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Research Article

Identification of Mushroom Species Variety in Mekar Lestari Local Fruit Park

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Abstract

Mekar Lestari Local Fruit Park is a park managed by the Indonesian Center for Biodiversity Studies and Conservation. This park has a collection of local fruit plants located in Anjir Muara, Barito Kuala Regency. One of the potential organisms found in this area is fungi. The purpose of this study was to identify the types of fungi in the local fruit garden area "Mekar Lestari" using the exploration method with the selected sample technique. The data obtained were then analyzed by descriptive method. Based on the results of research that has been carried out in the forest in the local fruit garden area "Mekar Lestari" found 15 species of fungi namely *Arcyria cinerea, Calocera cornea, Daldinia concentrica, Marasmius siccus, Physarum polycephalum, Physarum album, Volvariella sp, Trametes sanguine, Trametes ochracea, Schizophyllum commune, Collybia cookie, Xylaria polymorpha, Scleroderma cepa, Auricularia sp, and Ductifera pululahuana*. The types of fungi found in this study are divided into 12 families and 13 genera. The environmental conditions of the study site were temperature 30.2-37.7 °C, air humidity 77.0-84.8%, light intensity 198-2460 lux and soil pH 6.3-7. The fungi found generally live on decaying wood and litter, and a small proportion live attached to trees.

Keywords: *Identification, natural fungi, diversity, local orchard*

1. Introduction

Mekar Lestari local fruit park is administratively located in Anjir Muara, Barito Kuala Regency, South Kalimantan. This terrestrial area, which is adjacent to the river, is very rich in the diversity of local fruit plants and other natural plant vegetation, including low-level plant diversity, one of which is fungi, because the environmental conditions in this area have humid air temperatures and the availability of supporting resources for fungal life, especially weathered wood, so that it can become a habitat for fungal life.

Fungi are single- or multi-celled eukaryotic organisms that lack chlorophyll. Because they do not have chlorophyll, fungi obtain food from other organisms (heterotrophs). Generally, fungi act as saprobes that break down berselolusa and lignin materials such as rotting wood. While parasitic fungi can cause disease in forest plants, and there are fungi that carry out symbiosis with plants, to expand the absorption area of water and minerals. Fungi have a very real influence on

forest food webs, tree survival or germination, forest growth and health (Molina et al., 2001).

The structure of the mushroom body consists of a hood / pylus which is supported by a stem / stape. The morphology of the fungus varies greatly, especially the shape of the hood/pileus, some are flat or rounded (Achmad et al., 2013). The reproductive structure is in the form of blades/gills located on the lower surface of the hood/pileus. Fungi are composed of microscopic threads called hyphae. A collection of hyphae will form a mycelium so that a fruiting body is formed. Mushroom cells have walls composed of chitin. The function of chitin gives shape and support to fungal cells.

The diversity of fungal species in a habitat can be quite high. However, the abundance of fungal species may still change. This is due to changes in climatic conditions that affect the growth of fungi. In the rainy season, the humidity of the air and substrate is higher than the dry season so that it can affect the growth of fungal spores. Fungal spores that are dormant during the dry season can immediately germinate and form fruiting bodies in the rainy season (Proborini, 2012).

Based on data from the field practicum of Ecology Tadris Biology UIN Antasari (2020), the local fruit garden area "Mekar Lestari" has an average temperature of 30.2-37.7 ° C with an average humidity of 77.0-84.8%, soil pH ranges from 6.3-7, light intensity ranges from 198-2460 lux. With these conditions, it allows fungi to live and multiply. According to Suriawiria (2001) mesophilic fungi are types that can grow at temperatures between 25-37 ° C with an optimum temperature of 30 ° C and in general fungi will grow well in humid air conditions.

Based on this description, the researcher was encouraged to conduct research with the title "Identification of Mushroom Species Variety in Mekar Lestari Local Fruit Park", with the hope that the results of this study will provide information on the variety of mushroom species and their role in the local fruit park area "Mekar Lestari" in Anjir Muara-Barito Kuala, South Kalimantan.

2. Material and Method

The method used in this research is descriptive research. Descriptive research to determine the diversity of fungal species and using data sampling techniques of fungal diversity found in the local fruit garden "Mekar Lestari" in Anjir Muara-Barito Kuala, South Kalimantan. This descriptive research was conducted when sampling fungal diversity data. This research was conducted using the cruising method (exploratory survey) and sampling with the selected sample method, based on the presence of fungi that are considered representative of the area, after which it was continued by recording individuals, collecting and documenting.

