by-catch, sharks also as the fishing target by Cilacap fishermen. To support on conservation and shark fisheries management, an observation on fishing ground and length frequencies were carried out during 2014-2015 with updating in february-march 2018. Catch composition analysis as well as determining catch season peak is calculated based on daily vessels unloading data in 2013-2017. Sampling activities were conducted at Cilacap Ocean Fishing Port, Central Java, Indonesia. The results show that Alopias pelagicus and Alopias superciliosus are the dominant sharks caught. The fishing ground coordinate was at 6-130 SL and 96-110 EL, with the fishing season peak in August. The length and weight relationship of Alopias pelagicus W = 7x10-6L3.15 and Alopias Superciliosus W = 5x10-6L3.20 with the L50% for both of these species are 195 cmFL. Male A. pelagicus has lenght about 89-330 cm with an average of 168.5 cm, whereas the female about 46-332 cm with an average of 175.7 cm. Male A. Superciliosus have lenght about 95-512 cm with an average of 197.6 cm, while the female about 84-381 cm with an average of 184.1 cm.

Biological aspect, Cilacap, Indian Ocean, thresher shark

BP-08
Diversity of Lemna spp. (Lemmaceae) in West Java, Indonesia
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Lemna spp is a water plant that many found in the area of West Java, Indonesia. Lemna spp has an important role in aquaculture, because it can be used as a source of quality protein to feed herbivorous fish. The purpose of this study was to explore the diversity of Lemna spp species present in West Java. The exploration was done by collecting Lemna (Lemmaceae) from the waters/lakes/ponds located from the central fishery center in Garut (Cikajang), Bandung (Lembang), Sumedang (Ciparanje) and Tasikmalaya (Singaparna). The sample was identified in the Laboratory of Taxonomy of Department of Biology FMIPA UNPAD by using stereomicroscope to know Lemna morphology characteristic. Characters observed include root tip and shear characters as well as morphological ental characters (shape, bottom, and top surface). Identification of the type is done by identification key (Azer 2013), Backer and Bakhuizen (1968) and Van der Plas (1971). Identification results obtained 3 types of Lemnaceae located in West Java, including 1 type Spirodela, namely Spirodela polyrhiza (L.) Schleid and 2 types of Lemna, i.e., Lemna perpusilla Torr. and Lemna gibba L.

Diversity, feed, herbivorous fishes, Lemna, West Java
**BP-09**

**Diversity and conservation of Indonesian *Hoya* (Apocynaceae) in the Bogor Botanic Gardens**

**Sri Rahayu**


The genus *Hoya* (Asclepiadaceae) has become popular as exotic ornamental plant in Europe, USA, and Australia, while in Indonesia as the home country of many *Hoya* species is still neglected. Several species are rare due to habitat loss. Since 1995, an ex-situ conservation strategy has been conducted in Bogor Botanic Garden. Three main activities have been done. They are (i) Inventory of Indonesian *Hoya* species, (ii) Living collection management, (iii) Sustainable Utilization. Approximately 100 *Hoya* species occur in Indonesia, concluded from literature and Herbarium studies. Unfortunately, revision of this genus doesn’t do well and is still incomplete. 66 species have been collected in Bogor Botanic Gardens as a result from Flora Explorations during the 23 years (1995-2018), three species published as new species, and 11 more new species will be published soon, and a new variety relusted from mutation breeding registered and hold a Plant Variety Protection (PVP) right. During their adaptation in The Bogor Botanic Gardens, some species were unsuccess. The propagation techniques still need developing, as the different species may need different treatment. Promotion as an ornamental plant is the first utilization on Indonesian *Hoya* species is recomended.

Domestication, diversity, ex-situ conservation, *Hoya*, utilization

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**CO-01**

**Abundance of soil bacteria and soil fungi as affected by soil salinity levels**

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Soil microbes play a vital role in many biological processes in agricultural ecosystem. Land surrounding Northern Coast of West Java Indonesia has been degraded due to salinity. A study to quantify the population of soil bacteria and fungi from coastal area (distance of 75 m and 285 m) and its correlation with salinity levels has been done. Results showed that the population of bacteria was contrasted to fungi as the salinity levels increase. Fungi were suppressed by high salinity levels ($R^2 = 0.78$) while the population of bacteria was increased ($R^2 = 0.65$). The findings indicated that bacteria were more tolerant to high salinity levels than fungi, which means there is a potential for these halobacteria to be used as bio agent that could benefit for agricultural practices.

Salinity, soil bacteria, soil fungi

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**Diversity of Ecosystem**

**CO-02**

**Biodiversity and productivity indicators of Forest Health Monitoring as a valuation method on natural capital of Indonesian’s community forest program**

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Community forest program has been issued by Indonesian government since 1995 to rehabilitate protection forest, develop local government and jack up local community participation in state forest management. Sustainable Livelihood Framework (SLF) and Forest Health Monitoring (FHM) were used in this study to evaluate natural capital in the process of community forest management in Lampung's protection forest. Data were collected by interviewing respondents purposively selected from Beringin Jaya forest farmers groups located around protection forest in Tanggamus District, Lampung Province, Indonesia. A total of 71 households from Beringin Jaya forest farmers group representing 12.5 % of the members were randomly selected. Data were also collected from government officers in village, forest management unit (Kesatuan Pengelolaan Hutan), province and national level. 5 cluster plots were used and Biodiversity and productivity indicator of FHM were selected to know a natural capital of forest farmer group livelihood condition. The data were analyzed using SPSS. The result showed that the forest health status of natural capital of Beringin Jaya forest farmer group is enough good. The coffee plant is a dominant cultivation plant in protected forest. To improve the state forest condition, local government must assign forest farmer group to do rich planting in cultivation area.

Community forest, forest health monitoring, natural capital, protection forest, sustainable livelihoods
CO-03

City park as possible conservation area for native pollinators: Case of Bandung City Park, Indonesia

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Pollinator foraging dynamics and fitness depend on the availability of resources in the surrounding landscape. Many cities develop parks as recreation and green area for human needs. In bees point of view, parks could act as area that provides food resources and nesting area. In this study, we investigate the possibility of city parks landscape as an unintended conservation area for pollinator. The focus study areas are Bandung's city parks which known for their theme in which provides variation in term of local climate, human disturbance level, and type of vegetation. Pollinators were monitored, at six city parks, in the morning, noon, and afternoon (15.30-17.30) for one week. The study found 16 species of pollinator insects with moderate level of diversity (Shannon-Wiener Index of 1.80), unstable evenness is labile (0.65) and low dominance level (0.25). The most abundant species was Tetragonula laeviceps (relative abundance of 43.40%) and the lowest was Euploea Eunice (0.32%). Pollinator insects tend to visit flowers in the morning rather than noon and evening. This study showed significant positive effect of temperature, humidity, and light intensity to number of individual pollinator insects that visit the flower while wind speed and CO pollution levels in the air has negative effect.

City parks, diversity, pollinator insect

CP-02

Diversity of marine macroalgae in Karapyak Intertidal Rocky Shore, Pangandaran Coastal, Indonesia

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Pangandaran distinct has two coastal characteristics (sandy and rocky shore). The rocky shore of Pangandaran, West Java, Indonesia has a unique ecosystem and diverse macroalgae. This study aims to analyze the diversity of macroalgae on the Karapyak rocky shore of Pangandaran Coastal area, West Java. The study consisted of three stations with line transect method square 1 meter x 1 meter vertically towards the sea and the determination of horizontal station to the shore. The results of the study found 19 species (3793 individuals) spread into 3 phyla (Chlorophyta, Ochrophyta, and Rhodophyta). A phylum of Chlorophyta dominated with 55%, followed by Ochrophyta with 26.3% and Rhodophyta with 18%. Ulva lactuca is a dominant species found in every station with a high abundance 141-168 ind/m2. The location of east coast was founded by species of macroalgae with the highest covering (K= 503±15) ind/m2 and the diversity (H'=2,19-2,65) compared to another location. Based on the cluster analysis of Bray-Curtis showed variations in the distribution and abundance of different macroalgae of vertical to oceanic line.

Intertidal, macroalgae, Pangandaran, rocky shore

CP-01

Effectivity of organic fertilizers on growth improvement of organic chili peppers (Capsicum annuum) grown in the screenhouse

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Organic fertilizer can enhance soil fertility and crop productivity due to the soil biodiversity improvement, and be making ecosystems more resilient to stress. In the recent years, the demands for organic products such as organic rice, fruits, and vegetables was increased rapidly. It is expected to continue to steadily grow by using organic fertilizers, and this will support food security program in Indonesia. The research aimed to study the effect of type and proportion of organic fertilizer on the growth of chili (Capsicum annuum). The research was conducted in the screen house of the Germplasm Garden (KPN) of Research Center for Biotechnology LIPI, Cibinong, Indonesia from Mei to August 2017 using organic fertilizers produced by the Biovillage Program, i.e., corn steep liquor (S), cow urine (C), and bio-fertilizer of Beyonic (F) in the ratio of 20%, 30%, and 50%, and was arranged in a randomized complete design in triplicates. The result of the study showed that the best proportion was of corn steep liquor and cow urine 50: 50 (% of standard dosage) since they influenced the growth and yield of chili peppers in the first harvesting period. Although the treatments were not significantly different statistically, corn steep liquor and cow urine (50: 50) treatment resulted in the best performance of chili peppers.

