Differences Of Basidiomycotina Types In Natural Forest Arboretum Gardens Unmul Samarinda

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Abstract: Forest of Unmul Samarinda Botanical Garden (KRUS) is one of the tropical rain forests in East Kalimantan that have diversity of flora and fauna of exotic species and also serves as a research tool, conservation of environment education place as natural recreation area (Ecotourism) (Anonymous , 2005). Especially in the Unmul Botanical Natural Forest Arboretum (KRUS) in this area has a high level of biodiversity is still very high but still at least the species of plants, animals, or fungi are identified in the area. Basidiomycotina Mushroom Difficulties Research in Natural Arboretum of Unmul Samarinda Botanic Garden was conducted from February to March 2015. Observation and data collection was done by transect method by plot ploting purposively. The study was conducted on 3 transects, in each transect made plot 2x2 m which laying based on the presence or absence of fungus (purposive). From the results of research, 54 species of Basidiomycotina mushroom consist of 10 tribes and 5 nations. The dominant species in Transect 1 are Marasmielus candidus and Clitocybula abudans, on Transect 2 Ganoderma applanatum, on Transect 3 Marasmielus candidus and Pleurotus pulmonarius. The dominant Basidiomycotina fungus species in the study area was Marasmielus candidus. Index of macroscopic mushroom diversity at research location 3,277 and evenness index 0.098 and index of dominance of 0.068.

Index Terms: Diversity, Basidiomycotina, Arboretrum, Natural Forest.

1 INTRODUCTION

FOREST of Unmul Samarinda Botanical Garden (KRUS) is one of the tropical rain forests in East Kalimantan that have diversity of flora and fauna of exotic species and also serves as a research tool, conservation of environment education place as natural recreation area (Ecotourism) (Anonymous , 2005). Especially in the Unmul Botanical Natural Forest Arboretum (KRUS) in this area has a high level of biodiversity is still very high but still at least the species of plants, animals, or fungi are identified in the area.. According Waluyanti (2008) Mushrooms in various diverse nature of both types of macroscopic and microscopic size. Fungus is an organism that plays an important role in the decomposer process so that the fungus can live saprofit on the remains of organisms and parasites in living organisms. One group of fungi belonging to the macroscopic fungus is the fungus of the Basidiomycotina division. Basidiomycotina is a type of fungus that has a variety of basidiocarp shapes, colors and sizes. Mushrooms from the division of Basidiomycotina is a fungus that grows naturally in the surrounding environment, whether in moist soil, logs / deadwood sticks, or on the pile of garbage. Of the various fungi Basidiomycotina that can be found there are profitable and there are harmful to humans. With an area of 300 ha, the initial vegetation of KRUS is a natural forest of Dipterocarpace. After experiencing fires in 1983, 1993 and 1998, KRUS vegetation became a young secondary forest leading to climax.

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KRUS area divided into 3 zones, namely:

1. Conservation Zone, which consists of
   a. Primary Forest Reserve (Prime Forest Reserve) with an area of 117 Ha.
   b. Original Arboretum species (indigeneous Species Arboretun), with an area of 16 Ha.
2. Collection Zone,
   a. Natural and Artificial Forest, for research (Natural and Artificial Forest for Research), with an area of 60 Ha.
   b. Precious wood forest (precious Word Arboretum), covering an area of 4 Ha
   c. Introduced species Arboretum, covering an area of 27 Ha.
3. Zone Recreation area of 60 Ha, one of the arealdi this zone is a flower garden of 3.5 Ha.

According to Campbell (2003) Basidiomycotina has 25,000 species of species, but until now the data on the biodiversity of the fungi Basidiomycotina in Indonesia is still very limited. Research on the existence of the fungus Basidiomycotina in Indonesia is also not widely done, including in the forests of East Kalimantan. One area that has the potential to have a high level of biodiversity is in the area of the Botanical Garden Unmul Samarinda (KRUS), especially in the area of natural forest arboretum. Therefore it is necessary to identify the diversity of Basidiomycotina fungi species contained in the natural forest arboretum so that it can add data and information about the existence of types of drying. Basidiomycotina on forest at Botanical Garden Unmul Samarinda (KRUS). Characteristics of Basiodiomycetes are, among others, mostly macroscopic, slightly microscopic. The basidium contains 2-4 basiodiospores, each of which has a common nucleus. Among Basiodiomycotina there is useful because it can be eaten, but many are also harmful because it destroys plants, wood and furniture (Dwidjoseputro, 1978). In addition the body of Basidiomycotina consists of hyphae that are insulated and clustered solid into a kind of tissue, and the fruit body protrudes from Ascomycotina. Misellium consists of hyphae and cells that are in one nucleus only at a certain stage there are two-core hyphae. Vegetative propagation with conidia. Generally there are no generative breeding tools, so it usually takes somatogamy. The woven hyphae that form supports the himenium called himenofore. Himenofore can be

