

MACROFUNGI DIVERSITY IN MOUNT PANDAN ECOTOURISM AREA, ACEH TAMIANG

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Abstract. [Macrofungi are fungi that can be seen with the naked eye. Its characteristics can be seen based on its structure and body shape. Generally, fungi live in various types of habitats, namely wood, soil, litter, animal waste and so on. This research was conducted on 8-9 June 2022 in the Ecotourism area of Gunung Pandan, Aceh Tamiang Regency, Aceh Province. Determining the sampling point was carried out by the path method by observing macroscopic fungi along the hiking trail at a distance of 10 meters to the right and 10 meters. The most numerous macroscopic fungi, living solitary and these fungi were found in the Basidiomycota division, with 11 species and the least in the Thallophyta division, Eumycetes class, with 1 species.]

Keyword: Macrofungi, habitat, Ecotourism of Mount Pandan.

Abstrak. [Jamur makroskopis adalah jamur yang dapat dilihat dengan kasat mata. Karakteristiknya dapat dilihat berdasarkan struktur dan bentuk tubuhnya. Umumnya jamur hidup di berbagai tipe habitat yaitu kayu, tanah, serasah, kotoran hewan dan sebagainya. Penelitian ini dilakukan pada tanggal 8-9 Juni 2022 di kawasan Ekowisata Gunung Pandan Kabupaten Aceh Tamiang, Provinsi Aceh. Penentuan titik pengambilan sampel dilakukan dengan metode jalur dengan mengamati jamur makroskopis di sepanjang jalur pendakian dengan jarak 10 meter ke kanan dan 10 meter. Jamur makroskopis yang paling banyak, hidup soliter dan jamur ini ditemukan di divisi Basidiomycota, sebanyak 11 spesies dan paling sedikit pada divisi Thallophyta kelas Eumycetes sebanyak 1 spesies.]

Kata Kunci: Macrofungi, habitat, Ecotourism of Mount Pandan.

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1 Introduction

Macroscopic fungi have an important role in the decomposition process of forest litter. Fungi can decompose the complex organic matter contained within and into a very simple element that is

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easily absorbed and utilized by other organisms [1]. Fungi are organisms that do not have chlorophyll, these species have different sizes and shapes and have an important role for the life of other living things [2]. Macroscopic mushrooms are those that can be seen with the naked eye. Its characteristics can be seen based on the structure and shape of the body. Macroscopic mushroom morphology has varied body colors, namely brown, red, light orange, olive, white, yellowish white, green, gray and black. Macroscopic mushrooms have fruiting body shapes such as fans, kidneys, semicircles, trumpets and umbrellas [3].

Generally, fungi live in various types of habitat, namely wood, soil, litter, animal waste and so on. Forests are a type of ecosystem where mushrooms can grow, because forests have a high humidity level so that fungi can easily adapt [4]. In addition, macroscopic fungal groups significantly influence forest food webs, survival or germination of saplings, tree growth, and overall forest health. Thus, the presence of macroscopic fungi is an important component in a volatile forest community [5].

Mount Pandan is one of the bathing attractions located in Tenggulun District, Selamat Village, Pandan Hamlet, Aceh Tamiang Regency, Aceh Province. Aceh Tamiang is a district that includes the administrative area of Aceh province and is directly adjacent to the province of North Sumatra. Based on the law of the Republic of Indonesia number 4 of 2002 with an area of 1,957.02 km², and consists of 12 sub-districts. the physical condition of Aceh Tamiang district is mostly lowland areas and only a small part is hilly areas. Lowlands and gently sloping areas are often found on the coast, the elevation of the area between sub-districts is quite varied, ranging from 20-700 m above sea level with a slope of between 8-25% [6]. The Mount Pandan tourist attraction itself was only opened in 2006. Even though the Mount Pandan Bathing object is relatively new, the attraction of Mount Pandan is no less than other tourist attractions that first existed in Aceh Tamiang Regency. Evidenced by the large number of tourists from various regions who come to this bathing attraction. The purpose of this research is to identify macroscopic types. Mushrooms and Knowing the Habitat of Macroscopic Fungi in the Mount Pandan area, Aceh Tamiang Regency.

2 Methods

This research was conducted on June 8-9 2022 in the Gunung Pandan Ecotourism area, Aceh Tamiang Regency, Aceh Province. Sampling points were determined using the path method by observing macroscopic fungi along the hiking trail at a distance of 10 meters to the right and 10 meters. meters to the left along the hiking trail. The mushrooms obtained during the observation were then seen at the coordinate points of the mushrooms obtained, the coordinate points were taken in each area where the mushrooms were found. The specimens of fungi (mushrooms) found were then documented using a cellphone camera.

