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ABSTRACT

INTERNATIONAL CONFERENCE ON BIODIVERSITY

SOCIETY FOR INDONESIAN BIODIVERSITY

Yogyakarta, 19-20 March 2016

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Rice field in Nglanggeran, Baturagung Mts.; photo by: Irwan Julianur

ABSTRACT

INTERNATIONAL CONFERENCE ON BIODIVERSITY

SOCIETY FOR INDONESIAN BIODIVERSITY

Yogyakarta, 19-20 March 2016

THEME:

Agroecosystem Biodiversity: Managing Diversity in the Agricultural Landscape under Global Change

SECRETARIAT ADDRESS

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TIME SCHEDULE

International Conference on Biodiversity

Society for Indonesian Biodiversity (SIB)

Yogyakarta, Indonesia, 19-20 March 2016

TIME	ACTIVITIES	PERSON IN CHARGE	SITE
March 19, 2016			
08.00-09.00	**Registration**	Committee	Lobby
09.00-09.10	**Speech of the Committee**	Chairman of the committee	R1
09.10-09.20	**Opening speech**	Chairman of the society	R1
09.20-09.30	**Photo Session and Coffee Break**	Committee	R1, Lobby
09.30-11.00	**Panel 1** Prof. Dr. Sutarno Prof. Dr. Triwibowo Yuwono	Moderator	R1
11.00-12.30	**Panel 2** Prof. Dr. Johan Iskandar Dr. Jean W.H. Yong	Moderator	R1
12.30-13.30	**Rest, prayer, lunch** **Poster session**	Committee	Lobby
13.30-14.30	**Parallel presentation I**		
	Group 1: AO-01, AO-02, AO-03, AO-04, AO-05, AO-06	Moderator	R1
	Group 2: AO-07, AO-08, BO-01, BO-02, BO-03, BO-04	Moderator	R2
	Group 3: BO-05, BO-06, BO-07, BO-08, BO-09, BO-10	Moderator	R3
	Group 4: BO-11, BO-12, BO-13, BO-14, BO-15, BO-16	Moderator	R4
	Group 5: BO-17, BO-18, BO-19, BO-20, BO-21, BO-22	Moderator	R5
14.30-14.45	**Coffee Break**	Moderator	Lobby
14.45-15.45	**Parallel presentation II**		
	Group 6: CO-01, CO-02, CO-03, CO-04, CO-05	Moderator	R1
	Group 7: CO-06, CO-07, CO-08, CO-09, CO-10	Moderator	R2
	Group 8: CO-11, DO-01, DO-02, DO-03, EO-01	Moderator	R3
	Group 9: EO-02, EO-03, EO-04, EO-05, EO-06	Moderator	R4
	Group 10: EO-07, EO-08, EO-09, EO-10, EO-11, EO-12	Moderator	R5
15.45-16.00	**Closing speech and other explanations**	Chairman of the committee	R1

Upcoming events:

1. Seminar Nasional Masyarakat Biodiversitas Indonesia, Padang, Indonesia, 23 April 2016
2. International Conference on Biodiversity, Bandung, Indonesia, 28-29 May 2016

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International Conference on Biodiversity

Society for Indonesian Biodiversity (SIB)

Yogyakarta, Indonesia, 19-20 March 2016

Ethnobiology

Bioscience

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

results showed that callus of the samples were able to grow at 5-7 days after planting from different part of organ plants. The callus was then sub cultured and extracted using etanol. The etanolic extracts of callus of carrot and tomato were measured on their antioxidant activity using DPPH method. The IC_{50} etanolic extract of carrot was 1751.29 ± 4.00 mg/mL while etanolic extract of tomato was 620.56 ± 32.36 mg/mL. Cuersetin used as standard has IC_{50} value of 2,85mg/mL.

