

Massive Micropropagation Technology of Two Local Genotypes of Chili Pepper (*Capsicum annuum* L.) from West Sumatera

Jamsari, Renfiyeni, Lily Syukriani, and Alfi Asben

Department of Agroecotechnology, Faculty of Agriculture Andalas University-Padang, West Sumatera

Presented at International Conference of Biodiversity (ICB),
20-21 August 2016, Gorontalo -North Sulawesi



ANDALAS
UNIVERSITY



Why is Chilli Pepper?

- Economic role of Chilli as vegetable and spices in food and Indonesian diet
- Price fluctuation contribute as 2nd factor after rice in national inflation rate
- Price fluctuation is most caused by Pests/diseases



Selected “Landrace” from West Sumatera

“Susceptible
against major
diseases”



Trisula-Commercial



Kampung

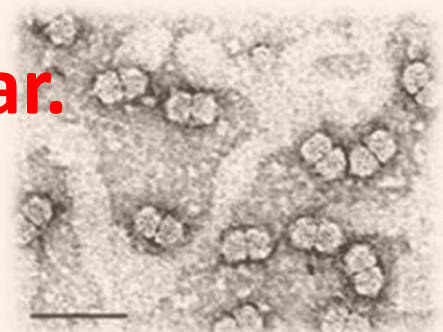


Kopay

Two Main Diseases in Chilli-Pepper Cultivation

#1. Pepper Yellow Leaf Curl Disease, (PepYLCD)-Virus

- Decrease of yield can reach up to 100%
- No effective control so far.
- High genetic variation.
- Transmitted by Whitefly

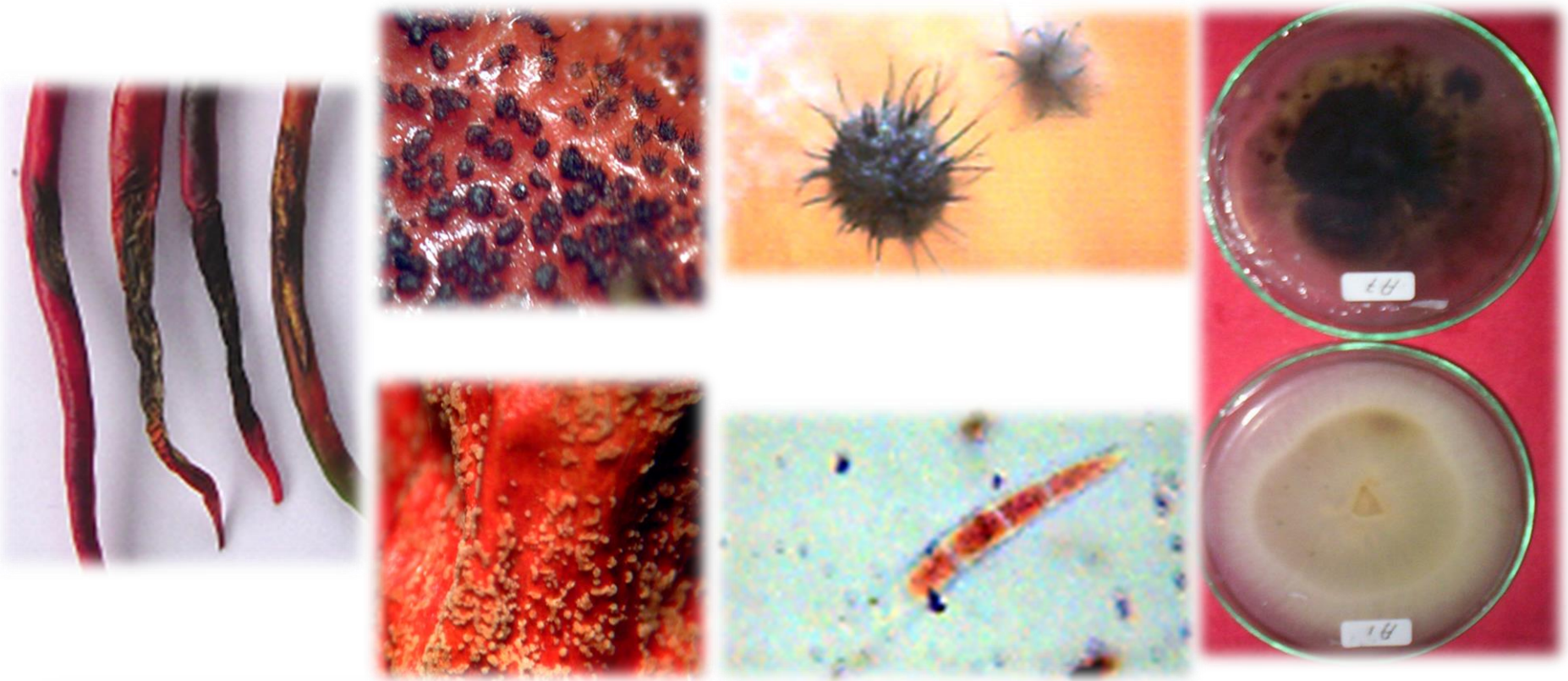


Source: Rybicki, 2007



Two Main Diseases in Chilli-Pepper Cultivation

#2. Anthracnose disease-Fungi (*Colletotrichum sp.*)



ANDALAS
UNIVERSITY



Aspect Limitation of “Technology”

- **Environmental condition: temperature, light, humidity, etc.**
- **Nutrient condition:**
Media composition, PGR, Vitamin
- **Genotype Characteristic**
- **Explants Sources**

Current Results



Topics

- **Calli Induction**
- **Shoot Induction**
- **Root Induction**



Calli Induction



ANDALAS
UNIVERSITY



Day of Calli Formation Among Genotypes, Explant and Medium Composition

Media	Code	Mean \pm SD
MS + BAP 5 mg/l + NAA 0,1 mg/l	A	5.33 \pm 0,77 A
MS + BAP 5 mg/l + IAA 0,25 + L2vitamin	B	5.18 \pm 0,83 A
MS + TDZ 2 mg/l + NAA 0,1 mg/l	C	5.17 \pm 0,44 A
MS + BAP 4 mg/l + IAA 0,5 mg/l + L2 vitamin	D	5.17 \pm 0,94 A
MS + BAP 4 mg/l + IAA 0,25 mg/l + L2 vitamin	E	5.17 \pm 0,85 A
MS + BAP 5 mg/l + IAA 0,25	F	5.17 \pm 0,63 A
MS + BAP 6 mg/l + IAA 0,25 mg/L	G	5.17 \pm 0,62 A
MS + BAP 4 mg/l + L2 vitamin	H	5.17 \pm 0,76 A
MS + BAP 6 mg/l + IAA 0,25 + L2vitamin	I	5.08 \pm 0,67 A
MS + NAA 10 mg/l	J	4.83 \pm 0,80 AB
MS + NAA 4 mg/l	K	4.75 \pm 0,77 AB
MS + 2,4 D 1,5 mg/l + kinetin 0,5 mg/l	L	4.58 \pm 0,35 AB
MS + 2,4 D 10 mg/l + IBA 10 mg/l	M	4.58 \pm 0,39 AB
MS + IAA 10 mg/l + 2,4 D 10 mg/l	N	4.58 \pm 0,56 AB
MS + 2,4 D 10 mg/l + NAA 10 mg/l	O	4.42 \pm 0,40 ABC
MS + 2,4 D 10 mg/l + NAA 4 mg/l	P	4.08 \pm 0,45 BC
MS + 2,4 D 4 mg/l	Q	3.50 \pm 0,52 C

Genotype	Mean \pm SD
Trisula	5,10 \pm 0,50 A
Kopay	4,77 \pm 0,62 B
Kampung	4,59 \pm 0,62 B

Explant	Mean \pm SD
Hypocotyl	5.29 \pm 1,11 A
Cotiledone	5.00 \pm 1,14 B
Epicotyl	4.53 \pm 0,91 C
First leaf	4.45 \pm 0,92 C

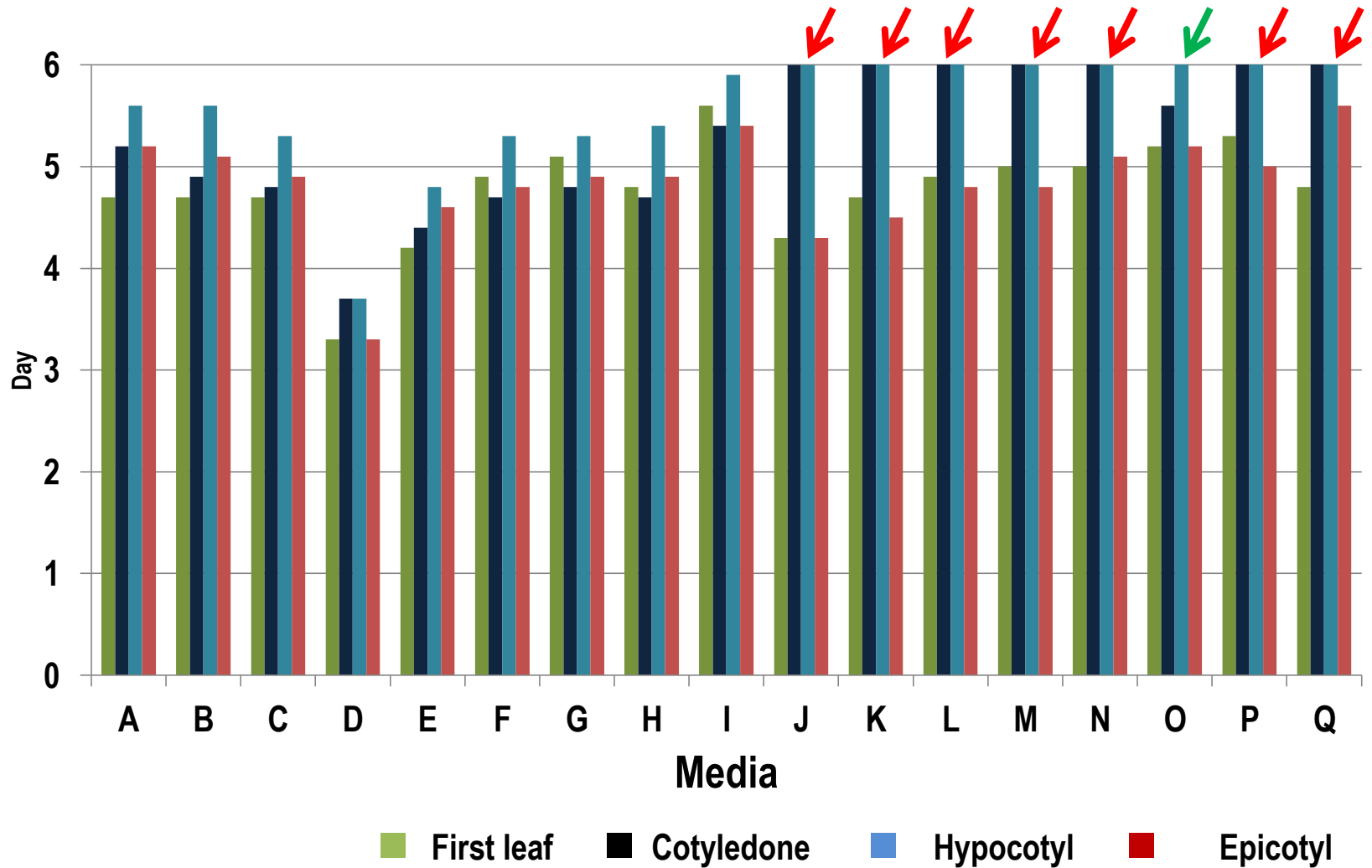
Mean followed by the same letters were not significantly different (p = 0.05)



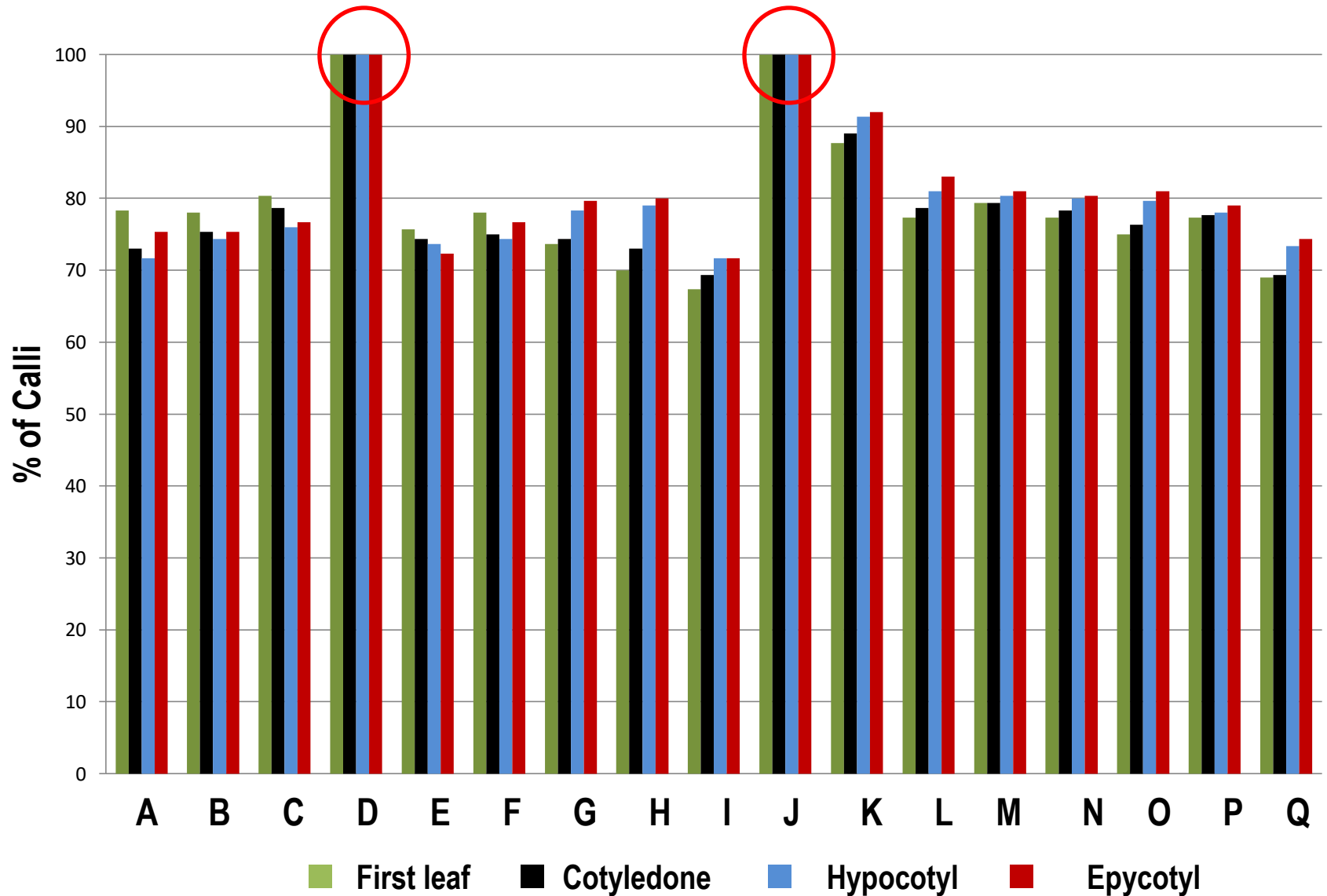
ANDALAS
UNIVERSITY



Calli Induction of Four Explants in 17 Culture Media



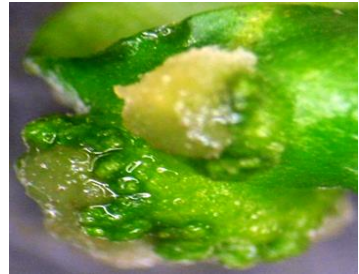
%-Tage of Calli Formation from Four Different Eksplant Sources



