



# International Conference on Biodiversity

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# ABSTRACT INTERNATIONAL CONFERENCE ON BIODIVERSITY

**SOCIETY FOR INDOONESIAN BIODIVERSITY**

**Bogor, 29-30 September 2018**

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# **A B S T R A C T**

## **INTERNATIONAL CONFERENCE ON BIODIVERSITY**

### **SOCIETY FOR INDONESIAN BIODIVERSITY**

**B o g o r, 29-30 S e p t e m b e r 2018**

**T H E M E :**

**Biodiversity for Sustainable Development and Human Welfare**

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# TIME SCHEDULE

## International Conference on Biodiversity

### Society for Indonesian Biodiversity (SIB)

### Bogor, Indonesia, 29-30 September 2018

| TIME                      | ACTIVITIES                                                                                                                                                          | PERSON IN CHARGE                                                | SITE                 |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|----------------------|
| <b>September 29, 2018</b> |                                                                                                                                                                     |                                                                 |                      |
| <b>07.30-08.30</b>        | Registration                                                                                                                                                        | Committee                                                       | Lobby                |
| <b>08.30-08.40</b>        | Opening ceremony                                                                                                                                                    | Chairman of the SIB                                             | R1                   |
| <b>08.40-09.00</b>        | Photo session and coffee break                                                                                                                                      | Committee                                                       | R1, Lobby            |
| <b>09.00-10.30</b>        | Panel I<br><b>Prof. Badrul Munir Md. Zain</b><br><b>Prof. Takaomi Arai</b>                                                                                          | Moderator                                                       | R1                   |
| <b>10.30-12.00</b>        | Panel II<br>[ <i>selected paper</i> ]<br>[ <i>selected paper</i> ]                                                                                                  | Moderator                                                       | R1                   |
| <b>12.00-13.00</b>        | Rest, prayer, lunch & Poster session                                                                                                                                | Committee                                                       | Lobby                |
| <b>13.00-14.00</b>        | Parallel presentation I<br>Group 1: <b>AO-01 to AO-06</b><br>Group 2: <b>AO-07 to BO-01</b><br>Group 3: <b>BO-02 to BO-07</b><br>Group 4: <b>BO-08 to BO-13</b>     | Moderator<br>Moderator<br>Moderator<br>Moderator                | R1<br>R2<br>R3<br>R4 |
| <b>14.00-15.00</b>        | Parallel presentation II<br>Group 5: <b>BO-14 to BO-19</b><br>Group 6: <b>BO-20 to BO-25</b><br>Group 7: <b>BO-26 to BO-31</b><br>Group 8: <b>CO-01 to DO-02</b>    | Moderator<br>Moderator<br>Moderator<br>Moderator                | R1<br>R2<br>R3<br>R4 |
| <b>15.00-15.15</b>        | Coffee break, prayer                                                                                                                                                | Committee                                                       | Lobby                |
| <b>15.15-16.15</b>        | Parallel presentation II<br>Group 9: <b>DO-03 to DO-07</b><br>Group 10: <b>DO-08 to EO-01</b><br>Group 11: <b>EO-02 to EO-06</b><br>Group 12: <b>EO-07 to EO-11</b> | Moderator<br>Moderator<br>Moderator<br>Moderator                | R1<br>R2<br>R3<br>R4 |
| <b>16.15-16.30</b>        | Announcement of the Best Presenters<br><br>Closing ceremony & other explanation                                                                                     | Chairman of the Board of Assessors<br>Chairman of the Committee | R1                   |
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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) Bogor, Indonesia, 29-30 September 2018

#### Genetic diversity

##### AO-01

#### Morphological and molecular study of *Puntius cf. binotatus* from Gunung Tujuh Lake, Sumatra

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Morphological and molecular study of *Puntius cf. binotatus* from Gunung Tujuh Lake in Sumatra has been conducted. The study aimed to determine the taxonomy status of that fish. The Gunung Tujuh Lake is located at the 1996 m asl. The characteristic morphology of *Puntius cf. binotatus* is the absence of black spot on the base of the anterior dorsal ray and one black spot in the middle of the caudal. Lateral line complete with 23-24 scales, lateral transverse scale-row 3 ½ between dorsal origin and lateral line, 3 between pelvic fin base and lateral line. The genetic divergences between *Puntius cf. binotatus* Gunung Tujuh Lake and another *Puntius* and *Barbodes* in Sumatra using Cytochrome b (Cyt b) and Cytochrome Oxidase 1 (COI) genes suggested that *Puntius cf. binotatus* from Gunung Tujuh Lake as a new record subspecies of *B. binotatus banksi* or *B. banksi*.

Morphology, Cyt b, COI, Gunung Tujuh Lake, *Puntius cf. binotatus*

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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 biodiversity@gmail.com

##### AO-02

#### West Sumatra local ducks as poultry genetic resources in Indonesia: A review

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Local poultry plays an important role for smallholders and contributes significantly to food security of households in rural area communities. Duck is considered as the second most preferred poultry species in Indonesia after chicken used as supplier of eggs and meats. Duck breeds (*Anas platyrhynchos*) are important genetic resources which are therefore used for improvement of duck breeds genetic in the future. West Sumatra Province, Indonesia has five well-known local duck breeds; four breeds as producer of meats and eggs named Pitalah, Bayang, Sikumbang Jonti, and Kamang and Payakumbuh duck breed as racing duck. This article aims to compare the phenotypic traits of those five local duck breeds as a purpose to provide some baseline information on typical West Sumatra local duck breeds for genetic characterization, conservation, and future breeding improvement programs.

Bayang, kamang, Payakumbuh race ducks, pitalah, sikumbang jonti

##### AO-03

#### Historical biogeography and divergence time estimates of the Sulawesi Dwarf Buffalo, Anoa

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Anoa is one of Indonesia's endemic animals. The biogeographic history of large mammals in Sulawesi including anoa is a source of debate. The source of the

debate reaches a complex on the migration route: continental or insular ways. This study aims to test the most probable between both hypotheses, and trace the historical biogeography and estimate the divergence time in anoa using a molecular approach (cyt b gene and control region). The results indicate that the divergence time estimation for ancestor anoa was about 1.4 Mya or in the Middle Pleistocene period. Based on the reconstruction of the phylogeny ancestral area, we also support the most possible continental way hypothesis. The sea level factor in the glaciation phase has an important role in the process of biogeographic history of anoa.

Anoa, *Bubalus depressicornis*, *Bubalus quarlessi*, evolution, historical biogeography

## AO-04

### The genetic diversity of tuber crop Daluga (*Cyrtosperma merkusii*) using Sequence-Related Amplified Polymorphism (SRAP) in Siau, Sangihe and Talaud Islands, North Sulawesi, Indonesia

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Daluga or the giant swamp taro (*Cyrtosperma merkusii* (Hassk.) Schott, a member of Araceae, is one of the minor tuber crops in Indonesia although it has a high nutritional value for alternative food. Study on genetic diversity in Daluga is very limited. Six Sequences-Related Amplified Polymorphism (SRAP) primers combinations were used for the first time to assess the genetic diversity among 36 of Daluga accessions were collected from several locations in Siau, Sangihe and Talaud islands, North of Sulawesi, Indonesia. A total of 80 DNA fragments were yielded, varied from 75-1500 bp. The scoring of the fragments resulted in 68 (85.03%) polymorphic bands. Amongst four populations studied, Siau Island population has the highest level of genetic variation with mean values of  $N_a = 1.9375 \pm 0.2436$ ,  $N_e = 1.6409 \pm 0.3255$ ,  $PPL = 93.75\%$ ,  $H = 0.3614 \pm 0.1516$  and  $I = 0.5299 \pm 0.1978$ . Meanwhile, Salibabu, Talaud Island population has the lowest level of genetic variation with mean values of  $N_a = 1.5125 \pm 0.5030$ ,  $N_e = 1.3075 \pm 0.3723$ ,  $PPL = 51.25\%$ ,  $H = 0.1800 \pm 0.1989$  and  $I = 0.2700 \pm 0.2855$ . The high of polymorphic bands were generated made SRAP markers become suitable for further analysis method in applied and basic of genetic study on daluga species and also related genera. This genetic information can be used for baseline data for further research especially to improving the variation of daluga and for conservation of daluga in the future.

*Cyrtosperma merkusii*, daluga, genetic diversity, SRAP

## AO-05

### Genetic diversity and indirect selection of fine cacao (*Theobroma cacao*) based on bean color

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Specialty fine cacaos performed higher price than the bulk. As a perennial tree, early detection marker is important for fine cacao (*Theobroma cacao* L.) breeding. Information on genetic diversity and selection trait will support the program. The aim of this study was to determine early selection marker from leaves traits in fine cacao breeding. Research was conducted on 4 fine and 5 bulk cacao clones in two seasons with different rainfall intensities. Observations performed on bean (white percentage/pod), flush color ( $L^*$ ,  $a^*$ ,  $b^*$ , saturation chroma  $C^*$  and hue angle  $h^\circ$ ), leaf anthocyanin content (A), leaf chlorophyll content (K), A/K and K/A. Analysis of variance and T-test result showed  $L^*$ ,  $b^*$ , A/K and K/A were able to differentiate fine from bulk cacaos and stable in two seasons. All traits showed wide genetic variability, but not all of them showed high heritability. Traits that highly correlated with white bean percentage/pod were  $L^*$  and  $b^*$ . However, only  $b^*$  (yellow color) performed wide genetic variability, high heritability, stability in two seasons and high direct correlation with white bean percentage/pod ( $r=0.93$ ). Fine cacaos showed higher  $b^*$  than the bulk. Therefore  $b^*$  of the flush could be used as selection marker of fine cacao.

Anthocyanin, chlorophyll, fine cacao,  $L^*a^*b^*$ , path analysis

## AO-06

### Analysis phytochemicals, anthocyanin, beta-carotene, and yield components on various genotypes okra (*Abelmoschus esculentus*)

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Okra (*Abelmoschus esculentus* (L.) Moench) is a group of vegetable plants and drugs that have various health benefits. This plant has different shapes, colors, and nutritional content. In Indonesia, this plant has not been widely cultivated, because of the less of socialization and

information about the benefits of okra to the Indonesian people. The aims of this study was to get information phytochemicals, anthocyanins, and beta-carotene content, to cluster and analyze the correlation between characters. This study conducted on September 2017 until January 2018, using Randomized Complete Group Design (RKLT) with three replications and 13 genotypes namely Naila, Zahira, Clemson, Stripe, B293, B291, E004, C127, P1, P2 Purple, MC2, C069, and OR01. Observations are made on okra fruit, namely the phytochemical content, anthocyanin, beta-carotene, chlorophyll, and yield component variables. All okra fruits have steroid phytochemical content and some of the okra have phytochemical content of Saponin and Tanin. Based on the results of the analysis that carried out on 13 okra genotypes showed that the highest okra fruit which has beta-carotene and chlorophyll is genotype C069. Okra fruit which has the highest anthocyanin content is B291. The results of cluster analysis clustered okra into three color groups. The anthocyanin content found in okra fruit does not correlate with the yield component variable. Chlorophyll-a, chlorophyll-b, and total chlorophyll were positively correlated to beta-carotene in okra fruit and variable number of fruits. The number of fruit and fruit weight per plant character greatly influence determined of the selection process. Therefore, this character is very useful for produce okra which has high yield which correlation with chlorophyll and beta-carotene.

Anthocyanin, beta-carotene, chlorophyll, correlation

## AO-07

### Estimation of genetic parameters and gene action of Ve/Se and Hp/Se wheat population for segregant transgressive selection

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Wheat (*Triticum* L.) is a subtropical plant that has been widely adapted in several areas of Indonesia. The assembly of tropical wheat varieties can be done through plant breeding programs. This study aimed to evaluate genetic diversity and gene action that control yields and yield components of wheat. The research was conducted from July 2018 to March 2017 at Balithi research station (1100 m asl.), Cianjur District, West Java Province, Indonesia. The genetic material was used two F2 populations of wheat (HP/Se, and Ve/Se) and three parent genotypes (HP1744, Vee, and Selayar). Characters observed were yield and yield components. The results showed that genetic diversity in both populations was wide except the characters of plant height, number spikelet of main panicle and floret number of main panicle. Broad-sense heritability was high in each

character in both populations. Estimation of gene action showed different results in the same character in each population. There were characters that controlled by many genes and some by few genes with additive and dominant gene action and there are epistasis influences both additive, complementary and duplicate. There were 39.41% and 49.54% putative segregant transgressive in the HP/Se and Ve/Se population, respectively.

Genetic diversity, heritability, yield and yield components

## AO-08

### The effect of polyethylene glycol (peg) on drought-resistant some durian accessions (*Durio zibethinus*) from Nibong, North Aceh, Indonesia

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Durian (*Durio zibethinus* Rumph. ex Murray) is one of Aceh main fruit because of its unique taste and flavor. Drought stress cause decrease in crop yields, so the use of drought-tolerant durian plants is important to anticipate drought stress conditions. Drought resistant plants can be used as rootstock. One of drought-resistant simulation selection method is using PEG solution. The aim of this research was to obtain drought-resistance durian of Nibong, North Aceh, Indonesia during the nursery. The research was held from February to June 2018, using the Split-Plot Design. The main plot was PEG concentration, i.e., 0%, 2%, 4%, and 6%. The subplot was durian accessions i.e. Accession1, Accession2, Accession3, and Accession4. Durian seeds were taken from plants that had big seeds, and could fruiting despite a long dry season. The results showed that there was no interaction between PEG and durian accessions. The most drought-resistant durian was Accession2.

Exploration, screen house, seedling, stress

## AO-09

### Folic acid content and fruit characteristics of five Indonesian Dessert Banana Cultivars

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Folic acid plays an important role in the many metabolic functions of organism, especially pregnant women. Aims

of this research were to analyze folic acid content and describe the morphology of mature fruits at three different genomic groups of five Indonesian dessert banana (*Musa* sp.) cultivars: Ambon Kuning (AAA), Ambon Lumut (AAA), Raja Sereh (AAB), Raja Bulu (AAB), and Lampung (AA). Folic acid content of fruit was analyzed using HPLC equipped with UV-vis detector. Fruit characters were analyzed based on 21 descriptors then subjected to clustering analysis. Folic acid content of mature stage from those 5 banana cultivars respectively are 22.26; 21.39; 22.59; 21.2; and 24.58 µg/100 g fresh weight. Statistical analyzed showed that cultivar significantly affect the folic acid, bunch weight, fruit weight, and fruit length. Clustering analyses revealed that two groups were formed. The first comprises of Ambon Kuning and Ambon Lumut while the second of Raja Sereh, Lampung and Raja Bulu. Interestingly, Lampung cultivar is close related to Raja Sereh than the other cultivars. Adjusted Rand Index analyzed concluded that the immature peel color, mature pulp color, and predominant taste are the best distinguishing characters. This knowledge can be used as a consideration for plant breeding program especially in nutrition improvement field.

Banana cultivar, folic acid, fruit, morphology

## AO-10

### Exploration of bidara laut (*Strychnos lucida*) mother tree in Gunung Tunak Nature Tourism Park, West Nusa Tenggara, Indonesia

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Bidara laut (*Strychnos lucida* R. Brown) is one of the rare plants that widely used as ingredients of traditional medicine. In West Nusa Tenggara, there is a bidara laut wood processing industries that produced the health cups. The raw material used is still derived from the bidara laut stand in the forest area, so that the greater the intensity of retrieval makes this plant threatened with extinction, especially if it is not balanced with cultivation activities. As a conservation effort, the NTFP Technology Research and Development Institute (BPTHBK) conducts collection garden development activities from the populations of Bali Island, Lombok Island and Sumbawa Island. The initial step is to carry out exploration activities of bidara laut stands in their natural habitat. Exploration on Lombok Island is carried out in the Gunung Tunak Nature Tourism Park. The mother tree exploration was carried out purposively sampling with a target of 25 trees. The seeds obtained are sown to determine the germinate ability and as material in the collection garden planting that will be carried out. The results found 25 selected mother trees with good growing conditions. The average height of the mother

tree is 9m and diameters of stem are 24cm with the straightness level of the stem on a scale of 1-3.

Collection garden, Gunung Tunak Nature Tourism Park, medicinal plant, mother tree, *Strychnos lucida*

## AO-11

### Sex sorting spermatozoa of Sumba Ongole Bulls by using snakehead fish (*Channa striata*) albumin extract

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Sex sorting spermatozoa are reproductive biotechnology which capable to control sex ratio of calves born for specific purpose by separated spermatozoa bearing X and Y chromosome. The objectives of this research were to investigate the potential of snakehead (*Channa striata* Bloch, 1793) albumin extract (channalbumin column) for sorting X and Y sperm of Sumba Ongole (SO) and its characteristic. Semen was collected from three SO bulls using artificial vagina then evaluated macro-and microscopically. The freeze-dried channalbumin was extracted from snakehead fish (±250 g). Channalbumin column was made with different concentration ratio of top and bottom fraction: 2%:4%; 3%:5%; 4%:6% respectively and BSA 5%:10% as control. Semen was put in top fraction then incubated for 30 min at room temperature then each fraction was centrifuged at 1800 rpm for 10 minutes. The pellet was evaluated for motility, abnormality, viability, membrane integrity and head sperm morphometric. The results showed that the channalbumin capable to maintain sperm motility in the top fraction better than the bottom fraction. Sperm viability and membrane integrity in control group was significantly higher ( $P < 0.05$ ) than all channalbumin treatment. BSA 5%:10% has highest proportion of X and Y spermatozoa (69%:76.77%) compared with 2%:4% (42.33%:79.13%), 3%:5% (55.97%:75.73%) and 4%:6% of channalbumin (62.77%:68%). It's concluded that channalbumin treatment of 4%: 6% is more effective for X bearing sperm separation (62.77%) than other concentration. On the other hand, channalbumin 2%:4% more effective for Y bearing sperm separation (79.13%). Channalbumin 4%: 6% was effective

for separation both XY sperm with higher proportion (62.77%: 68%).