Antioxidant, carrot, callus, tomato

EO-12

Study of gamma irradiation on the creating of mutant of local rice mentik susu variety

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Rice (*Oryza sativa* L.) is the most important food crop in Indonesia. The problem is the unavailability of rice producing high quality and hight yield. The aim of research was to obtain rice mutant that producing higher yield and having short-lived. This study used gamma irradiation with 5 level which were: 100 gray (R1), 200 gray (R2), 300 gray (R3), 400 gray (R4) and 500 gray (R5). The experiment was conducted on agricultural land in the village Mojosongo, Boyolali District, Central Java in January to May 2014. Three plants which considered as mutants has been detected. The three plants producing 95 tiller more than control and having shorter lived 26 days less than control. Further research needs to be done for nex generations M2, M3, and M5 to observe the stability of mutant due to gamma irradiation to obtain the maximum results and production of rice mutant.

Local variety, Gamma irradiation, Mentik susu

EP-01

Expression of Wnt4 gene in the Swiss Webster mice uterus as candidate antigen for wildlife immunocontraception method

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Immunocontraception is a procedure to altere the conception in animal using immune system. The concept of immunocontraception can be delivered firstly by isolating and identifying protein or gene that significantly plays a role in one of the reproductive processes to be used as antigen. Some peptides have been developed as source of antigen, however, it does not give a satisfactory result. Wnt4 gene is a regulator of mammalian embryo implantation process could be develops as source of the antigen candidates in immunocontraception. The aim of this study is to find the expression of Wnt4 in Swiss Webster mouse uterine. Uterine were isolated from implantation site of mice at seven days gestational age, fixed in 4% paraformaldehyde, embedded in paraffin, and then sectioned at 7 µm for immunohistochemistry. The detection of Wnt4 gene expression was run by immunohistochemistry procedure using antibody anti-Wnt4 (Santa Cruz Ltd.). The result of this study shows that Wnt4 gene expression gives positive reaction to antibody anti Wnt4 almost of the uterine tissues. This study indicates that Wnt4 gene were present in the mouse uterus during implantation period of pregnancy. Overall the results of this study demonstrate that Wnt4 gene from Swiss Webster mice will be very beneficial as an antigen source in regulating fertility of wildlife.

Antigen, immunohistochemistry, Wnt4

EP-02

The influence of the media Limboto lake sediment on the growth of maize were inoculated arbuscular mycorrhizal

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Lake Limboto now be categorized as critical lake called the Sea are broad and deep decline. In 1932, the area of Lake Limboto of 7,000 hectares and a depth of 30 m, in 1962, was reduced to 4,250 ha breadth and depth of the lake is 10 m. In 2012, the area of the lake is estimated to be only 3,000 ha and depth of about 2 m. The thickness of the sediment/sludge in Lake Limboto estimated 3-5 m in the east, from 5.8 to 6.4 m along the north-west, from 8.8 to 10.2 m along the south side and 12.4 m in the middle of the lake. One effort to reduce the thickness of the sediments of Lake Limboto (Sedalim) is to dredge the sediment back into the media and use it to grow plants. However Sedalim, besides containing many nutrients carried by water runoff that comes from agricultural land, also contain toxic substances derived from household waste and small industry located around Lake Limboto. This study aims to determine the effect of arbuscular mycorrhiza on the growth of corn plants (*Zea mays* L.) grown on media which inoculated arbuscular mycorrhizal Sedalim. Research

THE INFLUENCE OF THE MEDIA LIMBOTO LAKE SEDIMENT ON THE GROWTH OF MAIZE (*Zea mays* L.) WERE INOCULATED ARBUSCULAR MYCORRHIZAL

NOVRI YOULA KANDOWANGKO*), JUSNA AHMAD, FUJIAWATI, ASNI SANTI PATILIMA

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ABSTRACT

Lake Limboto now categorized as critical of the lake has decreased spacious and depth. In 1932, the extent of 7,000 hectares and a depth of 30 m, in 1962, was reduced to 4,250 ha breadth and depth of the lake is 10 m. In 2012, the area of the lake is estimated to be only 3,000 ha and depth of about 2 m. The thickness of sediment in Lake Limboto estimated 3-5 m in the east, from 5.8 to 6.4 m along the north-west, from 8.8 to 10.2 m along the south side and 12.4 m in the middle of the lake. One effort to reduce the thickness of the sediments of Lake Limboto (Sedalim) is dredge the sediment back into the media and use it to grow plants.