D = MS + BAP 4 mg/l + IAA 0,5 mg/l + L2 vitamin

J = MS + NAA 10 mg/l

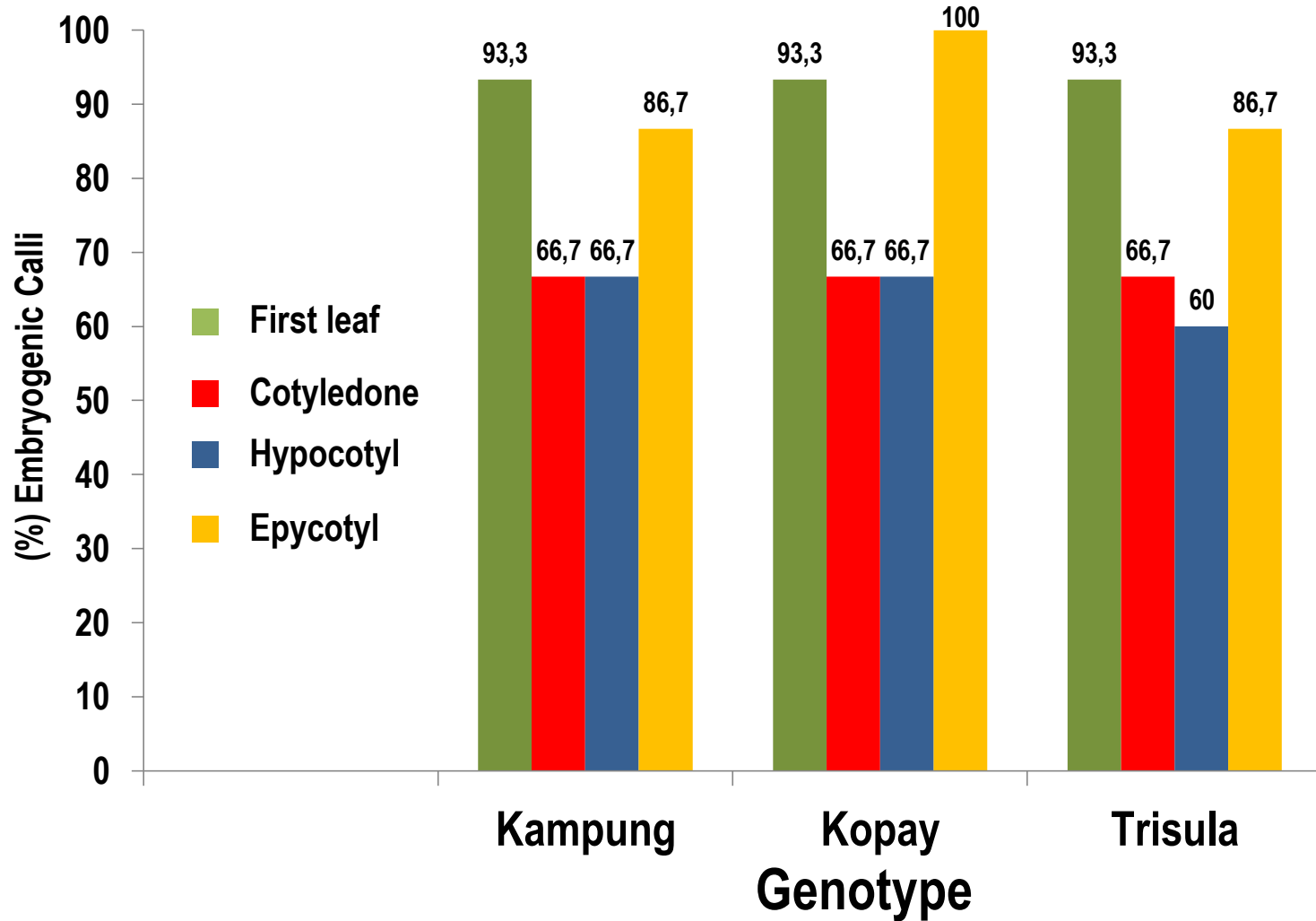
Embriogenic Calli Formation in MS + BAP + IAA + Vitamin L2



Embryogenic Callus

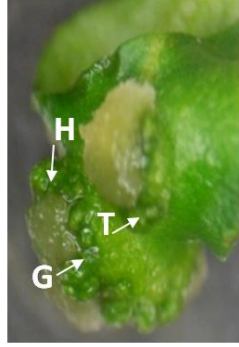
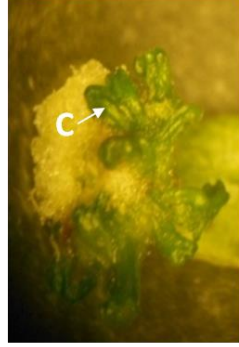
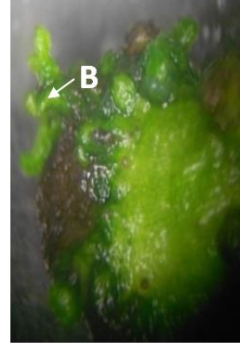
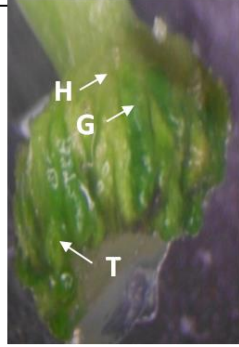
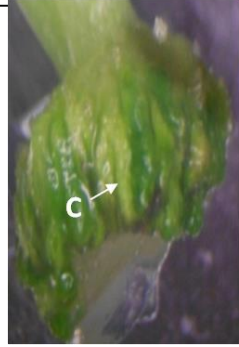


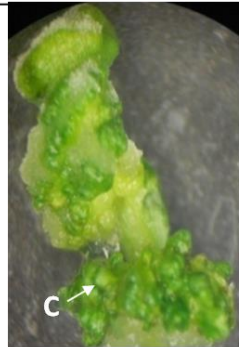
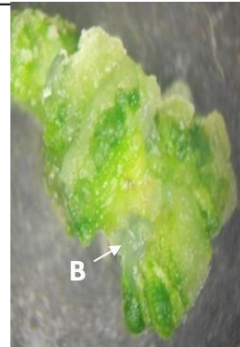


Non Embryogenic Callus



Developmental Phase of Calli in MS + BAP + IAA+ L₂ vitamin.

G = Globular phase,
H = Heart shape,
T = Torpedo,
C = Cotyledonary,
B = Buds.

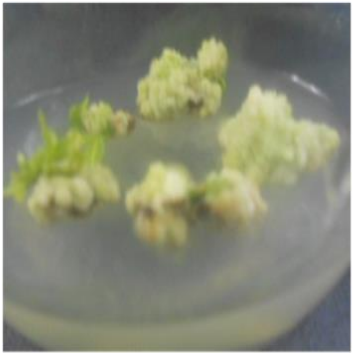
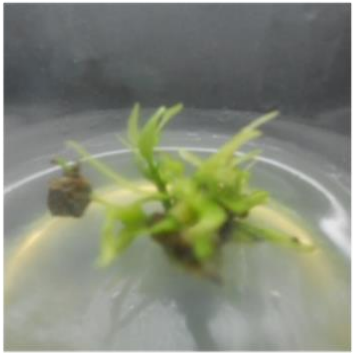
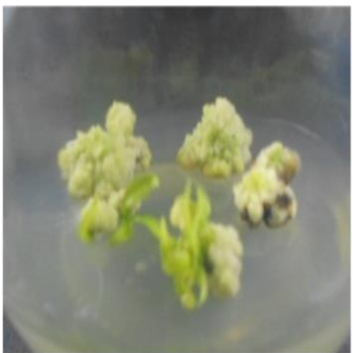

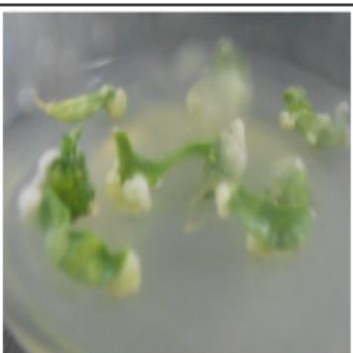
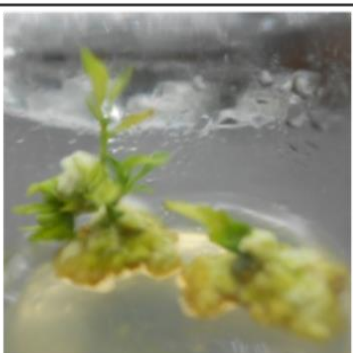
Genotypes	8-12 days	12-15 days	
	Globular/ Heart/ Torpedo	Cotyledonary	Buds
Kampung			
Kopay			
Trisula			



Shoot Regeneration

No	Medium Combination	References
1.	MS + TDZ 0.5 mg/l + BAP 1 mg/l	This study
2.	MS + TDZ 0.5 mg/l + BAP 3 mg/l	Mariska, (2001)
3.	MS + TDZ 0.5 mg/l + BAP 5 mg/l	This study
4.	MS + BAP 0.5 mg/l	This study
5.	MS + BAP 1 mg/l	This study
6.	MS + BAP 1.5 mg/l	This study
7.	MS + BAP 2 mg/l + IAA 0,5 mg/l	This study
8.	MS + BAP 3 mg/l + IAA 0,5 mg/l	This study
9.	MS + BAP 4 mg/l + IAA 0,5 mg/l	This study
10.	MS + BAP 0.5 mg/l + GA3 1 mg/l	This study
11.	MS + IAA 2 mg/l + 3 mg/l kinetin	This study
12.	MS + BAP 5 mg/l + AgNO3 3 mg/l	Ashfaruzaman, <i>et al.</i> (2009)
13.	MS + BAP 3 mg/l + IAA 1 mg/l	This study
14.	MS + TDZ 2 mg/l + NAA 0,1 mg/l	Song, <i>et al</i> , (2010)
15.	MS + BAP 3 mg /l + NAA 1 mg/l	Rabia Hasnat, <i>et al.</i> (2007)
16.	MS + TDZ 3 mg/l + NAA 1 mg/L	This study
17.	MS + BAP 2 mg/l + NAA 0.1 mg/l	Ashfaruzaman, <i>et al.</i> , (2009)
18.	MS + TDZ 0.5 mg/l	This study
19.	MS + BAP 3 mg/l + IAA 1.5 mg/l	This study
20.	MS + BAP 0.5 mg/l	This study
21.	MS + BAP 1 mg/l	This study
22.	MS + BAP 1.5 mg/l	This study
23.	MS + BAP 1 mg/l + GA3 0,5 mg/l + AgNO3 5 mg/l + Kinetin 0,1 mg/l	Yousuf, <i>et al.</i> (2008)

Shoot Formation of Three Genotypes on MS+BAP 1 mg/l + GA3 2 mg/L + AgNO3 5 mg/L + Calcium pantothenic 2 mg/L + L2 vitamin (SFM)

Genotype	8 DAS	14 DAS
Kampung		
Kopay		
Trisula		



ANDALAS
UNIVERSITY

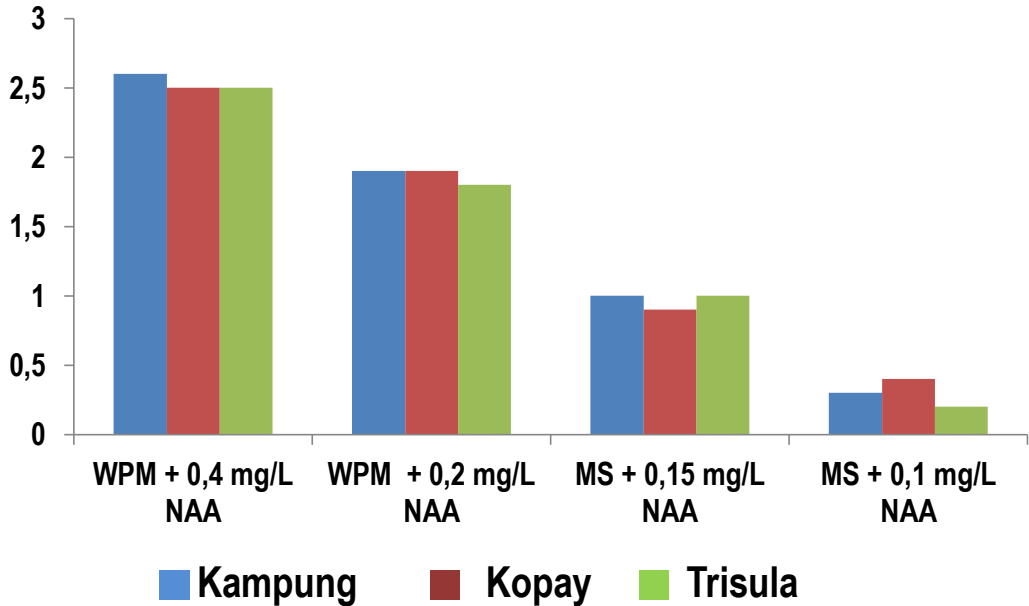


Root Regeneration

No	Medium Combination	References
1.	MS + IAA 0.1 mg/l + L2 vitamin	Yusniwati, (2008)
2.	MS + IAA 0.75 mg/l + L2 vitamin	This study
3.	½ MS + IBA 1 mg/l	This study
4.	MS + IBA 0.05 mg/l + NAA 0.1 mg/l	This study
5.	MS + IBA 0.5 mg/l	This study
6.	MS + GA3 1 mg/l	This study
7.	MS + NAA 1 mg/l	This study
8.	MS + IAA 0,05 mg/l + L2 vitamin	This study
9.	MS + IAA 0,15 mg/l + L2 vitamin	This study
10.	MS + IBA 0,05 mg/l + L2 vitamin	This study
11.	MS + IBA 0,1 mg/l + L2 vitamin	This study
12.	MS + IBA 0,15 mg/l + L2 vitamin	This study
13.	MS + NAA 0,05 mg/l + L2 vitamin	This study
14.	MS + IAA 0.1 mg/L + IBA 0.05 mg/l	This study
15.	MS + NAA 0,1 mg/l + L2 vitamin	This study
16.	MS + NAA 0.15 mg/l + L2 vitamin	This study
17.	WPM + NAA 0.2 mg/l	This study
18.	WPM + NAA 0.4 mg/l	This study