Chili peppers, organic fertilizer composition, organic food

CP-03

Landscape function on rehabilitation zones at Mount Ciremai National Park, West Java, Indonesia

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1ABS SOC INDON BIODIV, Bandung, 7-8 July 2018, pp. 79-111

Intertidal, macroalgae, Pangandaran, rocky shore
Mount Ciremai National Park (MCNP) is located in West Java, Indonesia, which has total area of 155 km² that consist of six zones, one of them is rehabilitation zone. Rehabilitation zone that has total area of 77288m² is focused on the restoration of forest conditions that have been degraded due to forest fire and inappropriate land-use. The process of rehabilitation has started from 2008 until now, but the landscape function of the zone has not yet known. The progress of landscape function can be evaluated using Landscape Function Analysis (LFA) method which yields three indexes namely land stability, water infiltration, and soil nutrition cycle. This study aims to determine the progress of landscape function in several MCNP rehabilitation zones based on the age of rehabilitation.

Infiltration, land stability, soil nutrition cycle, soil surface assessment

**CP-04**

**Predicting impacts of future climate change on the distribution of the widespread selaginellas (*Selaginella ciliaris* and *S. plana*) in Southeast Asia**

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Global climate is currently moving toward dangerous and unprecedented condition which has been viewed as a potentially devastating threat to the environment and all life within it. In this study, by utilized Maxent software along with bioclimatic, edaphic, and UV radiation variables, we tried to model the potential geographic distribution of the widespread selaginellas, *Selaginella ciliaris* and *S. plana*’s suitable habitat under present climate condition, and predict the impacts of projected climate change on their potential distribution in Southeast Asia region. We generate future predictions under four detailed bioclimatic scenarios (i.e., RCP 2.6, RCP 4.5, RCP 6.0, and RCP 8.5) over three-time intervals (2030, 2050, 2080). The result showed that future climate condition in SEA region had been predicted will significantly disturb the distribution of suitable habitat of *S. ciliaris* and *S. plana*, and alter its geographical distribution pattern. Despite there are some gained areas which were predicted to become suitable habitat in the early period of future climate change, the overall projection shows an adverse effect of future climate condition on the distribution of *S. ciliaris* and *S. plana*’s suitable habitat as the predicted losses of suitable habitat will be higher than the gains.

Climate change, distribution, *Selaginella ciliaris*, *Selaginella plana*, Southeast Asia, widespread selaginellas

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**Ethnobiology and Socioeconomics**

**DO-01**

**Economic significance and challenges in community-based sericulture cultivation in West Java, Indonesia**

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Development of new technology together with its proper dissemination play a vital role in the success of community-based sericulture development. Sericulture an age-old tradition has become a prospective and potential occupation generating higher income with frequent intervals for community cultivating sericulture. However, in spite of its potency, there are still some hitches in its development especially in improved practices by the farmers who are main actors and the end users and is coming in the way of the spread and development of sericulture. The research aimed to study its economic significance and some hindrances in community-based sericulture and strategy for its development. The research was done in some sericulture centers in Sukabumi and Cianjur, West Java, Indonesia in 2016. Interview of respondents using structured questionnaire and focus group discussion method were applied to collect the necessary information from farm households. Collected data and information were analyzed using quantitative and qualitative data analysis. Results showed that main hitches in the development of community-based sericulture development continue provision of seeds and feed with high quality; limited skill and experience of farmers that cannot bring the required adoption level of technology to generate higher income; and marketing facilitation from related stakeholders. To resolve the problem, a cluster of community-based sericulture by using partnership model should be widely established. There is a need for an active engagement of the Government, supporting agencies and entrepreneur communities for its success and sustainability.

Economic, challenges, community, prospect, sericulture
DO-03

Introduction of coffee (Coffea arabica) in the forest and its impact on socio-economic aspects of rural people and environment: Case study in Palintang Hamlet, Panjalu Village, Bandung, West Java, Indonesia

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Based on ecological history, it has been recognized that since 1980s Palintang people have involved in farming the commercial vegetable crops in the forest that is managed by Perhutani (the State Forestry Corporation). Commercial vegetable growing in the Perhutani forest has provided some economic benefits for the local people of Palintang. However, intensive growing commercial vegetables in the forest have also caused some negative aspects on environments, including soil erosion and pesticide pollution. Recently, some people of Palintang have introduced coffee (Coffea arabica L) that is farmed as mixed cropping (tumpang sari) with forest trees, including pine (Pinus merkusii Jungh and De Vriese) to improve social economic rural people as well to improve soil degradation of the forest. This paper presents the findings of research on innovatory cultural practices among the Palintang people, which contribute to the management of the tumpang sari in a sustainable way. Three aspects will be elucidated in this paper namely: (i) ecological history of introduction of coffee trees in the Perhutani forest of Palintang; (ii) cultural practices among the Plalintang people in cultivating coffee trees in the Perhutani forest; and (iii) impact of the farming coffee trees in the Perhutani forest on socio-economic local people and forest environment.

Coffee trees introduction, coffee farming, Palintang, Perhutani forest, West Java
Pelung chickens are local chickens originally from Cianjur District, West Java Province, Indonesia. The chickens are raised as singing chickens. Some studies showed that health-management practices and disease control present challenges in maintaining the existence of the chickens. A survey was carried out to determine health management and the use of ethnoveterinary in raising Pelung chickens. Structured questionnaires were used to collect data involving 131 Pelung keepers in four districts in West Java Province, Indonesia including Cianjur, Sukabumi, Bandung and Garut Districts. The data were analyzed using descriptive analysis. The result showed that respiratory diseases such as Snot (Infectious Coryza) and Tetelo (Newcastle Disease) were main diseases for Pelung chickens. Vaccination combined with traditional medicines was a common practice for Pelung keepers to prevent and cure chicken diseases. It was found more than five major medicinal plants used to cure various chicken diseases. More investigations regarding plant properties and their applications for Pelung chickens should be carried in the future. Government intervention would be required to improve keepers' skills and awareness in chicken health management.

Ethnoveterinary, health, Pelung

DO-05

Health management and ethnoveterinary medicine of Pelung Chickens in West Java, Indonesia

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Pelung chickens are local chickens originally from Cianjur District, West Java Province, Indonesia. The chickens are raised as singing chickens. Some studies showed that health-management practices and disease control present challenges in maintaining the existence of the chickens. A survey was carried out to determine health management and the use of ethnoveterinary in raising Pelung chickens. Structured questionnaires were used to collect data involving 131 Pelung keepers in four districts in West Java Province, Indonesia including Cianjur, Sukabumi, Bandung and Garut Districts. The data were analyzed using descriptive analysis. The result showed that respiratory diseases such as Snot (Infectious Coryza) and Tetelo (Newcastle Disease) were main diseases for Pelung chickens. Vaccination combined with traditional medicines was a common practice for Pelung keepers to prevent and cure chicken diseases. It was found more than five major medicinal plants used to cure various chicken diseases. More investigations regarding plant properties and their applications for Pelung chickens should be carried in the future. Government intervention would be required to improve keepers' skills and awareness in chicken health management.

Ethnoveterinary, health, Pelung

DO-06

A local socio-economy based model for sea ranching management

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The southern coast of West Java, Indonesia has great potential for tourism development due to abundant resources of coral fish, coral reefs, seagrass, seaweed, sea turtle, mangroves and white sand beaches. On the other hand, challenges are coming from fishing activities, which exploit the resources and thus leading to social conflict. This situation encourages communities to develop sea ranching, which is expected to open opportunity to harvest resources as well as to conserve, such that the tourism potentials can be maintained. The study aims to analyze and evaluate a local social economy based model for ranching sea management. This research used primary and secondary data, which were processed using the Analytical Hierarchy Process (AHP). The results of the analysis showed that for the development of sea ranching in the area, the preferred strategy is the management by local communities which put forward a number of important aspects in the region namely bioecoregion, fish species, technology, and socio-economic values. Further, the results
of the study concluded that sea ranching activities need to syneritize the development of marine tourism and marine aquaculture, wherein the main goal is the availability of alternative business for local people and reduction of pressures on resources.