in the form of rigi-rigi, lamella, board and thus become very wide surface of the himenium layer (Tjitrosoepomo, 1991).

2 MATERIALS AND METHODS

2.1 Time and Place of Study

The research was conducted from February to March 2012, at the Arboretum Natural Forest Botanical Garden of Mulawarman University of Samarinda (KRUS) and Biodiversity Laboratory of Faculty of Mathematics and Natural Sciences Mulawarman University of Samarinda.

2.2 Tools and Materials

The tool used in this research is as follows: raffia rope, wooden barrier, meter, digital camera, knife, tweezers, plastic bag, newsprint, hanging label, paper label, paper envelope, plastic tray, oven, clear glass bottle, , calculators and stationery. The materials used in this study are samples of Basidiomycotina fungi, 70% alcohol, sterile aquadest, and tissue.

2.3 Figures

All tables and figures will be processed as images. You need to embed the images in the paper itself. Please don't send the images as separate files.

2.4 Work procedures

Sampling method used in this research is transect method plot ploting done by purposive. From 16 ha the area of observation made 3 transects each along 100 m as the observation area. Each transect line with one another is spaced 20 m. In each transect line will then be made plot area of 2 x 2 m which is placed purposively and plot plot determined based on the presence or absence of mushroom. Analysis of Vegetation of Basidiomycotina Fungi. The analysis used is Magguran equation (1987), as follows:

1. Density (K)

$$K = \frac{\text{(Number of individuals of a species)}}{\text{(sample area)}}$$

$$KR = \frac{\text{(density of a type)}}{\text{(total density of all types)}} \times 100\%$$

2. Frequency (F)

$$F = \frac{\text{(Number of plots occupied by a type)}}{\text{(total plot)}}$$

$$FR = \frac{\text{(Frequency of a species)}}{\text{(Frequency of all species)}} \times 100\%$$

3. Important Value Index (INP)

INP = KR + FR Diversity Index

$$H' = -\Sigma \{(pi) \ln (pi)\}$$

Information :
H '= Shannon Index = Shannon diversity index
Pi = ni / N
n.i = number of individuals / species
N = Number of individuals of all species

3 RESULTS AND DISCUSSION

3.1 Results

Table 1.: *TYPES OF BASIDIOMYCOTINA FUNGUS FOUND ON EVERY TRANSECT IN NATURAL FOREST ARBORETUM BOTANICAL GARDEN UNMUL SAMARINDA*

No	Jenis	Family	Ordo	TR 1	TR 2	TR 3	∑ ind
1	*Lepiota citrodise*	**Lepiotaceae**	**Agaricales**	1(1)	-	-	1
2	*Agrocybe pedides*	**Bolbitiaceae**	**Bolatales**	1(1)	-	-	1
3	*Bolbitius reticulates*	"	"		1(1)	8(1)	9
4	*Conocybe tenera*	"	"		-	-	1
5	*Dentinum rapandum*	**Hydnaceae**	**Aphyllophorales**	4(2)	-	-	4
6	*Dentimun umblicatum*	"	"	4(1)	-	-	4
7	*Hydnum crisatum*	"	"	2(1)	-	-	2
8	*Phellodon confluens*	"	"	-	-	2(1)	2
9	*Phellodon melaleucus*	"	"	5(1)	5(1)	-	10
10	*Phellodon tomentosus*	"	"	-	-	3(1)	3
11	*Streum complicatum*	**Streaceae**	"	28(1)	-	-	28
12	*Streum ostracea*	"	"	-	4(1)	-	4
13	*Psilocybe castanella*	"	"	-	13(1)	22(2)	35
14	*Chanterellus calyculus*	**Chantharellaceae**	"	-	-	5(1)	5
15	*Psathyrella piluliformis*	**Coprinaceae**	"	1(1)	-	-	1
16	*Chondostreum purpereum*	**Polyporaceae**	"	1(1)	-	-	1
17	*Cerena unicolor*	"	"	-	-	7(1)	7
18	*Daedaleopsis confragusa*	"	"	-	-	4(1)	4
19	*Ganoderma applanatum*	"	"	-	27(2)	8(1)	35
20	*Gleophorus diserseus*	"	"	20(1)	10(1)	-	30
21	*Gloeophyllum sepiarium*	"	"	6(1)	26(2)	-	32
22	*Lenzites betulina*	"	"	-	17(1)	6(1)	23
23	*Oxyphorus populinus*	"	"	-	14(2)	-	14
24	*Phaeolus scweintzii*	"	"	-	7(1)	-	7
25	*Phellinus igniarius*	"	"	13(1)	2(1)	8(4)	23