Root Regeneration of Three Genotypes in Four Different Media

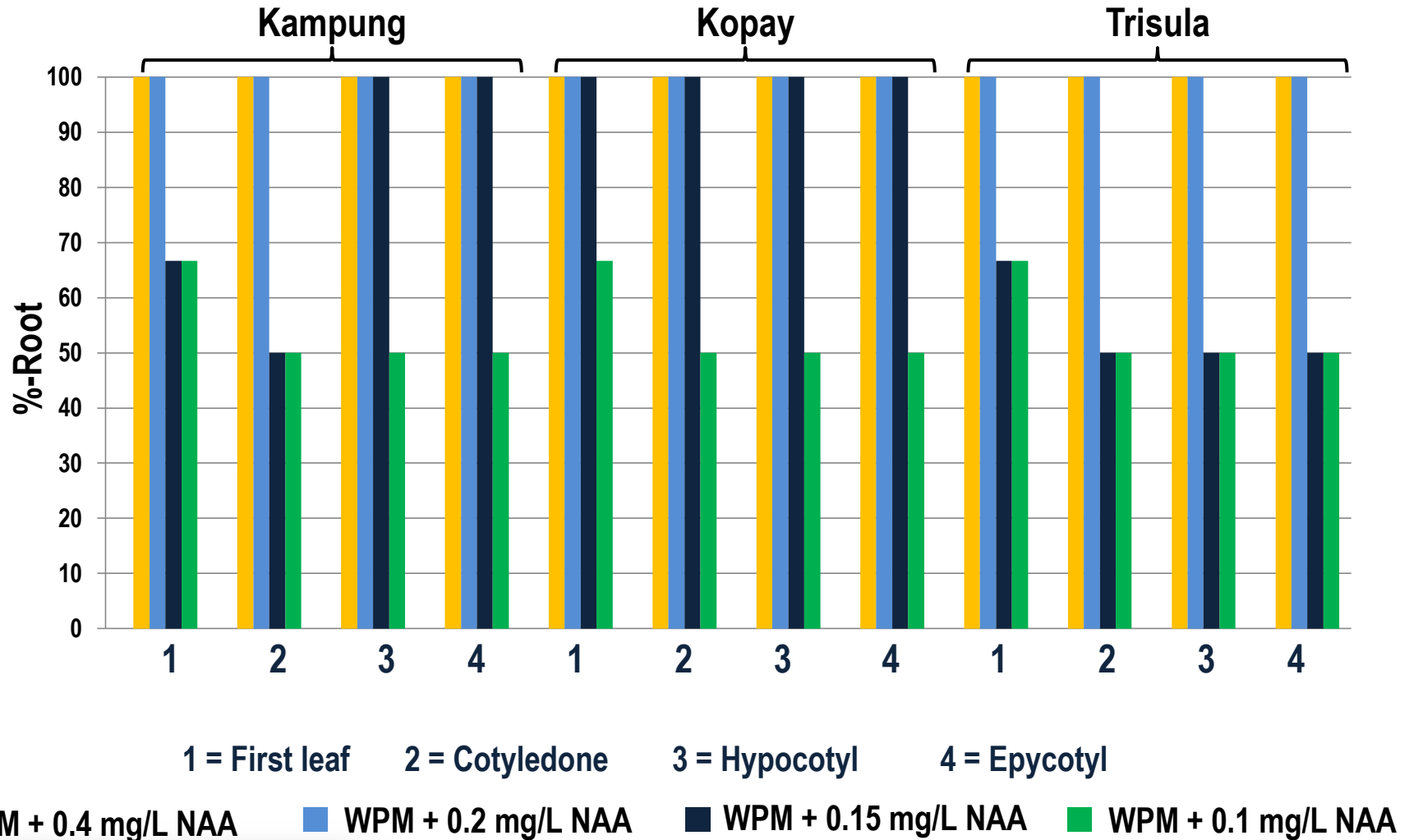
Root Length



Genotype	WPM + NAA 0.4 mg/L	WPM + NAA 0.2 mg/L	MS+ NAA 0.15 mg/L + L2 vitamine	MS + NAA 0.1 mg/L + L2 vitamine
Kampung				
Kopay				
Trisula				



Shoot Formation of 3 Genotypes from 4 Eksplant Sources in 4 Medium



Conclusions

Recommended media for massive Propagation of two cultivars: Kampung and Kopay

- 1. Calli formation : MS containing BAP 4 mg/L, IAA 0.5 mg/L and L2 vitamine (Thiamin-HCl and Pyrodoxine HCl) + sucrose 30 g/L + plant agar 8 g/L, with 5.8 pH.**
- 2. Shoots formation: MS containing BAP 1 mg/L + AgNO₃ 5 mg/L + GA₃ 2 mg/L + Calcium pantothenic 2 mg/L + L2 vitamin.**
- 3. Root formation : WPM supplemented with NAA 0.4 mg/L**



ACKNOWLEDGEMENTS

Directorate General of Higher Education, Ministry of Research, Technology and Higher Education of Indonesia

- Scheme of the National Strategic Grants**
- Scheme of Proffessorship Cluster Research Grant for fiscal year 2016, contract number: 57/UN.16/HKRGB/LPPM/2016**



Thank You





International Conference on Biodiversity

Abs Soc Indon Biodiv
vol. 3 | no. 5 | pp. 195-210 | August 2016
ISSN: 2407-8069

ABSTRACT

INTERNATIONAL CONFERENCE ON BIODIVERSITY

SOCIETY FOR INDONESIAN BIODIVERSITY

Gorontalo, 20-21 August 2016

Corn field; photo by Megantara

Organized by



Selected manuscripts
will be available at

BIODIVERSITAS
Journal of Biological Diversity

**NUSANTARA
BIOSCIENCE**





ABSTRACT

INTERNATIONAL CONFERENCE ON BIODIVERSITY

SOCIETY FOR INDONESIAN BIODIVERSITY

Gorontalo, 20-21 August 2016

THEME:

**Policies on Environmental Development and
Sustainable Use of Biodiversity**

SECRETARIAT ADDRESS

1. Sekretariat Masyarakat Biodiversitas Indonesia, Kantor Jurnal Biodiversitas, Jurusan Biologi Gd. A, Lt. 1, FMIPA UNS, Jl. Ir. Sutami 36A Surakarta 57126, Jawa Tengah, Indonesia. Tel. +62-897-6655-281. Email: biodiversitas@gmail.com.
Website: biodiversitas.mipa.uns.ac.id/snmbi.html
2. International Conference on Biodiversity (ICB) 2016 Gorontalo, Program Studi Magister Kependudukan dan Lingkungan Hidup, Program Pascasarjana, Universitas Negeri Gorontalo. Jl. Jenderal Sudirman No. 6 Kota Gorontalo, Tel.: +62-435-821755.

Organized by



Selected manuscripts
will be available at

BIODIVERSITAS
Journal of Biological Diversity

**NUSANTARA
BIOSCIENCE**



TIME SCHEDULE
International Conference on Biodiversity
Society for Indonesian Biodiversity (SIB)
Gorontalo, Indonesia, 20-21 August 2016

TIME*)	ACTIVITIES	PERSON IN CHARGE	SITE
Aug 20, 2016			
08.00-08.30	Registration	Committee	R1
08.30-08.40	Speech of the Committee	Chairman of the committee	R1
08.40-08.50	Opening speech	Rector of UNG Gorontalo	R1
08.50-09.00	Photo session and coffee break	Committee	R1, Lobby
09.00-10.30	Panel 1 Prof. Dr. Ramli Utina Prof. Dr. Winarni Monoarfa	Moderator	R1
10.30-12.00	Panel 2 Dr. Lida Pet Soede Dr. Graham Eagleton	Moderator	R1
12.00-13.00	Rest, prayer, lunch & Poster session	Committee	Lobby
13.00-14.00	Parallel presentation I Group 1: BO-01, BO-02, BO-03, BO-04, BO-05 Group 2: BO-06, BO-07, BO-08, BO-09, BO-10 Group 3: BO-11, BO-12, BO-13, CO-01, CO-02	Moderator Moderator Moderator	R1 R2 R3
14.00-15.00	Parallel presentation II Group 4: CO-03, CO-04, CO-05, DO-01, DO-02 Group 5: DO-03, EO-01, EO-02, EO-03, EO-04 Group 6: EO-05, EO-06, EO-07, EO-08, EO-09	Moderator Moderator Moderator	R1 R2 R3
15.00-15.15	Coffee break, prayer	Committee	Lobby
15.15-15.30	Closing speech and other explanations	Chairman of the committee	R1

TIME*)	ACTIVITIES	PERSON IN CHARGE	SITE
Aug 21, 2016			
07.00-07.30	Registration	Committee	Lobby
07.30-08.00	Trip to “Whale-Shark Ecotourism”	Committee	-
08.00-09.30	“Whale-Shark Ecotourism” at Botubarani beach, Bone Bolango, Gorontalo	Committee	-
09.30-10.00	Trip to airport	Committee	-
10.00	At the airport	Committee	-

Note: *) Gorontalo local time zone (WITA)

Upcoming events:

1. Seminar Nasional Masyarakat Biodiversitas Indonesia, Bogor, Indonesia, 17 September 2016
<http://biodiversitas.mipa.uns.ac.id/S/2016/bogor/home.html>
2. International Conference on Biodiversity, Pontianak, Indonesia, 8 October 2016
<http://biodiversitas.mipa.uns.ac.id/S/2016/pontianak/home.html>

TABLE OF CONTENTS
International Conference on Biodiversity
Society for Indonesian Biodiversity (SIB)
Gorontalo, Indonesia, 20-21 August 2016

CODE	TITLE	AUTHOR(S)	PAGES
AA-01	Plant genetic diversity, ex-situ conservation and the role of Botanic Gardens	Graham Eagleton, Joko Ridho Witono, Rosniati Risna, Dian Latifah	195
	Genetic diversity		
AP-01	Variation of leaflet shape from several soybean genotypes and its relation to morphological characters	Ayda Krisnawati, M. Muchlish Adie	195
AP-02	Sex type in flowering of <i>Jatropha curcas</i>	Dasumiati, Miftahudin, Triadiati, Alex Hartana	196
AP-03	Characterization and clustering of agronomic characters from several soybean genotypes	M. Muchlish Adie, Ayda Krisnawati	196
AP-04	Management leader in shark species protection on the beach of Botubarani ecotourism, Gorontalo	Novianty Djafri	196
	Diversity of species		
BO-01	Identification of aves, herpetofauna and gastropoda in Miangas Island, the north-end of Wallacea	Ady Suryawan, Isdomo Yuliantoro, Anita Mayasari, Margareta Christita	197
BO-02	Diversity of Holothuroidea in Torosiaje Marine Area, Subdistrict of Popayato, Pohuwato, Gorontalo	Chairunnisah J. Lamangantjo, Abubakar Sidik Katili, Maryam Pido	197
BO-03	The macrofungi diversity and its potential opportunities in Tangale Nature Reserve, Gorontalo	Diah Irawati Dwi Arini, Margareta Christita	197
BO-04	<i>Myrmecodia pendans</i> potentiality on decrease of MDA, Pb and increase of SOD, GPx level in serum of rats exposed plumbum	Djuna Lamondo, Mustamin Ibrahim	198
BO-05	Diversity of macroinvertebrate benthic as biomonitoring tools for organic pollution level in tropical river ecosystems	Dwi Nugroho Wibowo, Setijanto	198
BO-06	Diameter increment of selected tree species in the tropical secondary forest	Karyati, Isa B. Ipor, Ismail Jusoh, Mohd. Effendi Wasli	198

BO-07	Blood cockle (<i>Anadara granosa</i>) supplement increase serum calcium level, and femur growth of rats fed a low protein diet	Margaretha Solang, Aryati Abdul	199
BO-08	Biodiversity as ecotourism attractions in Nantu-Boliyohuto Wildlife Reserve, Gorontalo, Indonesia	Marini Susanti Hamidun, Dewi Wahyuni K. Baderan, Meilinda Lestari Modjo	199
BO-09	Diversity of insects and volunteer plants related to potato virus Y (PVY) disease in seed potato plantation in Sembalun, West Nusa Tenggara	Muhammad Sarjan, Chintia Clara Sista, Fesilya Anggraini, Hery Haryanto, Aluh Nikmatullah	199
BO-10	Hoya in Sulawesi with notes on its ethnobotanical records	Sri Rahayu	200
BO-11	Maintaining soil fauna diversity through soil management practice	Syamsu Alam, Asrun Gusti, Firman, Laode Muhammad Harjoni Kilowasid, Rahayu, Asniah, Tresjia C Rakian, Teguh Wijayanto.	200
BO-12	The dominant community of herpetofauna in the spot water in coal mining area	Teguh Muslim, Ulfah Karmila Sari, Ishak Yassir	200
BO-13	The survival rate and one-year growth of <i>Shorea javanica</i> , <i>Shorea macrobalanos</i> and <i>Hopea mangarawan</i> in coal mined land in Central Bengkulu, Indonesia	Wiryono, Hery Suhartoyo, Ali Munawar	200
BP-01	Four new variety of <i>Begonia</i> from interspecific hybridization of <i>Begonia natunaensis</i> C. W. Lin x <i>Begonia puspitae</i> Ardi	Hartutiningsih-M. Siregar, Wisnu H. Ardi	201
BP-02	Percentage of Green Sea Turtle (<i>Chelonia mydas</i>) in semi natural nest at Pangumbahan Turtle Conservation Center, Sukabumi, Indonesia	M. Qeitsal Sabil, M. Reza Saputra	201
Diversity of ecosystem			
CO-01	Impact of intensive silviculture technique on dung beetle communities	Adi Susilo	202
CO-02	The influence of liquid waste of tofu factory on the mortality of the Manggabal fish (<i>Glossogobius giuris</i>)	Chairunnisah J. Lamangantjo	202
CO-03	Length-weight relationship, gonad index of Payanka and Manggabal as base for sustainable management at Limboto Lake, Gorontalo	Hasim	202
CO-04	Dynamics of mangrove community in revegetation of Karangsong, north coast of Indramayu, West Java, Indonesia	Hendra Gunawan, Sugiarti, Sofian Iskandar	202
CO-05	Factors affecting paddy farm income in East Kalimantan, Indonesia	Karmini	203
CP-01	The vegetation structures, biomass, and values of carbon subsurface of <i>Avicennia</i> in the coastal of Kwandang, North Gorontalo	Dewi Wahyuni K. Baderan	203
CP-02	The diversity of alien plant in Dieng Mountains, Central Java, Indonesia	Ahmad Dwi Setyawan, Ari Susilowati, Ari Pitoyo, Jean W.H. Yong	204
CP-03	Standing stock estimation model of merbau, matoa and nyatoh in the tropical rain forests of Papua, Indonesia	Tien Lastini, Samsuri, Edwine Setia Purnama	204

Ethnobiology

DO-01	Selected medicinal plants in East and North Kalimantan for cosmetic	Enos Tangke Arung, Whicliffe Fiernaleonardo Pasedan, Medi Hendra, Mery Budiarti Supriadi	204
DO-02	Bioactivity of <i>Dacryodes rostrata</i> a pinkish fruit from East Kalimantan	Harlinda Kuspradini, Anindya Marsabella Rosiarto, Irawan Wijaya Kusuma	205
DO-03	Medicinal plants used by the Atinggola healers in North Gorontalo, Indonesia	Novri Y. Kandowangko, C.J. Lamangantjo, H. Hasan, R. Adam, R. Yunus	205

Bioscience

EO-01	Anoa Breeding Centre's role in the conservation and breeding Anoa in North Sulawesi	Anita Mayasari	205
EO-02	Optimization introduction of gene GEN MmCuZn-SOD to sugarcane (<i>Saccharum officinarum</i>) through <i>Agrobacterium tumefaciens</i>	Fitri Damayanti, Suharsono, Utut Widayastuti, Ika Mariska	206
EO-03	Nutrient content of Liquid Organic Fertilizer (POC) by various bio-activator and soaking time	Ince Raden, S. Syarief Fathillah, M. Fadli, Suyadi	206
EO-04	A new note of the flowering phase on the seedling of <i>Sarcotheca macrophylla</i> Blume	Inggit Puji Astuti, Siti Nurfadilah, Maman Suratman	207
EO-05	Massive micropropagation technology of two local genotypes of chili pepper (<i>Capsicum annuum</i>) from West Sumatra, Indonesia	Jamsari, Renfiyeni, Lily Syukriani, Alfi Asben	207
EO-06	Current progress on development of certified potato seed production in West Nusa Tenggara	Aluh Nikmatullah, Ermayanti, Mardiah, Irwan Muthahanas, Muhammad Sarjan	207
EO-07	The development of traditional land management through maintaining and enhancing soil macrofauna diversity on terrestrial agroecosystem	Laode Muhammad Harjoni Kilowasid, Namriah	208
EO-08	The growth rate of green kangkung (<i>Ipomoea aquatica</i>) exposed by heavy metals Pb and Cu	Novri Y Kandowangko, Ishak Isa	208
EO-09	Nutritional composition of some wild mushrooms consumed by indigenous people around the Lore Lindu National Park, Central Sulawesi, Indonesia	Yusran Yusran, Erniwati Erniwati, Akhmad Khumaidi	208
EP-01	Profile of aromatic plant: <i>Actinodaphne glomerata</i>	Harlinda Kuspradini, Farida Fitriani Purba, Irawan Wijaya Kusuma	209
EP-02	Seed germination and seedling growth of <i>Chiococca javanica</i> (Rubiaceae) in relation to fruit maturation and media growth	Chiococca javanica, fruit maturation, seed germinations, seedling growth	209
EP-03	Study of biological fertilizer and inorganic fertilizers use on the growth and yield of soybean in Pandeglang District, Banten	Resmayeti Purba	209
EP-04	Factors influencing the adoption of rice paddy threshing machine "Power Thresher": A case study of Serang District, Banten, Indonesia	Tian Mulyaqin, Ishii Keiichi	210

ABSTRACT

International Conference on Biodiversity
Society for Indonesian Biodiversity (SIB)
Gorontalo, Indonesia, 20-21 August 2016

AA-01

Plant genetic diversity, ex-situ conservation and the role of Botanic Gardens

Graham Eagleton[♥], Joko Ridho Witono, Rosniati Risna, Dian Latifah

Center for Plant Conservation-Bogor Botanic Gardens, Indonesian Institute of Sciences. Jl. Ir. H.Juanda No. 13, P.O. Box 309 Bogor 16003, West Java, Indonesia. Tel./fax.: +62-251-8322187. email: graham.eagleton@gmail.com

It is a truism that the genetic diversity of the world's flora and fauna is diminishing in response to increasing human populations and the effects of our reasonable quest for higher standards of living. Moreover, it is very likely according to current climate models that loss of genetic resources will continue or even accelerate in this century due to the impact of global warming, unless steps are taken to halt the trend. One such step, as far as higher plant life is concerned, is the provision and improvement of ex situ havens for conserving species and varieties identified to be at risk of extinction in dwindling native habitat. In this paper we first discuss the policy framework, International and Indonesian, determining the way botanic gardens and germplasm banks (long term storehouses of seed and other plant-propagating organs and tissues) are perceived to interact in saving endangered plant life from extinction. We then draw on case studies, to examine how this policy works out in practice for five plant genera that have current and potential human uses-*Sorghum*, *Elaeis*, *Corypha*, *Borassus* and *Psophocarpus*. It is clear that the 'hospital' model of *ex situ* plant conservation is a useful but inadequate response to the onslaught that we humans are visiting upon the biodiversity of planet Earth. Botanic gardens must continue to enlist and mobilize the genuine desire of the public at large to reverse this trend, by providing more perceptive research knowledge, more effective information and education, and more appealing experiences of the economic, recreational, aesthetic and spiritual value of our botanical heritage.