Observations include places where mushrooms grow, namely litter, dead branches, weathered wood and live trees. The number of types of mushrooms found were recorded and the characteristics of the mushrooms such as color, shape and body size of the mushrooms found were to identify the type of fungus. Each type of mushroom was photographed and a representative of that type was taken to make a specimen.

Samples were observed based on color, pores, volva, hood, stalks and habitat/substrate (dead wood, dead wood, live wood, soil, feels like leaves/soil or rocks). Mushroom samples found were photographed based on where they grew. Mushroom samples taken, namely for soft mushrooms, were taken with the substrate so that all parts of the mushroom were taken and not cut. Whereas for mushrooms whose texture is hard and sticky, harvesting mushrooms using a knife can also be done by cutting the substrate thinly. The mushroom samples are put into plastic containing 70% alcohol and labeled hanging [7]. The section title use 12 pt, bold, Times, title case with 6 pt spacing to the body text. The first letter of section title is capitalized and headings are numbered in Arabic numerals. The organization of the manuscript includes Introduction, Methods, Results and Analysis, Conclusion and References. Acknowledgement (if any) is written after Conclusion and before References and not numbered. The use of subheadings is discouraged.

3 Result and Discussion

Based on the observations that have been made, 12 types of macroscopic fungi from 2 divisions, 2 classes, 5 orders, 7 families, 11 genera and 12 species can be seen in Table 1.

Table 1. Types of Macroscopic Fungi in the Gunung Pandan Ecotourism Area

No	Divisio	Class	Ordo	Family	Genus	Species
1.	Basidiomycota	Agaricomycetes	Agaricales	Physalacriaceae	<i>Armillaria</i>	<i>Armillaria mellea</i>
2.	Basidiomycota	Agaricomycetes	Agaricales	Mycenaceae	<i>Mycena</i>	<i>Mycena epipterigia</i>
3.	Basidiomycota	Agaricomycetes	Agaricales	Tricholomataceae	<i>Delicatula</i>	<i>Delicatula integrella</i>
4.	Basidiomycota	Agaricomycetes	Agaricales	Hygrophoraceae	<i>Hygrocybe</i>	<i>Hygrocybe conica</i>
5.	Basidiomycota	Agaricomycetes	Agaricales	Marasmiaceae	<i>Marasmius</i>	<i>Marasmius candidus</i>
6.	Basidiomycota	Agaricomycetes	Hymenochetales	Hymenochaetaceae	<i>Hymenocheta</i>	<i>Hymenocheta sp.</i>
7.	Basidiomycota	Agaricomycetes	Poliporal	Polyporaceae	<i>Lentinus</i>	<i>Lentinus strigosus</i>
8.	Basidiomycota	Agaricomycetes	Poliporal	Polyporaceae	<i>Trametes</i>	<i>Trametes pubescens</i>
9.	Basidiomycota	Agaricomycetes	Poliporal	Polyporaceae	<i>Trametes</i>	<i>Trametes versicolor</i>
10.	Basidiomycota	Agaricomycetes	Poliporal	Polyporaceae	<i>Pycnoporus</i>	<i>Pycnoporus coccineus</i>
11.	Basidiomycota	Agaricomycetes	Russulales	Stereaceae	<i>Stereo</i>	<i>Stereo ostrea</i>
12.	Thallophyta	Eumycetes	Hymenochetales	Polyporaceae	<i>Ganoderma</i>	<i>Ganoderma applanatum</i>

The most numerous branch macroscopic fungi, living solitary and these fungi are found in the Basidiomycota division, totaling 11 species and at least 1 species in the Eumycetes class Thallophyta division (Table 1). In this case, [8] explained that the most common types of macroscopic fungi were found from the basidiomycota division. The characteristics of the basidiomycota division are macroscopic, while members of the ascomycota division are

microscopic and only a small proportion are macroscopic or have fruiting bodies. Based on macroscopic mushroom observations that have been carried out in the Gunung Pandan ecotourism area, Tenggulun Aceh Tamiang sub-district, we get the types of mushrooms as shown in Figure 1. Below:



Figure 1. (1) *Armillaria mellea* (2) *Mycena epipterigia* (3) *Delicatula integrella* (4) *Hygrocybe conica* (5) *Marasmius candidus* (6) *Hymenocheta sp.* (7) *Lentinus strigosus* (8) *Trametes pubescens* (9) *Trametes versicolor* (10) *Pycnoporus coccineus* (11) *Stereo ostrea* (12) *Ganoderma applanatum*