Channalbumin, sexing, spermatozoa, snakehead, Sumba Ongole

## AP-01

### Long-term germplasm storage of papaya (*Carica papaya*) seed by cryopreservation

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It's required long-term germplasm storage method to maintain the genetic of papaya in the future because most seed type of papaya included on intermediate seed category so they cannot stored for long periods of time conventionally. Cryopreservation currently offers the only safe and cost-effective option for the long-term conservation of genetic resources. The research aimed to get the best soaking time and water content of papaya seed for cryopreservation. The study was designed as factorial in an environment completely randomized design with two factors. The first factor was the time of soaking in a solution of cryoprotectant PVS2 (Plant Vitrification Solution 2) with 5 stage of incubation time included 0, 15, 30, 45, and 60 minutes. The second factor was the treatment of seed moisture content, with 3 levels of water content included low water content (6-8%), moderate water content (11-13%), and high water content (15-17%). The results showed the immersion of seed with cryoprotectant for 30 minutes and the level of moderate water content (11-13%) gives the best value of germination rate, growth maximum potential, and growth rate were 38.39%, 38.39%, and 2.24%, respectively.

Cryoprotectant, intermediate seed, sukma varieties

## AP-02

### Genetic variability and selection criteria of quantitative traits of chili (*Capsicum annum*)

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The objective of this study was to obtain genetic parameters information of quantitative traits and selection criteria in some chili (*Capsicum annum*) genotypes that are related to yield traits using populations planted on two locations. The experiment conducted at Leuwikopo Experiment Field, Department of Agronomy and Horticulture, Faculty of Agriculture, Bogor Agricultural University and Rimbo Panjang Experiment Field, Faculty of Agriculture, Riau University. The experimental design used randomized complete block design (RCBD) with two factors and three replications as block. First factor was 20 chili genotypes and second factor was two experiment locations. Genetic variability analyzed by cluster analysis. Selection criteria determined by path analysis based on genetic parameter value. High broad sense heritability observed from the traits. Cluster analysis by grouping 20 genotypes into 7 groups. Fruit weight, fruit length, number of fruit per plant and plant height were the best selection character for high yield chili variety.

Analysis, clustering variability, path analysis

## AP-03

### Genetic diversity, heritability, and correlation between the quantitative characters on 30 sweet potato germplasms in Politeknik Negeri Lampung, Indonesia

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Local food commodities such as sweet potato (*Ipomoea batatas* L.) is an alternative rice substitute food which has a high nutritional content. Estimating the value of genetic diversity, heritability and correlation between quantitative characters with the weight of large storage root per plant, is needed in the selection program for the development of quality sweet potato varieties. The purpose of this study was to find out information about genetic diversity, heritability, and correlation between quantitative characters with the weight of large storage root in 30 local Lampung sweet potato germplasm genotypes, introduced and national superiority at Politeknik Negeri Lampung. The study was carried out in the Politeknik Negeri Lampung, Bandar Lampung, Indonesia experimental garden from September 2017 to January 2018. The material used was 30 genotypes of sweet potato germplasm from the Politeknik Negeri Lampung collection. The study was arranged in a randomized block design (RBD) with two replications. The results showed that all characters (weight of large storage root, number of large storage root, storage root length, storage root diameter, vines length, segment length, vines

diameter, and weight of vines) had a value of genetic diversity, phenotypic diversity and wide heritability. All characters in this study are more influenced by genetic factors compared to environmental factors. The results of the correlation analysis showed that the characters of the weight of large storage root, storage root length, and storage root diameter were positively correlated with the weight of the storage root. Whereas, the length of vines is negatively correlated with the weight of large storage. The character of the segment length, vines diameter and weight of vines did not correlate with the weight of large storage root.

Correlation, diversity, heritability, sweet potato

## AP-04

### Preference of *Bemisia tabaci* and *Aleurotrachelus trachoides* (Hemiptera: Aleyrodidae) on different host plants

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Whitefly is one of the important pests in vegetable crops in Indonesia. The purpose of this study was to evaluate the preference (antixenosis) of *Bemisia tabaci* Genn. and *Aleurotrachelus trachoides* Back. on eggplant, tomato, chili, okra and cucumber. *A. trachoides* were taken from Bambu Kuning Greenhouse, National University, Jakarta and *B. tabaci* were taken from farmland of Kersana, Brebes, Central Java, Indonesia. This research was conducted at Cikabayan Greenhouse, Bogor Agricultural University (IPB), Bogor with a randomized block design with 3 replication (@2 plants/genotype). The most number of *A. trachoides* eggs and early instar nymphs were eggplant (cv. Ratih Ungu) followed by chili (cv. Kastilo), tomato (cv. New Mutiara), chili (cv. Yuni), chili (cv. Laris), cucumber (cv. Maestro) and okra (cv. Nayla). The highest number of eggs of *B. tabaci* were on cucumber (cv. Maestro), followed by eggplant (cv. Ratih Ungu), chili (cv. Kastilo, cv. Yuni), okra (cv. Nayla), tomato (cv. New Mutiara) and chili (cv. Laris). *A. trachoides* preferred eggplant, chili, and tomato (Solanaceae family), whereas *B. tabaci* preferred cucumber and eggplant. The preference of *A. trachoides* was different from *B. tabaci* due to differences in the type of whitefly, character and the metabolite content of the host plant leaves.

*Aleurotrachelus trachoides*, *Bemisia tabaci*, whitefly

## Diversity of Species

### BO-01

#### The influence of Predator presence on *Daphnia galeata* morphology: A preliminary study of *Daphnia* morphological change from Lake Konstanz, Germany

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*Daphnia* is one of animals which is able to develop morphological defend. This change could be induced by the presence of their predator. We studied the effect of cladoceran predators presence via kairomon on *Daphnia galeata* morphological change. This study is a preliminary experiment to investigate morphological change of *Daphnia* during oligotrophication in Lake Constance (Konstanz), Germany. We used *D. galeata* clones that hatched from resting eggs, which were collected from Lake Constance sediment core from the layer that represented the year 1999-2005. *Leptodora* and *Bythotrephes* were caught from Upper Lake Constance. They were used as a source of predator kairomones. We measured *D. galeata* morphological features such as body size, helmet length, spina length, body width, and eye width. Our result showed that under kairomon pressure *D. galeata* developed longer helmet and spine length than without kairomone pressure. We did not see any difference in body width and eye width between any treatments. *Leptodora* presence induced rounded and longer head meanwhile under *Bythotrephes* pressure it formed shorter cornerer head. We assumed that *D. galeata* responded to different predators with different morphological defenses. Further studies will need to analyze which kairomon has the strongest effect on *Daphnia* population in Lake Constance.

*Bythotrephes*, *Daphnia*, kairomone, *Leptodora*, morphological defends

### BO-02

#### Effectiveness of dosage mycorrhizal bio-fertilizer of *Gigaspora* sp. on growth and yield of some chili varieties in inceptisol Krueng Raya, Aceh Besar, Indonesia

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This study aims to determine the effect of application of *Gigaspora* sp. mycorrhizae dosage and chili varieties that

cultivated on the Inceptisol Krueng Raya, Aceh Besar, Indonesia to increase chili production. This research was arranged in a Randomized Block Design with three replications. The first factor was the dose of mycorrhizal strain *Gigaspora* sp. and the second factor was the chili variety. The dosage of mycorrhizal bio-fertilizer consisted of four levels, namely without mycorrhizae, 5 g per plant, 10 g per plant and 15 g per plant, while the varieties consisted of 3 types, namely Perintis, Lado, and PM 999. The results showed that the application of mycorrhizal bio-fertilizer has increased the growth and yield of chili. The best mycorrhizal dose was obtained with the use of mycorrhizae *Gigaspora* sp. 10 gram per plant. The best variety resulting from the results of this study was the Perintis variety. The use of mycorrhizal bio-fertilizer 10 g per plant in Perintis variety has solved the problems that found in Inceptisol soil. Mycorrhizal bio-fertilizers also helped the absorption of P available to increase the growth and yield of chili plants.

Chili, dosage, inceptisol, mycorrhizae, results

### **BO-03**

#### **Inventory of echinoderms in Bungus Teluk Kabung, Padang, Indonesia**

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Echinoderms are marine forms and include sea stars, brittle stars, sea urchins, sea cucumbers and sea lilies. Bungus Teluk Kabung is about 27 km from center of Padang City, West Sumatra, Indonesia. The research was conducted on August 25, 2018, until September 1, 2018. The samples were collected using visual encounter survey (ves) method and identified by determining the morphological characteristics. The research held when ecological parameters were  $\pm 27^{\circ}\text{C}$  for temperature and 70% humidity. We found 6 species (4 class: Asteroidea, Ophiuroidea, Echinoidea and Holothuroidea) in 2 different beaches. We collected data in Teluk Buo Beach and Sungai Pisang Beach. The beach has white sand and coral substrate in the intertidal zone. The research aim to inventory of species Echinoderms and their ecological condition in Bungus Teluk Kabung.

Beach, echinoderms, inventory, spin

### **BO-04**

#### **Abundance and distribution pattern of echinoderms in Sarangan Beach, Gunungkidul, Yogyakarta**

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Indonesia as an archipelago country has a wide sea and long coastal line, it has caused a high biodiversity. Gunungkidul is one of many beaches in Indonesia, which has echinoderms abundantly. The information about echinoderms especially in Sarangan beach, Gunungkidul, Yogyakarta have not been known yet. There is no research about it yet. The purpose of this research is to get the data about abundance of echinoderms in Sarangan beach, Gunungkidul, Yogyakarta. The research method was used quadrant plot. Sampling design of plot is baseline 45 meters which parallel to coastal line, then main transect divided into three transect lines. Each of transect was put down 15 plots with size 1x1 meter, distance between plots and transects are 3 meters and 10 meters. The result of this research is analyzed with measure the Margalef index (D), Pielou index (e), and Shannon-Wiener index (H'). Then analyze the distribution pattern and habitat parameters. Echinoderms in Sarangan beach is abundance. Distribution pattern of Echinometra mathei is uniform, Stomopneustes variolaris is clumped, Ophiomastix annulosa is clumped, Holothuria sp. is clumped, and Macrophiothrix longipeda is clumped.

Abundance, distribution pattern, echinoderms, Sarangan beach

### **BO-05**

#### **Bamboo diversity of Sulawesi, Indonesia**

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Bamboo is one of the important plants in the world, including Indonesian. Beside their economical important, bamboo also plays an important role in the environment for the climate change. The purpose of this study was to inventory the bamboo diversity in Sulawesi, so it can be used to develop the bamboo industry. The methodology used in this study is by observing herbarium specimen kept in the Herbarium Bogoriense (BO), Bogor, Indonesia and field experience by one of the authors (EAW). The result showed that there are 39 species of 12 genera, i.e. *Bambusa*

*blumeana*, *B. glaucophylla*, *B. maculata*, *B. multiplex*, *B. tuldoidea*, *B. vulgaris*, *Chloothamnus* sp.2, *Dendrocalamus asper*, *Dinorchloa albociliata*, *D. aopaensis*, *D. barbata*, *D. cordata*, *D. erecta*, *D. hirsuta*, *D. morowaliensis*, *D. petasiensis*, *D. pubiramea*, *D. truncata*, *Dinorchloa* sp.1, *Dinorchloa* sp.2, *Dinorchloa* sp.4, *Dinorchloa* sp.5, *Dinorchloa* sp.6, *Dinorchloa* sp.7, *Dinorchloa* sp.8, *Dinorchloa* sp.9, *Dinorchloa* sp.10, *Fimbribambusa* sp., *Gigantochloa apus*, *G. atrovioleacea*, *G. atter*, *Neololeba atra*, *Phyllostachys aurea*, *Racemobambos celebica*, *Schizostachyum brachycladum*, *S. latifolium*, *S. lima*, *Sphaerobambos subtilis* and *Thyrsostachys siamensis*. Identification keys and descriptions are presented. It is expected that this data will be used as basic information for bamboo conservation and bamboo industry.

Bamboo, description, diversity, identification key, Sulawesi

## BO-06

### Diversity of decapod crustaceans on intertidal zone of Porok Beach in Gunungkidul, Yogyakarta, Indonesia

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Decapod crustaceans are member of tropical benthic community and have crucial ecological function on coastal area. Human activities in Porok Beach have increased gradually, due to Gunungkidul as new emerging popular tourist destination in Yogyakarta, Indonesia. This condition may cause habitat loss of decapod crustaceans. However, there hasn't been any scientific report about the diversity of decapod crustaceans in Porok Beach. This study aims to provide systematic list of decapod crustaceans, as a preliminary study for further research and also a document base of marine area in Porok Beach, Gunungkidul. The study was conducted on intertidal zone and samples were collected using purposive random sampling method in August 2018. The result showed that 8 species from 5 families are recorded. These species consist of *Aniculus* sp. (Diogenidae), *Coenobita* sp. (Coenobitidae), *Dardanus* sp. (Coenobitidae), *Portunus* sp. (Portunidae), *Thalamita crenata* (Portunidae), *Thalamita* sp. (Portunidae), and the other 2 species from Majiidae and Plagusiidae are unidentified. They are all grouped in conservation status as least concern species.

Decapod, habitat loss, purposive random sampling, species inventory, tropical benthic community

## BO-07

### The diversity of cultivated plant species and characteristics of forest farmer in Danau Tes Nature Reserve, Bengkulu, Indonesia

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Danau Tes Nature Reserve (DTNR) is a conservation forest area, covers 2,724.5 hectares, located in Lebong District, Bengkulu Province, Indonesia. The main function of nature reserve is preservation area for plant diversity and its ecosystem which also functions as a buffer zone for life. Therefore, the land use must be forest or natural ecosystems. In Danau Tes Nature Reserve, there has been a change in land use from natural forest ecosystem to cultivated land ecosystems. The objective of this study was to know the diversity of cultivated plant species and to describe the characteristics of forest farmers. The data were collected by mapping techniques, field observation, and interview. The accidental sampling technique was used to select 43 respondents. The data were analyzed qualitatively and quantitatively. The results showed that land use of DTNR in 2017 consisted of forest 1.2 hectares (0.04%), shrubs 297.9 hectares (10.94%), rice fields 89.9 hectares (3.30%), settlement 14.5 hectares (0.53%), cropland 2,158.1 hectares (79.21%) and wetlands 162.8 ha (5.97%). Fifty-two species cultivated plants were found in this conservation forest. Three species of dominant cultivated plant were coffee (*Coffea canephora*), rubber (*Hevea brasiliensis*), and chili (*Capsium frutesces*). People have illegally occupied most of the forest areas. The average land area occupied by a household was 1.45 hectares. The people acquired their land by buying (79.17%) and inheriting (20.93%). The dependence of this community on the forest area was quite high. Only 25.58% of them had agricultural land outside the forest area; 74.42% depended on the land in the forest area.

Cultivated plant, diversity, forest farmer, nature reserve

## BO-08

### Diversity of cover crops and their function in Wonogiri Karst Area, Indonesia

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The objectives of this research are: (i) to provide baseline information on cover crop plant diversity in the form of a wide database for karst area Wonogiri, Central Java, Indonesia; (ii) to provide multiple biodiversity measures able to summarize these data. The research is exploring

research by 160 point sampling, each point divided into 4 plot (1x1) m<sup>2</sup>. Data collected are name of species, sum of individual each species, percentage cover. Then the data are analyzed to get the value of diversity indices and importance value indices. Based on the research there are 186 species found in Wonogiri karst area with diversity indices is  $4,28 > 2$ . Based on the indices it can be determined that diversity of cover plant community in Wonogiri karst area is high. The highest importance value is 36,20 of *Eupatorium odoratum*. The lowest importance value is 0,07 from species *Impatiens balsamina*. Based on the research it can be concluded that diversity of cover crop community in Wonogiri karst area is high with highest contribution of *Eupatorium odoratum*.

Cover crop, diversity, Wonogiri karst area

## BO-09

### Plant diversity in Muna Island, Southeast Sulawesi, Indonesia

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Muna Island is a relatively small island located in the southeast off coast of Kendari, the capital of Southeast Sulawesi Province, Indonesia. Compared to the neighboring island Buton, Muna is heavily populated and much less forested. Only few forest remnants left on the island bearing the remaining biodiversity of the island. A collecting expedition to the island was carried out with the aim to document Muna's plant diversity using an explorative method. The expedition targeted to document plant diversity from several of the few remaining forests in the island. This fieldwork listed 240 species of plants growing in the island comprising 182 genera and 67 families; 18 species (7.5%) of which are included in the IUCN Redlist of threatened species, such as *Gnetum latifolium* Blume, *Hopea gregaria* Slooten, *Pterocarpus indicus* Willd.; and five species (2,08%) of which are endemic to the area (Sulawesi), i.e. *Canarium acutifolium* (DC.) Merr., *Dillenia serrata* Thunb., *Kjelbergiodendron celebicum* (Koord.) Merr., *Luisia celebica* Schltr. and *Vanda devoogtii* J.J.Sm. The list also includes the orchid diversity of the island comprising 29 species and 21 genera. Many of the plants possess many potential such as ornamental, fruit, medicinal, timber. The growing population and expanding forest conversion into other uses clearly threats the island's plants diversity, thus conservation efforts to prevent the extinction of species is absolutely required.