Plant genetic diversity; botanic gardens; germplasm banks; Indonesian policy

Genetic diversity

AP-01

Variation of leaflet shape from several soybean genotypes and its relation to morphological characters

Ayda Krisnawati, M. Muchlish Adie

Indonesia Legumes and Tuber Crop Research Institute (ILETRI). Jl. Raya Kendalpayak Km 8, PO Box 66 Malang 65101, East Java, Indonesia. Tel.: +62-341-801468, 801075, Fax.: +62-341-801496, email: my_ayda@yahoo.com

Leaves are important life-giving part of the plant organs which varies in shape between soybean (*Glycine max*) genotypes. A total of 150 genotypes were observed for its leaflet shape in Kendalpayak Research Station, Malang (Indonesia) from February-May 2016. The field experiment was arranged in randomized block design with two replicates. The Leaflet Shape Index (LSI) is ratio of leaflet length to width of the third node in the main stem at R7. Analysis of variance for maturity traits and morphological attributes were significantly different, except for harvest index (HI). This indicates that there was variability in morphological characters between 150 soybean genotypes. The LSI value ranged from 1.40-3.05, in average 2.04. Out of 150 soybean genotypes, most of them have intermediate size (106 genotypes), 21 genotypes have broad leaflet, and the rest (23 genotypes) have narrow leaflet. The correlation between LSI with morphological characters showed that number of filled pod was significantly correlated ($r = -0.205^{**}$), indicate that the decreasing in leaflet size (smaller leaf) will increase the number of filled pods. Among the broad leaflet group, accession No. 92 was prospectively used as gene donor for improving soybean yield potential in Indonesia with yield production reached 3.05 t/ha, early maturity (79 days), and large seed size (16.48 g/100 seed). In the group of intermediate leaflet, accession No. 18 was prospective with yield production 3.07 t/ha, 75 days to maturity, and large seed size (16.92 g/100 seed). Meanwhile, in narrow leaflet group, there

were two genotypes which can be of value as gene donor, i.e. accession No. 22 (seed yield 2.87 t/ha, days to maturity 82 days, seed size 3.93 g/100 seed), and accession No. 20 (seed yield 2.69 t/ha, days to maturity 76 days, and seed size 17.11 g).

Glycine max, LSI, morphological characters, gene donor

AP-02

Sex type in flowering of *Jatropha curcas*

Dasumiati¹, Miftahudin², Triadiati², Alex Hartana²

¹Department of Biology, Faculty of Science and Technology, UIN Syarif Hidayatullah Jakarta, Jl. Ir. H. Djuanda No. 95, Ciputat, South Tangerang 15412, Banten, Indonesia. Tel: 62-21-7493606, Fax.: 62-21-7493315, *email: dasumiati@uinjkt.ac.id

² Department of Biology, Faculty of Mathematics and Natural Sciences, Institut Pertanian Bogor, Dramaga Campus, Bogor, 16680, Indonesia

Jatropha curcas (*jatropha*) produces male, female, and hermaphrodite flowers. The combination of those flowers in one plant caused the sex differentiation in *jatropha*. This study aimed to explore the sex types of flowers and individual on *Jatropha*, as well as to see the stability of the sex types after propagation through stem cuttings. Survey was conducted to the population of *Jatropha* in Kebun Industri Bukit Indah (KIBI) Cikampek and Kebun Induk Jarak Pagar (KIJP) Pakuwon. We found three sex types in both of plantations: monoecious that produces male and female flowers, andromonoecious that produces male and hermaphrodite flowers, trimonoecious that produces male, female, and hermaphrodite flowers in the same individual. Andromonoecious and monoecious *Jatropha* has stable sex type, but trimonoecious *Jatropha* has unstable sex type because hermaphrodite flower not necessarily be generated each time flowering. The stability of sex type was in conjunction with number of branch and distance between nodes.

Andromonoecious, monoecious, trimonoecious

AP-03

Characterization and clustering of agronomic characters from several soybean genotypes

M. Muchlish Adie , Ayda Krisnawati

Indonesia Legumes and Tuber Crop Research Institute (ILETRI), Jl. Raya Kendalpayak Km 8, PO Box 66 Malang 65101, East Java, Indonesia. Tel.: +62-341-801468, 801075, Fax.: +62-341-801496, email: mm_adie@yahoo.com

The development of improved soybean variety in Indonesia is mostly derived from crossing (51.19%), hence requires the availability of gene source for crossing parent. Characterization of 150 soybean genotypes was in Probolinggo, Indonesia, from February to May 2016. The research was arranged in randomized block design with two replicates. Clustering of agronomic characters using

cluster analysis. The grouping on plant age characters (duration of vegetative phase, duration of generative phase, generative and vegetative ratio, days to maturity), growth characters (plant height, number of filled pods, number of empty pods, number of branches, number of nodes), and seed characters (100 seed weight and seed yield/plant) created 10 groups. Cluster I, II and III consisting of 47, 80, and 13 genotypes, respectively; whereas other clusters consisting of one up three genotypes, respectively. Each cluster represents specific characters. Cluster IV which consists of three genotypes showed a late maturity (83.5-88.5 days), high number of pods (81.8-83.3 pods/plant) and high yield/plant (21.76-25.78 g/plant), but have small seed size (12.24-13.75 g/100 seed). Cluster VI consists one genotype, and characterized by large seed size (16.79 g/100 seed) and high yield/plant (15.76 g). Cluster IX (1 genotype) was characterized by early maturity (73 days), unbranched, but produce relatively low yield. The preference of soybean consumer in Indonesia is high yield, in addition early maturity (< 80 days), and large seed size (>14 g/100 seed). Soybean genotypes within cluster IV, VI, and IX can be value as gene source in the development of superior soybean varieties in Indonesia.

Agronomic characters, cluster, seed yield

AP-04

Management leader in whale shark species protection on the beach of Botubarani ecotourism, Gorontalo

Novianty Djafri

Department Biology, Faculty of Mathematics and Natural Sciences, Universitas Negeri Gorontalo. Jl. Jendral Sudirman No. 6 Kota Gorontalo, Gorontalo Province, Indonesia, Tel. +62-435-821125, Fax. +62-435-821752. email: djafriNovianty@gmail.com

The Provincial Government is an important part that can be a pillar in protecting the ecosystems in the regional area. Provincial and district government Bone Bolango management, protect and promote Olele coastal resources to maintain the characteristics of biodiversity through bureaucratic processes (regulations) with the goal of increasing sustainable economic growth for local communities. As for policies that can be done is through a thorough study of the presence of whale sharks in terms of administrative management through a regulatory scheme in the form of village regulations and local regulations. The government's efforts in the protection of whale sharks as ecotourism center are through: (i) The concept of beach management plan. (ii) Roadmap management by communities and governments for the protection of coastal whale shark species Botubarani as ecotourism. The data in this study is using data from the field, as well as secondary and primary data through a literature review of previous studies. The research method is a source of community information and visitors, it was presented in descriptive qualitative. The result of this research is the grand design

management strategy leader in the protection of whale shark species Botubarani shore based society.

Management leader, specie protection, ecotourism society, whale shark

Departement, Faculty of Mathematics and Natural Sciences, Universitas Negeri Gorontalo. Jl. Jendral Sudirman No. 6 Kota Gorontalo, Gorontalo Province, Indonesia

³ Education of Biology Study Program, Faculty of Mathematics and Natural Sciences, Universitas Negeri Gorontalo. Jl. Jendral Sudirman No. 6 Kota Gorontalo, Gorontalo Province, Indonesia

Diversity of Species

BO-01

Identification of aves, herpetofauna and gastropoda in Miangas Island, the north-end of Wallacea

Ady Suryawan , Isdomo Yuliantoro, Anita Mayasari, Margaretta Christita

Research and Development of Environment and Forestry Agency of Manado. Jl. Raya Adipura Kima Atas Mapanget, PO Box 1390, Manado 95119, North Sulawesi, Indonesia. Tel.: +62-851 00666683, Fax. +62-431-3666683, email: suryawanbioconserv@gmail.com

Miangas located at the north end of Wallacea and bordered by the Philippines that including on orientalis. This study aims to identify the species of wildlife terrestrial on the Miangas island. Observations using direct encounter method began at 7.00 a.m. to 5.00 p.m. conducted four visits, i.e.: September and November 2015, April and May 2016. Several species is found, such as: 15 species of birds, 3 species of lizards, 1 species of snake and two species of gastropods. *Hirundapus caudacutus* and *Butastur indicus* are migrant bird species. *Lamprolepis smaragdina* is a tree climbers species; a hybrid lizard from Pacific and Philippine. Based on IUCN, *Eos histrio* is classified as endangered group (E), *Todirhamphus enigma enigma* is classified as near threatened (NT), *Birgus lastro* is classified as data deficient (DD), while *Butastur indicus*, *Lanius schach*, *Nectarinia jugular plateni*, *Todirhamphus chloris*, *Hirundo tahitica*, *Hirundapus caudacutus*, *Egretta sacra*, *Ardea alba*, *Anthus cervinus*, *Motacilla cinerea*, *Cuculus saturatus*, *Passer Montanus*, *Ducula pikerlingii*, *Eutropis multicolorata multicolorata*, *Lamprolepis smaragdina*, *Emoia caeruleocauda* and *Laticauda colubrine* are classified as low risk (LC).

Diversity species, Miangas, Wallacea, wild life

BO-02

Diversity of Holothuroidea in Torosiaje Marine Area, Subdistrict of Popayato, Pohuwato, Gorontalo

Chairunnisah J. Lamangantjo, Abubakar Sidik Katili, Maryam Pido

¹Department Biology, Faculty of Mathematics and Natural Sciences, Universitas Negeri Gorontalo. Jl. Jendral Sudirman No. 6 Kota Gorontalo, Gorontalo Province, Indonesia. Tel. +62-435-821125, Fax. +62-435-821752. email: chairunnisahjl@gmail.com

² Coastal Ecology Based Local Wisdom Research Center Biology

The aims of this study to determine species diversity of Holothuroidea in Torosiaje Marine Area Subdistrict Popayato Pohuwato District, Gorontalo. The study was conducted from April to June 2014. The samples comprised five sampling point namely mangrove areas, seagrass, settlements, small islands, and large islands. The method used is survey method. Measured chemical physics parameters are temperature, salinity, dissolved oxygen, and the degree of acidity (pH). The results found five species of Holothuroidea, i.e. *Holothuria atra*, *Holothuria fuscocinerea*, *Holothuria impatiens*, *Holothuria hilla* and *Bohadschia vitiensis*. On average Holothuroidea diversity index obtained at the five points sampling are 1.217 in the medium category ($1.0 < H' < 3$), which means productivity, sufficient condition is exactly balanced ecosystem and medium ecological pressure. Environmental conditions obtained from five sampling points are the temperature range 28-29°C, salinity of 30-33‰. DO (Disolved Oxygen) 3.68-3.90 mg/L and pH (acidity) 7-8.

Diversity, Holothuroidea

BO-03

The macrofungi diversity and its potential opportunities in Tangale Nature Reserve, Gorontalo

Diah Irawati Dwi Arini, Margareta Christita

Research and Development of Environment and Forestry Agency of Manado. Jl. Raya Adipura Kima Atas Mapanget, PO Box 1390, Manado 95119, North Sulawesi, Indonesia. Tel.: +62-851 00666683, Fax. +62-431-3666683, email: irawati.diah@gmail.com

Tangale Nature reserve is a conservation area located in Gorontalo Province that holds the biodiversity typical of Wallacea bioregion. In addition to the higher vegetation, this region also has the potential diversities of macroscopic fungi. The purpose of this study is to identify the fungal species diversity found in the Tangale Nature reserve as well as its potential utilizing opportunities, considering that the information on species diversity of fungi in the Wallacea region is very limited. This research was conduct using the Cruise Method by identifying macroscopic fungi along the hiking trail of Tangale Nature Reserve. The macroscopic fungi were observed based on the characteristics includes the color, diameter, surface of the veil, the shape of the stem, the length and diameter of the stem, the presence or absence of lamella or porous and ring, type of lamella and the type volva. The research also identifies grow medium and the location where the fungus was found. Data were analyzed descriptively qualitative. The results of the Research identified 29 species of macroscopic fungi that included to the division

Ascomycota and Basidiomycota. It belongs to 18 families and 9 orders are Agaricales, Auriculariales, Boletales, Cantharellales, Helotiales, Pezizales, Polyporales, Russulales and Theleporales. Based on the potential of use, it has identified six types of mushrooms potentially as edible mushroom are *Scleroderma citrinum*, *Cantharellus* sp., *Auricularia auricular*, *Polyporus arcularius*, *Lentinula edodes* and *Pleurotus ostreatus*. Six types were identified as medicinal fungi are *Albatrellus confluens*, *Calvatia craniiformis*, *Lenzites betulina*, *Microporus flabelliformis*, *Coriolus versicolor*, and *Marasmiellus* sp. Based place to grow as much as 58.6% were found growing on decaying wood and 41.4% found growing in the soil/litter.