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8	*Phellodon confluens*	"	"	-	-	2(1)	2
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14	*Chanterellus calyculus*	**Chantharellaceae**	"	-	-	5(1)	5
15	*Psathyrella piluliformis*	**Coprinaceae**	"	1(1)	-	-	1
16	*Chondostreum purpereum*	**Polyporaceae**	"	1(1)	-	-	1
17	*Cerena unicolor*	"	"	-	-	7(1)	7
18	*Daedaleopsis confragusa*	"	"	-	-	4(1)	4
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No	Jenis	Family	Ordo	TR 1	TR 2	TR 3	∑ ind
26	*Phellinus nigricans*	"	"	11(1)	-	-	11
27	*Phellinus pini*	"	"	7(1)	-	-	7
28	*Polyporus arcularius*	"	"	-	12(2)	5(1)	17
29	*Pycnoporus cinnaterus*	"	"	22(2)	-	-	22
30	*Schizophyllum commune*	"	"	-	5(1)	-	5
31	*Trametes hirsute*	"	"	-	-	8(1)	8
32	*Gaestrum saccatum*	**Lycorpedaceae**	**Lycorperdales**	15(2)	-	-	15
33	*Gaestrum triplex*	"	"	1(1)	-	-	1
34	*Lycorpedon perlatum*	"	"	1(1)	-	-	1
35	*Clitocybe diltate*	**Tricholomataceae**	**Tricholomatales**	-	-	6(1)	6
36	*Clitocybe houghtonii*	"	"	-	6(1)	-	6
37	*Clitocybulla abudans*	"	"	74(1)	-	-	74
38	*Collyba butyracea*	"	"	-	16(1)	-	16
39	*Collyba kueherena*	"	"	-	-	1(1)	1
40	*Lentinus tigrinus*	"	"	-	6(1)	2(1)	8
41	*Marasmielus candidus*	"	"	86(1)	8(1)	46(2)	140
42	*Marasmielus ramelialis*	"	"	6(1)	-	-	6
43	*Marasmius androsacceus*	"	"	8(1)	1(1)	-	9
44	*Marasmius pluvius*	"	"	-	-	1(1)	1
45	*Mycena leaiana*	"	"	-	21(1)	-	21
46	*Mycena metata*	"	"	-	-	6(1)	6
47	*Mycena viscidocruenta*	"	"	-	1(1)	-	1
48	*Pleurotus pulmonarius*	"	"	-	2(1)	35(3)	37
49	*Phyllotopsis nidulans*	"	"	-	4(1)	-	4
50	*Strobilurus albifatus*	"	"	-	-	4(1)	4
51	*Strobilurus trulisatus*	"	"	-	11(1)	2(1)	13
52	*Arcularia auricular*	**Tremellaceae**	**Tremellares**	24(1)	-	28(3)	52
53	*Dacromyces oviporus*	"	"	18(1)	-	-	18
54	*Dacrycopinax spatularia*	"	"	-	-	25(1)	25
	∑	**10**	**5**	**360**	**219**	**242**	**821**

Information:
- x): number of plots of individual discovery per transect
- Σind: the number of an individual on all transects
- TR: transect at the study site

3.2 Discussion

From the results of observations in the table above can be seen that the fungus Basidiomycotina found in natural forest arboretum Botanical Garden Unmul Samarinda quite varied. Pek Transek 1, there were 29 sample specimens consisting of 360 individuals (number of individuals of all types in Transect 1) which included in 25 species. In Transect 2, there were 28 specimen samples consisting of 219 individuals and grouped into 23 types and Transect 3 obtained as many as 33 specimen samples consisting of 242 individuals and grouped into 23 types. The total mushrooms obtained are 54 species of mushrooms consisting of 821 individuals belonging to 10 families and 5 orders.