Community, local social economy, management, sea ranching

**DO-07**

**Factor confronting the resilience of Cirata reservoir social-ecological systems: Case study Cirata Reservoir, Cianjur, West Java, Indonesia**

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Water resources Cirata Reservoir has an essential ecological, economic and social functions. A number of economic and industrial activities flourish based on these resources, among them capture fisheries, fishery cultivation of floating net cage system and tourism. The condition of resilience as the capacity of an ecosystem to survive an interruption and then restore its essential basic functions. The development of derivative functions in capture fisheries and aquaculture of floating net cages at this time has reached the stage of overcapacity and the effect of mutual degradation of ecological, economic and social functions possessed by the resources. With the above considerations, this research was conducted to formulate the strengthening of resilience through socio-economic approach of fishery resources in Cirata Reservoir, West Java, Indonesia. The method used is survey method with the number of respondents 40 people the main actors of fisheries, aquaculture and aquatic tourism. Through resilience analysis, a general analysis is conducted to further develop a dynamic model to develop a small-scale fisheries management policy scenario to strengthen its resilience. Based on the analysis result, the resilience of fishery resources in the general waters of Cirata Reservoir is highly influenced by several attributes, among others from weather conditions, availability of fish resources due to high intensity of utilization, production input prices and transaction costs as well as social capital assets.

Cirata, ecology, economy, fishery, resilience

**DO-09**

**The effect of the fabric types on the shear strength properties of wooden carpet products glued by using polyvinyl acetate**

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Wooden carpets are one of the products made of a woody material glued to the textiles or fabrics. The wooden part can be in the form of plywood or solid wood, while the fabric as a carpet backing serves as a link between the pieces of woody material that make up the carpet. Compared with conventional carpets made of fabrics, the wooden carpets have several advantages. Conventional carpets can contain about 100 times more allergens than the wooden and capture dust greater than the wooden carpets. To bind between the wooden part and the fabrics usually use polyvinyl acetate (PVAc). However, so far there is no information about the bond strength between the fabrics and the woody parts in the wooden carpets. Therefore, the aim of this research was to investigate the effect of the fabric types on the shear strength properties of wooden carpets glued by PVAc. The materials used in this research involved PVAc glue, bangkirai wood, several types of fabrics such as jeans (denim), belacu (unbleached cotton), twill (canvas) and lining (furring). To see the adhesive strength between the wood and the fabric, it was approached by gluing the fabric between 2 pieces of wood samples with the size of each wood of about 2.5 x 5 x 5 cm then clamped them for 24 hours and tested by using UTM machine. The tensile strength and the price of the fabrics were also observed. The research results showed that the shear strength (kg/cm2) using Jean, thin belacu, thick
belacu, thick canvas, thin canvas, and furing were 39.32, 33.18, 24.76, 27.06, 23.18 and 20.18 respectively. Based on the shear strength properties, the price and the ease in obtaining the fabrics, it is recommended that the communities can use the thin belacu in making wooden carpets.

Fabrics, polyvinyl acetate, shear strength, wooden carpets

**DP-01**

**Social capital in order to utilization of mangrove ecosystem service for ecotourism on Kutai National Park, East Kalimantan, Indonesia**

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Social capital has an important role in ecosystem preservation. Utilization of ecosystem service of mangrove has been continued during the last two decades and degradation of mangroves have been occurring. Changes to mangrove ecosystem services can affect elements of social capital such as trust, awareness and altering human-environment relationships. Ecotourism is one of the alternatives that can be developed in the mangrove area in the National Park. The purpose of the present study is to give an overview of the relationship between several elements of social capital in support of ecotourism in the mangrove area. The social capital assessment was conducted in a study of society living around the mangrove area on Kutai National Park (KNP), East Kalimantan, Indonesia. The sample of the research was set as purposive sampling. There were 530 respondents involved from the five sub-districts on East Kutai District. The data were analyzed by Sequel Equation Modeling Partial Least Square (SEM-PLS) method with SmartPLS 3.2.7. Based on the initial assessment by scoring method, overall of five social capital (trust, networking, community involvement, social norm and concern to mangrove) assessed to have low criteria to support ecotourism in KNP mangrove area. Then based on SEM-PLS analysis for each village has proved there are variables of social capital having negative effect, only concern to mangrove variable which has positive effect in four villages. Overall analysis of all respondents has described only three variable of social capitals that have positive effect on the utilization of mangrove ecotourism, that is concern to mangrove, education and income levels and networking. Three other variables, namely community involvement, social norm, and trust have negative effect or the social capital have not yet had to power to support ecosystem service of mangrove for ecotourism.

Community, ecosystem service, ecotourism, mangrove, protected area

**DP-02**

**Management of coastal biodiversity based on sociocultural in establishing conservation character education**

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Coastal biodiversity is quite high among others; coral reef, mangrove, seagrass, and fishery resources. The decline of biodiversity in the coastal area is a form of human indifference to the ecological system in the region. Management of coastal biodiversity can be conducted interdisciplinary covering various aspects. There are 4 main aspects that can be integrated, i.e., physical-biodiversity, sociocultural, character education, and conservation. This study aims to develop an approach management of coastal biodiversity based on sociocultural and will result in a strong scientific understanding and apply in a conservation character education. Implementation of this goal is done through learning activities at the level of basic education. Specifically in this study aims to develop biodiversity learning of coastal ecosystem characterized in elementary school by sociocultural approach. To achieve this goal, this research uses model four-D, namely; define, design, develop and disseminate as a research method. The result shows that the conservation character education model based on sociocultural in this case local wisdom is the most appropriate education model to encourage the pattern of biodiversity coastal ecosystem management. Conservation character education has a high relevance to life-enhancing skills, based on the empowerment of skills and coastal biodiversity potency in each region.

Biodiversity, coastal ecosystem, conservation character, sociocultural

**DP-03**

**Fisher’s knowledge on fish behavior around anchors FADs: The case of handline tuna fishery in Palabuhanratu, West Java, Indonesia**
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The development of handline tuna fishery in Palabuhanratu, West Java, Indonesia along with the use of Fish Aggregating Devices (FADs) as a tool for luring fish. This study aims to provide a description of the condition of fish resources with limited data through the knowledge of fishers to the behavior of fish around FADs. The data were collected through a semi-structured questionnaire on handline fishing vessel’s captains (n = 37). The results indicate that based on the knowledge of fishers, fish usually aggregated with FADs at an average distance of 354 meters with the aggregation of more than a school of fish, aggregated by size and species with the aim of aggregating is looking for shelter and feeding. The time required for new deployed FADs to aggregating/Luring fish is about 1-2 months. The duration fish aggregated in FADs is about 1-2 weeks and fish will leave the FADs due to lack of food sources and the presence of predators. There is no difference in the variation of fish resources in the morning, day or night. Skipjack (Kastowanus pelamis) and juvenile tuna (Thunnus albacares and Thunnus obesus) resources are dominant at a depth of 0-50 meters, while large tuna usually caught at the deeper water with the range around 251 meters. Information from fishers regarding the behavior of fish can be used as reference material in the development of fishing around the anchor's FADs.

Fisher's knowledge, fish aggregating device, handline tuna, Palabuhanratu, tuna behavior

DP-04
Utilization and management of bamboo garden (talun bambu) by upper and middle community of Citarum Watershed, West Java, Indonesia
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Currently, bamboo gardens are undergoing rapid land conversion to other land uses, especially in the Citarum watershed, West Java, Indonesia. In the upper part, the bamboo gardens are vulnerable to change into vegetable land, while in the middle experiencing changes into residential or industrial areas. Therefore, efforts should be made to conserve bamboo gardens. One effort to conserve the bamboo field is to manage and utilize bamboo by the community. The purpose of this research is to know the utilization and management of community-based bamboo in upstream area (Pangauбан Village of Bandung District) and middle area (Cijedil Village of Cianjur District) of Citarum Watershed. The method used in this study is a qualitative method with interview techniques conducted by purposive sampling. The species of bamboo are collected by herbarium collection method, then identified with Bamboo identification book. The result of this research can be obtained 7 species of bamboo in upstream part of Citarum and 4 species of bamboo in the middle of Citarum.

Bamboo garden, Citarum watershed, conservation, conversion, talun bambu

DP-05
Ethno-primatology of Long-Tailed Monkey: Case study of human-monkey conflict in Karangwangi Village, Cianjur District, West Java, Indonesia
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Habitat disturbance often lead to conflicts between humans and primate animals, such as crop raiding. The condition of Bojonglarang Jayanti Nature Reserve (BJNR), Cianjur, West Java, Indonesia which is directly adjacent to agricultural land and residential area of Karangwangi Village caused the high potential of long tail monkey conflict with the community. Decrease in biodiversity due to excessive exploitation of natural resources, land conversion and territorial disputes with communities surrounding BJNR area triggered a greater impact of conflict. Comprehensive understanding of the current and potential conflicts of situations and their effects both now and in the future, and for both humans and primes, is of paramount importance. This requires the integration of quantitative and qualitative data from various aspects of human and primate behavior ecology, and good understanding of local perceptions of the situation. The method used in this research is a mixed method research conducted concurrently with ethno-primatology approach. Qualitative methods of direct observation and interview semi-structure done in-depth (deep interview). Quantitative methods are conducted by structured interviews and on the
calculation of long-tailed monkey populations using the concentration count method. The results show that local people of Karangwangi know the social, ecological and economic functions of long-tailed monkeys. The main factor causing long-tailed monkey conflict with Karangwangi community is forest destruction in BJNR. The value of economic losses of agricultural products resulting from the conflict of IDR. 52,823.00 KK/Month. The density of long-tailed monkeys in the BJNR area is 15.1 ind/km².