Macrofungi, Tangale Nature Reserve, potential, food, medicine

BO-04

***Myrmecodia pendans* potentiality on decrease of MDA, Pb and increase of SOD, GPx level in serum of rats exposed plumbum**

Djuna Lamondo, Mustamin Ibrahim

Universitas Negeri Gorontalo. Jl. Jendral Sudirman No. 6 Kota Gorontalo, Gorontalo Province, Indonesia. Tel. +62-435-821125, Fax. +62-435-821752. email: djunalamondo@ung.ac.id

Myrmecodia pendans is one of the plants that build the highly diverse nature of Indonesia and has many benefits. Active compounds in *Myrmecodia pendans* are flavonoids, tannins, polyphenols, and tocopherols, serves as primary antioxidants. The existence of these antioxidants enables *Myrmecodia pendans* to be used to reduce the free radicals induced by plumbum. This study aims to explain the potentiality of antioxidants *Myrmecodia pendans* to decrease of MDA, blood Pb level and increase of SOD, GPx serum level in rats exposed plumbum. This research was experimental research laboratories, the design of separate sample pretest-posttest control group. In the first stage, 50 rats were divided into two group, 11 rats were not exposed plumbum (Pb) acetate, and 39 rats were exposed to 1.000 ppm/200g BW/day of Pb. After 8 weeks, 4 rats of each group were sacrificed. While other rats continued to the second stage treatment, 7 rats were not exposed to Pb and 35 rats exposed Pb were randomly divided into 5 group. One group exposed Pb, 2 group (Pb plus *Myrmecodia pendans* extract 27 and 54 mg) and 2 group (Pb plus ethyl acetate fraction of *Myrmecodia pendans* 4 and 8 mg) orally/day. After 8 weeks of treatment all rats were sacrificed. Blood Pb level measurement was done with AAS. MDA, SOD and GPx level with ELISA method. The results showed that plumbum in blood levels a significant decreased (ANOVA, $p < 0,05$). The serum SOD and GPx levels showed a significant increased (ANOVA, $p < 0,05$). The serum MDA levels showed a significant decreased (Robust test, $p < 0,05$).

Myrmecodia pendans, Plumbum, MDA, SOD, GPx

BO-05

Diversity of macroinvertebrate benthic as biomonitoring tools for organic pollution level in tropical river ecosystems

Dwi Nugroho Wibowo , Setijanto

¹ Faculty of Biology, Universitas Jenderal Soedirman. Jl. Dr. Soeparno No. 68, Purwokerto, Banyumas 53122, Central Java, Indonesia. Tel. +62-281-638794, Fax: +62-281-631700, email: dnwibowo_unsoed@yahoo.com

² Faculty of Fisheries and Marine Sciences, Universitas Jenderal Soedirman. Jl. Dr. Soeparno, Karangwangkal, Purwokerto, Banyumas 53123, Central Java, Indonesia. email: setijanto@yahoo.com

Macroinvertebrate benthic is group of organism that abundance and as important component of freshwater. A study on the use of macroinvertebrate benthic as a tool of biomonitoring for organic pollution level has been done at some tributaries of the Serayu River catchment area, Central Java, Indonesia. The study aims to test the sensitivity of the quantitative approach (abundance, species richness, diversity indices) and quantitative and qualitative combined approach (Lothian Index, Trent Biotic Index, and Biotic Score). A total of 30 sites with different organic pollution levels as reflected by the BOD concentrations had been surveyed. The result revealed that there was no positive correlation between abundance, species richness, Shannon Wiener indices, and the BOD levels. In contrast, positive correlation was observed between the biotic indices (Lothian Index, Trent Biotic Index, and Biotic Score) and the BOD levels. Lothian Index was the most sensitive to BOD level changes compared to other indices.

Diversity, macroinvertebrate benthic, biomonitoring, organic pollution

BO-06

Diameter increment of selected tree species in the tropical secondary forest

Karyati¹, Isa B. Ipor², Ismail Jusoh², Mohd. Effendi Wasli²

¹ Faculty of Forestry, Universitas Mulawarman. Jl. Ki Hajar Dewantara, PO Box 1013, Gunung Kelua, Samarinda Ulu, Samarinda-75123, East Kalimantan, Indonesia. Tel./Fax.: +62-541-749160. email: karyati.hanapi@yahoo.com

² Faculty of Resource Science and Technology, Universiti Malaysia Sarawak, 94300, Kota Samarahan, Sarawak, Malaysia

The diameter at breast height (DBH) increment of dominant tree species in secondary forest can determine forest growth in the area. This study was conducted to investigate the DBH increment of nine dominant tree species in secondary forests. A total number of 180 trees representing 9 species, 7 genera, and 6 families were selected for assessment of DBH increment during two years. The results showed that the DBH increment of nine selected tree species may classify into two categories of fast growing species and slow growing species. Four species such as *Acacia mangium* Willd., *Cratoxylum*

arborescens Blume., *Cratoxylum glaucum* Korth., and *Endospermum diadenum* (Miq.) Airy Shaw were included to fast growing species. The other five species of *Euodia glabra* (Bl.) Bl., *Macaranga gigantea* Mull. Arg., *Macaranga triloba* Mull. Arg., *Vernonia arborea* Buch. Ham., and *Vitex pubescens* Vahl. were categorized into slow growing species. The average DBH increment for all selected fast growing species was 0.86 cm/year of periodical measurement and 0.75 cm/year for monthly measurement.

Diameter increment, selected species, fast growing species, secondary forest

BO-07

Blood cockle (*Anadara granosa*) supplement increase serum calcium level, and femur growth of rats fed a low protein diet

Margaretha Solang, Aryati Abdul

Department Biology, Faculty of Mathematics and Natural Sciences, Universitas Negeri Gorontalo. Jl. Jendral Sudirman No. 6 Kota Gorontalo, Gorontalo Province, Indonesia. Tel. +62-435-821125, Fax. +62-435-821752. email: martasolang@yahoo.co.id

Blood cockle (*Anadara granosa*) contains protein, zinc and calcium. The aim of this study was to evaluate the effects of blood cockle flour supplement on serum calcium levels, femur length, and femur weight of rats fed low protein diet. The design of this research was The Separate Sample Pre-Post Test Design. The 48 Wistar male rats were randomly grouped into 2 groups: 12 rats for normal control (NC0) and 36 rats were given karak for low protein group (LP). After eight weeks, 4 rats from each group were sacrificed. Eight rats were normal control (NC1), 32 rats in low protein were randomly grouped, namely malnourished, malnourished rats were given *Anadara granosa* flour of 12.5%; 2.5%; and 50% for 8 weeks. Data analysis was performed with Kruskal-Wallis, Mann-Whitney. The result showed there were significantly increased in serum calcium levels ($p = 0.003$), femur length ($p = 0.000$), and femur weight ($p = 0.002$) of rats in low protein diet. Blood cockle supply in 12.5 g was able to improve growth of femur in rats low protein diet. This study demonstrates that blood cockle flour may be use as a food alternative to improve growth of femur in malnutrition condition.

Anadara granosa, calcium, femur, low protein diet, rats

BO-08

Biodiversity as ecotourism attractions in Nantu-Boliyohuto Wildlife Reserve, Gorontalo, Indonesia

Marini Susanti Hamidun, Dewi Wahyuni K. Baderan, Meilinda Lestari Modjo

¹Department Biology, Faculty of Mathematics and Natural Sciences, Universitas Negeri Gorontalo. Jl. Jendral Sudirman No. 6 Kota Gorontalo,

Gorontalo Province, Indonesia, Tel. +62-435-821125, Fax. +62-435-821752. email: marinish70@gmail.com

²Tourism Departmen, Faculty of Letters and Culture, Universitas Negeri Gorontalo. Jl. Jendral Sudirman No. 6, Kota Gorontalo, Gorontalo Province, Indonesia

Nantu-Boliyohuto Wildlife Reserve in Gorontalo Province is an area conservation which has 204 kinds of plant, 20 kinds of wildlife, and 56 kinds of birds. The objective of this study is to analyze potentials of biodiversity attractions in Nantu-Boliyohuto Wildlife Reserve as object and natural tourist attractions. The research was done by literature search, direct observation, and interview. The result showed that biodiversity attractions in Nantu-Boliyohuto Wildlife Reserve as object and natural tourist attractions such: bird watching, wildlife attractions, vegetation attraction, tracking, river attractions, natural viewing attractions, photo hunting, and education attractions.

Biodiversity, Nantu-Boliyohuto, ecotourism

BO-09

Diversity of insects and volunteer plants related to potato virus Y (PVY) disease in seed potato plantation in Sembalun, West Nusa Tenggara

Muhammad Sarjan , Chintia Clara Sista, Fesilya Anggraini, Hery Haryanto, Aluh Nikmatullah

Faculty of Agriculture, Universitas Mataram. Jl. Majapahit 62, Mataram, West Nusa Tenggara, Indonesia. email: janjan62@gmail.com

Potato Virus Y (PVY) is an important diseases causing major loss during potato plantation in the world, and thus intensity of diseases caused by potato virus is a major criterion assessed for production of certified potato seed tuber. Despite being seed tuber borne, PVY can be transmitted by insects from other volunteer plants and disease intensity is enhanced by unfavorable environmental condition. This paper presents diversity of insects and volunteer plants related to PVY during seed potato tuber plantation in Sembalun Timba Gading, Sembalun, East Lombok, West Nusa Tenggara. Diversity of insects and volunteer plants were evaluated throughout the plantation in the production sites as well as the boundary. Intensity of PVY was calculated based on the percentage of plants showing PVY symptom, and confirmed by Enzyme Link ImmunoSorbent Assay (ELISA). Four species of leaves sucking insects were obtained, they were *Aphids* spp., *Bemisia tabaci*, *Thrips palmi* and *Tetranychus* spp. Population dynamics, species richness as well as domination were changed during plantation and were correlated with the present, population, growth stages of the potato and volunteer plants as well as changes in the temperature and humidity. Interestingly, the present of red mite, PVY infected cassava may be related to PVY infection in potato plants.

Potato Virus Y, red mite, cassava, potato seed tuber, insect diversity

BO-10**Hoya in Sulawesi with notes on its ethnobotanical records****Sri Rahayu**

Center for Plant Conservation-Bogor Botanic Gardens, Indonesian Institute of Sciences. Jl. Ir. H.Juanda No. 13, P.O. Box 309 Bogor 16003, West Java, Indonesia. Tel./fax.: +62-251-8322187. email: srirahayukrb@yahoo.com

Sulawesi is one of the major area under the Wallacea line which has unique and most of endemic species. *Hoya* of Sulawesi was not yet been well known. First publication dedicated to *Hoya* of Sulawesi was in Flora von Minahasa (Koorders in 1885), and *Hoya* of Central Sulawesi by Kleijn and van Don Kelaar in 2001. In this study, we account of *Hoya* Sulawesi based on herbarium studied at BO, Sing, L, Kew, Berlin, Edinburgh and Paris combined with the travel report of Indonesian Botanic Gardens expeditions in Sulawesi. It is about 20 *Hoya* species in Sulawesi with remain unidentified species (supposed to be new species). The number of species is predicted to be increased as further exploration done. The records of ethnobotanical uses are presented in this paper based on interview and herbarium sheets notes.

Hoya, species diversity, ethnobotany, ethnomedicine, Wallacea

BO-11**Maintaining soil fauna diversity through soil management practice****Syamsu Alam , Asrun Gusti, Firman, Laode Muhammad Harjoni Kilowasid, Rahayu, Asniah, Tresjia C. Rakian, Teguh Wijayanto**

Department of Agrotechnology, Faculty of Agriculture, Universitas Halu Oleo. Jl. HEA Mokodompit Kendari 93231, Southeast Sulawesi, Indonesia. email: alamhaluoleo@gmail.com

Soil fauna diversity was used as soil quality indicator in sustainable agricultural systems. Land management practices can impact soil fauna. The research objective was to study the effect of different land management practices on soil fauna abundance and diversity. Vegetation on the study area was dominated by *Imperata cylindrica*. Tested land preparation techniques included slash-burn, contact-herbicide, systemic-herbicide, slash-mulch, and land untreated land. Each technique was repeated five times following completely randomized block design. Soil macro-and micro-arthropods were taken from each plot at 1, 2, 4 and 8 week after treatment. Research results indicated that soil macroarthropods in plots treated with slash-burn, contact-herbicide, systemic-herbicide and slash-mulch was less abundant than in untreated plot. Abundance decreasing of macroarthropod in slash-mulch plot was lower than other plots. Taxon number in all plots was similar. Acari and Colembolla abundance decreased over time in treated plots, but increased in untreated plot. In

slash-mulch plot, the abundance of Acari and Colembolla was higher than others at eight week after treatment. In conclusion, land preparation technique had more impacts on composition of soil macroarthropod. Therefore, soil macroarthropod could be proposed as soil biological quality indicator in determining policies to asses sustainable land management in tropical agroecosystem.

Macroarthropod abundance, herbicide, slash-burn, slash-mulch, policy

BO-12**The dominant community of herpetofauna in the spot water in coal mining area****Teguh Muslim, Ulfah Karmila Sari, Ishak Yassir**

Research and Technology Development Institute of Conservation of Natural Resources. Jl. Soekarno Hatta Km. 38 PO. Box 578 Balikpapan 76112, East Kalimantan. Indonesia. Tel.: +62-542-7217663. *email: thegue97@gmail.com

Herpetofauna as one of the constituent components of the ecosystem that has a very important role in the ecological balance in the ecosystem, because most of the herpetofauna was cast as predators on the level of the food chain in an ecosystem as well as being an indicator of the occurrence of a change of environment. The presence of the herpetofauna in the reclamation area may be determined by the distance factor and the area around the mine still left as natural forests or fragmented. Changes of habitat conditions will affect the diversity of herpetofauna. Each type of herpetofauna have preferred habitat characteristics, even certain types requires specific habitat. Change of habitat allows the onset of movement and changes in herpetofauna communities on dominance of both the coal mine area and composition. This research aims to know the herpetofauna communities that form and dominating the fragmented habitat conditions and the new habitat that is formed due to changes of the area. The location of the research is in the area of coal mining PT Singlurus Pratama East Kalimantan. A method of Visual Encounter surveys with sampling Patches was used. The research results obtained 10 species of reptiles in the 5 families and 11 species of amphibian in 6 families. The dominant reptiles are *Eutropis multifasciata* (20 hds), *Enhydris enhydris* (hds), and *Dendralaphis pictus* (hds). The dominant amphibians are *Polypedates leucomystax* (42 hds) and *Fejervarya cancrivora* (41 hds).

Coal Mining, dominancy, Herpetofauna, spot water

BO-13**The survival rate and one-year growth of *Shorea javanica*, *Shorea macrobalanos* and *Hopea mangarawan* in coal mined land in Central Bengkulu, Indonesia**

Wiryo, Hery Suhartoyo, Ali Munawar

¹ Department of Forestry, Faculty of Agriculture, Universitas Bengkulu. Jl. WR Supratman, Bengkulu, Indonesia. email: wiryonogood@yahoo.com

² Department of Agrotechnology, Faculty of Agriculture, Universitas Bengkulu. Jl. WR Supratman, Bengkulu, Indonesia

Dipterocarp trees used to dominate the lowland forest of Sumatra and Kalimantan. Currently, however, dipterocarp trees are rare due to deforestation of natural forest. One major causes of deforestation in Sumatra and Kalimantan is coal mining. Rehabilitation of coal mined soil is usually done using fast-growing alien species. We tried to restore a piece of mined land in Central Bengkulu, using commercially valuable species of Dipterocarpaceae, namely *Shorea javanica*, *Shorea macrobalanos* and *Hopea mangarawan*. In this article, we presented the survival rate and growth of these three species within one year of observation. Of the three species, *S. macrobalanos* had the highest survival rate (93%), followed by *S. javanica* (80%) and *H. mangarawan* (77%). Within a year, the seedlings of *S. macrobalanos* grew 452% in height, significantly higher than that of *S. javanica* (221%) and of *H. mangarawan* (119%). *Shorea macrobalanos* also had the highest growth in diameter within a year, namely 337%, followed by *S. javanica* (145%) and *H. mangarawan* (135%). It can be concluded that within a year of observation, the three species of dipterocarp could grow relatively well in mined land. It is therefore recommended that restoration of mined land in Sumatra use economically valuable native species of dipterocarp instead of fast-growing alien species.

coal mined soil, dipterocarpaceae, rehabilitation

BP-01**Four new variety of *Begonia* from interspecific hybridization of *Begonia natunaensis* C. W. Lin x *Begonia puspitae* Ardi**

Hartutiningsih-M. Siregar, Wisnu H. Ardi

Center for Plant Conservation-Bogor Botanic Gardens, Indonesian Institute of Sciences. Jl. Ir. H.Juanda No. 13, P.O. Box 309 Bogor 16003, West Java, Indonesia. Tel./fax.: +62-251-8322187. email: hartutiningsih@yahoo.co.id

Increased genetic diversity of ornamental plants (*Begonia*) can be done by a hybridization and selection of the F1 generation. This study aims to improve the phenotypic character of the plant and produce new varieties which are hope to be better than its parent. The study was conducted in the green house of Bogor Botanic Gardens. Two native species of Indonesia, *Begonia natunaensis* C. W. Lin & C.-I Peng, *B. puspitae* Ardi were used as parent plants. The mature seeds were sowed and selected. The result of the selection is 4 accessions of F1 plants (X1, X3, X10, X22). Then the selected F1 plants are propagated vegetatively with leaves cutting, observed, named and registered on the Center of Plant Variety Protection (P2PVT). The result are, the X1 named as *Begonia* Blirik which is registered on a letter with (No. 347/PVHP/2015), which characterized with

purplish peltate leaves with bright whitish green veins, and white flowers. The X3 named as *Begonia fiandani* registered as No. 348/PVHP/2015, characterized by dark green leaf color, corrugated surface, pink flowers. The X10 named as *Begonia* Green Peltate registered as No. 345/PVHP/2015, characterized large green peltate leaves, and red flowers, the X22 named as *Begonia natunapangean* registered as No. 346/PVHP/2015, characterized by eccentrically green peltate leaves, with ovate shape, and cordate leaves base. Thus the new varieties have been registered in PPVTPP accordance with legislation in force. This new variety is beautiful and exotic leaves ornamental *Begonia* which will be developed as commercial ornamental plants.