4 Description of Macroscopic Fungi

The characteristics of macroscopic fungi found in Gunung Pandan Ecotourism are as follows

1. *Armillaria mellea*

Habitat : Dead wood twigs

Description: The mushroom *Armillaria mellea* has a convex cap at first but later becomes flat with a raised central umbo. It has a golden yellow color and fades to a yellowish or brownish, small brown scales lying in very moist areas. Smooth cap fungus and trees with high canopy surfaces with curved cap edges. The white lamellae initially change color to yellow-brown with

age, the lamellae are attached to the stem. The stalk of the fruit body is the same at the top, but tapers towards the base due to the clustered growth pattern, light brown color and smooth surface [9]. This mushroom has a height of 2 cm, grows on dead wood trees in groups.

2. *Mycena epiptergia*

Habitat : On the ground (between rumout and moss)

Description: *Mycena epiptergia* is a species of fungus in the family *Mycenaceae*. *Mycena epiptergia* has a hood shaped like an umbrella, concave, or has a bulge in the middle of the hood, with an average size of 1.4-2.5 cm. The surface of the cap is smooth and has closely spaced, medium or sparse lamellae. White to cream in color. The stalk is cylindrical, 0.5-3.8 cm long. Attaches to soil, leaves, and weathered wood. The *Mycenaceae* family is identical with the characteristics of having a hood that is clearly visible and striking in color, on the upper surface of the hood there is a brown center point. Fungi live in colonies on weathered wood, live in damp and shaded places. Most of these mushrooms have umbrella-shaped fruiting bodies (pileus), hymenophores forming lamellae or boards with hymenium layers on both sides. Most of these fungi live as saprophytes and a small proportion as parasites. Some of them are edible, but some are poisonous.

3. *Delicatula integralla*

Habitat : Moist dead stems and leaves

Description: The species *Delicatula integralla* has an umbrella-shaped hood measuring 0.3 cm. the surface of the smooth hood is white to cream. The lamellae are spaced apart. Stems slender cylindrical with a length of 1.8 cm translucent white. Has rhizomorphs. Attaches to stems and dead leaves. *Delicatula integralla* is a species from the *Tricholomataceae* family. Some mushrooms from this group are edible, but some are deadly with gray and grayish brown characteristics.

4. *Hygrocybe conica*

Habitat : in humus moist soil, weathered wood

Description : *Hygrocybe conica* hood mushroom with a diameter of 1-5 cm, blunt cone-shaped, smooth, moist and shiny surface, reddish-orange in color and some are brownish red especially in the middle, the hymenium layer (gill) is soft, waxy, white, then gray and black when mature. Stem 4-10 cm high, there is a yellowish hole in the middle. *Hygrocybe conica* mushroom habitat in moist, humus soil, weathered wood. Living solitary or in groups, this mushroom cannot be consumed because it is toxic. 126 The fungus *Hygrocybe conica* was found at stations 2 and 3.

5. *Marasmius candidus*

Habitat: weathered wood or twigs

Description: The cap of *Maramius candidus* is 0.6-2.5 cm in size, convex with a slight concavity in the middle, the surface of the cap is moist, transparent white in color, the fruiting body is soft. Hymenium layer (gill) is white, stalk height 0.5-3 cm. Oval in shape, smooth surface. The habitat of this *Maramius candidus* mushroom is on weathered wood or twigs. Living in clusters, the color of the white and transparent fruit body is the hallmark of this mushroom.

Maramius candidus is a mushroom from the Marasmiaceae family. [10] Marasmiaceae family belongs to wood-destroying fungi, most of which stick to living trees. The characteristics of this fungus are having perennial or annual basidiomas. The surface of the pileus is hard, crusty, serrated, or grooved like skin. [11] Stated that this family has more adaptability to the mountainous environment and is supported by high humidity in mountainous areas which are suitable as habitat for this family. The genus *Marasmius* has a hood like an umbrella with a size ranging from 0.3-2.7 cm. The surface of the hood is smooth, with tenuous lamellae. The dominant color is brownish, the stalk is cylindrical and slender with a length of between 0.6-2.8 cm. This genus is mostly attached to the substrate in the form of leaves and lampk branches, and grows on the ground.

6. *Hymenocheta* sp.

