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Inventarization Macroscopic Fungi at Tegallega Resort Taman Gunung Gede Pangrango National Park

Nabila Khusnul Cahyaningtyas[1], Husnin Nahry Yarza[2*]
[1,2]Program Studi Pendidikan Biologi, Universitas Muhammadiyah Prof. Dr. HAMKA, Jl. Tanah Merdeka, Kp. Rambutan, Pasar Rebo, Jakarta Timur 13830, Indonesia
*Corresponding author: husnin.rahry@uhamka.ac.id

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Abstract: *This study aims to inventory macroscopic fungi at Resort Tegallega, Gunung Gede Pangrango National Park conducted at three tracking locations. The research method used is descriptive qualitative and with the cruise data collection method (cruise method) by tracing the research location points.*
The results obtained based on the research that has been done, it was found that most of the fungi belong to the phylum Basidiomycota and only one type of fungus belongs to the phylum Ascomycota. The environmental conditions where mushrooms grow are not that much different, because the three tracking points are still in the same area.

Keywords: *fungi, inventrory mushroom, macroscopic fungi*

1. INTRODUCTION

The tropical climate means that Indonesia has high enough humidity so that plants can thrive as well as microorganisms (Wahyudi et al., 2016). One of the microorganisms that can live well is fungi. Mushrooms have a diversity of species due to the vast tropical rainforests in Indonesia (Al-amin, 2020). Environmental factors also influence fungal growth. One of the benefits of mushrooms is that they are useful in maintaining balance and preserving nature. Fungi as heterotrophic organisms require organic compounds as nutrition (Napitupulu & Situmorang, 2020).

As decomposers, fungi help the process of decomposing organic material and fertilize the soil; Apart from that, it maintains the forest ecosystem by providing nutrients so that the surrounding plants become fertile (Asis, 2021). Fungi are also eukaryotic organisms, do not have chlorophyll, have spores, reproduce asexually and sexually. Fungi are grouped into two, namely, macroscopic and microscopic fungi (Fitriani et al., 2018). Macroscopic fungi have habitats on the surface of the soil and on wood and can be seen directly without the aid of a microscope (Rahma et al., 2018).

The habitat of fungi in forests is generally found in rotting leaf litter which provides various organic materials that become food for fungi (Zulpitasari et al., 2019). There are also fungi that grow on rotting trees or wood, and on living trees and on the ground. According to Proborini (2006) the habitat of fungi is in litter, rotting tree wood, and living trees (Napitupulu & Situmorang, 2020).

Apart from that, there are several environmental factors that influence fungal growth, namely, temperature, air humidity, pH, aeration, CO concentration, and light requirements (Fitriyanti, 2016). The optimal temperature for fruiting varies with species and strain. Generally requires a lower temperature than the optimum temperature for vegetative growth, which ranges from 5-33°C (Sharma et al., 2015).

Quagga
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During fruiting, the relative humidity level varies for different species and should be between 80-95%. Increased CO2 concentrations can also promote vegetative growth, but can also inhibit fruiting body initiation and normal development. Fungi also do not need light for food synthesis. They grow on dead organic plant material. However, light is required to initiate fertilization (primordial development of the fruiting body), which (both duration and intensity) varies according to the species and subspecies of the fungus. In addition, the optimum pH for mycelium colonization should be in the range of 4.0 to 7.0 (Sharma et al., 2015).

Macrofungi or macroscopic fungi are an indicator of forest communities experiencing dynamics, capable of degrading lignocellulose with the enzymes cellulase, hemicellulase, fiber liginase (Tampubolon et al., 2013). Macroscopic fungi also greatly influence the survival and germination of trees and also greatly influences the food chain in the forest (Nasution et al., 2018).

Fungi also do not need light for food synthesis. They grow on dead organic plant material. However, light is required to initiate fertilization (primordial development of the fruiting body), which (both duration and intensity) varies according to the species and subspecies of the fungus. In addition, the optimum pH for mycelium colonization should be in the range of 4.0 to 7.0 (Sharma et al., 2015).

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The Basidiomycota phylum dominates macroscopic fungi and a small portion are Ascomycota fungi (Noverita et al., 2019). The Ascomycota phylum has an ascus where ascospores form. Most members of the Ascomycota phylum are microscopic and a few are macroscopic (Kristin, 2020).

Macroscopic fungi of the Ascomycota phylum can act as decomposers (Tanti et al., 2018). Askomata of macroscopic Ascomycota can be apothecium or fruiting body forms with an angiocarp type of development. Macroscopic ascomycota have several forms of ascomata, namely round to oval, bowl, stemmed sponge, and coral (Putra, 2021).

The Basidiomycota phylum is known as the basidium which in its life cycle undergoes a diploid form (Firdaushi & Muchlas Basah, 2018). This fungus is multicellular as a wood decomposer and this fungal plant has a shape like an ear or resembles an umbrella or even a semi-circle with a large basidiocarp (Rahma et al., 2018). Basidiomycota have a cap, blade and stalk, have insulated hyphae which are vegetative hyphae (Firdaushi & Muchlas, 2018).