The exploration was carried out at the local fruit park "Mekar Lestari" along 100 meters. The steps in descriptive research are as follows:

The descriptive research preparation stage is make observations of research locations that are suitable for taking samples, namely in the local fruit park "Mekar Lestari". Determine the sampling location while preparing tools and materials that will be used in research.

The implementation stage of descriptive research includes the sample used is observation data obtained based on the results of exploring along 100 meters. Mushroom samples found then the characteristics of the mushrooms are described and identified using journals and websites.

Morphological data described are (Karmilasanti & Maharani, 2016):

1) Hood (cap, pileus): shape, color, surface, and hymenophore
2) Stalk (stem, stipe): color
3) Ring (annulus, cortina): presence or absence and shape.
4) Odor: weak, strong/sharp or odorless.
5) Substrate type

Figure 1. Sampling site (red line) of natural fungi in this study

3. Result and Discussion

3.1 Result

Based on the environmental conditions of the local fruit garden "Mekar Lestari", it has the potential to create a diversity of flora of various levels. One of them is the diversity of fungi or macrofungi found. This is because fungi naturally like humid environmental conditions. Fungi can grow in various types of ecosystems from arctic to tropical and some fungi show specific habitats (Asnah,

2010). The process of mushroom identification needs to be done to find out its role in an ecosystem that is beneficial to human life. The results of identification data obtained from the local fruit garden "Mekar Lestari" in Anjir Muara-Barito Kuala, South Kalimantan found 15 species of fungi. The mushrooms found consisted of 12 families and 13 genus and can be seen in table 1.

Table 1. Types of natural mushrooms at Mekar Lestari Local Fruit Park

No	Family	Genus	Spesies	Habitat
1	Arcyriaceae	Arcyria	*Arcyria cinerea* (Bull.) Pers.	Weathered wood
2	Dacrymycetaceae	Calocera	*Calocera cornea* (Batsch) Fr.	Weathered wood
3	Hypoxylaceae	Daldinia	*Daldinia concentrica*	Weathered wood
4	Marasmiaceae	Marasmius	*Marasmius siccus* (Schwein.) Fr.	Leaf litter
5	Physaraceae	Physarum	*Physarum polycephalum*	Weathered wood
			Physarum album	Weathered wood
6	Pluteaceae	Volvariella	*Volvariella* sp	Bark wood
7	Polyporaceae	Trametes	*Trametes sanguine* (L.) Lloyd	Weathered wood
			Trametes ochracea (Pers.) Gilb. & Ryvarden	Weathered wood
8	Schizophyllaceae	Schizophyllum	*Schizophyllum commune*	Weathered wood
9	Tricholomataceae	Collybia	*Collybia cookie* (Bres.) J.D. Arnold	Leaf litter
10	Xylariaceae	Xylaria	*Xylaria polymorpha*	Weathered wood
11	Sclerodermataceae	Scleroderma	*Scleroderma cepa*	Leaf litter
12	Auriculariaceae	Auricularia	*Auricularia* sp	Bark wood
		Ductifera	*Ductifera pululahuana*	Weathered wood

The characteristics of the mushrooms studied in the local fruit garden "Mekar Lestari" are morphologically clearly different. These characteristics can be seen from the color of the fungus, the shape of the hood, having a lamella or porus and also the substrate where the fungus grows. The morphological differences of the fungi found can be seen in Figure 2.

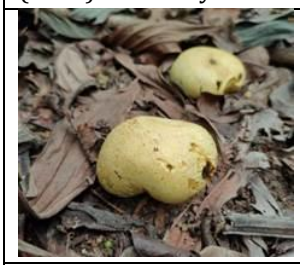
			
Arcyria cinerea (Bull.) Pers.	*Calocera cornea* (Batsch) Fr.	*Daldinia concentrica*	*Marasmius siccus* (Schwein.) Fr.
			