This study aims to determine the effect of arbuscular mycorrhiza on the growth of maize plants inoculated arbuscular mycorrhizal media Limboto lake sediments. The study was conducted using the experimental method Design Group Random Design (RAK) consisting of four treatments: 0, 3.75, 7.5, 11:25 g / polybag arbuscular mycorrhizal inoculant, which is repeated four times. Data were analyzed using analysis of variance and analysis of plant growth such as the rate of plant growth (RPG) and Net assimilation rate (NAR).

The results showed that the arbuscular mycorrhizal inoculant effect on the growth of corn plants grown on media Limboto lake sediments. LAB value increased in line with increasing doses of arbuscular mycorrhizae, whereas the average value of LTT decline after planting 20-30 days after planting.

Keywords : Corn, arbuscular mycorrhizae, sediment, RPG, NAR.

INTRODUCTION

Limboto Lake is the largest natural lake in Gorontalo Province. This lake is the estuary of the four major rivers, namely S. Alo, S. Pohu, S. Biyonga, and S. Molalahu tipped in the district of Gorontalo and also into the estuary of the 23 other tributaries and drains drainage of paddy fields in the east, the north and west of the lake. From across the river is just a river that flows throughout the year, namely S. Biyonga, with a watershed area of 68 km2, which drain the water from the mountains in the north to the permanent springs, Sungai Alo - Molalahu with 348 km2 area along the streams and rivers Pohu 156 km2. The creeks drain rainwater quickly, so very little water is held as the basic flow of the land. In addition, the other is the water source for the lake Limboto is rainwater that falls directly into lakes and groundwater.

Data reported by JICA Study Team (2001) showed that the river Biyonga, Meluopo and Alo - Pohu is a river - the main river carrying sediment into the lake. Of the three rivers, streams Biyonga contributed 56% of the total sediment into the lake. Since long, Limboto Lake has become a source of fresh water at a time of life support and water system for the community on the banks of the river. This lake is a flood control for most of the surrounding area. Based on the role and function is very important, it can be said that the lake Limboto essential role for the balance of nature and ecosystems.

Lake Limboto now be categorized as critical funds has decreased spacious and depth. According to data Balihristi, Gorontalo (Year 2010), Limboto Lake area in 1932 is 7,000 hectares and has a depth of 30 m, in 1962, was reduced to 4,250 ha breadth and depth of the lake is 10 m. Currently the area of the lake is estimated to be only 3,000 ha and depth of about 2 m.

The thickness of the sediment / sludge in Lake Limboto estimated 3-5 m in the east, from 5.8 to 6.4 m along the north-west, from 8.8 to 10.2 m along the south side and 12.4 m in the middle of the lake (Kusumawati , 2006)

The decrease in the breadth and depth of the lake Limboto partly due to the pollution and sedimentation of streams and domestic sewage population control land around the lake, good for agriculture and settlement activities.

Source sediments of Lake Limboto allegedly came from the destruction of forests / deforestation and agricultural land in the form of solid waste and other debris from the river and domestic waste. The amount of sediment floating (suspended load) ranges from 33 mg / l at low flow up to 1100 mg / l at high flow. (CIDA, 1996). Sedimentation in Lake Limboto also supplied from the river bottom sediment transport (bed load) during the flood, which also led to the river bank many landslides. In addition, there are organic sediments, including bacteria phytoplankton, zooplankton, macrophyte detritus and dirt that comes from fish and some invertebrates.