Bojonglarang Jayanti Nature Reserve, Crop raiding, ethnoprimateology, Long-Tailed Monkey

**DP-06**

**Antibacterial potency of simple fractions of ethyl acetate extract of Begonia baliensis**

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Balinese people have utilized *Begonia baliensis* Girm. (Begoniaceae) as traditional medicine to relieve cough. It is applied in a unique way by inserting plant material into a bamboo and then burned in the fire. The liquid produced by combustion process used as cough medicine. Based on that traditional knowledge, it is expected that *B. baliensis* have antibacterial activity. *B. baliensis* plant collected from Bukit Sangyang, Penebel, Tabanan-Bali used in this study. The chemical compounds of ethyl acetate extracts were isolated/separated by column chromatography. The obtained fractions were analyzed for antibacterial activity by disc diffusion assay against *Escherichia coli*, *Bacillus subtilis*, *Staphylococcus epidermidis* and *Staphylococcus aureus*. Chromatographic column yielded 14 simple fractions, whereas antibacterial test results showed 5 active fractions. Fraction 3 (F3) active against *S. epidermidis*, fraction 5 (F5) active against *E. coli* and *S. epidermidis*, while F10, F11 and F12 only active against *Bacillus subtilis*. Isolation and purification of the active components likely to increase its potential as an antibacterial.

antibacterial, *Begonia baliensis*, disc diffusion, simple fractions

**EO-01**

The effect of biofertilizers and organic ameliorants on soil P, phosphatase and yield of rice on Inceptisols

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Application of biofertilizers and organic ameliorants can be used to improve soil fertility in a sustainable manner and improve agricultural yields. The purpose of this research is to know the application of consortium of bio-fertilizer and ameliorant which have an effect on some chemical and biological properties and rice (*Oryza sativa* L.) yield on fluventic eutrudepts. The experiment was conducted in experimental field of Agricultural Faculty of Padjadjaran University, Sumedang, Indonesia from June to October 2017. The experiment was arranged as randomized block design consisting of twelve treatments and three replications. The experiment consisted of control, solid biofertilizer (50 kg ha⁻¹), liquid biological fertilizer (5 L ha⁻¹), combination of biofertilizers concortia (50 kg ha⁻¹) with organic ameliorants (10 t ha⁻¹) (composted straw, husk charcoal and cow manure), a combination of liquid biofertilizer (5 L ha⁻¹) and organic ameliorants (10 t ha⁻¹), and ameliorants (10 t ha⁻¹) independently. The results showed that the application of biofertilizers concortia and organic ameliorants improve soil P, phosphatase activity and yield of rice on Inceptisols. The treatment of solid biofertilizer and straw compost was the best treatment to improve soil P and phosphatase activity.

Biofertilizer, ameliorants, soil P, phosphatase, rice

**EO-02**

Growth, yield and quality response of sweet corn (*Zea mays* L. *Saccharata sturt*) on the application of biofertilizer and tricho-compost

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Sweet corn production can be improved by organic cultivation by utilizing biofertilizer and compost enriched with *Trichoderma* (Tricho-compost). This research used Randomized Block Design (RBD) with 3 replications. The treatments were: inorganic fertilizer recommendation (Urea 300 kg ha⁻¹, TSP 150 kg ha⁻¹ and KCL 100 kg ha⁻¹), 50% inorganic fertilization and Biomax Grow and 20 tons ha⁻¹.
tricho-compost, 50% inorganic fertilization and Biomax Grow and 15 tons ha⁻¹ tricho-compost, 50% inorganic fertilization and Biomax Grow and 10 tons ha⁻¹ tricho-compost, 50% inorganic fertilization and Biomax Grow and 5 tons ha⁻¹ tricho-compost, 50% inorganic fertilization and Biomax Grow. The results showed that the application of 15 tons ha⁻¹ tricho-compost combined with biological fertilizer resulted in the highest production of sweetcorn and increased respiration and the population of bacteria and fungi in the soil. The technology of biological fertilizer would then be the recommended adopted by farmers.

Bacterial population, biofertilizers, fungal population, soil respiration, tricho-compost

EO-03

Trichoderma sp. growth on solid organic carrier

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Soil fungi Trichoderma has a controlling ability against pathogens as well as stimulating effect on plant growth. The purpose of this study was to obtain the best formula of solid state Trichoderma inoculant using various organic matters. Carrier was formulated by using organic wastes derived from important plants in Maluku. Trichoderma has been grown on solid organic carrier based on sago starch solid, cajuput essential oil solid waste and cow manure enriched by rice bran of 10%, 20%, 30%. After seven days of incubation, half of that inoculant was formulated into a form of pellet. Both powder-and pellet-form inoculant were stored at room temperature for one month before Trichoderma population was counted. The results showed that highest Trichoderma population in either powder or pellet-form inoculant was in organic carrier enriched with 30% rice bran. The fungal population reached 4.53x10⁷ and 4.42x10⁷ cfu/g. This experiment suggested that Trichoderma inoculant could be produced in either powder or pellet form.

Formulation, organic carrier, Trichoderma

EO-04

Histological of normal testicular and diabetic rat (Rattus norvegicus Berkenhout, 1769) induced streptozotocin

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Diabetes mellitus (DM) is a chronic disease characterized by high blood glucose levels due to improperly adjusting glucose homeostasis settings. Diabetes mellitus can cause impotence, impaired ejaculation, impaired spermatogenesis, accessory glandular function and various systemic diseases in male fertility. This research was aimed to study histological of normal testicular and diabetic rat induced by streptozotocin. This study used comparative descriptive analysis method by making testicular organ preparation on normal treatment (0.5% CMC solvent) and diabetic treatment (0.5% CMC solvent; + Streptozotocin 60mg/kg BW). Each testicular histological incision of treatment was observed qualitatively in the microscopic structure of the cross-section of the seminiferous tubules. The study showed that the testicular histological features of normal, i.e. the normal cell components in each compartment observed consisting of the intravascular compartment, the interstitial compartment, the basal compartment, and the ad luminal compartment. The testicular histological of diabetic showed that spermatogenic cells in the intravascular and interstitial compartments were normal but in the basal compartment and ad luminal compartments was decreased in the number of spermatogenic cells.

Diabetic, rat, streptozotocin, testicular histological

EO-05

Intracellular antioxidant activity of Muntingia calabura leaves metanolic extract

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Excessive reactive oxygen species (ROS) results in oxidative damage that destroys proteins, lipids, and DNA, resulting in various diseases and accelerating the aging process. Antioxidants are compounds that have the ability to suppress oxidative stress. Muntingia calabura has a high phytochemical content, especially the phenolic group that can act as antioxidant. This study aims to determine the intracellular antioxidant activity of M. calabura leaves methanolic extract (MLME) through intracellular ROS levels in 3T3 fibroblast cells under normal condition and oxidative stress due to UVB exposure. Tests were performed using the DPPH (2,2 Diphenyl-1-picrylhydrazyl) method and Modified NBT (Nitroblue Tetrazolium). Data of intracellular antioxidant activity was analyzed using One-way ANOVA followed by Tukey-Kramer Post Hoc Test in Microsoft Excel 2010. Testing of antioxidant activity with DPPH method obtained result that...
MLME has high antioxidant activity with IC50 value of 3.030 μg/mL, while intracellular antioxidant activity with Modified NBT method showed that MLME statistically had significant effect on intracellular ROS level under normal condition (p < 0.05) based on dose-dependent manner, but not significant (p > 0.05) under oxidative stress condition. Significant effects were only shown at a concentration of 20 μg/mL against the control of oxidative stress due to UVB exposure.