Physarum polycephalum	*Physarum album*	*Volvariella* sp	*Trametes sanguine* (L.) Lloyd
			
Trametes ochracea (Pers.) Gilb. & Ryvarden	*Schizophyllum commune*	*Collybia cookie* (Bres.) J.D. Arnold	*Xylaria polymorpha*
			
Scleroderma cepa	*Auricularia* sp	*Ductifera pululahuana*	

Figure 2. Variety of natural mushroom species at Mekar Lestari Local Fruit Park

3.2 Discussion

Calocera cornea mushroom is known as "Jelly Mushroom" because it has a chewy texture or etymologically called "waxy horn". The yellow fruiting body resembles a horn. It is 3 mm wide and 1.6 cm high (Emberger et al., 2008). Appears in clusters after rain in the form of slippery, cylindrical fruiting bodies with rounded or slightly sharp tips. Shrinks in dry weather with orange discoloration. Generally, this fungus grows in forests with pine and pine trees Angiosperms (Steve et al., 2009). The mushroom is a saproba on the bark of dead hard trees, because its striking color can be used as a decoration on certain occasions, for example salad and food decoration.

Daldinia concentrica mushroom fruiting bodies are reddish-brown and dense, with age turning black, dry, and less dense. The fruiting body is attached to the host wood which has a large and flat area. Irregularly shaped it looks like a hemisphere, has a hard texture and is an inedible fungus. The diameter of the fruiting body ranges from about 2-7 cm. The inner fruiting body has a concentric gray and black layer which is characteristic of the *Daldinia concentrica* species (O'Reilly, 2016). Saprobic fungi on decaying wood, a food source for some beetle species such as *Biphyllus lunatus* that feed on the fruiting bodies of the fungus.

Marasmius siccus is known as the "Orange Pinwheel Mushroom". It appears in large clusters after rain and shrivels after drying, and rehydrates quickly when wet. The mushroom has a "beach umbrella" shaped hood/pileus with a fine and very thin structure. The hood/pileus has white gills, grooved and thin gills. The stem/stape is straight, long, and slender with a pale shiny top and a reddish brown bottom. Saprobes on leaf litter and hardwood chips, and belongs to the white weathering fungi.

Physarum polycephalum is known as "multi-headed slime" because it resembles slime. The fungus is in the form of sticky mesh-like threads, yellow in color, and several centimeters long. It looks like a common stain/dirt. The fungus is very sensitive to light, so it can remove slime and inhibit spore growth (Stempen et al., 1994). It grows in shady, cold, moist areas, such as decaying leaves and logs. One of the easiest eukaryotic microbes to grow in culture, and has been used as a model organism for many studies involving amoeboid movement and cell motility.

Physarum album is a slime mold with a total size of 1-1.5 mm. There are those that grow upright and nodding. Round egg-shaped (subglobose). Forms a concave underneath, 0.4-0.7 mm wide. The fruiting body is white, grayish white, or lime color. The stalk of the fungus is subulate/scaly and elongated. Gray to yellowish in color. Grows in groups, looking like white chalky grains in dense clusters. Grows on the surface of dead fungi and decaying wood. Saprobial on larger fungi and forest wood chips.

Volvariella sp mushrooms grow in clusters. Hoods are white-brown, with a pale central area. Blades are attached to the stem, white to pink in color. The stem tapers gradually to the apex and the base is wrapped by thick volva, the texture of the volva is smooth and white, the volva is 2-6 cm long. *Volvariella* sp mushrooms have a fleshy texture with an uncharacteristic aroma. *Volvariella* sp fungus grows in the crevices of woody tree trunks. *Volvariella* sp fungus is utilized as a food ingredient and has many health benefits. The fungus prevents lack of blood, as an anti-toxin, cancer and lowers high blood pressure.

Trametes sanguinea mushroom is called "Red Mushroom" because of its red color character. The fruiting body of the mushroom can grow individually or in groups, sometimes overlapping. The hood/pileus is red/bright orange in color. Some characteristics of the hood/pileus besides the color is its texture. The

hood/pileus appears smooth, rough, or corky. The edges of the hood/pileus display a faded color transition. It has a hard texture that is not edible. *Trametes sanguinea* can tolerate the desiccating effects of salt in mangrove forests so it can grow there. It grows on dead or decaying wood (Wunderle et al., 2019). The *Trametes sanguinea* fungus is a white rotting fungus and a saproba on dead wood, as well as a plant pathogen that infects *Mangifera indica* trees.