From a biophysical standpoint, the main problem Limboto Lake is primarily concerned with the flow surface (run off) derived from each parcel of land in the watershed Limboto. Runoff that flows into the rivers and into lakes with carrying sediment eroded which makes the lake became shallow, bringing nutrients from agricultural areas that are suspected to cause enrichment of minerals so hyacinth thrive and carry waste from households and industry the opportunity to make the lake water is polluted. Similarly a certain moment, the flow rate exceeded the carrying capacity of the lake surface causing flooding (Polontalo, S. 2010)

Various efforts have been made by the government and the community to tackle the problems of Lake Limboto, but the results have not been able to restore the function and role as a guardian Limboto lake and the natural balance of the ecosystem in the area around Lake Limboto. For that effort dredging sludge / sediments of Lake Limboto is important to help reduce the thickness of the sediment.

One effort to reduce the thickness of the sediments of Lake Limboto is to dredge the sediment back into the media and use it to grow plants. However, lake sediment Limboto, besides containing many nutrients carried by water runoff that comes from agricultural land, also contain toxic substances derived from household waste and small industry located around Lake Limboto.

The existence of the fertility status of this Limboto lake sediments provide opportunities utilization as a medium to grow plants with environmentally friendly agricultural technologies such as the use of arbuscular mycorrhizal inoculants.

Advantages plants with arbuscular mycorrhizal symbiosis is (1) a decrease in plant stress due to pathogen infection roots, low soil moisture, soil temperature is high, and other adverse factors; (2) increase the tolerance of crops to nutrient deficiency in poor soils and to acidity and toxicity of Al, Fe and Mn in acid soils (Sieverding, 1991; Abbott et al. 1992); (3) increased uptake and crop tolerance to the toxicity of Zn (Thompson, 1994), increased uptake of N and P for corn crop drought gripped (Kandowangko, N.Y. 2004).

To determine the effectiveness of the utilization of lake sediments Limboto as a medium to grow plants, it can be studied by measuring variables such as the rate of growth of plants (RGP) and net assimilation rate (NAR)plant. Gardner, et al (1991) suggest that the ability of plants to produce dry ingredients can be learned through the NAR and RGP average. NAR average is a measure of the increase in plant dry weight per unit of leaf area per unit time on average over a period of time, while RGP average was an increase in plant dry weight in the community of plants per unit area of land per unit time average during the period certain time.

This study aims to determine the effect on the rate of growth arbuscular mycorrhizal plants and net assimilation rate of corn plants grown on media lake Limboto sediments.

MATERIALS AND METHODS

This research was conducted in the greenhouse Department of Biology, Faculty Mathematic and Sciences, State University of Gorontalo. The material used is corn seed varieties Motoro (a local variety of Gorontalo to the age of the harvest 85-90 days), inoculant arbuscular mycorrhizal (Glomus manihotis) obtained from the Center for Research and Development of Biotechnology and genetic resources of agricultural Bogor, media lake sediments Limboto that taken on the outskirts of the south side, which is included in a polybag with size container 3 kg / polybag, while the tools used are: Balance, Oven, Ruler, polybag, Shovels, Camera, tool writing. This research used experimental methods to design a randomized block design (RAK) consisting of 4 treatments using mycorrhizal inoculant different doses: 0, 3.75, 7.5, 11:25 g / polybag. The whole treatment was repeated four

times. Observations and data retrieval is done every ten days until 50 days old plants. The parameters observed were RGP and NAR average. RGP average of ten daily is the average rate of increase in plant dry weight per unit area of land per ten daily, while NAR average of ten daily is the average rate of increase in plant dry weight per unit of leaf area per ten daily during the period of vegetative plants (Gardner, 1991), using the formula:

$$\overline{RGP} = \frac{1}{P} \times \frac{W_2 - W_1}{t_2 - t_1} \ (g\ m^2\ day^{-1})$$

$$\overline{NAR} = \frac{W_2 - W_1}{t_2 - t_1} \times \frac{\ln LA_2 - \ln LA_1}{LA_2 - LA_1} \ (g\ cm^2\ day^{-1})$$

Dimana :

W = Plant dry weight (g / plant) were measured after the plant samples were dried in an oven at a temperature of 70^0C until its weight is constant

LA = Leaf area (Cm2), the entire amount of leaf area measured within each corn plant by means of measurements using a thread that surrounds the periphery of leaves. After the measurement results yarn formed rectangular pattern and measure the length and width

t = waktu (hari)
time (day)

P = Total land area (cm2), in this case using the formula for the area tubes, assuming that already contains media polybag tubular sediment. Index 1 and 2 show the two samples in succession

Analysis of data using analysis of variance (F test) and a further test the smallest significant difference (LSD). Maintenance done by watering the plants according to crop needs.