The variety of Basidiomycotina mushroom species in each transect

In Transect 1 according to the vegetation analysis table, 25 species of fungi were found in 9 families: Bolbitiaceae family, Tremellaceae, Hydnaceae, Lycorpedaceae, Lepiotaceae, Coprinaceae, Streaceae, Tricholomataceae, and Polyporaceae. The types found with the highest percentage of individuals, Marasmiellus candidus and Clitocybula abudans. This is because the species Marasmiellus candidus and Clitocybula abudans are commonly found to grow on wet weathered wood substrate, and the type of wet plywood substrate is commonly found in a shaded environment type

and has a high degree of moisture. In Transect 1, environmental conditions tend to be very humid, the populations of the trees are dense and at least the intensity of the incoming sunlight, thus having the largest number of individuals compared to other transects due to the very humid conditions of the environment that support the growth of the fungus Basidiomycotina. The substrate type of the Basidiomycotina fungus found in Transect 1 is mostly in the litter, this is because the basidiomycotina fungus that grows in the litter is generally very easy to grow in areas that are protected from sunlight and high humidity conditions In Transect 2 in accordance with the vegetation analysis table, found 23 species included in 5 groups of families namely Bolbitiaceae, Tricholomataceae, Hydnaceae, Streaceae, And Poliporaceae. The type found with the highest percentage of individuals is Ganoderma applanatum. This is because the Ganoderma applanatum species are commonly found to grow on dried dead wood stump substrates, and the substrate type is commonly found in environmental types that are relatively low humidity and have considerable intensity of sunlight. In Transek 2, the environment is not too humid, much exposed to sunlight and the population of trees rarely makes the environmental conditions a bit drier than Transect 1 and Transect 3. The type of substrate of the fungus Basidiomycotina found in Transect 2 is mostly on tree trunks dry that has died. This is because the Basidiomycotina fungus that grows on dry stems of dead trees is generally easy to grow in areas that are exposed to sunlight and low humidity conditions. In Transect 3 according to the vegetation analysis table, 23 species were found in 7 family groups: Tremellaceae, Bolbitiaceae, Chantarellaceae, Tricholomataceae, Hydnaceae, Streaceae, and Poliporaceae. The largest number of individuals is the same as in Transek 1 of Marasmielus candidus and also the most other type of Pleurotus pulmonarius. This is because the Marasmielus candidus and Pleurotus pulmonarius species are commonly found to grow on wet or damp dead wood droplets, and the type of substrate is commonly found in environmental types that are relatively high moisture levels and are not exposed to such sunlight. In Transek 3 has environmental conditions with humidity levels that are not too moist and also not too dry. This is because the Transect 3 is exposed much to the sun, but because of the many tall trees overshadowing Transect 3 so that the environment conditions remain moist but not too humid like Transek 1 or too dry like Transek 2. The type of substrate from the fungus Basidiomycotina found in Transek 3 mostly in dead tree trunks and in the litter on the floor of the forest such as the stalks of dead trees and leaves, this is because Transect 3 has the type of environment suitable for Basidiomycotina fungi that grow on litter or deadwood stems . This is because the environmental conditions of Transect 3 are exposed to sunlight, but the humidity conditions are still very good because of the high trees that overshadow Transek 3, so the Basidiomycotina fungus species found in this transect. Differences in the number, size of mushrooms and types of Basidiomycotina fungi found in each transect due to the different environmental conditions in each transect. This is in accordance with opinion (Arora, 1996) that low temperature variations and high relative humidity will greatly affect the spreading of spores that will soon develop into fungal hyphae. The growth of misellium mushrooms will also grow rapidly in the dark / light and moist, but in the growth of the fruit body requires the existence of light stimulation. In places where there is no light of the fruit body can not grow, therefore the Basidiomycotina fungi in Transect 1 number more than Transect 2 and Transect 3, due to the environmental conditions that support the growth of mycotic mushrooms on the surface of the substrate, but due to the lack of sunlight required in the development of fruiting fruit body then Basidiomycotina fungus obtained in Transect 1 generally have a lot of colonies but small fruit body. In contrast to Transect 2 and Transect 3 which have environmental conditions with high levels of sun exposure so that the fungi Basidiomycotina grown in Transect 2 and Transect 3 generally have a large fruit body compared with the fungus Basidiomycotina grown on Transect 1. From the total data obtained by Transect 1, Transect 2 and Transect 3, the family of Basidiomyotina fungi is found most frequently in the natural forest arboretum of Unmul Samarinda Botanical Garden is from Tricholomataceae family group. This is because the Basidiomycotina fungi of the Tricholomataceae group generally require a cool temperature and high humidity. The natural forest arboretum of Unmul Samarinda Botanic Garden is classified in tropical rain forest, according to Arief (1994) tropical rain forests are formed by climax vegetation in areas with rainfall 2000-4000mm per year, with an average temperature of 25 ° C and average humidity air 80%. Tropical rain forest vegetation characteristic that has moisture and high availability of organic material, which is characteristic of habitat that support the growth of Basidiomycotina fungi from Tricholomataceae family group. According to the results of the calculation Index of arboretum natural forest diversity Unmul Samarinda Botanical Garden as a whole is included in the high category (H '> 3-4) is 3.272869. For Transect 1, the value of diversity 2,515, Transect 2 obtained the value of diversity 2,822 and Transect 3 got the value of diversity 2,601. So Transect 1, Transect 2 and Transect 3 are categorized by the level of diversity of the species into the medium category, while the Unbul Samarinda Natural Park's total arboretum natural forest diversity index is included in the high category. According to Barbour at al. (1987), this is closely related to the number of species found in each location, the higher the number of species the higher the index of species diversity. High species diversity is an indicator of the stability or stability of a growth environment. Based on the calculation of the evenness index in the natural forest arboretum of Unmul Samarinda Botanical Garden shows that the value is relatively homogeneous, ranging from 0.7-0.9 in Transect 1 obtained the fairness index of 0.847 in Transect 2 0.907 and on Transect 3 0.79, index kemerataan Mushroom Basidiomycotina on natural forest arboretum Botanical Garden Unmul samarinda obtained 0,097942. From result of calculation of vegetation analysis got value of dominance index as follows, at Transek 1 got value of dominance index equal to 0,12526, at Transek 2 got value of dominance index of 0.070716, at Transek 3 got value of dominance index equal to 0.0989979, and for dominance index value of mushroom Basidiomycotina at the natural forest arboretum of Unmul Samarinda Botanical Garden is 0.0679131. In Transek 1, the dominance index is low because it is in the range of 0.5-0.75, for Transect 2 the dominance index is included in the moderate class because it is in the range below 0.5 and for Transect 3 is included in the class of dominance index value high. For dominance index of Basidiomycotina mushroom on natural forest arboretum of Unmul Samarinda Botanical Garden, its dominance index is low at 0.0679131. the results of the index analysis dominance