Conservation, endemic, Muna Island, plant diversity, threatened

## BO-10

### Gall morphotypes on *Eucalyptus urophylla* in Mount Mutis Nature Reserve, East Nusa Tenggara, Indonesia

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The symptoms of gall are one of the damages caused by insect pests in *Eucalyptus urophylla* S. T. Blake. The type of symptoms of the gall occurs due to abnormal growth of plant tissues. The types of gall are very important to be studied to assess the abundance and wealth of herbivores because of the limited taxonomic knowledge. This study aims to obtain information and learn about the types of gall in *E. urophylla* that grows in Nature Reserve (NR) Mount Mutis, East Nusa Tenggara Province. Sampling was carried out by direct method on 50 sample plants. Observations were made directly to the symptomatic part of plant. The galls were characterized morphologically according to their shape, color, plant organ of occurrence. The results of the plants were found in the leaves, petiole, midrib, buds, twigs, and stems. Eighteen gall morphotypes were found on *E. urophylla*. The gall shapes were characterized as globoid, avoid, conical, fusiform, spherical, lenticular. Symptoms of galls found on *E. urophylla*, associated with insects from Order Hymenoptera, Hemiptera, and Diptera.

Globoid, insects, leaves

## BO-11

### Soil organism diversity in post-coal mining area in East Kutai, East Kalimantan, Indonesia

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Rehabilitation through reclamation and revegetation is expected to improve the quality and quantity of soil organic matter, and also biotic activity and diversity of soil fauna species rapidly. The objective of this study was to evaluate the soil organism diversity after 20 years of rehabilitation activities in a coal mining rehabilitation site in East Kutai District, East Kalimantan, with coordinate 00°33'23"-00°38'17" N and 117°23'55"-117°23'20" E. Sampling was conducted in 5 pitfall traps in every 0,4 ha in location area. This study compared rehabilitation site with the natural forest sites. There were found 16 soil organism species in rehabilitation sites. In comparison, 21 species were found in the natural forest sites. There is a species

which exists in rehabilitation and natural forests such as (*Acheta domesticus*, *Carabidae cataulacus*, *Crematogaster*, *Dicyrtomidae*, *Drosophila*, and *Monomorium*. Soil organism diversity indices in the rehabilitation site after 20 years post-mining (i.e., 2.21) was lower than in the natural forest sites (1.85); while the diversity indices for soil organism in natural sites were 2.57. Species richness of soil organism species was low, but it has a high species evenness indices in the rehabilitation sites (0.65) and the natural sites (0.84).

Diversity, soil organism, species richness, rehabilitation area, post-coal mining,

## BO-12

### Bird diversity on Koto Kampar Hulu, Riau, Indonesia

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Koto Kampar Hulu has high biodiversity potential because its forest area is dominated by tropical rain forests. This forest is the richest habitat for various types of birds. This study aims to explore the diversity of bird species found in Koto Kampar Hulu. Sampling using the Point Count and Mist-netting methods in 3 different areas in Kampar Hulu Koto, namely Kapur River, Tanjung Village, and Bukit Putus. In the Kapur River area, the data was taken from April 6 to 8, 2018, Tanjung Village area from July 14 to 18 2018, and the Bukit Putus area from August 3 to 8, 2018. Data were analyzed using the Shannon-Wiener index, Simpson index, Margalef Index, and Relative Dominance Index. In the Kapur River region found 39 species with the index  $H = 3.38$ , in the Tanjung Village region found 22 species with the index  $H = 2.34$ , while in the Bukit Putus region found 22 species with the index  $H = 2.85$ . The most birds found in the Kapur River region are *Dicaeum trigonostigma* (Scopoli, 1786) 10%, Bukit Putus area are *Psittinus cyanurus* (Forster, 1795) 14%, and Tanjung Village area are *Passer domesticus* (Linnaeus, 1758) 38%. Based on the results of data analysis obtained, it was concluded that the level of biodiversity in Koto Kampar Hulu was high. It is hoped that this research can provide information about the types of birds and become a basic benchmark in the preparation of biodiversity conservation strategies in Koto Kampar Hulu, Riau.

Animal ecology, biodiversity, birds, Koto Kampar Hulu, point count

## BO-13

### Biodiversity of mollusk in Krakal Beach, Gunungkidul, Yogyakarta, Indonesia

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Krakal beach is located in Ngestirejo, Tanjungsari, Gunungkidul, Yogyakarta, Indonesia. The beach still natural and the substrates dominated by fine sand and coral reef flat. Mollusc is soft body animal that has three main parts of body, namely the legs, visceral mass, and mantle. Most mollusks live in the sea and some of this live in freshwater and land. The aim of this research was to understand the diversity of mollusks in intertidal zone of Krakal beach, Gunungkidul, Yogyakarta. The research was conducted on 4th March 2018 in Krakal Beach, Kabupaten Gunungkidul, Yogyakarta. Indonesia ( $S8^{\circ}8'42.3''$   $E110^{\circ}36'8.9''$ ). Data collection was carried out in intertidal zone of Krakal Beach when ecological parameters were  $\pm 27^{\circ}C$  for water temperature and  $\pm 8$  for pH. The method used in this research was purposive random sampling. The result of this research shows 15 families of classes Gastropods and 3 families of classes Bivalves. The families of classes Gastropods that found were Volutidae, Buccinidae, Bursidae, Conidae, Ranellidae, Cypraeidae, Pisanidae, Muricidae, Mitridae, Nassariidae, Neritidae, Columbellidae, Cerithiidae, Trochidae, and Rostellariidae. Meanwhile, families of classes Bivalves that found were Arcidae, Lucinidae, and Veneridae.

Diversity, Krakal, mollusk

## BO-14

### Gastropod diversity in intertidal zone of Poganda Beach, Luk Panentang, Banggai Kepulauan, Central Sulawesi, Indonesia

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Poganda beach is located in Luk Panentang, Banggai Kepulauan, Central Sulawesi, Indonesia. The beach is still natural and the substrates are dominated by fine sands and coral reef, which is suitable as the habitats of gastropods. Gastropods is one of the class in Molluscs, and the most highly diversified class. The aim of this research was to understand the diversity of gastropods in intertidal zone of Poganda beach. The research was conducted on July-August 2018. The research held when ecological parameter

Diversity, gastropods, Luk Panenteng,

Bird, diversity, plant, open space, settlement

Alternative livelihoods, biodiversity, forest, research

# Isolation of secondary metabolite from *Trichoderma* spp. and its potential to suppress the growth of *Colletotrichum gloeosporoides* caused anthracnose disease on chili

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One of the problem to use *Trichoderma* spp. for controlling the airborne plant pathogens is the fungi not be able to grow in the part of plant above the soil. Actually, *Trichoderma* spp. have potential to develop for controlling anthracnose disease caused by *C. gloeosporoides* with using its secondary metabolite as fungicide function. The goal of this research was to determine the ability of secondary metabolite that produced by *Trichoderma* spp. For suppressing the growth of *C. gloeosporoides* caused anthracnose disease on chili in vitro. The research used Randomized Block Design (RBD) with 6 treatments and 4 replications. Those treatments were *T. harzianum*, *T. viride*, *T. koningii*, *Trichoderma* PP2, *Trichoderma* PP3, and control. Secondary metabolite was produced by rejuvenating *Trichoderma* spp used shaker for 72 hours. The result indicated that all secondary metabolite that produced by *Trichoderma* spp were been able to suppress the growth of *C. gloeosporoides*. *T. koningii* was the best isolate for inhibiting the growth of *C. gloeosporoides* with diameter of colony 6,1 cm, germination of conidia 28% and konidia density 1.7.

*Colletotrichum gloeosporoides*, growth, secondary metabolite, *Trichoderma*

## **BO-18**

### **Terrestrial cave ecology of predator and decomposer insects count using Generalized Linear Latent Variable Model**

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The caves are a unique ecosystem because it's very different environment compares to other environments. The caves environment have high air humidity, and low microclimate variations compared to the outside of the caves. The absolute darkness of cave environment due to the absence of light leads to the absence of green plants that play a role as a source of energy in the caves. Also, the food resources in the cave is relatively low. Essential food resources in the cave include bat guano and swallow and swiftlets, organic material from outside the cave due to flooding, and microorganisms such as fungi and bacteria.

Therefore, the biota that lives in the cave is dominated by groups that are able to adapt to the cave environment. Arthropods are dominant groups in the caves both in terms of abundance and diversity. The most common terrestrial arthropods live in caves include myriapods, arachnids, and insects. The paper will discuss in detail the "Insects count modelling" especially groups that act as predators and decomposer. Identification of insect species using the concept of morphospecies is based on differences in morphological characters to anticipate taxonomic limitations and get an overview of species diversity. Generalized Linear Latent Variable Model (GLLVM) is one of the ecological statistical methods that can connect the manifest variables with latent which are continuous and discrete types. GLVVM can also provide a graphical display to strengthen interpretation of results and conduct multivariate inferences about edaphic and climatic factors that are considered to affect the diversity of these species.

GLLVM, latent, multivariate, species counts

## **BO-19**

### **Lichen diversity as indicators for monitoring ecosystem health in Rawa Danau Nature Reserve, Banten**

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The study of environmental changes is very important in present circumstances throughout the world. Lichen biodiversity may provide an excellent system in bio-monitoring of the ecosystem health of nature reserve areas such as Rawa Danau in Banten Province, Indonesia. At present, this area highly disturbed due to ecological factors and human activities such as land use. The objectives of this research are to provide the information needed for an ecosystem health quality assessment study which will be revealed by the lichens diversity in the study areas. The study was conducted using transect-based plot in three main habitats in investigated: residential area, primary forest, secondary forest, while exploration technique was carried out in freshwater swamp area. The cover for lichen species in the substrates and the number of species present were recorded. Shannon-Wiener diversity index was also calculated. A total of 86 specimens were collected from these four areas which resulted in the occurrence of 25 species of lichens belonging to 21 genera and 15 families. Shannon-Wiener's diversity index from 1.7197 to 2.6678. The variation in species composition was related to the environmental habitat variables and lichens demonstrated a condition of environmental alteration.

Ecosystem health, lichen diversity, Rawa Danau

**BO-20****Abundance of gastropods in Krakal Beach, Gunungkidul, Yogyakarta, Indonesia**

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Krakal Beach is located in Gunungkidul District, Yogyakarta, Indonesia. Krakal Beach is called the reef beach because it is built by a stretch of coral animals with various marine biota and stretches for 5 kilometers. The aim of this study was to determine the abundance of Mollusc in the intertidal zone of Krakal Beach. The study was conducted in April 2018 at night in the Krakal Coast intertidal zone using the quadrant plot method. The research held when ecological parameter was  $\pm 27^{\circ}\text{C}$  for water temperature and 7 for pH. Twelve transects along the beach were made with four plots on every transect. So that, there were 40 plots data which were analyzed using Shannon-Wiener index of diversity ( $H'$ ), evenness index ( $E$ ), and dominance index ( $D$ ). The result of this research shows 48 species of classes Gastropods. The most abundant species in this study were *Cypraea* sp. (6 individuals). The diversity index ( $H'$ ) was 3.6948, the evenness ( $E$ ) index was 1.28, and the dominance index ( $D$ ) was 0.0306.

Abundant, Gastropods, Krakal

**BO-21****Abundance and distribution pattern of echinoderms in Sarangan Beach, Gunungkidul, Yogyakarta, Indonesia**

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Indonesia as an archipelago country has a wide sea and long coastal line, it has caused a high biodiversity. Gunungkidul, Yogyakarta is one of many beaches in Indonesia, which has echinoderms abundantly. The information about echinoderms especially in Sarangan beach, Gunungkidul have not been known yet. There is no research about it yet. The purpose of this research is to get the data about abundance of echinoderms in Sarangan beach, Gunungkidul, Yogyakarta. The research method was used quadrant plot. Sampling design of plot is baseline 45 meters which parallel to coastal line, then main transect divided into three transect lines. Each of transect was put down 15 plots with size 1x1 meter, distance between plots and transects are 3 meters and 10 meters. The result of this research is analyzed with measure the Margalef index ( $D$ ),

Pielou index ( $e$ ), and Shannon-Wiener index ( $H'$ ). Then analyze the distribution pattern and habitat parameters. Echinoderms in Sarangan beach is abundance. Distribution pattern of *Echinometra mathei* is uniform, *Stomopneustes variolaris* is clumped, *Ophiomastix annulosa* is clumped, *Holothuria* sp. is clumped, and *Macrophiothrix longipeda* is clumped.

Abundance, distribution pattern, echinoderms, Sarangan beach

**BO-22****Species diversity of butterflies at Cibodas Botanic Gardens in West Java, Indonesia**

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Butterflies (Lepidoptera) included in class insects have a very important role in the process of food chains and bioindicator flowering plants. This study attempts to determine the level of diversity species butterflies (Lepidoptera) in Cibodas Botanic Gardens, West Java, Indonesia. The methodology uses cruiser methods to technique arrest directly at the observation percent insects. Research carried out in may until July 2018. The result of the observation butterflies in Cibodas Botanic Gardens that is in four locations observation was found about 33 species of 885 individuals that splits into five the family of them Papilionidae (4 species), Nymphalidae (18 species), Hesperidae (3 species), Pieridae (4 species), and Lycaenidae (4 species). Index diversity of species ( $H'$ ) in Cibodas Botanic Gardens of the four the observation as a Waterfall Ciismun, Fountain, Sakura Park, and Guest House category on index value diversity species among others 2,44; 1,63; 2,24; and 2,20. The index dominance ( $c$ ) greater is guest house of 0,26. A Waterfall Ciismun index value wealth species and index evenness species of butterflies of 4,647 and 0,749.

Butterflies, diversity, Cibodas Botanic Gardens, West Java

**BO-23****Species diversity of Odonata at Cibodas Botanic Gardens, West Java, Indonesia**

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The Order Odonata (dragonfly) is insects which have an important role in determining the bioindicator water and nets food because of the most of his life (metamorphosis) in the water and ate other small insects. This study aims to know the level the diversity in species of a dragonfly looks like (Odonata) in a Cibodas Botanic Gardens, West Java, Indonesia. A method of was used in the study to technique arrest directly at the observation percent insects. Research carried out in May until July 2018. The result of the observation of the dragonfly in Cibodas Botanic Gardens that is in four locations observation there were eight species which is divided into two sub-ordo: (i) Anisoptera (Orthetrum pruinosum, Pantala flavences, Orthetrum sabina, Neurothemis fluctuans, Neurothemis terminata, and Orthetrum glaucum); and (ii) Zygoptera (Ischnura senegalensis, dan Ceoliccia membranipes) a whole 1.510 individual. Index the diversity of species ( $H'$ ) and evenness ( $E$ ) of the dragonfly is highest in a Ciismun Waterfall of 1,45 and 0,88. Index fourth dominance location range 0.25-0.32. Index wealth ( $R$ ) from highest in the Sakura park of 0.99.

Diversity, Odonata, Cibodas Botanic Gardens, West Java

## BO-24

### Diversity and host preferences of ferns and fern-allies epiphytes on palm trees

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Epiphytic ferns contribute importantly to the biodiversity of tropical rainforest. Epiphytic diversity and host preference of pteridophytes were observed on palm trees collection growing at Bogor Botanic Gardens. This study aimed: (i) to figure out the diversity of ferns and fern allies growing on palm trees on the lowland areas and (ii) to determine the host preferences of ferns and fern-allies epiphytes on palm trees. Thirty-three of individual phorophytes palm trees which were included in 28 species and 16 genera were observed. Trunk of palm trees was divided in to three zonas (basal, middle and upper areas). Individual number for each species growing on each zona of species of palm tree were recorded. Eight epiphytic fern species which were most commonly found growing in palm trees were analyzed statistically to determine their preference to the host trees. Sixteen species of epiphytic ferns included in 12 genera and eight families were recorded growing on 28 species belong to 17 genera of Arecaceae. *Corypha* no hosted the greatest number of pteridophytes while *Sheelea insignis* hosted the fewest. Individual numbers of six epiphytic fern species were significantly affected by palm trees species, namely *Belvisia callifolia* (Christ) Copel., *Pyrrosia lanceolata* (L.) Farwell, *Pyrrosia piloselloides* (Linn.) M.G. Price, *Davallia denticulata* (Burm.) Mett., *Nephrolepis biserrata*

(Sw.) Schott, *Vittaria ensiformis* Swartz. Individual numbers of five epiphytic fern species were significantly affected by zone of the host plant. *Nephrolepis biserrata* tends to grow well on upper zona. *Pyrrosia lanceolata* tends to live in abundance on the middle zona. *B. callifolia*, *D. denticulata*, and *V. ensiformis* fond to grow well and make a dense on the basal zone.