RESULTS AND DISCUSSION

Table 1. Chemical and Physics Properties of sludge Limboto Lake on Gorontalo, Indonesia

Soil Variable	Value	Criteria*)
Pasir (%)	26.6	
Debu (%)	41	Clay Loam
Liat (%)	32.4	
pH H_2O	7.1	Neutral
C-organik (%)	2.07	sedang
N total (%)	0.25	Sedang Moderate
C/N ratio	8	rendah
P olsen (ppm)	77	Sangat tinggi
Mg (me/100 g)	3.6	Tinggi
K (me/100 g)	0,2	Rendah
Fe (%)	2.01	
Mn (72 ppm)	580.72	
Cu (ppm)	33.28	Sangat tinggi
Zn (ppm)	72.25	
Pb (ppm)	17.48	
Cd (ppm)	1.26	
Co (ppm)	10.95	

Remarks: *) Laboratorium tanah, Balai Penelitian Tanaman Obat dan Rempah, Bogor (2011)

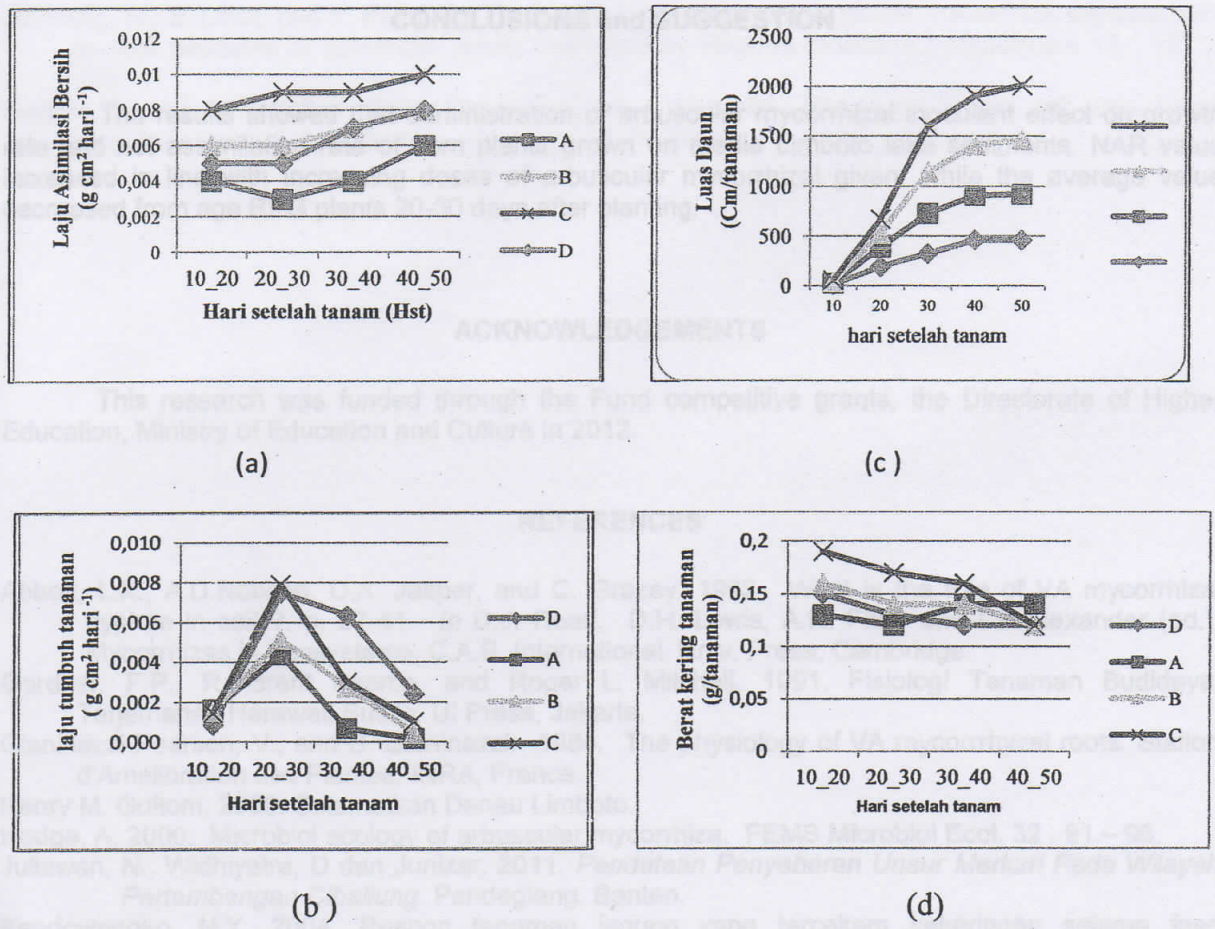

Figure 1. Curve net assimilation rate (a), plant growth rate (b), leaf area (c), and the dry weight (d) of the corn crop arbuscular mycorrhizal inoculated with varying doses.

From Figure 1 it appears that arbuscular mycorrhizal inoculation on maize grown on lake sediments media Limboto NAR and RPG effect on the average of the corn crop varieties Motoro. In the figure 1.a. it appears that corn plants with arbuscular mycorrhizal inoculation able to increase LAB average. NAR increase in the average of the plant to rise in line with the increasing dose of arbuscular mycorrhizal inoculation. It was also supported by data from the leaf area of maize (Figure 1.c). Instead RPG average corn crop, based on the image 1.b appear by the age of the plants 20-30 days after planting increased in accordance with the magnitude of the dose arbuscular mycorrhizal inoculation, but by the age of the plants 30 days after planting decreased average RPG.

Mycorrhizal Fungi is a form of microorganisms symbiotic relationship between fungi and roots. MA has the function of helping the absorption of nutrients for plants. Award MA in principle can increase plant growth due to the ability of the MA in expanding the root system through the formation of hyphae-hyphae lateral (Setiadi, 1992).