Begonia natunaensis, *Begonia puspitae*, *Begonia* Blirik, *Begonia* Green peltate, *Begonia natunapangean*, *Begonia fiandani*, interspecific hybridization

BP-02**Percentage of Green Sea Turtle (*Chelonia mydas*) in semi natural nest at Pangumbahan Turtle Conservation Center, Sukabumi, Indonesia**

M. Qeitsal Sabil, M. Reza Saputra

Universitas Al Azhar Indonesia. Jl. Sisingamangaraja, Komp. Masjid Agung Al Aazhar, Kebayoran Baru, Jakarta Selatan. email: gifari06@gmail.com

The green sea turtles (*Chelonia mydas*) are reptiles of the order Testudines, family of Cheloniidae which is listed as endangered by the CITES in Appendix I, and their existence is protected by Indonesian law UU No. 34/2004 as well as Permenhut No. 8/2008. Therefore, it is necessary to the preservation of green turtles in their natural habitat. This research focuses on the spawning stage by observing the depth as a variable at the nesting site. The eggs that are observed come from one green sea turtle parent which are divided into 9 nests with 10 eggs laid at each nest. This research was using the SRS method (Simple Random Sample) with three replications. The average percentage of hatchings on the nest depth variation was 86.7% at a depth of 55cm, 60% at a depth of 45cm and 30.33% at a depth of 35cm. Nonparametric test analysis (Kruskal-Wallis test) provides the value sig. 0.006<0.05 so there exists the influence between the depth of the nest to the percentage of hatching.

Chelonia mydas, green sea turtle, hatchings percentage, temperature fluctuation, UPTD turtle conservation.

Diversity of Ecosystem

CO-01

Impact of intensive silviculture technique on dung beetle communities

Adi Susilo

Research and Development of Environment and Forestry Agency of Manado. Jl. Raya Adipura Kima Atas Mapanget, PO Box 1390, Manado 95119, North Sulawesi, Indonesia. Tel.: +62-851 00666683, Fax. +62-431-3666683, email: adisusilo@hotmail.com

Impact of Intensive Silviculture Technique (IST) on dung beetle community was studied by comparing forest block of logged-over area with and without IST. On each block 20 pitfall traps were opened for 24 hours. In total, 1,093 dung beetles from 7 (morpho) species were caught with diversity index of 0.41. Dung beetles caught in logged-over area was 694 individuals from 2 (morpho) species with diversity index of 0.04 meanwhile on the logged-over area with IST were 399 from 7 morpho species and diversity index of 0.83. The differences on number of individual, species richness and diversity index were statistically significant. In conclusion, logged-over area with intensive silviculture technique hold better habitat for dung beetle community

Dung beetles, logged-over forest, intensive silviculture technique, species richness, diversity index

CO-02

The influence of liquid waste of tofu factory on the mortality of the Manggabai fish (*Glossogobius giuris*)

Chairunnisah J. Lamangantjo

Department Biology, Faculty of Mathematics and Natural Sciences, Universitas Negeri Gorontalo. Jl. Jendral Sudirman No. 6 Kota Gorontalo, Gorontalo Province, Indonesia. Tel. +62-435-821125, Fax. +62-435-821752. email: chairunnisahjl@gmail.com

This research aims at finding out the influence of administration of solid waste of tofu factory on the mortality of the Manggabai fish species (*Glossogobius giuris*). This research is a quantitative laboratory research. The research applied experimental method with six treatments (0%, 5%, 10%, 15%, 20% and 25%) each treatment is repeated twice. This research shows that in the concentrate of 0%-10% of liquid waste from tofu factory, the mortality of the fish are relatively small, around 0-3 (1.8%). In 15%-25% concentrate of liquid waste from tofu factory, the mortality of the Manggabai fish reached soared to 100%. This indicates that the higher the concentrates of liquid waste of the tofu factory, the higher the mortality rate of the Manggabai fish. Based on the data from anova test with $\alpha = 0.05$. The significance value obtained is 0.00. This value is smaller than $\alpha = 0.05$. The analysis shows that the liquid waste concentrate from the tofu factory

significantly influences the mortality rate of the Manggabai fish species. Based on the probit analysis in determining the LC50 at 12th hours shows that the concentrate where the mortality rate is 50% is the 11,3% concentrate. This means that in 11,3% concentrate, the liquid waste from tofu factory is toxic toward the Manggabai fish. Hence, it is concluded that the liquid waste from the tofu factory influences the mortality rate of the Manggabai fish species.

Liquid waste, tofu factory, Manggabai, *Glossogobius giuris*, mortality

CO-03

Length-weight relationship, gonad index of Payangka and Manggabai as base for sustainable management at Limboto Lake, Gorontalo

Hasim

Universitas Negeri Gorontalo. Jl. Jendral Sudirman No. 6 Kota Gorontalo, Gorontalo Province, Indonesia, Tel. +62-435-821125, Fax. +62-435-821752. email: hasimgtlo@gmail.com

The payangka and manggabai are rated as the local fish of Lake Limboto, Gorontalo experiencing economic and ecological pressures. Conservation action requires of information related to biological aspects. Therefore, this study conducted to analyze the relationship between length and weight, degree of maturity gonad and gonad index of Payangka and Manggabai fishes in Lake Limboto. The research activities conducted in September-October 2015 on cross-sectional approach. Fish samples were obtained using gear mesh with a sample of 60 head. Furthermore, the fish samples taken to the laboratory for analysis of gonad maturity and weight. The analysis showed that the length-weight relationship of payangka fish and manggabai fish are allometric. Gonad Maturity Index of payangka fish varies between 0.05-1.98% while the gonad maturity index of manggabai fish varies between 0.10-20.00%.

Length-Weight relationship, gonad index, payangka fish, manggabai fish, Limboto Lake

CO-04

Dynamics of mangrove community in revegetation of Karangsong, north coast of Indramayu, West Java, Indonesia

Hendra Gunawan¹, Sugiarti², Sofian Iskandar¹

¹Forest Research and Development Center, Ministry of Environmental and Forestry. Jl. Gunung Batu No. 5. PO Box 165, Bogor 16001, West Java, Indonesia. Tel. +62-251-8633234; 7520067. Fax. +62-251 8638111. email: hendragunawan1964@yahoo.com

²Center for Plant Conservation-Bogor Botanic Gardens, Indonesian Institute of Sciences. Jl. Ir. H.Juanda No. 13, P.O. Box 309 Bogor 16003, West Java, Indonesia. Tel./fax.: +62-251-8322187. email: ugiarachim@gmail.com

³Forest Research and Development Center, Ministry of Environmental and Forestry. Jl. Gunung Batu No. 5. PO Box 165, Bogor 16001, West

Java, Indonesia. Tel. +62-251-8633234; 7520067. Fax. +62-251 8638111.
email: sofianiskandar@yahoo.com

Mangrove in the north coast of Java is heavily degraded due to the conversion into fish pond and settlement. Re-vegetation program has been initiated by local community of Karangsong Village, Indramayu District which supported by PT. Pertamina RU VI Indramayu. This research was aimed to study the population dynamics of mangrove re-vegetation in Karangsong. Data was collected from the Fishery and Maritime Services of Indramayu and PT. Pertamina. Field observation and interview with key respondents were also applied. Data was analyzed to describe the trend of diversity index and population dynamics of mangrove. The result showed that the re-vegetation effort has covered ± 58.04 hectares consisted of six species of mangrove and three species of coastal vegetation i.e. *Rhizophora mucronata* Lam., *Rhizophora stylosa* Griff., *Rhizophora apiculata* Bl., *Avicennia marina* (Forssk.) Vierh., *Avicennia alba* Blume, *Sonneratia caseolaris* (L.) Engl., *Terminalia catappa* L., *Casuarina equisetifolia* L., and *Ziziphus mauritiana* Lam. Mangrove population increase drastically, from 25,000 individuals in 2008 to 1,031,878 in 2016. *Rhizophora mucronata* was the most dominant (78.99%), followed by *Rhizophora stylosa* (12.27%) and *Rhizophora apiculata* (6.38%). Shannon diversity index was fluctuated between range of 0.71 and 0.91.

Mangrove, re-vegetation, north coast, Karangsong

CO-05

Factors affecting paddy farm income in East Kalimantan, Indonesia

Karmini

Department of Agrobusiness, Faculty of Agriculture, Universitas Mulawarman. Jl. Paser Balengkong, Gunung Kelua, Samarinda Ulu, Samarinda-75123, East Kalimantan, Indonesia. Tel./Fax.: +62-541-749159, *email: karmini.kasiman@yahoo.com

The development of paddy farming in East Kalimantan faces problem and challenge as the low level of paddy farm income. Consequently, efforts are needed to increase paddy farm income. The objective of this study is to determine factors affecting paddy farm income. This study was carried out in East Kalimantan Province, Indonesia. The two-stage cluster sampling was applied to select three cities/districts (Kutai Kartanegara, Penajam Paser Utara, and Bontang) and to choose nine subdistricts (Tenggarong Seberang, Loa Janan, Muara Muntai, Babulu, Penajam, Waru, South Bontang, North Bontang, and West Bontang) as the study areas. This study assessed 380 paddy households as respondents. The regression function was used to analyze the data. The result of F test shows age of household head, depreciation of tools, experience of household head in paddy farming, labor cost, land cultivation cost, paddy farm size, raw materials cost, and rice requirement of the household, collectively, very

significantly affect paddy farm income in East Kalimantan, Indonesia. However, the result of t tests show land cultivation cost, paddy farm size, and raw materials cost, individually, very significantly affect paddy farm income in East Kalimantan, Indonesia. The other variables, individually, are not significantly affect paddy farm income.

Paddy, farm, income, East Kalimantan, Indonesia.

CP-01

The vegetation structures, biomass, and values of carbon subsurface of *Avicennia* in the coastal of Kwandang, North Gorontalo

Dewi Wahyuni K. Baderan

Department Biology, Faculty of Mathematics and Natural Sciences, Universitas Negeri Gorontalo. Jl. Jendral Sudirman No. 6 Kota Gorontalo, Gorontalo Province, Indonesia, Tel. +62-435-821125, Fax. +62-435-821752. email: dewibaderan14@gmail.com

This study aims to consider about the Mangrove forest in North Gorontalo District. Nowadays, mangrove forest which is located on the Kwandang coastal is eventually involved under pressure by human activities which have been over the usual resource. This mangrove forest actually has an essential function for human survival; because it has several function, namely physical function which has several functions such keeping seashore in order to remain stable, protecting beaches, steep and riverbanks from erosion processes, mitigate and withstand the blows of the tsunami, as a buffer zone intrusion process. Moreover, it has chemical functions as a recycling process that produces oxygen and absorbs carbon dioxide, as a result of processing materials industry pollution and ships at the sea. Additionally, biological function produces the material weathering (decomposer), as foraging (feeding ground), spawning (spawning ground), and the breeding grounds (nursery ground) of different kinds of fish, shrimp, crab, oysters and other marine life, and as a natural habitat for many species of land and other marine biota. Further, Socio-economic functions is a function which is similar to those of the mangrove fruits that can be processed into alternative food sources such as pastries, flour, rice, crackers, and drinks, and mangrove leaves can be processed into medicines, cosmetics, industrial raw materials; and can be used as a tourist area, conservation, education and research. Furthermore, the method that will be used on this study is the survey method with vegetation analysis technique using the quadrant method. The estimation of biomass considers about allometric equations and analysis of subsurface carbon and substrate that is at the root of mangrove Genus *Avicennia* which is based on calculations directly in the field and the laboratory analysis. Moreover, the result of this study found that the vegetation structures obtained 16 species of mangrove plants namely *Rhizophora mucronata* Blume, *Rhizophora apiculata* Lamk, *Ceriops decandra* (Griff.) Ding Hou, *Ceriops tagal* (Perr.) CRob, *Bruguiera gymnorhiza* (L) Lamk,

Bruguiera parviflora (Roxb) W & A, *Sonneratia alba* JE Smith, *Sonneratia caseolaris* (L) Eng, *Xylocarpus moluccensis* (Lamk) Roem, *Xylocarpus granatum* Koen (NIRI), *Avicennia alba* Blume, *Avicennia marina* (Forsk) Vierh, *Avicennia officinalis* (L) Lamk, *Acanthus ilicifolius* L, *Heritiera littoralis* Dryand. Ex W.Ait, *Aegiceras corniculatum* (L.) Blanco. Biomassa (root) to *Avicennia marina* (Forsk) Vierh of 11.75 ton/ha (mean diameter 34.45 cm) is equivalent to 5.5413 ton C/ha or 20.3366 tons CO₂/ha; *Avicennia alba* Blume has a biomass of 1.51 ton/ha (mean diameter 30.8 cm) which is equivalent to 0.7097 ton C/ha or 2.6046 tons CO₂/ha. The carbon content of subsurface of Genus *Avicennia* on the tree roots (D 20cm) amounted to 6.251 ton C/ha and the carbon content of the substrate amounted to 1842.44 tons C/ha. Therefore, the total carbon content of subsurface of Genus *Avicennia* amounted to 1848.69 tons/ha.

Biomass, carbon, structural vegetation, mangrove

CP-02

The diversity of alien plant in Dieng Mountains, Central Java, Indonesia

Ahmad Dwi Setyawan^{1,Å}, Ari Susilowati¹, Ari Pitoyo¹, Jean W.H. Yong²

¹Department of Biology, Faculty of Mathematics and Natural Sciences, Universitas Sebelas Maret. Jl. Ir. Sutami 36A Surakarta 57126, Central Java, Indonesia. Tel./Fax.. +62-271-663375, ✉email: volatileoils@gmail.com

²Singapore University of Technology and Design, Singapore

The movements of human beings driven by exploration and commerce have led to the shipment of a large number of species, either intentionally or by accidents. Starting from the spread of kapok from old world to new world in prehistoric era by Indonesian sailors, now, a large number of species introduced into a new place to get the benefits, either as food, medicine, pets or ornamentals, industrial raw materials, etc. This research was conducted in the Dieng plateau, Central Java, Indonesia in early 2016 to determine the alien plant diversity and its potential harm as an invasive plant. The results showed there were more than 40 alien plants species; they are generally imported as an ornamental plant. *Lantana camara* is an ornamental plant that most distributed and tend to be invasive because it can grow wild and compete with native species. *Passiflora* sp. is an alien plant species that potentially harm because it can grow over the canopy of trees and shrubs and compete in the sun. However, most of introduced species is useful plants. Potatoes (*Solanum tuberosum*) are the most widespread introduced crop due to the tuber cultivated. Depth research on the process of naturalization and competition of alien and native species need to be conducted to determine the mitigation process.