Composition, fern epiphytes, host preference, species richness

## BO-25

### Pitcher morphology and pitcher color distribution of *Nepenthes mirabilis* in Muara Badak, East Kalimantan, Indonesia

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The shape and color of the pitcher of *Nepenthes* play an important role in attracting prey. The lower and upper pitchers have different shapes due to differences in trapped prey. The pitcher color has also functioned as a prey trap. *Nepenthes mirabilis* Druce, one of pitcher plant species, scatters in East Kalimantan. These species is very interesting for offering as ornamental plant due to its variety of sizes, shapes, and colors. However, information about pitcher morphology in the wild is inadequate. Therefore, this study aimed to record the size, shape and pitcher color of *N. mirabilis*. The pitcher is divided into lower and upper pitchers. Both lower and upper pitchers, consist of 750 on each, were taken as a sample for observing the pitcher morphology and color distribution. Size, shape and color distribution on tendrils as well as on pitchers were observed and recorded by naked eyes, ruler and camera. The results showed that the lower pitchers shape were narrowly ovoid in the bottom and cylindrical on the top. The upper pitchers were infundibular in the bottom, narrowly ovoid in the middle then cylindrical toward the top. The highest percentage of lower pitcher tendril's color is green (44.61%), and the upper pitcher tendril's is reddish green (55.39%). Mostly lower pitcher body's color is green in below and green purple stripes at above (21.07%), whereas the upper pitcher body's color is green in below and green purple stripes at upper part, tinged greenish red irregular spots on both (16.15%). Purplish dark red is the highest percentage of wing color, found on both lower and upper pitchers. The dominant peristome color at lower pitcher is brownish dark red (26.15%) while the upper pitcher peristome's color is purplish dark red (44.19%). The lid color is dominated of purplish dark red on both lower and upper pitchers, 38.92% and 31.39% respectively

Color, *Nepenthes mirabilis*, pitcher, size, shape

**BO-26****Tourism potential of the birds and reptiles diversity for the development of mangrove ecotourism in Blanakan Forest, Subang, West Java, Indonesia****Ufairah Hartanti<sup>✉</sup>, Mufti Petala Patria, Suyud Warno Utomo**

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Blanakan mangrove forest is the forest which is used as a place of recreation by The Blanakan and surrounding communities. This forest has a tourist attraction in the form of a unique type of mangrove root, mangrove zoning, and crocodile breeding. But actually, this forest has a lot of tourism potential that has not been optimally developed. Blanakan mangrove forest tourism has provided income to the local government and also increased community income. Therefore, good management is needed so that the Blanakan mangrove ecotourism can be sustainable. This study aims to reveal the diversity of birds and reptiles that can be used as additional attractions in the Blanakan mangrove forest. This research used quantitative method. Data were collected through literature studies, field surveys with questionnaires and in-depth interviews. This research found 10 reptile species and 24 bird species. The most common reptile species found in this research area were crocodiles (*Crocodilus porosus*). There are 7 species of birds that are protected at the location of this study, namely: small egrets (*Egretta garzetta*), Ibis (*Plegadis falcinellus*), small sea dara (*Sterna albifrons*), egrets coral (*Egretta sacra*), buffalo egret (*Bubulcus ibis*), white belly albatross (*Haliaetus leucogaster*), and large Wili (*Burhinus gihanteus*). Presence of the protected birds and crocodile breeding sites, of course, the main attraction for ecotourists.

Birds, diversity, mangrove ecotourism, reptiles, sustainable

**BO-27****Bali cattle performance fattened in a traditional manner in Oelatsala Village, Kupang District, Indonesia****Upik Syamsiar Rosnah<sup>✉</sup>, Y.U.L. Sobang, Marten Yunus**

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A study was aimed to know the growth performance of Bali cattle fattening that maintained in a traditional manner. The method used in the study is a survey focused on observation techniques and laboratory analysis. The sampling of cattle was randomly sampled as many as 36 fattening Bali cattle (20% of the total fattening cattle) spread in five sub-villages. Data were analyzed applying descriptive analysis by calculating the mean and standard deviation. The variables observed consisted of daily weight

gain, linear body size, feed consumption, digestibility, feed conversion and percentage of botanical composition. The results show that the average daily weight gain is  $0.28 \pm 0.259\text{kg/head/day}$ ; average increase in linear body size, i.e., body length of  $0.06 \pm 0.037\text{cm/head/day}$ ; chest size of  $0.07 \pm 0.0563\text{ cm/head/day}$ , and shoulder height of  $0.04 \pm 0.0291\text{cm/head/day}$ ; consumption of dry matter of 2.51% based on body weight, consumption of dry matter of 4.88%, and consumption of organic matter of 3.22%; dry matter Digestion of 58.97% and organic matter digestibility of 61.53%; Feed conversion of 31.79%; with botanical composition of feed (based on fresh matter) namely *Leucaena leucocephala* of  $85.2 \pm 13.13\%$ , *Sesbania grandiflora* of  $5.49 \pm 7.31\%$ , *Ficus* sp of  $2.92 \pm 6.2\%$ , banana stems (*Musa paradisiaca*)  $2.52 \pm 4.22\%$ , *Acacia leucophloea* of  $1.33 \pm 3.79\%$ , cassava stem (*Manihot utilisima*) of  $1.17 \pm 3.04\%$ , *Brousonetia papyritera* of 0, 52  $\pm 1.18\%$ , *Timonius timun* of  $0.38 \pm 0.97\%$ , *Hibiscus rosasinensis* of  $0.37 \pm 1.06\%$ , and *Melochiaum bellata* of  $0.28 \pm 0.70\%$ . Based on the results of the study, it can be concluded that: 1) the use of local food is quite varied according to the availability at the farmer level; 2) the performance of Bali cattle fattening at the farmer level is still low ( $0.28 \pm 0.259\text{kg/head/day}$ ) compared to the optimal growth potential of Bali cattle at  $0.5-0.6\text{kg/head/day}$ .

Bali Cattle, breeder's pattern, fattening, local feed, production performance

**BO-28****The Araceae at two protected forests in West Lampung District, Sumatra, Indonesia: diversity, conservation, and threats****Yuzammi<sup>✉</sup>, Tri Handayani, Inggit Puji Astuti**

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Sumatra Island has a rich diversity of the Araceae family. About 25 genera out of 35 total genera in Indonesia or 71.4% are found on this island. This study aimed to reveal the diverse members of the Araceae found in Regist 48-B Palakiah Protected Forest and Regist 9-B Mount Seminung Protected Forest, to conserve it and to analyze the threats in the wild. These two protected forests are located at different elevations; the former has an elevation of 773-851 m and the latter has an elevation 1071-1303 m. The results showed that there are 15 genera (60% of total genera in Sumatra) and 35 species are found at both protected forests, of which 25 species occur in Regist 48-B, and 13 species are found in Regist 9-B. A few species are found in both locations, such as *Sauromatum horsfieldii* and *Schismatoglottis calypttrata*. The genera *Apoballis*, *Colocasia* and *Leucocasia* are only found in Regist 48-B Palakiah whereas the genera *Amydrium*, *Arisaema*, and *Epipremnum* are only found in Regist 9-B Mount Seminung. Ten species are rare and/or endemic to Sumatra

viz. *Aglaonema pictum*, *Amorphophallus asper*, *A. beccarii*, *A. gigas*, *A. titanum*, *Apoballis hastifolia*, *Epipremnum silvaticum*, *Homalomena megalophylla*, *Rhaphidophora angustata*, and *R. puberula*. A novelty species from the genus *Apoballis* is also discovered from Regist 48-B Palakiah. The charismatic species, *Amorphophallus titanum*, is now being proposed to IUCN Red Data List as Endangered, A2ac; C2a(i); D (IUCN version 3.1). The conversion of the protected forests into coffee plantations was increased in West Lampung District in last two decades. Consequently, the existence of Araceae is threatened in the wild. Therefore, ex situ conservation, e.g., botanic gardens, is an effort to save these species from disappearing.

Araceae, diversity, protected forest, threat, West Lampung

## BO-29

### Cattle urine as a low-cost medium to accelerate growth, biomass productivity, and lipid production of *Botryococcus braunii*: Future energy

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The increasing necessities of global energy can trigger an energy crisis. Microalgae is a unicellular microorganism which has potency as bioenergy such as biofuel and efficient alternative to substitute fossil resources. *Botryococcus braunii* is one of the microalgae that has high lipid concentration around 25-80%, this characteristic shows its potency to produce biofuel. This research takes into 15 days which purpose to utilize cattle urine as an alternative medium for growth *B.braunii*. Some of components in cattle urine are 95% water, urea, 2.5% mineral salt, hormone, enzyme, 69% nitrogen, sulfur, and magnesium. The components of cattle urine can substitute macronutrient and micronutrient in others synthesis medium. This research was designed by using Random Design Complete (RAL) with seven variables: control culture *B.braunii* (medium macronutrient+ micronutrient Jhonson); cultures *B.braunii* with 5%, 7.5%, 10%, 12.5%, 15%, and 17.5% concentration of cattle urine+ micronutrient Jhonson. The method of this research is divided into three steps; preparation, testing, and analysis of biomass also lipid extraction. The data from the observations of biomass were analyzed with linear regression equation. All of data was analyzed by Ms.Excel program. The result from this research is showed in culture *B.braunii* with 12.5% of concentration cattle urine that can accelerate the growth of cell *B.braunii* being maximal which production 1.425 mg/L biomass in days 12 and also *B.braunii* culture with 12.5% of concentration cattle urine can accelerate biomass productivity of *B.braunii* which production 9.018 g/L biomass, whereas with added cattle urine as medium is not given significantly to lipid production.

Biofuel, *Botryococcus braunii*, cattle urine

## BO-30

### Isolation and identification lactic acid bacteria from spontaneous sorghum fermentation

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Lactic Acid Bacteria (LAB) predominant the microflora of fermented products. The objective of the present study were isolation and identification proteolytic and amylolytic lactic acid bacteria during spontaneous sorghum fermentation. Fifty-six isolates had isolated from fermented sorghum are presumed as lactic acid bacteria. Twenty-two isolates had proteolytic activity and ten isolates had amylolytic activity, only 2 isolates had proteolytic and amylolytic activity. These two isolates were further identified by morphology, biochemistry, and physiology. The results showed that two isolates are *Pediococcus acidilactici*

Amylolytic, fermented sorghum, lactic acid bacteria, proteolytic

## BO-31

### Tree species composition and structure of Prigen-Raden Soerjo Forest Park on the north slope of Mt. Arjuno, East Java, Indonesia

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Prigen-Raden Soerjo Forest Park is one of the remaining mountain forest ecosystems on the north slope of Mount Arjuno, East Java, Indonesia. The objective of the study was to do measurements of floristic composition and structure of Prigen-R. Soerjo Forest Park vegetation. It was conducted using purposive random sampling method. Plots 12.000 m<sup>2</sup> were established in two sites of Prigen-Raden Soerjo Forest Park at altitude of 850-1.100 asl. (above sea level) and 900-1.400 m asl., in order to determine density, frequency, basal area, important value index of trees, poles, seedlings and diversity index of sites. A total of 88 species belonging to 76 genera and 49 families were recorded. Mempatar (*Pentace triptera*), gondang (*Ficus variegata*), alpukat hutan (*Persea rimosa*), beringin (*Ficus benjamina*), anggrung (*Trema orientalis*) were the dominant tree in forest site, followed by kileho (*Saurauia nudiflora*), beringin (*Ficus*), cembirit (*Tabernaemontana macrocarpa*) in pole strata and teh-tehan (*Ageratina riparia*) in seedling

strata. For rehabilitation site, grass was the dominant group, such as suket putihan (*Bothriochloa pertusa*), kipare (*Deyeuxia australis*), alang-alang (*Imperata cylindrica*) and other group of Asteraceae, particularly for teh-tehan (*Ageratum riparia*) and kirinyuh (*Chromolaena odorata*). Data analysis showed that the diversity index trees in forests site were high, with value ( $H'$ ) of 3,05. This indicates that Prigen forest conditions are approaching sustainable conditions. Meanwhile, the condition of the vegetation rehabilitation area which is dominated by grass, Asteraceae group, and ferns shows that this area is still in the early stages of succession. Based on the altitudinal zone, Prigen site consists of two zones are tropical lowland and submontane forest.

Floristic composition and structure, north slope of Mount Arjuno, Prigen site, Raden Soerjo Forest Park, submontane forest, tropical lowland forest

## BP-01

### Efforts to develop the potential of indigenous vegetables

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Indigenous vegetables also have resistance high in pathogens and adaptable to an unfavorable environment, so can be used as a substitute for vegetables commercial in supply nutritional needs humans and contribute to overall food supply. However, the fact also shows that the existence of this group of indigenous vegetables began to be threatened because it was replaced by various species of cultivation. The following is described indigenous vegetables that are of economic value and have the potential to be developed is Kenikir (*Cosmos caudatus* Kunth), Genjer (*Limnocharis flava* (L.) Buchenau), Poh-pohan (*Pilea melastomoides* (Poir.) Bl.), *Leunca* (*Solanum americanum* Miller). The role of utilizing indigenous vegetables to help overcome nutritional problems in Indonesia, to overcome problems this, especially for pre-family prosperous, reliable because indigenous vegetables have adapted to the local environment by means of easy cultivation and low cost. Indigenous vegetables still require a study of economic value, potential nutritional content as well as prospects for development.

*Cosmos caudatus*, indigenous vegetables, *Limnocharis flava*, *Pilea melastomoides*, *Solanum americanum*

## BP-02

### Notes of endemic species *Sindora javanica* in Java, Indonesia

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Sampanantu or *Sindora javanica* (Koord. & Valeton) Backer is a Java endemic plant from family Caesalpiniaceae and joint tribe Detarieae like *Brownea*, *Cynometra*, *Hymenaea*, *Intsia*, *Maniltoa*, *Saraca*, and *Tamarindus*. Previous, it is named *S. sumatrana* var. *javanica* Koord. & Valeton then taxonomist, Cornelis Andries Backer revised that to *S. javanica*. According to the IUCN Red List, Sampanantu is categorized as vulnerable species (VU). In 1963, it was recorded that species was only found in West and Central Java. The natural population is only found in Parahyangan, West Java and Banyumas, Central Java. In 2014, it was recorded that species was found in Nusakambangan Island, Central Java. The results revealed that distribution record has not changed over 50 years until present. During exploration in 2015-2016, it was recorded tree and seedling species *S. javanica* in Sendang Biru and Sempu Island, Malang, East Java. By the discovery of species in East Java, it could be a new distribution record in Java.

Distribution, endemic plant, Java, *Sindora javanica*

## BP-03

### The abundance and diversity of Mollusca species in the coastal mangrove areas of Panango, North Sulawesi, Indonesia

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The abundance and diversity of Mollusca species in the coastal mangrove areas of Panango, North Sulawesi, Indonesia. The study reported in this paper sought to analyze the abundance and diversity of Mollusca species in the coastal mangrove areas of Panango in North Sulawesi, Indonesia. Data collected in the study lent support to policy making in reducing the loss of marine biotic species in the coastal mangrove areas. To collect data, a stratified-random sampling method (plot size was 10 m x 10 m) with three plots at each research station was used. The Brower and Krebs, as well as the Shannon Wiener equations, were also used. The distribution sample was at 12 research sample points. The study found 14 families of mollusk consisting of 11 gastropod families (22 species) and 3 bivalve families (3 types). The highest  $KR$  was found in *Terebralia* sp. (24,24%) and the lowest  $KR$  was obtained (1,52%) in the following species: *S. violaceus*, *Conus* sp., *Semiricinula turbinoides*, *C. quoyi*, and *Faunus ater*. The diversity index of mollusk species (gastropods and Bivalvia) at the observation station was classified as high category, indicating by  $H' > 3,32$  (Station I  $H' = 2,19$  and Station II  $H' = 2,22$ ). This study suggests a need to regulate mangrove

areas of Panango for a sustainable mangrove ecosystems management

Abundance, diversity, Bivalvia, Gastropoda, Panango

## **BP-04**

### **Diversity of orchid (Orchidaceae) in Bukit Barisan Selatan National Park, Lampung, Indonesia.**

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Orchids, belong to Orchidaceae family, are well known as ornamental plants. It is one of popular ornamental plants due to of its beautiful flowers and varied in color. The members of this family always get more attention rather than other families because of its unique and having potential economic value. This study aimed to reveal the diverse members of the Orchidaceae in Sumatra, notably in Bukit Barisan Selatan National Park (TNBBS), Lampung, Indonesia. This research has been carried out from 2011 to 2014 at Kubu Perahu Resort, Sukaraja Atas Resort, Pugung Tampak Resort, and Sekincau Resort; purposive sampling method has been used. The result showed 132 species and 52 genera have been identified at TNBBS, Lampung, of which 37 genera are epiphyte orchids and 15 genera are terrestrial orchids. A few species have recognized as endemic species viz. *Grammatophyllum speciosum* Blume, *Phalaenopsis amboinensis* J.J.Sm. and *Vanda sumatrana* Schlecht. All of these orchids then cultivated at Bogor Botanic Gardens as well as in Liwa Botanic Gardens as an ex situ conservation and for a sustainable effort.