Trametes ochracea fungus has a thin fruiting body on the inside and is coarse-textured. The fungus grows attached in a rosette on the substrate by overlapping and layering to form larger clusters. The mushroom has a characteristic ochre or brownish orange color on the surface of the hood. The surface of the hood is semicircular with dark concentric zones. The underside of the hood of the *Trametes ochracea* mushroom has round pores. The mushroom has no distinctive aroma or flavor. With a hard texture it is difficult to consume. Unlike the *Trametes versicolor* mushroom which varies greatly in color, *Trametes ochracea* is much more consistent in its color appearance. *Trametes ochracea* mushroom grows on fallen hardwood trees and dies of decay. *Trametes ochracea* saprobes on dead hardwood trees and is a white rotting fungus.

Schizophyllum commune has wavy blades/gills that resemble a Chinese fan. The color of the blades/gills varies from creamy yellow to off-white. The fruiting body of *Schizophyllum commune* is small, 1-5 cm wide with a dense yet spongy texture. The blades/gills that produce basidiospores on their surface, split as the fungus dries. The split blades/gills are elongated and they curve backwards to protect the fertile surface. This is the only fungus known to be capable of movement. The stem/type of *Schizophyllum commune* is very short and often not visible above the substrate surface.

Collybia cookei grows in clusters. The fruiting bodies are small with a whitish color. The hood of *Collybia cookei* has a diameter of 9 mm. The mushroom hood is convex/hemispheric (convex/half round) when young, and becomes flat when old. The surface of the hood is smooth and whitish in color, with a brownish center. The blades are attached to the stem or adnate (stick straight), with a whitish color. The stem of the mushroom is slender and 6 cm long with a diameter of 1-2 mm. The stem is whitish in color. At the base of the mushroom stem, embedded in the substrate is a small yellowish-brown tuber/sclerotium measuring 6 mm long. The sclerotium is round to almond-shaped to irregular, and its surface is often wrinkled and hollow. *Collybia cookei* has no distinctive odor and is inedible (Bessette et al., 2007). Saprobes on decaying fungal remains or on humus or decaying wood (Desjardin et al., 2014).

The fungus *Xylaria polymorpha* is also called "dead man's finger". Polymorpha means "many forms". As the name suggests, it has highly variable fruiting bodies. The mushroom is usually shaped more or less like a stick, with rounded ends. When young it is pale in color (often bluish), with whitish tips. By

summer, the mushroom starts to blacken, and reaches maturity. Often these mushrooms are found with many separate "digits" but sometimes individual parts will fuse together. A fungus that lives on decaying hardwood stumps and trunks, usually at or near the base of the stump. A fungus that causes softwood decay.

Scleroderma cepa fungus, also called "globe", has a spherical to slightly flattened fruiting body with a diameter of 6-10 cm. The outer surface of the fruiting body is yellow to yellow-brown with a scale-like surface. Embedded in the soil by a sturdy stalk. Not edible. Lives in small groups in grasses, along paths, and under various trees. ectomycorrhizal fungi used as soil inoculants in agriculture and horticulture.

Auricularia sp fungus has fruiting bodies attached to decaying logs in wet and damp places. When fresh it looks like wet jelly and when dried it becomes shrunken. The fruiting body is wavy and irregular, shaped like an irregular ear. The surface of the mushroom is brown to reddish brown, the texture of the flesh is thin, gelatinous-spongy. The upper surface is velvety and the lower part is shiny smooth. The entire mushroom fruiting body becomes hard and black when it dries. Lives saprobially on hardwood logs, logs, and decaying stumps.

The fungus *Ductifera pululahuana* grows on decaying hardwood logs, and appears to be one of the fungal species forming clusters to decay fallen trees. The fungus is a cluster of white, jelly-like blobs that grow to form an open brain-like structure. Individual blobs are about 3 cm in diameter, irregularly shaped with thick flesh. Older mushrooms may change color to yellowish, brownish, or even pink to purplish.

Conclusion

Based on the results of the research conducted, 15 species of fungi were found, namely *Arcyria cinerea, Calocera cornea, Daldinia concentrica, Marasmius siccus, Physarum polycephalum, Physarum album, Volvariella sp, Trametes sanguine, Trametes ochracea, Schizophyllum commune, Collybia cookie, Xylaria polymorpha, Scleroderma cepa, Auricularia sp*, and *Ductifera pululahuana*. The types of fungi found in this study were divided into 12 families and 13 genera. The environmental conditions of the study site were temperature 30.2-37.7 °C, air humidity 77.0-84.8%, light intensity 198-2460 lux and soil pH 6.3-7. The fungi were found to generally live on decaying wood and litter, and a small portion lived attached to trees.

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