Allien plants, Dieng Mountains, *Lantana camara*, *Passiflora*, *Solanum tuberosum*

CP-03

Standing stock estimation model of merbau, matoa and nyatoh in the tropical rain forests of Papua, Indonesia

Tien Lastini¹, Samsuri², Edwine Setia Purnama³

¹School of Life Sciences and Tecnology, Institut Teknologi Bandung. Jl. Ganesha No. 10 Bandung, West Java, Indonesia, Tel. +62-22-2511575, ✉email: tien@sith.itb.ac.id

²Department of Forestry, Faculty of Forestry, Universitas Sumatera Utara. Jl. Tri Darma Ujung No. 1 Kampus USU Medan Sumatera Utara, Telp.+62-61-8220605, ✉email: gsamsuri@gmail.com,

³Department of Forest Management, Faculty of Forestry, Institut Pertanian Bogor. Jl. Lingkar Akademik, Kampus IPB Darmaga, Bogor 16680, West Java, Indonesia, ✉email: edwine.setia@live.com

Deforestation and degradation of tropical rain forests cause partial loss of natural biological resources. Some tree species are threatened by extinction and some have already become extinct. In Papua, merbau, matoa and nyatoh are vulnerable to extinction. Therefore, standing stock information for these threatened species is needed to formulate their protection and conservation mechanisms. The use of high-resolution satellite images are required to determine the potential standing stock of these threatened tree species due to its hard accessibility and large coverage. This study aimed to develop a standing stock estimation model of merbau, matoa and nyatoh using crown density as the estimator. High-resolution satellite images Worldview and medium-resolution Landsat 8 were used to measure the crown density. The model was selected based on criteria of mean deviation, Root Mean Square Error (RMSE), bias (e), Chi square (X²), aggregate deviation, and coefficient of determination (R²). The main result of the study was a standing stock estimation model of all species 1.7111x1.285 where x was crown density. The standing stock of merbau, matoa and nyatoh were calculated from the ratio between those species and all species in a stand. The proportion of merbau, matoa, and nyatoh were 10%, 15%, and 2% respectively. From this study, it was found that matoa has the highest potential standing stock. Another finding was nyatoh has a relatively higher vulnerability to threats.

standing stock, Papua, modeling, vulnerable tree species

Ethnobiology

DO-01

Selected medicinal plants in East and North Kalimantan for cosmetic

Enos Tangke Arung¹, Whicliffe Fiernaleonardo Pasedan², Medi Hendra², Mery Budiarti Supriadi³

¹ Forest Product Chemistry Laboratory, Faculty of Forestry, Universitas Mulawarman. Jl. Ki Hajar Dewantara, PO Box 1013, Gunung Kelua, Samarinda Ulu, Samarinda-75123, East Kalimantan, Indonesia. Tel./Fax.: +62-541-749160. email: tangkearung@yahoo.com

² Biology Laboratory, Mathematic and Science Faculty, Universitas

Mulawarman, Samarinda, Indonesia

³ Medicinal Plant and Traditional Medicine Research and Development Center, Karanganyar, Indonesia

Based on community based research on ethnomedicine local knowledge and medicinal plant in Indonesia by Medicinal Plant and Traditional Medicine Research and Development Center in 2012 and 2015, has collected various data on medicinal plants including for cosmetic in all Indonesia region. From these data, there are 38 medicinal plants use for cosmetic. This study focused on some selected medicinal plants used by several ethnic groups in East and North Kalimantan for cosmetic such as for skin lightening/smoothing, anti-acne, etc. We have selected 4 plants for evaluating its property on anti-acne named Selekop (*Lepisanthes amoena*), Kelepapaaq (*Vitex pinnata*), Belaluq lasooq (*Crotalaria pallida*), Singkil (*Premna corymbosa*) by well diffusion method. The zone inhibition (mm) of these extracts on anti-acne was 8,56; 11,89; 11,33; 9,44 mm respectively and chloramphenicol (positive control) was 29.44 mm at 500 ppm. These results were in line with traditional used by tribes in East and North Kalimantan.

Traditional medicine, medicinal plants, cosmetic, anti acne

DO-02

Bioactivity of *Dacryodes rostrata* a pinkish fruit from East Kalimantan

Harlinda Kuspradini , Anindya Marsabella Rosiarto, Irawan Wijaya Kusuma

Faculty of Forestry, Universitas Mulawarman. Jl. Ki Hajar Dewantara, PO Box 1013, Gunung Kelua, Samarinda Ulu, Samarinda-75123, East Kalimantan, Indonesia. Tel./Fax.: +62-541-749160. email: alinkuspra@gmail.com

The pinkish shades of *Dacryodes rostrata* fruit were extracted with 2 different solvents, 1% HCl-ethanol and ethanol. These extracts were then screened for Total Phenolic Content (TPC), Total Flavonoid Content (TFC), Total Anthocyanin Content (TAC). The TPC, TFC, and TAC were determined by Follin-Ciocalteu, AlCl₃ and the pH method, respectively. Antioxidant activity was measured through diphenyl-1-picrylhydrazyl assay. The obtained result was analyzed and compared to commercial standard. The TPC, TFC, TAC from 1% HCl-ethanol extracts were 647.21 mg gallic acid equivalent (GAE), 1,082.71 mg catechin equivalent (CE) and 14.78 mg cyanidin-3-glucosyde equivalent (CGE) per 100 g dry weight sample, respectively. The TPC, TFC, TAC from ethanol extracts were 775.72 mg gallic acid equivalent (GAE), 982.58 mg catechin equivalent (CE) and 14.28 mg cyanidin-3-glucosyde equivalent (CGE) per 100 g dry weight sample, respectively. The IC₅₀ of antioxidant value from 1% HCl-ethanol extracts (37.36 µg/mL) were lower than ethanol extracts (123.08 µg/mL). No toxicities were found in the 1% HCl-ethanol extracts and ethanol extracts.

Antioxidant, *Dacryodes rostrata*, fruit, toxicity

DO-03

Medicinal plants used by the Atinggola healers in North Gorontalo, Indonesia

Novri Y. Kandowangko¹, C.J. Lamangantjo¹, H. Hasan², R. Adam³, R. Yunus⁴

¹Department Biology, Faculty of Mathematics and Natural Sciences, Universitas Negeri Gorontalo. Jl. Jendral Sudirman No. 6 Kota Gorontalo, Gorontalo Province, Indonesia, Tel. +62-435-821125, Fax. +62-435-821752. email: novri1968@gmail.com

²Jurusan Farmasi, Fakultas Ilmu Kesehatan, Universitas Negeri Gorontalo

³Dinas Kesehatan, Kabupaten Gorontalo Utara, Provinsi Gorontalo

⁴Jurusan Sejarah, Fakultas Ilmu Sosial, Universitas Negeri Gorontalo. Jln. Jenderal Sudirman 6, Kota Gorontalo, 96128, Indonesia

The present study was done to determine the medicinal plants used by traditional healers of the Atinggola Community in the North Gorontalo, Gorontalo, Sulawesi. Data has been collected by survey method, and analyzed using the descriptive qualitative method. Based on this study, it was shown that there were 42 species (25 families) medicinal plants that can be used to cure diseases by the healers, comprising of 13 species used to cure fever, 2 species to treat toothache, 2 species to treat malaria, 6 species for the treatment of urinary stone disease, 3 species to treat gastrointestinal diseases, 2 species to treat liver disease, 1 species to treat tonsillitis, 1 species for treating cancer, 1 species for treat in allergies, 2 species to treat skin diseases (ulcers), 2 species to treat cough, 1 species to treat eye irritation, 1 to treat wound infections, 2 species of thrush, 2 species to restore power, 1 species of snake poison antidote. For example, to treat fever disease, healers (*sarampah*) use *Jatropha curcas* L., *Averrhoa carambola* L., *Averrhoa bilimbi* L., *Zingiber purpureum* Roxb., *Euodia redlevi*, and *Flueggea leucopyrus*. On the other hand, to treat toothaches use *Acalypha indica* and *Hyptis capitata*. Furthermore *Imperata cylindrica* and *Centella asiatica* were used for the urinary stone disease treatment. *Physalis peruviana* was also used for treating diabetes. Unidentified species of Cyperaceae called *diata* in local name, was used to cure cancer. These medicinal plants were mostly used by boiling, squeeze, and scrape to the part where it will be cured. Most of those species used for medicinal plant are still collected from the forest (23 species, 54.76%) and 19 species (45.24%) collected from cultivated plant. To preserve those species collected sustainably, it is necessary to propagate the species which is harvested from the forest.

Atinggola community, medicinal plant

Bioscience

EO-01

Anoa Breeding Centre's role in the conservation and breeding Anoa in North Sulawesi

Anita Mayasari

Research and Development of Environment and Forestry Agency of Manado. Jl. Raya Adipura Kima Atas Mapanget, PO Box 1390, Manado 95119, North Sulawesi, Indonesia. Tel.: +62-851 00666683, Fax. +62-431-3666683, email: anita.mayasari11@gmail.com

Dwarf buffalo or anoa (*Bubalus spp.*) is a species of wildlife where estimated that only 2,500 individuals. Dwarf buffalo is solitary life and will meet during estrus period, so that breeding in the wild is very limited by their estrus period and the chance encounter of male and female. Anoa Breeding Centre (ABC) plays a role in the effort through captive breeding. F3 will be released back to nature by BKSDA, and as F2. ABC has been conducting since 2012, began of enclosure management, feed management, marriage management and management of pregnancy and childbirth. Until now, ABC has two males and four females are ready to mate. ABC has successfully mated 2 females as naturally and has been pregnant. ABC has their special facilities such as veterinarians, health infrastructure, tiny and large enclosures, gardens feed, and the means of observation infrastructures using CCTV. ABC has been a study site for students of bachelor and master programs. ABC sincerely hope there will be support from all walks of life in conservation efforts anoa

Anoa, breeding, conservation, dwarf buffalo, role

EO-02

Optimization introduction of gene GEN MmCuZn-SOD to sugarcane (*Saccharum officinarum*) through *Agrobacterium tumefaciens*

Fitri Damayanti¹, Suharsono², Utut Widyastuti², Ika Mariska³

¹Department of Biology, Universitas Indraprasta PGRI. Jl. Nangka 58, South Jakarta, Indonesia. *email: fitridamayantineng@gmail.com

²Department of Biology, Faculty of Mathematics and Natural Sciences, Institut Pertanian Bogor. Kampus IPB Darmaga, Jl. Raya Darmaga Bogor 16680, West Java, Indonesia

³Indonesian Center for Agricultural Biotechnology & Genetic Resources, Jl. Tentara Pelajar No. 4A, Bogor, West Java, Indonesia

The majority of Indonesia's land area including acid soils with high level acidity (low pH) and the highest concentration of Al, which reached the level of toxicity. The main problem is the absence of varieties (genotypes) of sugarcane (*Saccharum officinarum*) that is adaptive to the acidic soil. Therefore, efforts to obtain genotypes of sugarcane that can adapt to acidic conditions of environmental stress is very important. The most effective approach and promising to apply is the technology of recombinant DNA by inserting the gene tolerant acid soil that MmCuZn-SOD gene using *Agrobacterium tumefaciens* into embryogenic callus of sugarcane. This study was conducted to determine and co-cultivation to produce transgenic of sugarcane that carry SOD genes from *Melastoma malabatricum* (MmCuZn-SOD). Two level of A. tumefaciens OD600 (0.2 and 0.4), four duration of inoculation (10, 20, 30 and 40 minutes) and two periods of co-cultivation (3 and 6 days) were tested. The result of

selection transformed callus on selection media showed that the percentage of survival of callus on OD600 0.2 and 0.4 were quite low where the percentage of callus necrosis up to 90% when compared to non-transgenic callus. Regeneration efficiency of callus was lower than the non-transgenic control.

Agrobacterium tumefaciens, MmCuZn-SOD, sugarcane, co-cultivation, optic density

EO-03

Nutrient content of Liquid Organic Fertilizer (POC) by various bio-activator and soaking time

Ince Raden¹, S. Syarief Fathillah¹, M. Fadli¹, Suyadi²

¹ Faculty of Agriculture, Universitas Kutai Kartanegara, East Kaimantan, Indonesia. Jl. Gunung Kombeng, No. 27, Tenggarong, 75513, East Kaimantan, Indonesia. *email: irad_unikarta@yahoo.com

²Department of Agrotechnology, Faculty of Agriculture, Universitas Mulawarman. Jl. Paser Balengkong, Gunung Kelua, Samarinda Ulu, Samarinda-75123, East Kalimantan, Indonesia. email: suyadisumokaryo@gmail.com

Inorganic fertilizers have negative impacts on soil structure, causing water and soil pollution, and less healthy in crop production. These conditions can be improved with organic fertilizers. The research aimed to make liquid organic fertilizer (POC) treated with various bio-activator and soaking time and to know the nutritional content in it as well. Observed variables were pH; C/N ratio; macro and micro nutrients. Research used a completely randomized design in factorial analysis. The first factor was the various bio-activator (b), i.e. b1 = EM-4 culture; b2 = boisca; and b3 = shrimp paste. The second factor was soaking time (t), i.e. t1 = 10 days; t2 = 20 days; t3 = 30 days; and t4 = 40 days. The treatment was repeated (r) three times and tested by analysis of variance and LSD at 5% level. The results showed that culture of EM4 bio-activator had higher content values of C/N ratio; organic C; total-N; Co; B; Mn; Fe; Cu; and Zn than the other bio-activators, although it also had lower content values of pH, P2O5; K2O than others but those values were not significantly different compared to boisca and shrimp paste bio-activators. The other result showed that soaking time had significantly effect in determining the nutrient content of the C/N ratio; C-Organic; N-Total; P2O5 ; K2O; Ca-Total; Mg; S; Co; B; Mn; Fe; Cu; and Zn, but not at pH variable. Soaking time of 40 days (t4) provided the highest value on the C/N ratio; pH; Mn; Fe; and Zn. On the other hand, soaking time of 30 days (t3) provided the highest value on the C-organic; K2O; Ca-total; and B. Meanwhile, soaking time of 20 days (t2) provided the highest nutrient values on Cu; Co; B; Mg; and N-total. While, soaking time of 10 days (t1) gave the highest value on the nutrient content of P2O5 and S. The interaction between the various bio-activator and soaking time b3t3 had the highest value 575.41 ppm of B, then treatment b2t3 had the highest 0.89% of K2O, and treatment b1t4 gave the highest nutrient content 1648.82 ppm of Fe.

Bio-activator, EM4, Boisca, shrimp paste, macro and micro nutrients

EO-04

A new note of the flowering phase on the seedling of *Sarcotheca macrophylla* Blume

Inggit Puji Astuti, Siti Nurfadilah, Maman Suratman

Center for Plant Conservation-Bogor Botanic Gardens, Indonesian Institute of Sciences, Jl. Ir. H.Juanda No. 13, P.O. Box 309 Bogor 16003, West Java, Indonesia. Tel./fax.: +62-251-8322187. email: inggit_pa@yahoo.com

Sarcotheca macrophylla Blume is a small tree up to 15 mm tall, it's a Borneo endemic plant, growth in West, Center and East Kalimantan. It is growing in primer and secondary forest at 0-200 m about sea level. Generally, it grows in a long the river, side of the road, and the open areas. In Temula village, Nyuatan Subdistrict, West Kutai District, East Kalimantan Province, this plant has been usage especially the fruit as shampoo and the leaves as a material for traditional ceremony by Dayak community. While the extract of the roots was usage as a contraception. The information about *Sarcotheca macrophylla* is very limited, only some information about taxonomy, ecology and the usage. So, another study such as germination of seeds, seedling developing and flowering phase must be conducted. We observed to done seeds germination, with observed parameter were seeds viability and developing of the seedling. We were sowing 25 seeds and planted 3 seedlings from the wild. The seeds viability is 92% and the developing of seedling are good. When some seedling from the seed germination 7, 8, 9, 10 and 11 month age, they success to produce the flower. This condition is an anomaly because know more information about when this plant for the first time produce flower.