Bukit Barisan Selatan National Park, diversity, exploration, orchids

## **BP-05**

### **The role of Batam Botanic Gardens as a Plant Conservation Center for small islands plants and coastal in Indonesia**

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The development of conservation areas in ex-situ is one of the efforts to reduce the degradation and protection of biodiversity, especially various types of small island plants in Indonesia. Development of botanical gardens in various regions in Indonesia is the right step in the preservation of plant species in the archipelago. One area that responds well to regional botanical development programs is the Batam City Government. The development of Batam Botanical Gardens with the theme of conservation of small

islands and coastal areas of Indonesia has the aim of saving Indonesian plants in accordance with this theme, is one of the efforts to reduce the effects of global warming and climate change as well as carry out functions as environmental services, producing oxygen in the Batam City. The method carried out includes the stages of planning, infrastructure development, exploration, planting, management of plant collections. Currently, the conservation function has been carried out by the Batam Botanic Gardens is to carry out exploration activities on the islands around the island of Batam by taking plants in their natural habitat and planting collection and non-collection plants. The exploration results that have been planted are the types of plants that are almost extinct or the typical plants of the region the rest are the plants that are found while in the field so that the plants are maintained. The collections planted are from the families Anacardiaceae, Annonaceae, Apocynaceae, Arecaceae, Burseraceae, Calophyllaceae, Clusiaceae, Dipterocarpaceae, Ebenaceae, Euphorbiaceae, Fagaceae, Flacourtiaceae, Gnetaceae, Lauraceae, Lecythidaceae, Leguminosae, Meliaceae, Moraceae, Myristicaceae, Myrsinaceae, Myrtaceae, Podocarpaceae, Rubiaceae, Sapindaceae, Sapotaceae, Simarubaceae, Theaceae, Thymelaeaceae, and Verbenaceae. The total number of planting collections is 2,472 specimens consisting of 28 families, 140 genera, 193 species, 824 sp. With the collection is expected to be able to provide ecological impact in improving environmental quality which includes water management, biodiversity, carbon sinks, oxygen providers and landscape beauty.

Batam Botanic Gardens, conservation, ex-situ, small islands plants

## **BP-06**

### **Diversity of mosquito types in Central Java Province that can act as vector in various tropical diseases**

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Some mosquito-borne diseases are still a public health problem. At present, there have been many reports of diseases which are transmitted through mosquitoes as vectors. The presence of mosquitoes is widespread throughout the world including in Indonesia with an estimated 3100 species from 34 genera. Eradication of disease through vector control programs is the main thing to do in addition to treatment in patients. The proper morphological identification of mosquitoes can be used to identify the character and number of species so that it becomes a picture of diversity in an area. Data collection was carried out using secondary data from the 2015 Special Research Report on Vector and Reservoir Diseases (Rikhus Vektora) in Central Java Province, Indonesia. The data obtained were analyzed descriptively. Mosquito samples in Rikhus Vektora in 2015 in Central Java Province were

collected from 3 different ecosystems, namely forest, and beach. The location of the ecosystem includes near settlements and away from settlements. The overall mosquito sample was successfully identified as many as 27,479 tails consisting of 5 genera and 37 species. From Pekalongan District, there were samples of mosquitoes consisting of 5 genera and 19 species. As many as 4 species of mosquitoes are species that have never been identified and reported in circulation in Pekalongan District. Identification of mosquitoes collected in Purworejo District has 5 genera and 23 species. Mosquito samples from Pati District were identified as having 5 genera and 22 species. Indonesia has a tropical climate that is heterogeneous and vulnerable to the impacts of climate change. Climate change can affect the spread of various mosquito vector infectious diseases. Increasing humidity and rainfall will increase the density of mosquitoes as a vector for some diseases.

Central Java, mosquitoes, vectors, tropical diseases

## BP-07

### Key species of wildlife as tourism attraction in Gorontalo Province, Indonesia

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Wildlife has a vital role in human life. From ecology perspective, wildlife is a reflection of ecological condition and its changes over the course of time. Moreover, wildlife has become a natural tourist attraction. The research aimed to identify wildlife species that has become a tourist attraction in Gorontalo Province, Indonesia. The data were secondary data collected by examining related studies and journals. The results showed wildlife species that have become a tourist attraction in Botubarani Beach is whale shark (*Rhincodon typus*); in Panua Nature Reserve: Maleo bird (*Macrochepalon maleo*), olive ridley turtle (*Lepidochelys olivacea*); in Nantu-Boliyohuto Wildlife Reserve: babirusa (*Babirusa babirusa*), anoa (*Bubalus depressicornis*), Malay civet (*Viverra zibetha*), tarsius (*Tarsius spectrum*), Sulawesi black macaque (*Macaca heckii*), Sulawesi dwarf cuscus (*Strigocuscus celebensis*), and bird species; in Pepaya Mas Nature Reserve: green turtle (*Chelonia mydas*), hawksbill turtle (*Eretmochelys imbricata*), leatherback sea turtle, (*Dermochelys coriacea*), loggerhead sea turtle (*Caretta caretta*) and bird species; in Limboto Lake area: endemic birds and migratory birds.

Attraction, Gorontalo, key species, tourism wildlife

## BP-08

### 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 6-13° SL and 96-11° EL, with the fishing season peak in August. The length and weight relationship of *Alopias pelagicus*  $W = 7 \times 10^{-6} L^{3.15}$  and *Alopias Superciliosus*  $W = 5 \times 10^{-6} L^{3.20}$  with the  $L_{50\%}$  for both of these species are 195 cmFL. Male *A. pelagicus* has length 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 length 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, fishing season, Indian Ocean, thresher sharks

## BP-09

### The potential of Suweg and its habitat in Gubug Payung, Temenggeng, Blora District, Indonesia

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Suweg (*Amorphophallus paeoniifolius* (Dennst.) Nicolson) is one of the potential sources of food plants that are often found growing wild in farmers' gardens or fields. In the teak plantation of Cepu KPH precisely in Temenggeng Village, there were many suwegas growing between the teak trees that were already big and old. To find out the potential and range of habitat where suweg grows, especially in teak forests, ten plot observations were made using purposive sampling, each measuring 10 x 10 m<sup>2</sup>. Overall, 17 adults and 30 young individuals were obtained. In addition to teak plants, 43 wild plant species were identified alongside suweg, from various habitus, herbs, lianas, shrubs, and trees as well as some ferns and orchids. Herbs are the most common habitus that grows around

suweg, especially from the families Fabaceae, Compositae, and Zingiberaceae. The species that are almost always found together in the suweg plot are *Tetrastigma lanceolarium* and *Thespesia lampas*, but in quantity, *Costus spiralis* is more abundant than the two species, although it is only found in four sampling plots. The results of this study also showed that there was no specificity of the group of plants that had to live with suweg, this was supported by a similarity index which generally showed quite small values between one plot and another.

Potential, habitat, suweg, teak forest

## BP-10

### Identifying the turtles species traded at several pet shops in Jakarta, Indonesia

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The turtles population in Java island are in danger of decline, due to illegal trading. Turtles trading is more intense due to the high interest of buyers and the selling price, so the threats of turtles extinction have been increased. This study aimed to identify the species of turtles traded in Jakarta, especially for the species listed in the Red List of IUCN, and Appendix of CITES. The data collection was used in surveys and interview methods to 6 pet shops in Jakarta. We found 8 local species, and 23 introduced species, those were consisted of 5 critically endangered species, 3 endangered species, and 11 vulnerable species according to IUCN Red List. There were 6 species listed in Appendix II CITES found trade freely, they were *Chelodina mccordi* (snake neck turtle), *Cuora amboinensis* (Ambon turtle), *Siebenrockiella crassicolis* (white cheeks turtle), *Manouria emys* (emys turtle), *Carettochelys insculpta* (pig-nosed turtle), and *Cyclemys dentata* (leaves turtle). The local species that buyers interest most, were *C. amboinensis*, *S. crassicolis*, and *C. mccordi*, while introduced species sold mostly was Brazilian turtles *Trachemy scripta* elegans.

CITES, IUCN, Jakarta, Red List, turtles trade

## BP-11

### The composition of plant species living under the shade of the main constituent trees in Nantu-Boliyohuto Wildlife Reserve in Gorontalo, Indonesia

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Nantu-Boliyohuto Wildlife Reserve, Gorontalo, Indonesia is a primary forest area dominated by large and tall trees with dense canopies. The main constituents in this vegetation are tree species with the highest Important Value Index (IVI): *Palaquium obovatum*, *Dracontomelon dao*; and *Ficus benjamina*. The research aimed to determine plant species living under the shade of the main constituent trees. The data were collected using exploration method by identifying plant species found under the main constituent trees. The data were analyzed using descriptive method. The results showed that there are four plant species living under the shade of *Palaquium obovatum*, i.e., *Diospyros pilasenthera*, *Pangium edule*, *Calamus inops*, and *Drypetes globosa*; four plant species living under the shade of *Dracontomelon dao*, i.e., *Polyalthia sp*, *Drypetes globosa*, *Calamus inops*, and *Terminalia celebica*, i.e., five plant species living under the shade *Ficus benjamina*, i.e., *Duabanga moluccana*, *Drypetes globosa*, *Calamus inops*, *Myristica fatua*, and *Cananga odorata*.

Nantu-Boliyohuto Wildlife Reserve, under tree shade, vegetation

## Diversity of Ecosystem

### CO-01

#### Community of predatory coccinellids in various agricultural ecosystems in West Sumatra

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Predators are important natural enemies for their high diversity and effectiveness as biological agents. The important predators of aphids are Coccinellids. A research was conducted in different agricultural landscapes of food crops and vegetables to study the community of coccinellids. Insects were collected using insect net or sweep net and direct collection by hands. There were 26 species of Coccinellids predators found in some agricultural landscapes in West Sumatra. *Verania lineata* was a dominant species found in rice plants and *Menochillus sexmaculatus* was a dominant species found in horticultural and other food crops. No significant difference found between diversity of coccinellids in simple and complex agricultural landscapes

Aphids, agricultural ecosystems, biological agent, predatory coccinellids

**CO-02****Ecology of *Zanthoxylum acanthopodium*: specific leaf area and habitat characteristics****Decky Indrawan Junaedi<sup>1</sup>, Yati Nurlaeni**

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Andaliman (*Zanthoxylum acanthopodium* CD) is an important species in North Sumatra, either from conservation, economy, or socio-culture point of views. Andaliman known as a difficult to cultivate plant species and their natural distribution in Indonesia is restricted to Aceh and North Sumatra. This study aims to identify the modest characteristic of andaliman's habitat (natural and cultivation) and to assess the importance of light in these habitat types in North Sumatra. We surveyed five districts in North Sumatra and used specific leaf area as a proxy for light importance in andaliman habitat. We found that andaliman grew naturally in high slope areas and not in a plain area. Even in cultivation, andaliman grow well in sloped area with minimum inundated surface runoff water. Andaliman with high SLA value occurred in high slope area and andaliman with smaller SLA found in cultivated area. This study indicates the importance of light preferences and surface run-off for andaliman habitat suitability. Further study needed to examine the quality, intensity, and frequency of light to support andaliman growth; and to examine the role of land inclination and their position relative to sun exposure for andaliman growth rate and growth success.

light intensity, logistic regression, Toba lake, trait-based ecology, *Zanthoxylum acanthopodium*

**CO-03****Population of common palm civet (*Paradoxurus hermaphroditus*, Pallas 1777) at the coffee plantation: Case study coffee fields in Pulosari Village, Bandung, West Java, Indonesia****Susanti Withaningsih<sup>1</sup>, Erri N. Megantara<sup>1</sup>, Parikesit<sup>2</sup>, Alfiana Devi<sup>3</sup>**<sup>1</sup>Department of Biology, Faculty of Mathematics and Natural Sciences, Universitas Padjadjaran. Jl. Raya Bandung-Sumedang Km 21, Jatinangor, Sumedang 45363, West Java, Indonesia<sup>2</sup>Center for Environment & Sustainability Science (PPSDAL), Universitas Padjadjaran. Jl. Sekeloa Selatan I, Bandung 40213, West Java, Indonesia<sup>3</sup>Postgraduate Program of Environmental Science & Sustainability Science, Universitas Padjadjaran. Jl. Dipatiukur No. 35, Bandung 40132, West Java Indonesia

The research about estimation of common palm civet (*Paradoxurus hermaphroditus*, Pallas 1777) was done at the Coffee Plantation in Pulosari, Pangalengan Sub-district, Bandung District, West Java, Indonesia from May to June 2018. The purpose of this research is to determine the population of common palm civet which exists at the coffee plantation in Pulosari village that can be used as a

reference to common palm civet protection and conservation efforts and the threaten of common palm civet population at the coffee plantation in Pulosari village. Three methods were used in this research; which was semi-structured interview, direct encounter and sign survey. Based on the research, there were seven common palm civets that were found by using direct encounter method and 94 sign that was found using sign survey. Based on these results obtained the estimated total population of common palm civets at the coffee plantation in Pulosari village ranged from 5 to 35 individuals. The threat to the common palm civet population at the coffee plantation in Pulosari village is the presence of competitors, porcupines, squirrels, and pigs. Threats from predators are tiger and dog and human activity is poaching.

Common palm civet, encounter survey, Pulosari Village, semi-structured interview, sign survey

**CO-04****Invasion of Quinine (*Cinchona* spp.) from South America to the montane forest of Java****Zaenal Mutaqien<sup>1</sup>, Eizi Suzuki<sup>2</sup>, Dian Rosleine<sup>3</sup>, Yoshifumi Kudo<sup>2</sup>**<sup>1</sup>Cibodas Botanic Gardens, Indonesian Institute of Sciences. Jl. Kebun Raya Cibodas, Cipanas, Cianjur 43253, West Java, Indonesia<sup>2</sup>Kagoshima University, 1 Chome-21-2 4 Korimoto, Kagoshima, Kagoshima Prefecture 890-8580, Jepang<sup>3</sup>School of Life Science and Technology, Institut Teknologi Bandung (SITH-ITB). Gd. Labtek XI, Jl. Ganesha No. 10, Bandung City 40132, West Java, Indonesia

Since 1854, Quinine trees (*Cinchona* spp.) was introduced to Java and generated establishment for more than a hundred *Cinchona* estates which supplied about 97% world quinine. Later, some people noted the spreading of Quinine trees outside the plantations in Java., especially Red Quinine (*Cinchona pubescens*), one of the 100 most invasive species in the world listed by IUCN. Five locations in Gede Pangrango National Park (GPNP), Tangkuban Perahu Nature Reserve (TPNR) and in Mount. Tilu Nature Reserve (MTNR) were surveyed in 2011, 2015 and 2016. Belt transects with 10 m width were located to clarify the spread of *Cinchona* and three 100 m<sup>2</sup> plots were put to measure growth rate and effect to resident vegetation. *C. pubescens* and *C. calisaya* found invasive in protected montane forest of West Java. *C. calisaya* was fewer than *C. pubescens*. Mainly the spread of these species was driven by short-distance dispersal, however, the 'jump' long-distance dispersal also occurred. The growth rates may suggest Quinine trees would be difficult to prevail against native trees. Species richness, density, and population of *Cinchona* inclined to drop over the time. These species were on spread stage in the invasion process, but seem to be failed to pass through the environmental barrier.

*Cinchona*, environmental barrier, invasive species, Java, montane forest

## Ethnobiology and Socioeconomics

### DO-01

#### The quantity of beach macro debris in different monsoon at Tunda Island, Indonesia

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Marine debris is one of the problems that occur on the coast of the island, because its existence has a bad impact on the environment, social and economic. This study aimed to compare the abundance of marine debris in the west and east monsoon in Tunda Island, Banten. The method used is to determine 8 stations around the island. Sampling data collection uses a Line Transect with a length of 100 m<sup>2</sup> at each station. There are seven categories of debris in this study. The most common categories are "most likely to find items" with the most types of debris being food wrappers as many as 174 pieces in February and 720 pieces in August. Based on the results of the study there was an increase in the weight of debris in the east season by 50% with an increase in average weight of 3.25 kg. This increase occurs due to human activities and differences in wind velocity. Wind velocity in February averaged between 0.04-0.05 m/s. While in August the velocity ranges from 0.06-0.08 m/s.

Abundance, beach debris, human activities, monsoon, Tunda Island

### DO-02

#### *Leunca* (*Solanum nigrum*): Ethnobotany of a minor-indigenous vegetable in two villages in Upper Citarum, Bandung, West Java, Indonesia

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Taxonomically, *leunca* is included into complex of *Solanum nigrum* L. species, with synonyms *S. amercanum* Miller and *S. nudiflorum* Jacq, of the Family Solanaceae. In recent years, academic interest to *leunca* has been

increasing. After so long studied as weeds, today *leunca* has also studied because of its important meaning as crops that have high nutritional and economic value in relation to food resilience of developing countries, as well as because of its chemical substances with its medicinal properties. *Leunca* was recorded in colonial period by botanists or agricultural scientists' reports as local vegetable in rural West Java also in modern time by anthropologists or ecologists who studying rural population. In recent time in Indonesia, *leunca* studies almost all have been focused on its pharmacological, agronomic, and economic aspects. The aspect that is related to Sundanese sociocultural system was almost neglected. This article elucidates the finding of ethnobotanical research on people related to *leunca* that includes people botanical and ecological knowledge, agronomical knowledge and practices, institutional aspects of *leunca* in everyday life, and status of *leunca* in local culinary culture. This research shows that *leunca* is a part of peasant cultural identity and Sundanese social identity. *Leunca* cultivation, although has not been intensive, and its consumption as raw vegetables and as main component of some local dish, become a part of Sundanese villagers habitus and identification of *leunca* with 'peasant-ness' dan 'Sunda-ness' emerge when it is contrasted with urban way of life and other ethnic identities.