Antioxidant, intracellular ROS, Muntingia calabura, NBT

**EO-06**

Total phenolic content and antioxidant activity of ginger extract (*Zingiber officinale*) and SNEDDS with eel fish bone oil (*Anguilla spp.*)

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The aims of this study are to measure phenolic content of ginger (*Zingiber officinale*) and to observe the comparison of antioxidant activity between pure ginger extract and ginger extract in SNEDDS (Self Nanomulsifying Drug Delivery System) with bone of eel fish oil (*Anguilla spp.*) as a conductor based on IC50 value using DPPH method and activity of Superoxide Dismutase (SOD) in vivo using Adrenochrome Assay. Determination of total phenolic content of ginger extract was measured by UV/Vis Spectrophotometric using Folin-Ciocalteau reagents then the absorbance was measured at wavelength 756 nm. Calculation of IC50 DPPH (2,2 diphenil-1-picrydydrazyl) of the ginger extract and SNEDDS were performed by mixed 1 mL of extract from different concentration with 0.3 mM DPPH 1 mL and the absorbance was measured using spectrophotometer UV/Vis at 517 nm wavelength. Measurements of SOD was based on the ability of SOD inhibit spontaneous autoresidation of epinephrine using adenochrome assay, then the absorbance was measured at wavelength 480 nm at temperature of 30°C. Total phenolic content of ginger extract was 4.85 mg/mL equivalent with gallic acid standard solutions (GAE). Antioxidant Scavenging activity by DPPH assay of ginger was higher than SNEDDS. IC50 of ginger was 385.4 mg/mL and IC50 of SNEDDS was 428.4 mg/mL. The result of descriptive analysis of Kruskal Wallis of SOD activity assay was expressed that Asymp sig value P = 0.001 (P <0.05) indicated that there were significant differences between treatment groups. SOD activity test performed in vivo showed that ginger extract made into SNEDDS system with eel fish oil as the conductor has a significant influence compared with ginger extract group.

Sorghum (*Sorghum bicolor L.*) is a drought-tolerance plant that has ability to survive on post-tin mining land. One way to increase the optimum growth and production of sorghum on post-tin mining land can be done by ameliorant addition. The objective of the study was to increase the optimum growth and production of sorghum in post-tin mining land. The experiment had been conducted in post-tin mining area located in Dwi Makmur Village, Merawang, Bangka, from November 2017-May 2018. The experiment was conducted using Completely Randomized Design (RAL) with 1 (one) single factor as follows: Control (C0), NPK (C1), 40 g Phosphate Solvent Microorganism (C2), SP36 100 kg/Ha (C3), SP36 200 kg/Ha (C4). The results showed that the application of 40g of Phosphate Solvent Microorganism (C2) had the highest value on the total dissolved solids content (° Brix). Complete NPK fertilizer (C1) has the highest root growth when its compared to other treatments. This indicates that full NPK fertilizer (C1) are able to increase the production of seeds/plant and harvest index (%). The addition of ameliorant is able to increase the optimum growth and production of sorghum in post-tin mining land of Bangka.

Ameliorant, phosphate solvent microorganism, post-tin mining, sorghum

**EO-07**

Optimization of sorghum cultivation (*Sorghum bicolor*) with ameliorant addition in post-tin mining land

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**EO-08**

Composting the rice straw by *Trichoderma viride* and its potential to reduce *Fusarium oxysporum* f.sp. *cubense* on banana seedling

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*Trichoderma viride* is one of fungi which can be used as antagonistic fungi and also as decomposer. This research was aimed at determining the best dose of rice straw compost to suppress the development of *Fusarium* wilt disease and to improve banana plant growth. The research was conducted in Laboratory and greenhouse using...
Randomized Block Design with seven treatments and four replications. The treatments were the doses of rice straw compost which was decomposed by *Trichoderma viride* (Tv-T1sk) given to plants (60, 80, 100, 120 and 140g per plant), control I (Compost without Tv-T1sk) and control II (without compost). The observed parameters were density of Tv-T1sk propagule, incubation period, percentage of damaged leaves and tubers, and plant growth (plant height, number of leaves, and stem circumference). The results showed that compost decomposed by Tv-T1sk was effective in suppressing *Fusarium* wilt disease on banana seedlings. A dose of 100g/plant showed the best effect on reducing *Fusarium* wilt diseases up to 74.26% and increase the plant growth to 11.48%.

Banana, compost, *Fusarium* wilt disease, *Trichoderma viride*

**EO-09**

**Induce systemic resistance of shallots with endophytic indigenous bacteria against bacterial leaf blight diseases**

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Endophytic bacteria capable to control plant pathogens indirectly through induce systemic resistance. Indicators to induce resistance are increased activity of defense enzymes and production of secondary metabolite compound. The research objectives are; analyze the activity of the defense enzyme (Polyphenol oxidase = PPO) and the production of salicylic acid in shallot that were introduced with endophytic indigenous bacteria against Bacterial Leaf Blight (BLB) Disease. Mechanism of systemic resistance was observed on roots and leaves of shallots plants that have been introduced by indigenous endophytic bacteria and inoculated with *Xanthomonas axonopodis pv. allii* (Xaa). Observations were made on the percentage of incidence of disease, severity of disease, PPO enzyme activity observed by spectrophotometry and production of salicylic acid as measured by capillary electrophoresis. The results showed that endocytic bacteria *B. cereus* P14, *B. cereus* Se07, *Bacillus* sp. HI, *Bacillus* sp. SJI and S. marcescens isolate ULG1E2 and JB1E3 were able to affect shallots resistance to BLB disease. The physiological responses of Shallots plants colonized with indigenous endophytic bacteria showed increased activity of PPO enzyme and salicylic acid production in roots and leaves. Endophytic bacteria colonization of *B. cereus* Se07 increased the PPO activity (0.045 μg/mL). Colonization of endophytic bacteria *B. cereus* P14 increases the salicylic acid production (29.62 ppm/g).

Bacterial leaf blight, defense enzyme, endophytic bacteria, polyphenol oxidase, salicylic acid

**EO-10**

**Analysis of nutrient requirement on the growth of young porcupine (*Hystrix brachyura* Linnaeus, 1758) placed in two types of cage**

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Porcupine (*Hystrix brachyura*) is one of Indonesia's wild mammals that are protected and extinct species. In order to increase breeding at ex situ conservation level, the adequacy of feed and nutrition factors should be considered. Four young porcupines used in this study to determine the effect of cage type on growth of porcupines in captivity. During the study, two porcupines of each are placed in individual cages with concrete floor and the other two porcupines of each are placed in battery cages made of steel. The two treatment groups are given the same ration. Ration experiment consisted of siam banana (*Musa* sp.), cassava (*Manihot utilissima*), carrot (*Daucus carota*), tomato (*Solanum lycopersicum*), guava (*Psidium guajava*), water spinach (*Ipomoea aquatica*), and koi fish pellets. Feeding is done 2 times a day and drinking water available ad libitum. The results showed body weight gain of porcupine kept in battery cages was higher (namely 40.48 g/head/day) than that of porcupine in the cage of concrete floor (34.52 g/head/day). In terms of the feed used, porcupines in the cage floor more efficiently (14.71%) in comparison to porcupine in battery cages (15.76%).

Cage type, growth, feed efficiency use, *Hystrix brachyura*

**EO-11**

**Optimization of three sequential green processes of biohydrogen production from coconut husk by using response surface methodology**

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The objective of this study is to optimize the three significant parameters of subcritical water (SCW) process for biohydrogen production from coconut husk by using central composite design model. In this study, the effect of temperature, reaction time and water-solid ratio were evaluated and discussed comprehensively. The results showed that water-solid ratio had a significant effect than temperature and reaction time towards total reducing sugar (TRS). Surprisingly, the optimal yield of TRS was obtained...
at the shortest time of 4.773 minutes and the highest temperature of 183.636 C of the SCW process. The result of SEM, XRD, and FTIR characterization confirmed that lignocellulose structure was changed remarkably then contribute to the efficient processes of enzymatic and fermentation. The parameters evaluation of this study suggests that the three sequential green process for biohydrogen production is promising for large commercial production.

Biohydrogen, central composite design, enzymatic hydrolysis, reducing sugar, subcritical water

EO-12

Ecological restoration of gold mined out forest lands to support biological conservation at East Kalimantan, Indonesia

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Physical changes in landscape is always followed by changes of the existing biological composition which can be assessed by analyzing their ecological range and its relationship with surrounding biological components. Accordingly, biological composition is used as bio-indicator of ecological restoration, whether land rehabilitation is then unrestrained to natural mechanism. The research objective was to identify the biological composition after land rehabilitation works. Research was conducted at selected sites of rehabilitated forest lands (Lower Nakan-164, Upper Nakan-138, Lower Bayaq-85 and Ex-Ladang sites). In Lower Nakan-164, the crown of naturally growing trees have been engaged and providing natural shadow for supporting growth of primary plants species of Dipterocarpaceae. Wild plants such as creeper was periodically removed due to being weeds to primary plants species. In Upper Nakan-138 and Lower Bayaq-85 sites, an intensive liberation cutting was done to open space of tree growth for forests ecosystem recovery. Ex-Ladang site showed a mature succession of dominant tree stands close to old secondary forest ecosystem. For biological conservation reason, the status post gold mining concession has been changed from permanent production forest into protected forest areas. The forest management intended for biological conservation purpose is supported with trust fund provided by former gold mining operations as a mandatory of mine closure programs.