Flowering phase, New Note, *Sarcotheca macrophylla*

EO-05

Massive micropropagation technology of two local genotypes of chili pepper (*Capsicum annuum*) from West Sumatra, Indonesia

Jamsari¹, Renfiyeni², Lily Syukriani³, Alfi Asben³

Department of Molecular Breeding, Faculty of Agriculture, Universitas Andalas. Kampus Unand Limau Manih, Padang 25163, West Sumatra, Indonesia. Tel. +62-751-72773, Fax.: +62-751-72702, email: ajamsari@yahoo.com

Faculty of Agriculture, Universitas Mahaputra Muhammad Yamin, Solok, West Sumatra, Indonesia

Department of Agricultural Product Technology, Faculty of Agricultural Technology, Universitas Andalas, Padang, Indonesia

Massive micropropagation for producing identical genetic clones is necessary for research in genetic engineering and development of experimental design. Such necessity is also met during improvement of genetic resistance of some

local chilli peppers (*Capsicum annuum* L.) against some important diseases. Thus, this approach needs an established regeneration system for calli preparation as well as transformant regeneration. Since in most cases that this is genotype dependent especially for some local genotypes, we optimized media for calli induction, shoot and root regeneration of our two local genotypes ie: Kampung and Kopay. Media combinations basically were composed of MS and combined with some growth factor substances for instance IAA, BAP, NAA and TDZ with different combinations for each calli induction, shoot and root regeneration. All medium compositions were supplemented with 30 g/L sucrose. The best medium for calli induction was MS media supplemented with 4 mg/L BAP, 0.5 mg/L IAA and L2 vitamin (Thiamin-HCl and Pyrodoxine-HCl). While the best medium for shoot induction and elongation was MS supplemented with 1mg/L BAP, 5 mg/L AgNO₃, 2 mg/L GA₃, 2 mg/L Calcium Pantotenat and L2 vitamin. Furthermore, the best medium for root induction and elongation was WPM (Woody Plant Medium) supplemented with 0.4 mg/L NAA. Thus, this finding should provide optimal medium for calli induction and shoot-root regeneration for our two local genotypes Kampung and Kopay.

Capsicum annuum, local genotype, massive micropropagation, shoot and root regeneration, genotype dependent

EO-06

Current progress on development of certified potato seed production in West Nusa Tenggara

Aluh Nikmatullah, Ermayanti, Mardiah, Irwan Muthahanas, Muhammad Sarjan

Faculty of Agriculture, Universitas Mataram. Jalan Majapahit 62, Mataram, West Nusa Tenggara, Indonesia. email: janjan62@gmail.com

Potato (*Solanum tuberosum* L.) is an increasingly important crops in Indonesia, partly due an increase in income, changes in consumption pattern, requirement for lower glucemic index foods, utilization of potato for industry as well as development of tourism industry. It is reported that annual areas of potato production in Indonesia is 76,000 hectares with annual demand for seed seed potato tuber is more than 110.000 tonnes. On the other hand, availability of adequate quality of certified seed potato tuber is only 10% if the annual demand. Therefore, it is an urgent need to increase seed potato tubers production in Indonesia through improvement of established seed potato production areas and establishment of newly potential areas, such as West Nusa Tenggara. In this presentation, current status of four years certified seed potato tuber development in West Nusa Tenggara will be reported. The certified seed potato tuber production was initiated in Sembalun areas in the hill of Rinjani Mountain which is Yellow Cyst Nematode free areas. Currently, development is extended to lower altitude areas of Timba Nuh (750 m above sea level) and Santong (450 m). This expansion requires adequate production

management and technology, including suitable selection of potato varieties, micro-climate modification, plantation technology, insect and disease management which will be discussed in this paper.

Potato seed tuber, aeroponics, breeder seeds, commercial seeds, Sembalun

EO-07

The development of traditional land management through maintaining and enhancing soil macrofauna diversity on terrestrial agroecosystem

Laode Muhammad Harjoni Kilowasid, Namriah

Department of Agrotechnology, Faculty of Agriculture, Universitas Haluoleo. Jl. HEA Mokodompit, Anduonohu, Kendari, Southeast Sulawesi, Indonesia. Tel.: +62-401-3191692, Fax: +62-401-3191692, email: anamriah@gmail.com

The diversities of vegetation and soil macrofauna are used as sources of soil organic materials for traditional farmers' terrestrial-agroecosystems to sustain the productivity of local soil. Developing adapted land management practices to sustain and improve the soil quality of them needs socio-cultural, economical and ecological approaches. To address this, a study was conducted to find a method of maintaining and enhancing the diversity of soil macrofauna communities under different land management of local soil types. The integration of experimental research and participatory approach were used to evaluate the effect of the traditional land management by thoroughly burning organic materials and agricultural residues on soil surface which was compared to the smoothly scattered organic materials and residues on the surface of wite ngkahole (oxisol) and wite kaowea (entisol). The results showed that soil water availability in the smoothly scattered organic materials increased by 0.4%. The soil aeration increased significantly as indicated by the decreasing bulk density. As consequences soil macrofauna communities were more abundance in the soil with scattered soil organic matters. In conclusion, the smoothly scattered organic matters on the local soil surface could maintain and enhance the soil macrofauna diversity on terrestrial agroecosystem.

Sustainable land management; local soil knowledge; traditional farmer; soil macrofauna

EO-08

The growth rate of green kangkung (*Ipomoea aquatica*) exposed by heavy metals Pb and Cu

Novri Y Kandowangko¹, Ishak Isa²

¹Department Biology, Faculty of Mathematics and Natural Sciences, Universitas Negeri Gorontalo. Jl. Jendral Sudirman No. 6 Kota Gorontalo, Gorontalo Province, Indonesia, Tel. +62-435-821125, Fax. +62-435-821752. email: novri1968@gmail.com

²Department of Chemistry Education, Faculty of Mathematics and Natural

Sciences, Universitas Negeri Gorontalo. Jl. Jendral Sudirman No. 6 Kota Gorontalo, Gorontalo Province, Indonesia

The purpose of this study was to determine the growth rate of green kangkung (*Ipomoea aquatic* Forks), which is exposed to heavy metals Pb and Cu in a contact time of 7, 14, 21, and 28 days. Heavy metal concentrations used were 40 ppm Pb and 35 ppm Cu. The method used is an experimental method. Parameters measured were growth rates and dry weight of green kangkung, which is exposed to heavy metals Pb and Cu. Data on growth rates and dry weight of plants were analyzed descriptively. The results showed that: (i) Green kangkung that exposed to heavy metals Pb and Cu has a different growth rate; (ii) The growth rate of green kangkung that exposed to heavy metals Pb increased until 14 days after application, and then declined. On the contrary, the growth rate of plants exposed to heavy metals Cu tends to fluctuate, the observations on 7-14 days and 21-28 days after the application has increased the growth rate. But on the observation of 14-21 days after application has declined the growth rate.

Copper, growth rate, *Ipomoea aquatica*, lead

EO-09

Nutritional composition of some wild mushrooms consumed by indigenous people around the Lore Lindu National Park, Central Sulawesi, Indonesia

Yusran Yusran¹, Erniwati Erniwati², Akhmad Khumaidi²

¹ Department of Forestry, Faculty of Forestry, Universitas Tadulako, Palu 94118, Central Sulawesi, Indonesia. email: yusran_ysrn@yahoo.ca

² Department of Pharmacy, Faculty of Mathematic and Natural Sciences, Universitas Tadulako, Palu 94118, Central Sulawesi, Indonesia

Lore Lindu National Park is one of the most important protection area in Central Sulawesi, Indonesia. We investigated the diversity of mushrooms belonging to the class Basidiomycetes at some different sites in this area; primary forest, secondary forest, agroforestry and scrub jungles. A total number of 147 species of mushrooms were collected from all study sites. Some mushroom species were classified to edible mushrooms. This study provides the nutritional qualities of some wild mushrooms (*Auricularia* sp., *Auricularia auricular-judae*, *Termitomyces* sp., *Lentinus* sp, *Pleurotus ostreatus*, *Schizophyllum* sp, *Agaricus subrutilescens*, *Boletus* sp.) commonly consumed by the indigenous people around The Lore Lindu National Park, Central Sulawesi, Indonesia. Atomic absorption spectrophotometry was used to determine the mineral element composition, while the proximate composition of the mushroom flours was determined by proximate analysis method. The differences in proximate composition, minerals and protein fractions between the uncooked and cooked samples of mushrooms were assessed by t-test. The results showed that all the tested samples contained appreciable amount of essential

nutrients and proteins. The results on a dry weight (mg/kg) basis demonstrated that all the tested mushroom samples shows significant amount of macro and micronutrients ranging from N, P, K, Ca, S, and Na, respectively between cooked and uncooked mushroom samples. The pH, total protein and proximate composition of mushroom samples were also significantly influenced by cooking process. This study demonstrated that cooked and uncooked mushrooms were endowed with potential nutritional principles. From the present study, further research is required for commercial cultivation and evaluation bioactive compounds of different parts of these mushrooms

Composition, indigenous people, Lore Lindu National Park, nutrition, wild mushrooms

EP-01

Profile of aromatic plant: *Actinodaphne glomerata*

Harlinda Kuspradini, Farida Fitriani Purba, Irawan Wijaya Kusuma

Faculty of Forestry, Universitas Mulawarman. Jl. Ki Hajar Dewantara, PO Box 1013, Gunung Kelua, Samarinda Ulu, Samarinda-75123, East Kalimantan, Indonesia. Tel./Fax: +62-541-749160. email: alinkuspra@gmail.com

The chemical and bioactivity profile of *Actinodaphne glomerata* leaves oil were established to investigate its potential uses. The essential oil was evaluated for physical and chemical characteristic such as color, yield, refractive index and solubility in ethanol. *A. glomerata* has a light yellow color and 0.23% yield. The refractive index value and ratio of oil and ethanol were 1.42 and 1: 1.2, respectively. Twenty three compounds of *A. glomerata* leaves oil were identified by gas chromatography. The main compounds were linoleic acid chloride, -sitosterol and spathulenol. The oil of *A. glomerata* was effective to inhibit the microorganisms such as *Candida albicans* and *Staphylococcus aureus* at 1% concentration.

Actinodaphne glomerata, composition, essential oil

EP-02

Seed germination and seedling growth of *Chiococca javanica* (Rubiaceae) in relation to fruit maturation and media growth

R. Subekti Purwantoro

Center for Plant Conservation-Bogor Botanic Gardens, Indonesian Institute of Sciences. Jl. Ir. H.Juanda No. 13, P.O. Box 309 Bogor 16003, West Java, Indonesia. Tel./fax.: +62-251-8322187. email: subekti27@yahoo.com

Chiococca javanica is a plant has ornamental potential. Seed extracted from fruits harvested at the plant were classified according to maturity stage: Unripen-yellow; Ripen-reddish; and Over ripen-red black color and seed germination were done in two germination media: sand and

rice husk. The statistical approach was a randomized complete block design with three replications. Analysis of variance indicated that the seed of *C. javanica* from ripen and over ripen fruit stages were higher significant $P < 0.05$ on germination capacity, speed of germination, mean germination time, mean daily germination, peak value and germination value to seed from yellow fruits. The effect of growing media showed higher germination capacity significant different in sand than in rice husk, similarly mean daily germination in sand higher than in rice husk. The all seedling growth parameters showed significantly different on number of leave, shoot lengths, diameter of seedlings, number of roots, roots length, fresh weight and dry weight of plants to unripen fruit stages.

Chiococca javanica, seed germination, seedling growth

EP-03

Study of biological fertilizer and inorganic fertilizers use on the growth and yield of soybean in Pandeglang District, Banten

Resmayeti Purba

Banten Assessment Institute for Agricultural Technology. Jl.Raya Ciptayasa Km 01 Ciruas, Serang 42182, Banten, Indonesia. email: resmayeti63@yahoo.com

Effective utilization of biological fertilizer not only can save the use of anorganic fertilizers, but also have positive impact on the improvement of ecosystem balance and supporting environmentally friendly farming. The purpose of this experiment is to study the use of biological fertilizers Agrimeth and Gliocompost on the growth and yield of soybean. The assessment was conducted in the central areas of soybean production area in dry land at Cisereheun village, Cigeulis Subdistrict, Pandeglang District, Banten Province. Randomized Block Design (RBD), which consists of 5 treatments with 6 replications using treatment plots about 140m². The treatment being studied is as follows: (A). 50 kg/ha of urea + 50 kg/ha SP-36 + 150/ha kg NPK Phonska, (B) Agrimeth + 25% (50 kg/ha of urea + 50 kg SP-36 + 150 kg/ha NPK Phonska, (C). 50% (Urea 50 kg/ha + 50 kg/ha SP-36 + 150 kg/ha NPK Phonska), (D) Gliocompost 25% (50 kg/ha of urea + 50 kg/ha SP-36 + 150 kg/ha NPK Phonska), (E). Gliocompost (Urea 50 kg/ha + 50 kg/ha SP-36 + 150 kg/ha NPK Phonska). The study showed that the treatment of biological fertilizer Agrimeth + 50% (50 kg/ha urea + 50 kg/ha SP-36 + 150 kg/ha NPK Phonska) influence on plant growth and yield components of soybean. Soybeans fertilizing using biological fertilizers Agrimeth + 50% (50 kg/ha of urea + 50 kg/ha SP-36 + 150 kg/ha NPK Phonska) provide the highest result of plant height and number of pods, were able to increase soybean production about 20% and inorganic fertilizer efficiency about 50%.

Agrimeth, biofertilizer, growth, yield, soybean

EP-04**Factors influencing the adoption of rice paddy threshing machine “Power Thresher”: A case study of Serang District, Banten, Indonesia****Tian Mulyaqin¹, Ishii Keiichi²**

¹Banten Assessment Institute for Agricultural Technology. Jl.Raya Ciptayasa Km 01 Ciruas, Serang 42182, Banten, Indonesia. email: tian.mulyaqin@yahoo.com

²Graduate School of Agricultural Science Tohoku University. 1-1 Amamiya-machi, Tsutsumidori, Aoba-ku, Sendai, Miyagi, Japan

For ensuring national food security, main focus policy of Indonesia government is not only to increase rice production, but also to reduce harvest and post-harvest losses in order to safe rice production. Introducing and disseminating threshing machine such as powered-thresher to rice farmer is one of government effort to reduce yield losses and labor cost, especially on threshing stage. This paper examined the factors influencing the adoption of powered-thresher in rice production area in Serang District, Banten Province Indonesia. The data used in this study were collected mainly through an interview survey using structured questioner to 103 respondents, including 61

respondents as and 42 respondents as non-adopters of paddy's threshing machine. It was conducted in 4 (four) sub district (Ciruas, Lebak Wangi, Pontang, Tirtayasa) in Serang district area for first season of 2014/2015 cropping season with descriptive statistics and probit model as tool for data analysis. Empirical study shows that the significant factors influencing the adoption of power threshers positively are farm size and financial source, and the significant factors that influencing the adoption of power thresher negatively are the labor availability including the number of household member who working in farm and side job as a labor, and threshing cost. This is true in the case of non-adopter area where high labor availability prevents the use of power thresher because of the possibility of conflict due to labor displacement. However, dissemination information about the machine through agriculture extension activity by stakeholder (government, extension officer, farmers) to farmer as a user is the important factor to increase adoption of agriculture technology, especially this kind of threshing machine.

Powered-thresher, rice, yield loss, labor displacement, ex-situ collection, genetic resources, repository