Habitat: weathered wood

Description: *Hymenocheta* sp. It is a species of the Hymenochaetaceae family. The Hymenochaetaceae family has a rigid shape with a gray color on the surface and a light gray color on the fruit body which can turn black and expand when the mushroom is old. Mushrooms in this family are up to 40 cm wide and 20 cm thick. This fungus is a parasite that lives in trees, for example, in trees of the *Salix* species. The type of mushroom from the Hymenochaetaceae family that was found was from the genus *Phellinus*, had a circular cap with a size of 21 cm, the upper surface had a hard texture and was black in color. On the lower surface has white pores. Usually grows on weathered wood.

7. *Lentinus strigosus*

Habitat: weathered woody trees

Description: The mushroom *Lentinus strigosus* has a funnel-shaped hood with brownish hair, sometimes purplish pink and has lamellae that point towards the middle of the stalk. The *Lentinus strigosus* mushroom is a saprophytic mushroom that usually grows from spring to autumn. This mushroom is a fungus that can be eaten even though it has a slightly bitter taste. 132 The fungus *Lentinus strigosus* is usually found on weathered woody trees.

8. *Trametes pubescens*

Habitat: weathered wood

Description: *Trametes pubescens* has a fruiting body 3-7 cm in diameter. Curved, superfine upper surface with zones of color variation, sessile and porous lamellae form. The habitat of this fungus

is on weathered wood, living alone or in small groups. Live all seasons. This mushroom cannot be consumed because the texture of the fruit body is hard or tough.

9. *Trametes versicolor*

Habitat: weathered trees and litter

Description: This mushroom is shaped like a fan, its characteristic feature is circular lines like year circles with different colors. The fruit body of this mushroom is brownish-black in the middle and brownish-white on the edges. [12] This mushroom has a variety of colors, the top is yellowish white, gray, and brown. Environmental conditions other than temperature and humidity that affect the growth of wood fungus is the degree of acidity. Wood mushrooms can grow in acidic environmental conditions. [13] The pH required for wood mushrooms is 7, but there are fungi that can grow below a pH of 5.5. Habitat for wood mushrooms is usually on weathered trees and litter soil [14].

10. *Pycnoporus coccineus*

Habitat: on hard weathered wood

Description : *Pycnoporus coccineus* is a species of fungus from the Polyporaceae family. The Polyporaceae family has characteristics, the basidiocarp can [15]. This mushroom form (carpophore) is hard, sessile rigid. Diameter 2-12 cm, circular, elongated or fan-like shape, smooth, hairy, wrinkled surface, bright orange to red orange, and the old seedlings fade. The sporophore is the same color as the surface. Spores measuring 5-6 x 2-2.5 microns, elliptical, smooth. Edibility : not edible. Habitat: solitary or clustered on hard weathered wood.

11. *Stereum ostrea*

Habitat: tree bark

Description: *Stereum ostrea* also called false turkey tail and golden curtain crust which is a basidiomycete fungus in the genus *Stereum*. It is a plant pathogen and wood rotting fungus. The name *ostrea* comes from the word 'oyster', describing the shape. With concentric circles of many colors, it closely resembles *Trametes versicolor*, turkey tail, and is thus called 'false turkey tail'. Stemless fruiting bodies are shell-like and grow 1–7 cm (0.39–2.76 in) high. It's hard and inedible. Grows on tree bark. This mushroom is native to North America, where it is widespread and grows all year round.

12. *Ganoderma applanatum*

Habitat: weathered wood

Description : *Ganoderma applanatum* grows/attaches from the base of a stem or root on a living or dead tree. In addition, there are other species of *Ganoderma* whose pileus is attached directly to the tree. Because the growth medium is in wood/trees, the fungus enters the "lignicolous" fungus. The *applanatum* fungus is a wood rot fungus. This mushroom has a semicircular fruiting body with a diameter of 10 cm, a hard and stiff texture with a thickness of 1.5 cm, and on the

upper side it has radial lines with a reddish brown color on the fruit body and the lower side has a hymen in the form of pores. small. It does not have a fruit stalk, so it directly attaches to the substrate and lives alone by clinging to dead trees [16].

Ganoderma mushrooms are found all over the world (tropical regions). The body of the Ganoderma mushroom is hard and quite large, and the pileus (cap) can reach more than 60 cm in diameter. The color of Ganoderma pileus varies, some of which can be white, yellow, brown, red, or dark purple, light in color. Pileus in each Ganoderma species has a color pattern that varies depending on age and environmental conditions. Several species of them have a shiny and shiny appearance of pileus [17].