Bio-indicator, ecological restoration, mined-out forest lands, revegetation, succession

EO-13

In vitro characterization and identification of indigenous endophyte bacteria from potato as potential biocontrol agents of Ralstonia syzygii subsp. indonesiensis

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Our previous research had screened 8 potential indigenous endophyte bacteria which had ability to control Ralstonia syzygii subsp. indonesiensis in greenhouse conditions. This research purposed to identified endophytic isolates and characterized its ability to promote growth and control pathogens. Potential isolates then identified using 16S rRNA with 27F and 1492R primers. Isolates abilities characterized were biocontrol ability (protease production, hemolysin, fluorescent, antibiotic production, cyanide) and growth promotion ability (siderophore and IAA production, phosphate solubilization). The 8 potential isolates identified as Bacillus toyonensis strain BCT-7112, Bacillus aryabhattachi strain B8W22, Bacillus cereus ATCC 14579, B. cereus strain CCM 2010, B. toyonensis strain BCT-7112, B. cereus ATCC 14579, B. cereus strain JCM 2152 dan Mesorhizobium thiogameticum strain SJT. All characters of endophyte strain shown varied ability to both promote growth and control pathogens. None of strains had ability to solubilize phosphate. All isolates could produce IAA whereas. Strain B. toyonensis strain BCT-7112, B. cereus ATCC 14579, B. cereus strain CCM 2010, B. toyonensis strain BCT-7112 and B. cereus strain JCM 2152 can produce ammonia. Strain Bacillus aryabhattachi strain B8W22, B. cereus ATCC 14579, B. cereus ATCC 14579, B. cereus strain JCM 2152 can produce siderophore. All those varied abilities made those isolates potential for consortium development, need further research for those isolates.

16S rRNA identification, endophyte, characterizations,

EO-14

Effect of various encapsulant material on the probiotic Bacillus macerans viability as anti-Helicobacter pylori agent

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Probiotic bacteria *Bacillus macerans* able to act as an anti-*Helicobacter pylori* when viability is high (107-109 CFU/g) in the acidic digestive tract being shielded by encapsulant. The purpose of this study was to determine the effect of various encapsulation material on the viability of the bacteria *B. macerans* before and after treatment with the method of encapsulation extrusion and drying with spray-drying. The study was conducted with descriptive exploratory experimental methods, variables are *B. macerans* and encapsulant composed of calcium alginate 3%, skimmed milk 10% and 15% as well as a mixture of calcium alginate 3%-skimmed milk (10% and 15%), the observed parameters *B. macerans* is positive cells encapsulated, viability before and after encapsulation at storage temperatures of 40 and 370 °C for two weeks. The result of observations after treatment encapsulation and storage for two weeks at 40 and 370 °C, respectively viability of *B. macerans* is lowest with calcium alginate 3% encapsulant is (3.8 x 107), (3.3 x 107) and (12.3 x 107), while the highest viability with combination of calcium alginate 3%-15% skim milk encapsulant is (7.4 x 107), (6.5 x 107) and (14.3 x 107) on this basis can be concluded that the level *B. macerans* encapsulation survival with calcium alginate 3% is 58.5%, while the combination of calcium alginate 3%-15% skim milk encapsulant is 77.9%.

*Bacillus macerans*, *Helicobacter pylori*, probiotic

**EO-15**

Mycorrhizal fungi biofertilizer production in hydroponic system using different rates of phosphorus content in nutrient solution

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Mycorrhizal fungi have been produced as one of biofertilizer products to improve soil health and plant production. To improve the efficiency of the production system, current research has been conducted using hydroponic technology with automatic watering system and reduced phosphorus content in nutrient solution. An experiment to find out the best rate of P content in nutrient solution to produce mycorrhizal biofertilizer was carried out in a glasshouse condition. The treatments were two hydroponic systems (Ebb-Flow and Nutrient Film Technique) and different P levels in nutrient solution (0, 20, 40, 80 ppm). The plant used was Sorghum bicolor which grown in a mixture of zeolite and rice husk charcoal for six weeks. The parameter measured was percentage of mycorrhizal colonization, number of spores, nutrient (P and K) uptakes, and plant biomass. In all parameters measured, for both hydroponic systems, the rate of P at 20 ppm gave the highest results. The findings suggest that hydroponic system with reduced P content in standard nutrient solution up to 25% provide an alternative for mass production of clean, soilless mycorrhizal biofertilizer.

Biofertilizer, hydroponic, mycorrhiza, phosphorus

**EO-16**

Isolation and antibacterial activity of fungal endophytes from *Antidesma bunius* against *Candida albicans*

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The resistance of pathogenic bacteria to various types of antibacterial drugs becomes crucial issues for the medical practitioners. Continuous research is therefore required to develop new natural antibacterial compounds that are effective against resistant microbes. The aim of the present study was to isolate and characterize the endophytic fungi from the stems and leaves of Buni plant (*Antidesma bunius* L.) and to identify their antibacterial activities against *Candida albicans*, which considered as opportunistic bacteria when its host immunity is reduced. In this study, Direct Dilution Plating method was applied to isolate the fungal endophytes. The antibacterial activity test of endophytic isolate was conducted by Agar Plug Assay method. While microscopic observation of endophytic fungal isolates that display antibacterial activity was performed by Moist Chamber method. A total of seven isolates were obtained from the stems and leaves of Buni plant. Among these isolates, two of them showed antibacterial activity against *C. albicans*. Endophytic fungus P03D03 showed the most potent antibacterial activities, compared to that of B yellow isolate. Both macroscopic and microscopic characteristics reveal that the P03D03 isolate was identified as *Aspergillus* sp.. Further study on the species and compounds contained in P03D03 isolate is highly suggested for further development as a new antibacterial source.

*Antidesma bunius*, antibacterial activity, *Candida albicans*, fungal endophytes

**EO-17**

Effectivity of inoculum endogenous arbuscular mycorrhiza on yield of corn plant on marginal dry land

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Arbuscular mycorrhiza (AM) has a very large function in symbiosis with plant roots, as one of a group of microorganisms known as biological fertilizers, it's very important to be studied further in relation of effort to increase the productivity of maize crops in an organic farming system. AM inoculum easy to get, can take from weed rhizosphere in dry land. The study aimed to observe the existence of AM and evaluated the growth and productivity of corn plant with AM inoculation by using inoculum indigenous isolated from rhizosphere of weed. The design used in this study was Randomized Block Design (RBD) in three groups with single factor pattern, by using arbuscular mycorrhiza and manure treatments. The result showed that in the rhizosphere there is various arbuscular mycorrhizal genus which is effective in increasing local corn yields in marginal dry areas when combined with manure, increasing of P plant uptake and P available in one-month-old plant rhizosphere. The use of indigenous arbuscular mycorrhiza inoculum combined with manure of 80 g per planting pit to corn plant resulted in dry seed yield increasing 3.85 t. ha⁻¹, while in plants without arbuscular mycorrhiza inoculation and manure did not produce seeds.

Endomycorrhiza, manure, phosphor, weed

EO-19

Soil and organic matter mixed by soil fauna as inoculum source of arbuscular-mycorrhizae spore on cocoa seedling

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Soil fauna as an ecosystem engineer plays an important role in mixing soil particles with organic matter, and contain arbuscular mycorrhizal spores. The objective of this research is to study the potential of soil-organic materials mix produced from soil fauna ecosystems engine activity as a source of arbuscular mycorrhizal inoculum for cocoa seedlings. Three kinds of soil mixed products with organic materials resulting from collaborative activities between earthworms (Pheretima sp.) and ants (Ponera sp.) was used as inoculum sources. Each inoculum comes from a mix between soil and biochar from the cocoa pod husk (S-BC), soil and Chromolaena odorata pruning compost (S-CC), and soil with Gliricidia sepium leaf litter (S-GL). Different doses of every inoculum were tested on cocoa seedlings grown in polybags containing 1 kg of sterile soil and maintained for three months under glass house. The difference among inoculum dose on the leaf area, root dry weight, shoot, and root: shoot of the seedling at three months after application were not significant, while the height and number of leaves were not significant. The difference in leaf area at 10 g S-GL than control, 10 g, and 20 g S-BC is significant. The dry weight of roots, shoot, root:shoot, and root: shoot ratios at 30 g S-GL is highest. The root infected mycorrhizal at 20 g and 30 g S-CC, and 30 g S-GL can reach 100%, while the control (without inoculum) was not found out the root infected. N, P, and ratio N:P content in seedling among inoculum are various. We concluded soil and organic material mixture produced from collaboration activity between earthworm and ant had a potential as inoculum sources of arbuscular mycorrhizal spore for application on plant. The type of organic material determines the performance of the inoculum.