Ethnobotany, habitus, indigenous vegetable, *leunca*, socio-cultural identity, *Solanum nigrum*

### DO-03

#### Women and agriculture in forest: Case study in Palintang Hamlet, Cipanjalu Village, Bandung, West Java, Indonesia

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Agricultural activity in rural West Java usually involves men and women. The division of the labor of men and women in agricultural sector varies in different West Javanese villages is influenced by local culture and ecosystem. Palintang hamlet (Cipanjalu Village, Cilengkrang, Bandung, West Java, Indonesia) is located in close to forest ecosystem. As a result, the main agricultural activities of Palintang people have been undertaken in the forest. They have predominantly cultivated crops in the pine (*Pinus mekusii* (Jungh) et De Vriese) that is managed by Perhutani. This paper was focused on dynamics of women's involvement in various agriculture agricultural activities, including cultivation of vegetables, such as farming cabbage/kol (*Brasica oleracea* var. *capitata*) and potato/kentang (*Solanum tubersum* L), and cultivation of coffee/kopi arabika (*Coffea arabica* L) in the forest of

Perhutani based on case study in the Palintang hamlet. Method used in this study was qualitative with descriptive analyses. Some techniques, such as observation, participant observation, and semi-structured interview to collect primary data were undertaken. The result of study showed that women of Palintang hamlet have not been static and stagnant, but they are very active and try to adapt with forest ecosystem and socio-economic and cultural changes. For instance, women of Palintang have adapted to unpredictable climatic condition, and socio-economic conditions, including market economy development, and responded on the Perhutani or Government policies. In the past, women in Palintang were more focused on farming vegetables. They were main actor of farming vegetables, including cabbage and potato. For example, they involved in weeding of weeds (*ngored*) and harvesting potato (*ngali hui*). Today, they have also been important actor in farming coffee of Arabica in the forest. Some activities, including harvesting coffee beans in the forest, washing, selecting, and drying coffee beans in the settlement have been predominantly undertaken by women. In addition, because the main road has been improved and more opened access, many women of Palintang have predominantly involved as traders in a village market Sunday or permanent traditional market of Ujung Berung, Bandung. Women of Palintang have dynamically involved and tried to adapt with various agricultural job activities for long time. Since women have also duty to fulfill the income in the household, they have intensively involved in agricultural activities. As rural farmer, men and women have been important role in agricultural activities based on gender, that have role who complement each other to meet the needs of their family.

Agriculture, Palintang, pine forest, socio-dynamic, West Java, women

## DO-04

### Ethnobotany of bamboo and its utilization in Ciboboko Peoples, Mekarasih Village, Sumedang, West Java, Indonesia

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Bamboo has many advantages in terms of ecology, social and culture as one of the renewable natural resources. Behind the many potentials and their many uses, biodiversity is absolutely necessary for human survival. the method used in this study is qualitative. Data collection techniques are carried out by semi-structural interviews. The results showed that the knowledge of the people of Ciboboko Hamlet was very good in knowing the types of bamboo and their utilization. There are 8 types of bamboo

based on community knowledge is Haur Koneng (*Bambusa vulgaris* Schrad. Ex. Wndl. var striata), Haur Hejo (*Bambusa tuldoidea*), Awi Tali (*Gigantochloa apus* JA & J.H. Schultz Kurz), Awi Hideung (*Gigantochloa atrovilacea* Widjaja), Awi Tamiyang (*Sshizostachyum iraten* Backer ex Heyne), Awi Surat (*Gigantochloa pseudoarundinacea* Steud Widjaja), Awi Buluh (*Gigantochloa atter*), and Awi Betung (*Dendrocalamus asper* Schult. Backer e Heyne). Bamboo was categorized into its uses based on botanical character i.e. rhizome, bamboo shoots, culm, and leaves. The utilization of bamboo was determined into 6 categories such as material building, furniture, household appliances, working tools, traditional medicine, and myth.

Bamboo, Ciboboko, management, utilization

## DO-05

### The diversity of endemic animals as a potential for economic development based on local future support of community income in Mountain Arfak Natural Reserve, West Papua, Indonesia

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Arfak Mountain Nature Reserve is determined by Minister of Forestry Decree no.783/Kpts-II/1992 dated 11 August 1992 covering an area of + 68,325.00 hectares. CA Arfak Mountains geographically stretches on Papua Island Bird's Head section at 133°46'0"-134°15'0" E coordinates, 1°00'0"-1°30'0" S with altitude between 15 to 2,900 m asl. Government administration, CA Arfak Mountains are included in 3 districts of Manokwari, South Manokwari and Arfak Mountains, West Papua Province, Indonesia. This area of biodiversity is a variety of protected flora and fauna. Among these are various types of orchids, butterfly species of birds (*Ornithoptera* spp.) Which hunt collectors of international butterflies living in this region, In the CA Arfak Mountains area is estimated there are 110 mammals species of which 44 species have been recorded, 320 aves species, of which 5 are endemic to the Arfak-Tambrau Mountains such as Cenderawasih Arfak (*Astrapia nigra*), West Parotia (*Parotia sefilata*), and Namdur plain (*Amblyornis inornatus*) and Maleo Gunung (*Aepyptodius arfakianus*). This is where tourists can enjoy the beauty or

see firsthand the natural wealth contained in the nature reserve area of Arfak Mountain that has the potential as an ecotourism location that prioritizes nature attraction (nature-based tourism). The tourism industry has an important role in the development and development of a region. Even in some areas shows that the tourism industry is able to lift the area from backwardness and make as the main source of income. Based on that, the research conducted the impact of ecotourism development based on endemic animal in Arfak Mountain Nature Reserve in June-July 2017. The purpose of this research is to know the impact of ecotourism development on endemic animals. The material used in the fauna is endemic (Butterfly bird wing, Cenderawasih Arfak, Cenderawasih Parotia West, Nambur plain, and Maleo Bird bird) using survey method. The data were obtained through direct interviews with communities around the nature reserve area, through related government in Manokwari District. The observed variables are (i) the condition of the existing animal in the location, (ii) the society's income, from the data and the result of the discussion it can be concluded that the Ecotourism program is very good to be developed because it can give positive impact to the conservation effort, increase the people's income and the regional income.

Arfak mountains Nature reserve, ecotourism, endemic animals

## DO-06

### Traditional knowledge of the use of garden plants in Ciboboko Hamlet, Mekarasih Village, Sumedang, Indonesia

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Indonesia has been known as own diversity of flora, fauna and culture, which also holds a variety of information in its community, one of the most popular diversity in Indonesia, namely plant diversity. One of the traditional knowledge of the Indonesian people is the knowledge of the use of garden plants. This research was conducted to obtain information about the types of garden plants, their use and how to maintain the yard by the people of Ciboboko Hamlet, Mekarasih Village, Jatigede, Sumedang, West Java, Indonesia. The method used for this research is semi-quantitative methods. Data collection techniques were carried out by semi-structural interviews. Determination of informants is done by snowball sampling technique. Based on the results of the study, there were 81 species from 47 families located in the 34 yards of the village community. The highest utilization is dominated by food crop groups as many as 44 species from 30 families, dominating plants namely Onion leaves (*Allium fistulosum* L.). Furthermore, as many as 31 species of ornamental plants from 24 families are applied for the ornamental plants, namely

porbia (*Euphorbia millii*) and red shoots (*Syzygium oleana*). The use of other garden plants is a dye-producing plant, Pandan (*Pandanus amaryllifolius* Roxb). Then there is the use of medicinal plants totaling 4 types from 4 families, the dominant plants are African leaves (*Vernonia amygdalina* L), and the utilization of wood-producing plants namely Teak (*Tectona grandis* Linn.f.). The way to maintain garden plants is generally watering some types of plants and giving fertilizer which is derived from compost.

Ciboboko hamlet, utilization, yard crops

## DO-07

### Using wildlife for local livelihood: Papuan experiences

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Wildlife products are valuable commodities, and they are commonly used for consumption purpose, generating household income and cultural reasons. Because cultural values differ among ethnic groups, it is important to understand how changing cultural values of wildlife in Papua within the last 10 years. Data was obtained opportunistically during fieldwork to some parts in both Papua and West Papua provinces, Indonesia from 2010 to 2017. Direct observation was done and semi-structural interview was carried out. A supplemented by a review of the literature based on the research undertaken in Universitas Papua was also done to complete the field survey information. Our findings show that many people rely on wild meat as an alternative source of family food. Wildlife also offers forms of income generation such as sale of bushmeat products. Acquisition of animal parts as cultural artifacts, for personal adornment or for trophies (most often skins, teeth, antlers, and horns) is still a widespread practice throughout the areas. Religious and cultural aspects are also contributed significantly to the use of wild meat for traditional or spiritual aspects as well. We also encounter that the tendency of using wildlife is currently increasing in popularity and is largely considered to be for recreational purposes, including ecological based tourism. In brief, this study shows that cultural values of using wildlife tend to utilize the uniqueness of the species themselves merged with the beauty of the nature-ecosystem services to support ecologically-based tourism along with the development of creative economy bases for local livelihood. Therefore, ecotourism development plan and other creative economy activities should take into account trends and tourist interests on the beauty of nature and the uniqueness of the endemic faunas. Thus, encouragement and involvement of local community in ecotourism activities should also be supported to improve the local

communities' commitment to keep the fauna's habitat sustainably.

Ecotourism, local livelihood, Papua, wildlife

## DO-08

### Biodiversity in posthumanism and social media era

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Everyday using social media enable interactive forms of information transmission. The increasing number of citizen awareness on public policies has been revealed by previous studies. Despite the digital divide and expanding of Internet usage, there are few studies analyze who own legitimated truths on biodiversity and bioethics policies. In this article, we argue for posthumanism approach to the citizen science in developing a critical self-awareness and environmental and sustainable education. We draw attention to alternate way of posthumanism framework and actor-network theory to challenge an emancipation in human relations with the rest of nature. We then analyze barriers to transdisciplinary method strategic communication by the possibility of social networks and the new champions of biodiversity communication in social media. Content analysis on digital networks, links, and communications draw to analyze significant effects on participation of collective identities and the creation of communities. Digital socio-technological system immerses binary categories of the human and the nonhuman, dominance of fetishization scientists, and biases in researches.

Biodiversity, bioethics, social media, posthumanism, transdisciplinary approach

## DO-09

### Qualitative morphological diversity of female Pelung chickens in West Java, Indonesia

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Pelung chickens are indigenous chickens in Indonesia derived from Cianjur District, West Java Province, Indonesia. The chickens which are raised as singing chickens have a distinctive body shape compared to other local chickens. Regular contests are conducted as a media to show singing ability of Pelung chickens. Pelung keepers believe that Pelung chickens inherited their singing capability from their parents. Pelung keepers perceived qualitative traits for example plumage color as an indicator of a good female breed. The objective of this study was to determine qualitative traits of female Pelung Chickens in West Java. A survey was conducted to gather data involving 175 chickens in four districts in West Java Province, including Cianjur, Sukabumi, Bandung and Garut Districts. The results showed that adult female Pelung chickens have similar qualitative characteristics. The majority of chickens have single combs with black plumages except in Cianjur District. The plumage of chickens in Cianjur is dominated by brownish yellow. Other qualitative traits such as eye rings are dominated by yellow color (in Cianjur and Sukabumi Districts) and black color (in Garut and Bandung Districts). All chickens in study areas have white skin, while their beaks and shanks are dominated by black color. These findings are important in terms of breeding strategy of Pelung chickens

Pelung, qualitative, trait, West Java

## DO-10

### Ethnobotany of tree ferns in Kampong Pasir Menyan, Sukamandi Village, Subang District West Java, Indonesia

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Tree ferns are plants that have spores, stature is like a tree and most grow on highlands, such as Kampong Pasir Menyan, Sukamandi, Subang, West Java, Indonesia. Local knowledge about tree ferns such as local names, and their use and habitat is the focus of this research. The study was carried out at Pasir Menyan, Sukamandi, Subang-West Java in March-June 2017 using qualitative and quantitative methods (Mix methods). The qualitative method was carried out by using indepth interview technique to several key informants, who were obtained by snowball sampling, while the quantitative method was carried out using questionnaires to 162 respondents. The selection of respondents was selected using systematic random sampling technique. The results showed that residents around the conservation area had local knowledge of the name of the species of tree ferns, benefits, and habitat. Residents with range of 50-59 years with a low level of

education (not graduating from elementary school) have the highest level of knowledge of the name of the species of tree ferns, and their use (as vegetables, ornamental plants, growing media, and for handicrafts). In addition, knowledge of tree ferns is an open slope, on the edge or riverbank, in damaged forest areas, and in a closed forest.

Local knowledge, qualitative and quantitative methods, ornamental plant, tree ferns

## **DO-11**

### **Impact increase of input and output prices toward production of rice in Banten Province, Indonesia**

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In Year 2014 the production of rice in Banten amounted to 2,045,883 tons with a harvested area of 386,398 ha. The objectives of this study are: (i) to know the factors of influencing rice production in Banten Province, (ii) to know the impact of price increase of input and output on paddy production in Banten Province. This method of study used survey method with 120 respondents. The analysis method uses Simultaneous Equations Model. The results of the study were (i) The factors that affect rice production in Banten Province significantly are: Total Use of Certified Seeds, Total Use of SP-36 Fertilizers, Total Use of Solid Growing Substances, Total Use of Solid Pesticides, Total Use of Liquid Herbicides, Total Use of Labor Rent, Land area, and Farm Household Income per year. (ii) From the simulation results that the increase in grain prices by 20% will increase production by 4.4% and household income of 11.6%. A 20% increase in the price of Urea and NPK fertilizers could increase rice production by 2.5% and farm household income by 1.1%. So the increase of farm input prices (fertilizer and wage of tractor and labor rent) by 20% does not affect rice production and farmer's income.

Input and output prices, rice production, simultaneous equation model

## **DP-01**

### **Impact of the green revolution on the wet rice farming based on gender: A case study in Karangwangi Village, Cinjur, West Java, Indonesia**

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The wet rice farming (sawah) is very complex that is determined by ecological and social economic and cultural factors, including soil conditions, water availability, weather and climate, population, local knowledge, beliefs, technology, and economy. In addition, the wet rice farming is determined by the government policy and market economy. In the past, the Sundanese rural people of West Java practiced the wet rice farming was based on the local knowledge or traditional ecological knowledge which is strongly embedded with local tradition, and division of labor based on the gender. Traditionally, most inputs of the wet rice farming, including rice seeds, organic fertilizer, and biopesticides were provided by internal resources of rural ecosystem. Both male and female farmers intensively involved in various the wet rice farming activities based on the gender which is embedded by local tradition. For example, female farmers involved work in various activities that not need require have energy, but need to be careful and diligent, including selection of rice seeds. Conversely, some works, including hoeing and ploughing were undertaken by male farmers. In the late 1960s, the Indonesian government modernized the wet rice farming through the Green Revolution program. Consequently, most rural farmers of West Java adopted this program. The aim of this research was to elucidate the impact of the Green Revolution program on the wet rice farming activities of Karangwangi Village, Cianjur, West Java, Indonesia based on the gender issue. Method used in this study was qualitative with ethnoecological approach, while some techniques including observation, participant observation, and semi structured interview were applied in this research. The result of study shows that in the past the wet rice cultivation of Karangwangi was traditionally cultivated based on the local knowledge and embedded with local cultures, including traditional beliefs. Various activities of each stage of the wet rice farming were undertaken by male and female farmers based on gender and strongly embed by local tradition. By introduction of the Green Revolution, the female farmers have still involved in various activities of the wet rice farming. However, some female activities, including observation of star in the sky, rice seed selection, and ponding of rice grains of post-harvesting have been lost due to introduction of the Green Revolution.

Cultivation activities, gender, green revolution, wet rice farming system

## **DP-02**

### **Fisher's knowledge on fish behavior around anchors FADs: Case of handline tuna fishery in Palabuhanratu, West Java, Indonesia**

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The development of handline tuna fishery in Palabuhanratu 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 m 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 (*Katsuwonus pelamis*) and juvenile tuna (*Thunnus albacares* and *Thunnus obesus*) resources are dominant at a depth of 0-50 m, while large tuna usually caught at the deeper water with the range around 251 m. Information from fishers regarding the behavior of fish can be used as reference material in the development of fishing around the anchor's FADs.

Fish aggregating device, fish behavior, handline fishers knowledge, tuna, Palabuhanratu, tuna

### DP-03

#### Inventory of types of medicinal plants and how to use them in Atinggola, North Gorontalo, Indonesia

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The medicinal plants have been used by the people of Gorontalo as a hereditary medicine, but are not known by the wider community, because the data on medicinal plants have not been managed well and have not been stored and documented digitally.

The purpose of this study is to inventory the types of medicinal plants and how to use them in Atinggola district, north Gorontalo district, Indonesia. Data has been collected by survey method, and analyzed using the descriptive qualitative method. Based on this study, it was shown that there were 38 species (20 families) medicinal plants that can be used to cure so mediseases by the healers, among others: 6 species used to cure fever, 5 species to treat skin diseases (ulcers). For example, to treat fever disease,

sarampah used *Jatropha curcas*, L. This medicinal plants were mostly used by boiling, squeeze, and scrape to the part where it will be cured. Some species used for medicinal plant are still collected from the forest (9 species, 23,68%) and 29 species (76,31%) collected from cultivated plant. To preserve these medicinal plant species in a sustainable manner, it is necessary to multiply existing species, by being cultivated.