5. Conclusion

Based on the observations made, 12 types of macroscopic fungi were obtained from 2 divisions, 2 classes, 5 orders, 7 families, 11 genera and 12 species. Most of the fungal species found are from the Polyporaceae family, of which there are 5 species including: *Lentinus strigosus*, *Trametes pubescens*, *Trametes versicolor*, *Pycnoporus coccineus* and *Ganoderma applanatum*.

6. Reference

- [1] S.T. Nuhamara, H. Solle & F. Klau, “Keanekaragaman Jamur di Cagar Alam Gunung Mutis Kabupaten Timor Tengah Utara, Nusa Tenggara Timur”, *Jurnal Biota*, vol. 2, no. 3. Pp. 105-110. 2017
- [2] L. Waretno, “*inventarisasi jamur makroskopis di PT perkebunan nusantara III perkebunan karet sarang giting Dolok Masihul*”. Skripsi, Fakultas Biologi Universitas Medan Area, Medan. 2017.
- [3] K. Rahma, M. Nursalmi & H. Muslich, *Karakteristik Jamur Makroskopis di Perkebunan Kelapa Sawit Kecamatan Meureubo Aceh Barat*. Prosiding Seminar Nasional Biotik. 157-164. 2018
- [4] I. Annisa, A. E. Hanna & Wahdina, “Keanekaragaman Jenis Jamur Makroskopis di Arboretum Sylva Universtas Tanjungpura”, *Jurnal Hutan Lestari*, vol. 5, no. 4, pp.969-977. 2017.
- [5] R. Molina, D. Pilz, J. Smith, S. Dunham, T. Dreisbach, T. O’Dell, dan M. Castellano, *Conservation and Management of Forest Fungi in The Pacific Northwestern United States: An Integrated Ecosystem Approach*, 2001. Cambridge University Press. Cambridge.
- [6] Badan Pusat Statistik, *Aceh Dalam Angka*, Aceh, 2013. [online] Available: bps.go.id.
- [7] Darwis, W. U. Ulandasari, R. H. Wibowo, Sipriyadi & RRS Astuti, “Keanekaragaman Hayati Makroskopis Jamur di Sekitar Kawasan Cagar Alam Tanjung Laksaha Pulau Enggano. Bengkulu”, *Bioedukasi*, vol. 11, no. 1, pp. 18-26. 2020.
- [8] Santoso, *Biologi dan Kecapakan Hidup*. Bandung: Ganeca Tepat. 2004.
- [9] M. Kuo, *Galerina marginata jamur*, 2016. [online] Available: [Expert.com](https://www.expert.com).
- [10] Muzayyinah, *Keanekaragaman Tumbuhan Tak Berpembuluh*. Padang: Andalas University Press. 2005

- [11] S. D. B. M. Tampubolon, “*Keanekaragaman Jamur Makroropis Di Hutan Pendidikan Universitas Sumatera Utara Desa Tongkoh Kabupaten Karo Sumatera Utara*”. Skripsi, Fakultas Kehutanan Universitas Sumatera Utara. 2013
- [12] J. M. Polese. *The Pocket Guide to Mushrooms*. London : Divis, Cologne. 2005.
- [13] I. Ganjar, W. Sjamsuridjal & A. Oetari, *Mikologi Dasar dan Terapan*, 2006. Jakarta: Yayasan Obor Indonesia.
- [14] M. W. Proborini, “Eksplorasi dan identifikasi jenis-jenis jamur klas basidiomycetes di kawasan Bukit Jimbaran Bali”, *Jurnal Biologi*, vol. 16, no. 2. Pp. 45-47. 2012.
- [15] D. Dwidjoseputro, *Pengantar Mikologi*, 1976. Penerbit Alumni: Malang.
- [16] T. Elis, “*Jenis-jenis Jamur Basidiomycetes Familia Polyporaceae Di Hutan Pendidikan Universitas Hasanuddin Bengo-bengo Kecamatan Cenrana Kabupaten Maros*”, *Jurnal Biologi Makassar*, vol 1, no. 1, pp. 31-38. 2016.
- [17] J. Zhao, Y. L. Zhang, L. W. Wang, J. Y. Wang, & C. L. Zhang, “Bioactive Secondary Metabolites from *Nigrospora* sp. LLGLM003, An Endophytic Fungus of The Medicinal Plant *Moringa oleifera* Lam”, *World Journal Microbiol Biotechnol* , vol. 28, no. 1. pp. 2107-2112. 1994.