Ant, ecosystem engineers, earthworm, infection, plant adaptation

Endomycorrhiza, manure, phosphor, weed
The effect of chitin concentration as a substrate on chininase production by *Bacillus cereus* TB04-05

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The effect of chitin concentration as a substrate on the culture of *Bacillus cereus* TB04-05 on chininase production was investigated. The bacteria were cultured on medium with variation of chitin colloidal concentration of 0.1%, 0.3% and 0.5%. The relationship between chininase production and the central carbon metabolism was performed by determining the growth rate, pyruvic acid, and acetic acid. As a result, the highest specific activity was produced when *B. cereus* TB04-05 was cultured on chinin medium 0.3%, incubation time 24 hours with activity value 27.34 ± 2.383 U/mg. These results were supported by a growth curve which showed that culture also produced the highest growth rate at a concentration of 0.3%. The association of chininase activity with the central carbon metabolism showed that culture at 0.3% concentration also produced pyruvic acid with the highest concentration compared to the other two concentrations. Meanwhile, the concentration of acetic acid accumulated was not significantly different between cultures at all three concentrations. Therefore, it can be concluded that chininase activity may be affected by substrate concentration by increasing the rate of pyruvic acid as intermediate compounds in glycolysis.

*Bacillus cereus* TB04-05, chininase production, chinin concentration

Optimization of bacteriocin production from inasu bacterial isolate by using response surface methodology

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Bacteriocins are ribosomally synthesized antimicrobial compound. Bacteriocin as biopreservative agent was potential as bactericidal effect against various types of pathogenic bacteria. Response surface methodology (RSM) is a combination of statistical and mathematical techniques used to create model and to analyze a response that is influenced by several factors to optimize material production from lactic acid bacteria (LAB). The objective of this study was to determine the optimum condition using RSM to obtain optimal bacteriocin production from LAB. Activity test was performed using well diffusion agar method. The experimental design for bacteriocin production was used central composite design with four experimental factors, i.e., glucose concentration, pH, temperature and concentration of yeast extract, with 30 running experiments. The results indicated that the optimum condition of bacteriocin production from *L. plantarum* IN13 which showed inhibition activity optimum against *Salmonella typhimurium* and *Listeria monocytogenes* with the addition of 4 g L⁻¹ glucose, 8.11 g L⁻¹ yeast extract, pH 5.3, and temperature 30°C and. The highest bacteriocin activity against *S. typhimurium* and *L. monocytogenes* was 3136 AU/mL and 2426 AU/mL respectively.

Bacteriocin, *Lactobacillus plantarum*, response surface methodology

A cost-free method improvement of metagenomic DNA isolation from sub-optimal soils

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Soil is one of the most complex and challenging environments in which many microbes and this may possibly represent thousands of different species. Because of its complexity and dynamic in nature, soil presents a unique challenge for metagenomic applications. Metagenomics currently represents a powerful tool for assessing the diversity of complex microbial communities, providing access to a number of new species, genes or novel molecules that are relevant for biotechnology and agricultural applications. Selecting the most suitable combination of soil sampling, DNA extraction, and purification, are the most appropriate for the metagenomics study. The metagenomic DNA isolated from different rhizosphere under sub-optimal condition, using three manual methods, were analyzed in terms of yield, quality and downstream application as template for PCR amplification. Of the three, the method employing liquid nitrogen yielded readily amplifiable DNA, while that by all others required further downstream processing to achieve purity and PCR amenability. In conclusion, it is significantly simplifying the routine practice of many molecular biotechnologies and decreasing the cost.

DNA metagenome, manual method, soil diversity
**EP-02**

Formulation of mycorrhization helper bacteria liquid inoculant for controlling *Pratylenchus coffeae* in coffee plantation

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Plant Growth Promoting Rhizobacteria *Pseudomonas* and *Bacillus* are well-known biofertilizer due to their ability to solubilize inorganic phosphate in soil. However, their potential to enhance mycorrhiza formation is well documented. Mycorrhization of *Coffea* sp. is important to decreased *Pratylenchus coffeae* incidence, a major coffee pest in a number of countries in Asia. The objective of this laboratory experiment was to formulate Mycorrhization Helper Bacteria biofertilizer in organic-based liquid medium. *Pseudomonas diminuta* (PD) and *Bacillus subtilis* (BS) have been cultured in molasses-based liquid media at neutral acidity. Different composition of BS ad PD liquid culture has been mixed and stored in room temperature for three months. At day seven, cell density of each species was count using serial dilution method; as well as liquid culture acidity and nitrogen profile. cell counting and acidity measurement was continued once a month until the end of experiment. Indole acetic acid level in two best BS and PD composition has been analyzed. The result was the best composition of MHB liquid culture was 2 volume of *P. diminuta* mixed with 3 volume of *B. subtilis*. The viable cell count and acidity of this formula were in within Indonesian liquid biofertilizer standard.

Biofertilizer, cell density, culture acidity, mycorrhization helper bacteria

**EP-03**

Characteristics and growing environmental conditions of *Amorphophallus paeoniifolius* in Cisoka Village, Cikijing Sub-district of Majalengka, West Java, Indonesia

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Indonesia is a country that has abundant biodiversity. *Amorphophallus paeoniifolius* (Dennst.) Nicolson is one of biodiversity which spread in the territory of Indonesia. This study aims to determine the characteristics of phytochemicals and the physical environment conditions where *A. paeoniifolius* grows in Cisoka Village, Cikijing Sub-district, Majalengka District, West Java, Indonesia. The research method is descriptive analysis. The parameters observed some phytochemical compounds and environmental conditions such as light intensity, pH, humidity, and temperature. Samples are taken from several points by exploring the research location, randomly. The results showed that the blade of leaf contains phenolic, flavonoids, and tannins. Petiole contains saponins. Bulbs contains carbohydrates, proteins, and starches. Meanwhile, the recorded physical environment conditions include dusty clay texture, soil pH 6.8-7, air temperature, 21-44.5ºC, air humidity 39-98%, and light intensity 100-153900 lux.

*Amorphophallus paeoniifolius*, characteristics, environmental conditions

**EP-04**

Influence of NAA and coconut water with variation of soaking duration on the growth of yellow bamboo branch cutting

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Yellow bamboo (*Bambusa vulgaris* Schrad Ex. var. *striata*) is one kind of bamboo used for industrial and household raw materials. Yellow bamboo propagation with branch cuttings has relatively low percentage of growth. To increase the growing success of yellow bamboo branch cuttings can be used growth regulators substance, such as NAA (Naphthalene Acetic Acid) and coconut water. This study aims to obtain the best combination of NAA and coconut water with the soaking duration in the growth of yellow bamboo branch cuttings. The study was conducted using Completely Randomized Design (CRD) of 6 × 3 factorial arrangement with five replications. The first factor was the combination of NAA and coconut water (CW), which consists of six levels, namely 100% CW, 20% NAA + 80% CW, 40% NAA + 60% CW, 60% NAA + 40% CW, 80% NAA + 20% CW and 100% NAA. The second factor was the soaking duration which consists of three levels, namely 12 hours, 24 hours, and 36 hours. Parameters observed included shoot emerging time, shoot number, shoot length, leaf area, root number and root length. The data obtained were analyzed using the Analysis of Variance (ANOVA) and Duncan’s Multiple Range Test (DMRT) α=5%. The results showed that the combination of 80% NAA + 20% CW gave the best yellow bamboo branch cuttings growth with an average shoot length of 1.44 cm, leaf area 41.29 cm², root number 42.87 and root length
23.70 cm. The interaction of 80% NAA + 20% CW with soaking duration of 36 hours resulted in average the fastest shoot emerging time of 2.02 days after planting.

Branch cutting, coconut water, NAA, yellow bamboo

**EP-05**

**Corrosion and scaling tendency indices of water from the Saguling Reservoir, West Java, Indonesia**

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Corrosion and scaling can be a serious problem in hydroelectric power plants including the PLTA Saguling. To evaluate corrosivity properties of water from Saguling Reservoir, five water stability indices of Langelier Saturation Index (LSI), Ryznar Stability Index (RSI), Puckorius Scaling Index (PSI), Larson-Skold Index (LI), and Aggressive Index (AI) were determined at five different times. The mean water parameters included were temperature (27.35 ± 0.240°C), pH (6.93 ± 0.106), TDS (170.60 ± 6.841 mg/L), TSS (53.20 ± 21.74 mg/L), electrical conductivity (334.20 ± 21.65 μS/cm), SO4 (67.70 ± 11.105 mg/L), Cl (21.87 ± 1.897 mg/L), HCO3 (109.69 ± 11.105 mg/L), Ca (11.52 ± 1.610 mg/L), and CO3 (17.28 ± 4.635 mg/L). The mean values of LSI, RSI, PSI, LI, and AI indices were-1.41±0.135, 9.74±0.185, 6.82±0.101, 0.70±0.067, and 10.06±0.135 respectively. According to all indices, water samples showed a corrosion tendency that ranges from slightly corrosive to highly corrosive. Based on these results then corrective action should be taken.