is smaller than the index value of diversity and evenness this is because the dominance index is always inversely proportional to the index value of diversity and evenness. This is reinforced by Brower, J.E. and J.H. Zar, (1977) which states, dominance ranges from 0 to 1. If the index of dominance close to 0 means almost no individual dominates and is usually followed by a high diversity index. If the index of dominance is close to 1, there is one of the dominating genera and the diversity index value is smaller. So the index of dominance is inversely related to diversity and uniformity.

4 Conclusion

Based on the research conducted, it can be concluded:

1. Types of Basidiomycotina fungi contained in natural forest arboretum Botanical Garden Unmul Samarinda (KRUS) consists of 54 species belonging to 10 families, among others: Bolbitiaceae: 3 types; Tremellaceae: 3 types; Hydnaceae: 6 types; Lepiotaceae: 1 type; Lycorpedaceae: 3 types; Streaceae: 3 types; Coprinaceae: 1 type; Chantharellaceae: 1 type; Tricholomataceae: 17 species; Polyporaceae: 15 species.
2. Basidiomycotina fungi that dominate the natural forest arboretum of Unmul Samarinda Botanic Garden is Marasmielus candidus with dominance index value 0,029078, Clitocybulla abudans with value of dominance index 0,008123, and Arcularia auricular with value of dominance index 0,004011.

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