Based on the pictures 1.b. RPG turns out the average value began to decline at the age of 30 hst for all treatments. It is thought to be caused by the influence of a nutrient contained in lake sediments Limboto media, which turned out in addition to containing nutrients needed by plants, there are also nutrients that are toxic when excessive. For example the content of Cu (32.28 pm), where the threshold values for plant growth by only 2 ppm (Juliawan, et al., 2011). In addition, Limboto lake sediments also contain Mn (580.72 ppm), Cu (33.28 ppm), Zn (72.25 ppm), Pb (17.48 ppm), cadmium (1.26 ppm), Co (10.95 ppm). Where this nutrient for plants is a micronutrient that is needed in very small amounts.

The growth of maize plants was also supported by loose soil texture. It can not be fulfilled if only using media sediments. As it turns out the texture of the sediment contains silt and clay are quite high.

CONCLUSIONS and SUGGESTION

The results showed that administration of arbuscular mycorrhizal inoculant effect on growth rate and net assimilation rate of corn plants grown on media Limboto lake sediments. NAR value increased in line with increasing doses of arbuscular mycorrhizal given, while the average value decreased from age RPG plants 20-30 days after planting.

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INTERNATIONAL CONFERENCE ON BIODIVERSITY

Society for Indonesian Biodiversity

State University of Gorontalo & Sebelas Maret University

Gorontalo, Indonesia, August 20-21, 2016

Certificate of Appreciation

Awarded with thanks to:

Novri Youla Kandowangko

In recognition of his/her significant contribution as:

Presenter

of

International Conference on Biodiversity

Gorontalo, Indonesia, 21th August 2016

Prof. Dr. Sutarno, M.Sc., Ph.D.

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