Corrosion tendency, Saguling Reservoir, scaling tendency, water stability indices

**EP-06**

**Cytotoxicity assay of ramie leaf (Boehmeria nivea) ethanolic extract against proliferation of A-549 Lung Cancer Cell Line**

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Lung cancer is ranks first as cause of death in men and ranks fourth in women, also included in the 6th largest cause of death in Indonesia. Treatment of lung cancer that is safe and effective need to be developed. One of the efforts of cancer treatment can be done by utilizing the compounds contained in natural materials. One of them is the ramie plant (Boehmeria nivea (L.) Gaud.), ramie plant has a bioactive content such as polyphenols, flavonoids, and catechins that have an important effect on cancer chemoprevention. The purpose of this study was to find concentration value of ramie leaf ethanolic extract that can inhibit 50% of A-549 lung cancer cell proliferation (IC50). The cytotoxicity test was performed using MTT cytotoxicity assay method which is based on the change of tetrazolium salt (3-(4,5-dimethylimidazole-2-yl)-2,5-diphenyltetrazolium bromide) (MTT) to formazan in active mitochondria in living cells. The percentage of inhibition was analyzed using probit analysis to obtain IC50. The results showed that the ethanolic extract of ramie leaf was cytotoxic with IC50 value 12.84 μg/mL; therefore it has cytotoxic activity against A-549 lung cancer cell line with potent extract potency as an anticancer agent.

A-549, anticancer, Boehmeria nivea, MTT cytotoxicity assay, proliferation

**EP-07**

**The effect of jengkol (Archidendron pauciflorum) fruit peel ethanolic extract to heart histologic of rat (Rattus norvegicus) induced by streptozotocin**

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Indonesia is ranked 7th out of 10 countries with the highest diabetic patients in the world. Diabetes mellitus is a disease that can cause heart disorders and adults who suffer from DM are four times more likely to develop heart disease. Jengkol fruit peel has been used traditionally as a drug for diabetes mellitus. The aim of this research is to know the effect of jengkol (Archidendron pauciflorum) fruit peel ethanolic extract (JFPEE) on rat (Rattus norvegicus) heart histological and to obtain effective dose from JFPEE. This research used experimental method in laboratory with Completely Random Design (CRD) by 6 treatment level and 4 replications. Treatment was given for 14 consecutive days consisting of negative control, positive control (glibenclamide dose 10 mg/kg BW), P1, P2, and P3 (JFPEE dose 385, 770, and 1.540 mg/kg BW). Diabetic induction was performed with streptozotocin dose of 65 mg/kg BW in female Wistar rat, except for negative control group. The parameters that observed were number of necrosis and cell damage score, including fat degeneration, hydropic degeneration, and inflammatory cell. The data that obtained were analyzed by ANOVA-Tukey's with 95% confidence level using SPSS version 21 for Windows. The result of histological structure showed that number of necrosis and cell damage score in group of rats treated with JFPEE dose 385 mg/kg BW (174.25±6.34; 1.25±0.50) were not significantly different from the negative control rats (172.00±7.62;
The effective dose of JFPEE that can repair the damage of heart cell's rat induced by streptozotocin is 385 mg/kg BW.

Heart, jengkol fruit peel, rat, streptozotocin

**EP-08**

Prospectivity of *Aloe vera* and *Spirulina fusiformis* as supplements on rabbit carcass performance *(Oryctolagus cuniculus)* male New Zealand White

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Food supplements are defined as a natural product that can complement the nutritional needs required, containing vitamins, minerals, amino acid, and compounds that have nutritional value or physiological effects in concentrated amounts. Supplements are classified as the nutraceutical. *Spirulina fusiformis* is a blue-green alga and contains complete nutrients such as protein, fatty acids, vitamins and high antioxidants. *S. fusiformis* can improve the immune system, metal protective, and anti-arthritic. The previous research has been done in Biosystem Laboratory of Department Biology FMIPA Universitas Padjadjaran, Jatinangor, Sumedang, West Java, Indonesia showed that *Aloe vera* dose 200 mg/kg bb was shown to decrease the frequency of apoptosis of cells exposed to etoposide. This study aims to examine the potential and the formulation of the two effects into supplements that can improve carcass performance. The experimental method was done experimentally in single Randomized Complete Design (RAL) laboratory using 28 males rabbit (*Oryctolagus cuniculus*), 16 weeks old and 1 kg body weight. animal test was randomly divided into 7 treatments ie negative control (P0), positive control of vitamin C dose 19 mg/kg bw (P1), *A. vera* dose 74 mg/kg bw (P2), *S. fusiformis* dose 296 mg/kg bw (P3), *A. vera* dose 74 mg/kg bw: *S. fusiformis* dose 148 mg/kg bw (P4), *A. vera* dose 74 mg/kg bw: *S. fusiformis* dose 296 mg/kg bw (P5) and *A. vera* dose 74 mg/kg bw: *S. fusiformis* dose 593 mg/kg bw (P6). All treatments were repeated 4 times. Parameters observed include cutting weight, carcass weight, the percentage of carcass component (bone, meat, and fat) and color and texture of carcass. The data obtained were tested using Analysis of Variance (ANOVA) and Duncan test (α = 0.05). The results showed that *A. vera* and *S. fusiformis* had the potential to be an effective supplement to improve rabbit carcass performance with *A. vera: S. fusiformis* formulation (74: 148 mg/kg bw).

*Aloe vera*, carcass, *Oryctolagus cuniculus*, performance, rabbit *Spirulina fusiformis*

**EP-09**

Phytoremediation of settling ponds after revegetation of ex-mining area

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A silica mining company try to restore the ecosystem post-mining with rehabilitation activities such as reclamation and revegetation of their ex-mining area. It is located at Sukabumi District of West Java Province, Indonesia. After three years planting the area the trees and cover crops grew well. There are two settling ponds located in the middle of the ex-mining area, the small and the large settling pond. Those settling ponds were built in order to prevent the effect of acid mine drainage (AMD). AMD is the main pollutant at the open pit mining. The impact of acid mine drainage is the contamination of aquatic biota due to the high acidity and heavy metal content in the water. One method to reduce heavy metal content in settling ponds is by phytoremediation technology. The purpose of this study was to analyze the heavy metal content of fish cultured in settling ponds of ex-mining area and analyze the ability of some plants as phytoremediation. The cultured fish is *Tilapia* with 3 phytoremediation plants such as eceng gondok (*Eichhornia crassipes*), apu-apu (*Pistia stratiotes*) and kiambang (*Salvinia cucullata*). The results showed that the fish cultured in small settling ponds only survived for 4 days after that all fish death 100%, eceng gondok plant survived 15 days after it died 100%, apu-apu and kiambang survived 7 days (100% dead). Small settling ponds have high acidity and relatively high Fe metals. In large sediment ponds, fish and plants can live and grow well.

Ex-mining area, phytoremediation, revegetation, settling pond, *Tilapia*

**EP-10**

The effect of ethanol extract of fruit peel jengkol *(Archidendron pauciflorum)* to spleen histological structure of streptozotocin-induced diabetic rats (*Rattus norvegicus*)

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Diabetes Mellitus (DM) is a chronic endocrine disorder associated with several secondary complications. The spleen is a lymph organ with the main function of filtering red blood cells, immune response and playing any kind of role in diabetes. Despite the currently available anti-diabetic drugs, there are need remedies for alternatives which are economical and safe. One alternative medicine well known by local Indonesian communities to treat DM is the fruit peel of Archidendron pauciflorum. This study aimed to evaluate the histological changes in the spleen following administration of ethanol extract of fruit peel Archidendron Pauciflorum (EEFPAP) in the streptozotocin (STZ)-induced diabetic rats. Diabetic rats were used in this study consisting of six groups of four animals each. The treatments given are NC (CMC solution 0.5%), Positive Control (CMC solution 0.5%), G (glibenclamide), Treatment 1, 2, and 3 (EEFPAP dose 385; 770; 1540 mg/kg BW). All of the treatment was administered orally to the experimental rats 14 days following induction. The spleen was collected and the histological study was performed using hematoxylin and eosin (H&E). The parameters observed were the number of necrosis and cell damage score, including fat degeneration, hydropic degeneration, and inflammatory cell. The result showed that EEFPA at dose 385 mg/kg BW and 770 mg/kg BW gave significant recovery (p<0.05) on spleen damage by the decreased of the number of necrotic cells and cell damage score which lower than other treatments and compared to negative control group. It was concluded that doses of 350 mg/kg BW EEFPAP is the optimum dose to improve the histological structure of spleen damage in diabetic rats.

Archidendron pauciflorum, diabetes mellitus, spleen, streptozotocin