Diversity, Gorontalo, medicinal plant, traditional medicines

### DP-04

#### Ethnobotany of banana plants (*Musa x paradisiaca*) Palintang Hamlet, Cipanjalu Village, Bandung, West Java, Indonesia

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Rural people of West Java have traditionally farmed various varieties (landraces) of banana (*Musa x paradisiaca* L) in the agroecosystem of homegarden and garden. Because the increasing human population, rapid rate of agricultural land conversion to other land uses, intensive penetration of market economy to rural areas, and introduction and selection of banana landraces of good taste culinary and own high market price, consequently some landraces of banana have been rare even local extinct in the rural areas. The main purpose of this study was to elucidate local knowledge of Palintang people on landraces, population, farming local management, and utilization of banana. The mixed methods, qualitative and quantitative were applied in this study, while some techniques of collecting primary data, mainly observation, participant observation, semi-structured interview, structure interview, semi-quantitative population of banana plant were carried out. The result of the study showed that based on this research can be concluded that bananas have been recorded 18 landraces in Palintang hamlet. Local knowledge or traditional ecological knowledge of Palintang people on bananas have predominantly obtained from individual personal experiences and obtained from the parents and ancestors inherited from intergeneration via oral communications. Most banana landraces have predominantly cultivated by Palintang farmers, particularly have superior culinary, including good taste and high price for purchasing. As a result, some landraces of banana considered not good taste and low price selling have rarely planted in the garden. Banana trees have traditionally cultivated by farmers of Palintang based on traditional ecological knowledge and culturally embedded. There are 7 main stages of banana cultivation, namely preparation of banana suckers, land preparation, planting, look after of banana trees, harvesting, post-harvesting management, and utilization for home consumption and selling through village middleman and market. The banana cultivation has

dramatically changed due to ecosystem, socio-cultural rural communities or both ecosystem and socio-cultural rural community changes.

Banana cultivation, banana landraces, banana utilization, local knowledge, Palintang

## DP-01

### The feasibility and farmer perception of true seed shallot technology in Sigi District, Central Sulawesi, Indonesia

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Shallot (*Allium cepa* var. *ascalonicum* (L) Back) is one of horticultural commodities that plays a significant role in the economy. A fluctuation supply of shallot influence the inflation level. Production still faces many problems, including high production cost. The high cost of production mostly goes to labor and seed while shallot production in Indonesia based on crops grown from seed bulbs. The high-cost production impact to a lower shallot competitiveness. Therefore the introduction of True Seed Shallot (TSS) which lower in seed cost could be an option to improve competitiveness of shallot in Indonesia. However, the farm feasibility and farmer perception become important consideration to adopt the new technology. The research aims to study the potency of true seed shallot development in Central Sulawesi based on the TSS's farm feasibility and farmer perception of TSS. The research took place at Sigi District, Central Sulawesi, Indonesia. The result of feasibility analysis shown that using TSS farms could save 37.7 percent of seed cost, and within 14 tons per hectare productivity, the benefit-cost ratio was 1.86. The perception based on three aspects namely technical, economic, and social. The farmer perception's result shown that farmer was interested to plant true seed shallot based on its productivity, lower production cost, and market acceptance of the product; while in social aspect the extension and farmer group's support still need to be improved for developing TSS.

Central Sulawesi, perception, seed cost, shallot

## Bioscience

### EO-01

#### The effect of rice straw mulch and cow urine on the growth, nitrogen uptake, yield, quality, and pest population density on sweet corn plant (*Zea mays*) *saccharata*

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This study aims to determine the effect of rice straw mulch application and the addition of cow biourin to growth, nutrient uptake, production, quality, and population of sweet corn pest (*Zea mays* (L.) *saccharata*). This research was carried out in the Bandar Lampung, Indonesia on March to June 2017. This research was designed using a Randomized Block Design (RBD) which was arranged factorially 2 x 4 with 3 replications. The first factor is rice straw mulch which consists of 2 levels, namely, with rice straw biomulch and without biomulch and the second factor is the concentration of cow urine consisting of 4 levels, 2.5 ml L<sup>-1</sup>, 5, 0 ml L<sup>-1</sup>, 7.5 ml L<sup>-1</sup>, 10.0 ml L<sup>-1</sup>. The results showed that rice straw mulch and beef biourin could increase the growth, production, and quality of sweet corn. The maximum total production of 17.87 tons ha<sup>-1</sup> was achieved in straw mulch treatment with 10.0 ml L<sup>-1</sup> of cow urine. The intensity of the corn planthopper pest attack (Family Delphacidae) ranged from 40-40.4% in sweet corn plants aged 7 WAP and between 44.5-51.1% at 8 WAP and not consistently affected by mulch treatment or the level of beef urine concentration. This study recommends that biomass rice straw and liquid biourin fertilizer can be one component of organic farming that utilizes the diversity of biological resources around the location of farmers

Liquid fertilizer, nitrogen uptake, organic farming, rice straw, pest attack

### EO-02

#### Impact analysis of peatland conversion into plantations in Bukit Batu, Riau on soil glucosidase activity and microbial biomass

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Most of the peatland in Riau Province, Indonesia have been converted into plantation, field, and settlement that can affect the microbial activity and diversity. This research was aimed to analyze the impact of peatland conversion on microbial carbon biomass (Cmic), activity of soil  $\beta$ -glucosidase, and cells number of heterotrophic and cellulolytic bacteria. Peat soils were sampled by using purposive sampling method from five different locations in Bukit Batu, Riau, namely the secondary forest,  $\pm 10$  and  $\pm 18$  year-old oil palm plantation,  $\pm 20$  and  $\pm 45$  year-old rubber plantation. The Cmic biomass was measured by

chloroform fumigation-extraction (CFE) method. The  $\beta$ -glucosidase activity was assayed colorimetrically using 4-p-nitrophenyl- $\beta$ -D-glucopyranoside as substrate. Cells number of heterotrophic and cellulolytic bacteria was quantified by use of serial dilution plate technique. Peatland conversion into oil palm and rubber plantations tend to cause changes in soil physicochemical characters based on an increase of soil bulk density, soil temperature, soil pH and soil dry weight as compared to the secondary forest. Cmic biomass ranged from 199.27-942.67  $\mu\text{g C/g}$  soil with the highest value is in the secondary forest which indicates that the organic matter content in the area is higher than other soil sampling sites.  $\beta$ -glucosidase activity ranged from 0.05-0.22  $\mu\text{mol p-NP/hour/g}$  soil and was significantly different between conversion sites when compared to the secondary forest except for the 18 year-old oil palm plantation and the 45 year-old rubber plantation. The heterotrophic and cellulolytic bacterial cells number tends to increase in the conversion area. Peatland conversion in Bukit Batu, Riau generally caused in decreasing of Cmic biomass and the activity of  $\beta$ -glucosidase, but increasing of the bacterial cells number.

$\beta$ -glucosidase, Bukit Batu, cellulolytic bacteria, microbial carbon biomass, peatland

### EO-03

#### Response and potent bioherbicide of two sorghum varieties to NPK fertilizer

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Sorghum (*Sorghum bicolor* (L.) Moench) is a cereal and forage crops, preferentially cultivated in arid and semi-arid tropical regions due to its greater adaptability to extreme dry climates. Besides its traditional usage in food and fodder, it is also a commercial crop that can be used in the production of ethanol and gluten-free derivatives. The phytotoxic effect on weeds may be attributed to the presence of allelopathic termed as sorgoleone along with several congeners that are commonly exuded from the root hairs of sorghum. An array of lipid quinones and resorcinols are exuded from the root hairs of sorghum. An experiment of two sorghum varieties to perform their agronomic component at different varieties was aimed to get growth, yield and potent bioherbicide of sorghum. A factorial randomized complete block design was applied to evaluate two sorghum varieties namely Numbu and Samurai on three dosages of NPK fertilizer 0.9 gram/plant, 1.8 gram/plant, 2.9 gram/plant and 0 gram/plant (control) respectively. The result showed that Numbu with the application of NPK fertilizer application 2.9 gram/plant dose performed better growth and yield compare to the other treatments. Analysis with gas chromatography-mass spectrometry (GCMS-QP2010S Shimadzu) showed

hydroquinone and resorcinol components were found in the root of Numbu and Samurai.

Bioherbicide, sorghum, sorgoleone,

### EO-04

#### Preliminary study of Ocean Health Index (OHI) of Jakarta, Indonesia

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Ocean health index is the first integrated assessment framework that combines scientifically important aspects, such as biological, physical, chemical, social and economic in order to measure and analyze the ocean health with a comprehensive method. Marine area of Jakarta Province, Indonesia was examined since it is considered as the representative of Indonesian seas, because of the variety of a variety of human activities in capital of Jakarta. This study explored the feasibility of applying the OHI framework to assess the ocean health at the province scale. The aims of this study are to assess the current condition of ocean health and to analyze the characteristics of the spatial-temporal condition of Jakarta. The method has been determined by Conservation International with 10 goals and 8 subgoals in OHI. The results showed the index of Jakarta Province was 58. Based on the results, the five of ecoregion of Jakarta sea were categorized as healthy. In the future, the ocean health index of Jakarta sea is predicted to increase. This is due to the increase in seagrass, coral ecosystems in several ecoregions, and GRDP (Gross Regional Domestic Product) per capita in North Jakarta City and Kepulauan Seribu District.

Coastal social-economy, marine ecoregion, marine ecosystems, measurement, water quality

### EO-05

#### Condition of microplastic debris in Savu Sea, East Nusa Tenggara on both of Indonesia's seasons

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Microplastic enhances pollutants in the sea because among sizes ranging from 1  $\mu\text{m}$ -1 mm, it can poison the enclosing marine biota. The study aimed to determine the type, distribution, microplastic type in the Savu Sea, East Nusa Tenggara Province, Indonesia and to know the conditions

on both of Indonesia's seasons. The method utilized consists of two parts, namely the identification of the microscopic scale, then describes the microplastic existence according to the season in Indonesia. Some types of microplastic that have been found in several data collection areas are types of fragments, filaments, and films. With the most density is the type of fragment. Microplastic sizes found ranged between 10  $\mu\text{m}$ -1 mm. This season's difference will affect the condition of microplastic waste in the Sawu Sea.

Distribution, identification, pollutant, season

## EO-06

### Various antioxidant assays of agarwood extracts (*Gyrinops versteegii*) from West Lombok, West Nusa Tenggara, Indonesia

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*Gyrinops versteegii* (Gilg) Domke is an endemic agarwood produced plant from West Nusa Tenggara. Several methods are necessary to evaluate antioxidant. The present study aimed to evaluate antioxidant activities of agarwood extracts using various antioxidant assays. The antioxidant activity of leaves, fruits, and fruit barks extracts was investigated based on DPPH radicals scavenging activity, reducing power, and  $\beta$ -carotene bleaching assays. Total phenolic content was also investigated. The result showed that leaves extract revealed the strongest antioxidant activity on all assays performed such as DPPH radicals scavenging activity ( $\text{IC}_{50}$   $22.13 \pm 0.71$   $\mu\text{g/mL}$ ); reducing power ( $251.85 \pm 0.03$  mg QE/g dry extract); and  $\beta$ -carotene ( $\text{IC}_{50}$   $24.23 \pm 2.60$   $\mu\text{g/mL}$ ). The total phenolic content (TPC) in the leaves was higher ( $184.90 \pm 0.76$  mg GAE/g dry extract) than fruit barks and barks extracts. The high content of phenolic compounds in *G. versteegii* leaves indicated that these compounds might contribute to the antioxidant activities. In conclusion, these findings showed that *G. versteegii* leaves are potential for development as an antioxidant source.

Agarwood, antioxidant, *Gyrinops versteegii*, West Nusa Tenggara

## EO-07

### The ability of endophytic fungi based on IAA content to stimulate the growth of sengon tissue culture

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The diversity of endophytic fungi that colonize sengon tissue can stimulate the growth of sengon tissue culture, by its IAA production. IAA content in *Cladosporium* sp. (311.36 ppm) higher than *Trichoderma* sp. (200.51 ppm). However, the high content of IAA in endophytic fungi does not always show a positive correlation to the growth of sengon tissue culture. This research aimed to determine the ability of endophytic fungi based on IAA content to stimulate the growth of sengon tissue culture. The method used is sengon tissue culture and introduction of endophytic fungi (*Cladosporium* sp. and *Trichoderma* sp.) on sengon tissue culture. The results showed that the inoculation of endophytic fungi (*Cladosporium* sp. and *Trichoderma* sp.) were able to increase the growth of tissue culture sengon by increasing the number of leaves compared to control. *Trichoderma* sp. able to increase the number of leaves twice as much as the number of leaves of tissue culture sengon that inoculation with *Cladosporium* sp. This shows that the high content of IAA produced by endophytic fungi does not always increase the growth of higher sengon tissue culture. Thus this research needs to be continued to study how the interaction of endophytic fungi in plant tissues.

Endophytic fungi, IAA, growth, sengon

## EO-08

### Total phenolic content and antioxidant capacity on various infusion herbal tea *Moringa oleifera*

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*Moringa oleifera* Lam is widely distribution plant in the tropics and sub-tropics countries. It is a multipurpose medicinal plant that has healthy benefits. The *Moringa* leaves especially promising as a herbal tea. Herbal tea made from leaves powder is packaged in teabag form. Variations in brewing methods were made to evaluate the antioxidant potential by DPPH (1,1-Diphenyl-2-picrylhydrazyl) radical scavenging assay, total phenolic content (TPC) by the Folin-Ciocalteu assay and analyzed for phytochemical constituents such as alkaloid, flavonoid, tannin, saponin, steroid, coumarin, phenolic, quinone, triterpenoid. Samples were prepared by seven different brewing methods, that are soft infusion, hard infusion, cold infusion, decoction, chilled, ambient and puree. Hard infusion showed the highest total phenolic content ( $175.13$   $\mu\text{g. mL}^{-1}$ ) and the potent antioxidant with  $\text{SC}_{50} = 112.33$   $\mu\text{g. mL}^{-1}$ . The  $\text{SC}_{50}$  ( $\mu\text{g. mL}^{-1}$ ) and total phenolic content ( $\mu\text{g. mL}^{-1}$ ) in soft infusion (112,91; 160,47), chilled (113,44; 159,70), puree (119,33; 157,21), decoction (124,33; 153,62), ambient (486,35; 63,81) and cold

infusion (522,28; 62,74). There was a correlation between the total phenolic content and the antioxidant activity. All phytochemical constituents (alkaloid, flavonoid, tannin, triterpenoid, saponin, essential oil and phenolic) were found in all different brewing methods. The result shows that the herbal tea of *Moringa oleifera* leaves has phenolic contents and antioxidant activity. Thus they are a potential source of natural antioxidants

Antioxidant assay, brewing methods, *Moringa oleifera*, herbal tea

## EO-09

### The hydroxyproline content on fish bone gelatin from Indonesian *Pangasius* catfish by enzymatic hydrolysis for producing of bioactive peptide

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Gelatins has been widely used in the food, medicines, cosmetics, photography industries. In the food industry, gelatin used as food additives and functional foods. The applications of gelatin as a functional food due to their bioactivity in a form of peptides. Bioactive peptides from gelatin are mostly obtained through enzymatic hydrolysis processes. This study was conducted to measure the hydroxyproline content on gelatin from bone of Indonesian *Pangasius* catfish (*Pangasius sutchi*) before and after enzymatic hydrolysis. The hydroxyproline is one of the dominant amino acids in gelatin. Gelatin hydrolysis was carried out using a flavourzyme in concentration of 6% and then incubated 0, 4, 6 and 8 hours. The standard concentration of hydroxyproline was used in range 0-1 µg. The results showed that the linear curve of the hydroxyproline standard solution was  $y=0.0554x+0.0406$ , with the coefficient of determination ( $R^2$ ) = 0.9435. The incubation time of enzymatic hydrolysis (6% enzyme concentration) affected the hydroxyproline content. The hydroxyproline from fish bone gelatin was  $18.91 \pm 2.87$  mg/ml,  $63.81 \pm 1.28$  mg/ml,  $46.21 \pm 1.28$  mg/ml and  $37.64 \pm 0.64$  mg/ml respectively during 0, 4, 6 dan 8 h incubation time. This hydroxyproline content was significantly different at 95% confidence level from each treatment time.

Bioactive peptide, enzymatic hydrolysis, fishbone gelatin, hydroxyproline

## EO-10

### Diversity of pineapple leaf fiber utilization as fiber-based molding and its biodegradation to the wood-decay

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The needs of wooden material are increasing along with human population growth. Effort to meet the needs of wooden material is by providing composite products using non-wood materials such as fiber-based molding. One of the potential materials to be used as composite raw material is pineapple leaf fiber. This material was chosen because it contains lignocellulosic besides this material is abundant. The quality of the composite one of them is determined from its resistance from wood-decay attack. This study aims to investigate the resistance of fiber-based molding from attack by the wood-decay. Six different types of molding were manufactured based on different composition of Acacia mangium bark powder, citric acid, and pineapple leaf fiber. The fibers were prepared in 10 cm length and oven-dried to moisture content approximately 5%. The resin solution was prepared by mixture of citric acid and sucrose with ratio of 25:75 and concentration 59%. The actual combination of fibre and bark powder of six types as follows: 0:20; 0.125:19.875; 0.25:19.75; 0.5:19.5; 1.25:18.75; and 2.5:17.5. A cylindrical mold with a 70 mm inner diameter and a dumbbell-shaped mold of the Japanese Industrial Standard (JIS) K 7139-1966 A type were used for making molding. The mixture bark powder was poured into the molds and hot-pressed at 200°C and 4 MPa for 10 min. Decay resistance of the fiber-based molding was evaluated by testing against white-rot and brown-rot decay. In this study, both of wood-decay resistances were increases with the large amount of bark powder and less fiber content.

Decay resistance, fiber-based molding, *Fomitopsis palustris*, pineapple leaf fiber, *Trametes versicolor*

## EO-11

### Morpho-agronomic characterization of induced autotetraploid pisang madu by chromosome doubling

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Generating triploid bananas could be accomplished by crossing diploid to tetraploid banana cultivars. To produce tetraploid banana plants using oryzalin or colchicines is one of the methods. The aim of the present research is to characterize autotetraploid Pisang Madu (*Musa*, AAAA) induced by in-vitro oryzalin treatment that will be used as 2n gamete donors in crosses with diploids to generate secondary triploids. In vitro-cultured shoots of Pisang

Madu parthenocarpic diploid banana (*Musa* AA) were treated with oryzalin at a concentration of 60  $\mu$ M for 7 days in a liquid MS basal medium with addition of 2 mg/L BA. Ploidy identification of induced Pisang Madu was conducted by using Flow-cytometer. Morpho-agronomic characterization was conducted at Cibirong Science Center for 2 cycles of banana reproduction. 52 characters of quantitative and qualitative of banana plants were recorded based on UPOV for Banana. Compared with the original diploids, the Pisang Madu autotetraploids showed increases in pseudostem height and diameter, fruit size, and bunch weight. The autotetraploid Pisang Madu was successfully used as 2n gamete donors in generating secondary triploid hybrids.

Autotetraploid, *Musa*, oryzalin, pisang madu

## EP-01

### Antioxidant activity of extract green algae silpau *Dictyosphaeria versluysii*

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Silpau is a green alga that is widely available in Southwest Maluku District, Indonesia live on coral reefs and are not classified as seasonal plants. Silpau has long been used by local people, generally in the form of processed vegetables or *colo-colo* (*kudapan*). Accept the nutritional value, comprehensive informations about silpau still much unknown. Therefore, the author would like to find out much more information about silpau especially its potential as an antioxidant. The method used in this research is explorative. The method used to test the activity of the antioxidant extracted from silpau by eliminating the activity of free radicals DPPH (1,1-diphenyl-2-picrylhydrazyl). Phytochemical test of silpau showed that silpau contain terpenoid compounds. Results of testing the antioxidant activity of crude methanol extracted from silpau showed that silpau have antioxidant activity seems very weak because it has a very high IC50 value about 548.08 ppm.

Antioxidant activity, *Dictyosphaeria versluysii*, DPPH, IC50

## EP-02

### Physical and chemical characteristics of effervescent powder drinks from *Channa micropeltes* of West Kalimantan, Indonesia

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*Channa micropeltes* (Cuvier, 1983) is a type of fish that lives in West Kalimantan's freshwater. This fish is native to Asia or commonly known as snakehead because its head is similar to a snake's head. Results Previous research shows that the *Channa micropeltes* species have an animal protein source, one of which is albumin content which is almost the same as cork fish. Albumin extract from toman fish has not been produced much compared to cork fish extract. At present the toman fish albumin extract is still not widely sold in the market and the processing process is still very limited so it is necessary to use and further processing into effervescent beverage powder. The purpose of this study was the process of making effervescent granules with the addition of toman fish albumin and an analysis of the chemical characteristics of the effervescent granules produced which are expected to help hypoalbumin sufferers. The results of the analysis of the chemical characteristics of beverage powder included albumin levels in formula 1 about 57.05 mg/L, formula 2 about 34.05 mg/L, and formula 3 about 36.81 mg/L; protein levels in formula 1 were about 8.74%, formula 2 was about 9.33% and formula 3 was about 10.94; the water content is about 6.63%, formula 2 is about 5.97% and formula 3 is around 11.14%; ash content in formula 1 was about 23.84%, formula 2 was about 22.59% and formula 3 was about 27.86%; Sugar level in formula 1 is about 4.33%, formula 2 is about 5.26% and formula 3 is about 6.98%; total acid in formula 1 is about 0.36%, formula 2 is about 0.66% and formula 3 is about 1.07%. The results of physical analysis included lovibond color tests showing that beverage powder tends to have increasingly white and yellow colors; time is around 3-4 minutes; pH 7; Viscosity (cP) in formula 1 is about 31.2 cP, formula 2 is about 4.80 cP and formula 3 is about 31.2 cP; Total dissolved solids in formula 1 were about 344 mg/L, formula 2 was about 322 mg/L and formula 3 was about 309 mg/L.

*Channa micropeltes*, effervescent beverage powder, physical and chemical characteristics, West Kalimantan

## EP-03

### Potential of catfish oil extract (*Pangasius hypophthalmus*) in well pain healing white rat

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Catfish oil extract contains albumin and w-3 fatty acids which play a role in wound healing. The purpose of this study was to determine the potential of catfish oil extract (*Pangasius hypophthalmus* Sauvage, 1878) in healing white rat wounds on the area of the wound and the percentage of wound healing. Rats were grouped into 7

treatments, namely positive control with administration of betadine ointment, negative control was not given and 4 other treatments with administration of catfish oil extract (A, B, C, D), treatment E was given twice 20. White rats were injured in the area back with a length of 2 cm and a depth of 2 mm. Rat treatment is done for 7 days topically. The results of analysis in this study showed that catfish oil extract has the potential to heal the wounds of white rats in the presence of decreased wound area of about 0.62 mm-0.84 mm and the percentage of wound healing around 79.00-84.45%.

Albumin, catfish, wounds, omega 3

## EP-04

### Potential of exopolysaccharide from *Lactobacillus plantarum* as cholesterol lowering on the hypercholesterolemic rats (Sprague Dawley)

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Exopolysaccharide is a polysaccharide produced from one of Lactic Acid Bacteria *Lactobacillus plantarum* which gives beneficial impact on human health such as cholesterol-lowering. This study aim was tested cholesterol-lowering activity of the crude exopolysaccharide in vivo against the Sprague Dawley rats were induced by feeding high cholesterol. The study was divided into six groups: normal control, negative control, positive control of atorvastatin, crude exopolysaccharide test group at the doses of 20, 40, and 60 mg/BW. The parameters tested were total of cholesterol, triglycerides, HDL, and LDL in blood plasma by using spectrophotometer UV-Vis. The results showed that the crude exopolysaccharide 60 mg is an effective dose which can lower total plasma cholesterol as big as 21.66%, triglyceride levels 16.86%, HDL levels 10.89%, and LDL levels 42.46%. Based on these results concluded that the crude exopolysaccharide has activity as a cholesterol-lowering.

*Lactobacillus plantarum*, Sprague Dawley rats, cholesterol, exopolysaccharide,

## EP-05

### Characteristics of collagen nanoparticles from skin of catfish (*Clarias gariepinus*) with desolvation method

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Collagen is the active ingredients that are often used in cosmetics application, especially antiaging cosmetics with the function to increase skin moisture, prevent wrinkles, keep the skin from bad effects of radiation, and maintain elasticity. Animal skin has been developed as a source of raw material for producing collagen. However, studies about application of nanotechnology in collagen production processes are still very rare. The purpose of this research was to study the effect of type desolvating agent (acetone and ethanol) and desolvating agent/collagen solution ratio (1: 1; 1: 2; 1: 3) on the characteristics of collagen nanoparticles from skin of catfish (*Clarias gariepinus*). Collagen nanoparticles from the skin of catfish have been successfully produced by desolvation method with variation of type and ratio desolvation agent. Collagen nanoparticles from skin of catfish showed the average particle size of 110,98 nm-203,4 nm and the yield between 3,81-4,78%. The smaller particle size was produced by using ethanol as desolvating agent with ethanol/collagen solution ratio of 1:1. Fourier transform infrared (FTIR) spectra of all collagens nanoparticle were similar and suggests that collagen nanoparticles was characterized as Type I collagen with have a  $\beta$ -sheet structure.

Catfish skin, characteristics, collagen nanoparticles, desolvation methods

## EP-06

### The effect of plant spacing at the growth and yield of shallot from true shallot seed in Sigi District, Central Sulawesi, Indonesia

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Generally, shallots are cultivated using seed bulb (vegetatively). The problem is the cost of providing seed bulbs is quite high. One of the ways to save the usage of seed bulbs is by using seed (True Shallot Seed). An effort to improve the yield of shallots from the true shallot seed (TSS) is the use of the right and suitable spacing. The objectives of this research were to determine the effect of various plant spacing on the growth and yield of shallots from true shallot seed. This research was conducted in the farmer's land in Kalukubula Village, Sigi District, Central Sulawesi, Indonesia from December 2017 to March 2018. This research was designed using a Randomized Block Design non Factorial consisting of 3 treatments of spacing and repeated 10 times, so that the total experimental plot was 30 plots. The treatment consisted of JT1 = 10 cm x 10 cm, JT2 = 8 cm x 10 cm, and JT3 = 6 cm x 10 cm. The observations included plant height/Length, number of leaves, number of bulbs per clump, weight of bulbs per clump, bulb weight, and bulb diameter. The results showed

that the plant spacing of 8 cm x 10 cm (JT2) provided greater plant height/Length, number of leaves, number of bulbs per clump, weight of bulbs per clump than the other treatments, while 10 cm x 10 cm spacing provided bulb weight and bulb diameter greater than the other treatments.

Plant spacing, shallot, true shallot seed

## EP-07

### Growth and yield of two shallot varieties from True Shallot Seed (TSS) in Sigi District, Central Sulawesi, Indonesia

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The use of True Shallot Seed (TSS) for shallot bulb production has not been widely practiced in Indonesia. The availability of TSS as a healthy and high-yield shallot seed is still very limited because not many have produced TSS. The objectives of this research were to determine the growth and yield of two shallot varieties from true shallot seed (TSS). This research was conducted in the farmer's land in Kalukubula Village, Biromaru Sub-district, Sigi District, Central Sulawesi, Indonesia from December 2017 to March 2018. This research was designed using a Randomized Block Design non Factorial consisting of 2 treatments of varieties and repeated 10 times, so that the total experimental plot was 20 plots. The treatment consisted of V1 = Lokananta and V2 = Sanren. The observations included plant height/Length, number of leaves, number of bulbs per clump, weight of bulbs per clump, bulb weight, and bulb diameter. The results showed that the shallots from TSS Sanren Varieties provided greater plant height/Length, number of leaves, number of bulbs per clump, weight of bulbs per clump than Lokananta Varieties, however, Lokananta Varieties provided bulb weight and bulb diameter greater than Sanren Varieties.

Lokananta, sanren, shallot, true shallot seed

## EP-08

### The effect of mocaf substitution and wheat flour as filler on organoleptic properties oyster mushroom nugget

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The purpose of this study is to determine the effect of substitution mocaf and wheat flour as filler (filler material) on the organoleptic properties of oyster mushroom nugget. The result data of the research is statistically processed using vetting analysis at 5% significance level and if there is any real effect of further test using DMRT (Duncan

Multiple Range Test). The study design was using Completely Randomized Design (RAL) with 5 treatments and 3 replications. T1 is mocaf and wheat substitution with a ratio of 100%: 0%, T2 (80%: 20%), T3 (60%: 40%), T4 (40%: 60%) and T5 (20%: 80%). The organoleptic test was performed by 30 panelists which included hedonic test with scoring system (1-5). The result of the analysis of variance showed that for the aroma and taste parameter did not give significant effect between the treatments ( $P > 0.05$ ), while for the color and texture parameters resulted in significantly different effect between the treatments ( $P < 0.05$ ). The resulting oyster mushroom nugget has 35.96% moisture content, 2.38% ash content, 16.16% fat, 10.75% protein, and 34.75% carbohydrate.

Mocaf, nugget, organoleptic, oyster mushroom, substitution

## EP-09

### Nutritional component of *Barbonymus balleroides*- a wild freshwater fish from Indonesia

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*Barbonymus balleroides* (Valenciennes, 1842) is a local fish of Indonesia that threatens by overfishing activity and habitat damage whereas little is known about its nutritional information. This study aimed to evaluate the nutritional content of wild barb fish that was collected from two different sites in Indonesia. Fishes were collected from Serayu and Cipunagara Rivers. Body part of fishes was grouped and weighted to identify the ratio. Proximate composition was determined for flesh and byproduct parts. Flesh parts of fish were then examined for mineral content, fatty acid, and amino acid profile. Barb fish samples contain high protein compare to several Indonesian freshwater fishes that commonly consumed. Flesh samples from both fish group were the heaviest part followed by its edible byproduct that often wasted. The amount of moisture and protein were higher in the flesh parts while byproduct showed higher content of fat and ash. The level of macro elements K, Mg, and Na were higher in barb fish from Serayu river. Overall, fatty acid composition of flesh sample was found higher in barb fish from Cipunagara. Omega 6 was found higher than omega 3 in both samples. The most dominant amino acid found in both samples was glutamic acid. Histidine was also high in fish from Serayu, however, it was not detected in barb fish from Cipunagara.

Amino acid, *Barbonymus balleroides*, fatty acid, mineral content, protein, proximate

**EP-10****Antibiotic-producing Actinomycetes isolated from Mangrove Forest of Torosiaje, Gorontalo, Indonesia****Yuliana Retnowati<sup>1,2,\*</sup>, Sukarti Moeljopawiro<sup>3</sup>, Tjut Sugandawaty Djohan<sup>3</sup>, Endang Sutariningsih Soetarto<sup>3</sup>**<sup>1</sup>Doctor Program of Biology, Universitas Gadjah Mada. Jl. Teknik Selatan, Sekip Utara, Sleman 55281, Yogyakarta, Indonesia<sup>2</sup>Department of Biology, Faculty of Mathematics and Natural Sciences, Universitas Negeri Gorontalo. Jl. Jenderal Sudirman No. 6, Kota Gorontalo 96128, Gorontalo Province, Indonesia<sup>3</sup>Faculty of Biology, Universitas Gadjah Mada. Jl. Teknik Selatan, Sekip Utara, Sleman 55281, Yogyakarta, Indonesia

Mangrove forest is an extreme environment that promises to be a source of antibiotic-producing microorganisms. Overall 167 Actinomycetes isolates were successfully isolated from rhizosphere of seven type mangrove in the mangrove forest of Torosiaje, Gorontalo, Indonesia. Six isolates among 167 isolates were tested for ability to produce secondary metabolites. Crude extract metabolites were showed antimicrobial activity against pathogenic microbial. Crude extracts of metabolites produced by two selected isolates (FUAm2-h1 and FMBg2-x3) inhibited the growth of pathogenic microbes at a concentration level of 0.0625-0.625 mg/ml. Bio-autography assay of metabolites produced by isolates FUAm2-h1 was showed antibacterial activity and was detected at migration distance of 0.94 using chloroform: methanol (2:1 v/v) as eluent. Antibacterial compounds composed of 17 components were detected in LC chromatograms with 3 main peaks. Each of main peak showed the molecular weight of 507.37, 344.32 and 563.66 mol/gram. The main volatile compounds were detected by GCMS, showed a 93% similarity to palmitic acid and ricinoleic acid. Antibiotic production of FUAm2-hi and FMBg2-x3 isolates were coded by PKS2 and NRPS genes in their genome. Two isolates were closely related to *Streptomyces qinglanensis* strain 172205 (97%) and *Streptomyces sanyensis* strain 219820 (99%) based on the molecular character of the 16S rRNA gene.

Actinomycetes, antibiotics, mangrove

**Keynote Speech****OO-01****Molecular systematic studies for biodiversity conservation****Badrul Munir Md-Zain**

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Many of Southeast Asian fauna especially mammals are facing threat of extinction. For example, Sumatran rhinoceros and banteng are fully extinct in the Malay Peninsular. Other endangered mammals such as tiger, tapir, seladang, elephant, and primates have also faced the same fate to critically disappear. Due to the declining number of endangered Southeast Asian mammals, conservation effort is important to identify endangered mammals species genetically. Few DNA barcoding is available for endangered mammal's genetic identification. Molecular systematic studies have been conducted to portray phylogenetic relationships of several selected Malaysian fauna. Findings are discussed in term of genetic identification and relationships at genera, species, subspecies, and population level, classification discrimination, identifying and monitoring of the trade in wildlife and commercial products, species distribution and rediscovery. All of these molecular systematic applications will provide useful information for biodiversity conservation efforts in the future.

Conservation genetics, mammals, mitochondrial DNA, molecular systematics

**OO-01****Biology and conservation of freshwater eels****Takaomi Arai**

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Freshwater eels have fascinated biologists for centuries due to the spectacular long-distance migrations between their freshwater habitats and their spawning areas far out in the ocean. Although freshwater eels originated in the Indonesian region, remarkably little is known about the life history of tropical freshwater eels. Because these eels have a unique catadromous life history and are used as food resources, they are one of the most important eel families from a conservation standpoint. Recently, however, the juvenile population has declined dramatically, likely due to wild juveniles being used in cultivation. These eels are captured in estuaries. Almost all of the world's total eel supply comes from aquaculture. Therefore, the supply of eel resources for human consumption is completely dependent on wild catch. The causes of decline in stock and recruitment are not well understood. Overfishing, habitat loss, migration barriers, increased natural predation, parasitism, ocean climate variation, and pollution all might have an impact. Since the European eel was listed by CITES under Appendix II and came under protection in March 2009, and since the export/import ban was issued by the EU in 2010, the international trade of juvenile eels has changed. Most recently, the Japanese and American eels were added to the IUCN's list with an endangered classification, suggesting they have a high risk of extinction. Although there are fewer data available for tropical anguillid eels, conservation concerns also exist for

many of these species including *A. bicolor* rated as Near Threatened. In the future, further eel species could be classified as endangered without comprehensive conservation and protection. We may not be able to see such a unique animal on the earth in the near future. In this conference, the latest information regarding biology

and ecology of the freshwater eel genus *Anguilla* in combination with its conservation and management shall be discussed.

Biology, conservation, freshwater eels