Basidiomycota substrates include litter, bark surfaces, or soil (Mahardhika et al., 2021). Interwoven generative hyphae can form fruiting bodies or not. The fruiting body is called basidiocarp. Basidiomycota live saprophytically, for example in leaf litter, on the surface of the soil, and in rotting wood. Basidiomycota like damp places (Firdaushi & Muchlas Basah, 2018).

Mushrooms can be grouped based on shape and size, namely, large mushrooms are known as macroscopic fungi (Fitriyanti, 2016). Another macroscopic characteristic of fungi is their way of life. Fungi have quite diverse ways of life, for example, solitary, scattered (in groups but the distance between fruit bodies is far apart), gregarious (in groups and the distance between fruit bodies is close together), caespitose (in groups and the distance between fruit bodies is very close, can be seen from a distance very close stipe), connate (a variation of caespitose with the stipe appearing to arise from the same basal) (Desmiwati & Surati, 2019).

Then, in terms of the shape of the fruiting body, there are mushrooms that are stemmed and have a cap with lamellae, stemmed-hooded-porous, stemmed-hooded-serrated, stemmed with a raised hood (hoody), hard fruit body (bracket), bowl-shaped, round-oval- star-net, coral shape, in the form of a thin layer on the substrate (crustlike), and gelatinous (Desmiwati & Surati, 2019).

Macroscopic fungi, most of which come from the phylum Basidiomycota, generally form basidiocarps consisting of a basidium and basidiospores. Basidioscarp consists of several parts, namely, mycelium, stem (stipe), cup (volva), ring (annulus), blade (lamella), and cap (pileus). However, there are some mushrooms that have rings without cups or cups without rings, and

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there are also several types that only have some parts (Hiola, 2011). Reproduction occurs asexually by producing conidia and sexually by mating between hyphae of different types (Khayati & Warsito, 2016).

Research on the inventory of macroscopic fungi has not been carried out at the Tegallega Resort, no researchers have been found who have inventoried macroscopic fungi. Therefore, research on the inventory of macroscopic fungi in the Tegallega Resort area of Gunung Gede Pangrango National Park was carried out in order to increase the inventory of macroscopic fungi as a reference for future fungal research.

2. RESEARCH METHOD

The method used in this research is descriptive qualitative and the data collection method is the cruise method by following the research location points. Mushrooms found on the tracing route were observed, their physical characteristics (size, color, body shape and texture), the environmental conditions where they grew (air temperature, light intensity, soil temperature (if growing in soil), soil pH (if growing in soil) were recorded.), and humidity), where it grows (litter/soil, trees, dead/rotted wood, dead twigs), and the number of individual fungi. Then, documentation is carried out in the form of photos using a cellphone camera.

The data that has been obtained in the field is then identified using literary sources, namely, the book entitled "The Book of Fungi: A Life-Size Guide to six Hundred Species from Around the world" by Peter Robert, "Concise Mushroom Guide" by Bloomsbury, " The Kingdom of Fungi" by Jens H. Petersen, and several research journals.

Obtaining mushroom data from this research, physical characteristics of mushrooms (color, size, shape and texture of the mushroom body), environmental conditions where they grow (air temperature, light intensity, soil temperature (if growing in soil), soil pH (if growing in soil), humidity), and the place of growth (litter/soil, trees, dead/rotted wood, dead twigs) were then analyzed descriptively and arranged in table form.

3. RESULTS AND DISCUSSION

This macroscopic fungal inventory research was carried out using an exploratory method which was carried out by tracing 3 location points in the Tegallega Resort area. Based on the research that had been carried out, 15 genera, 10 families and 7 orders were found consisting of two phyla, namely, Basidiomycota and Ascomycota as mentioned above. listed in Table 1.

The recorded mushrooms are then identified and given information regarding their physical characteristics, environmental conditions where they grow, and where they grow.

Based on Table 1, the results of research carried out at 3 search locations, namely Curug Goong, Pamayoran and Pasir Panon, found 25 types of mushrooms. Most of the individual mushrooms found were 24 types of mushrooms grouped into 15 genera. 14 genera belong to the phylum Basidiomycota and only 1 type of fungus belongs to the genus belonging to the phylum Ascomycota.

Table 1. Fungi Genus jamur are finding in 3 locations points lokasi at Resort Tegallega

Filum	Ordo	Familia	Genus
Basidiomycota	Auriculariales	Auriculariaceae	*Auricularia (2)*
		Marasmiaceae	*Marasmius*
	Agaricales	Mycenaceae	*Mycena (2)*
		Psathyrellaceae	*Coprinellus (3)*
			Parasola
	Dacrymycetales	Dacrymytaceae	*Dacryopynax*
	Hymenochaetales	Hymenochaetaceae	*Hymenochaete*
		Ganodermataceae	*Ganoderma (4)*
			Lentinus
	Polyporales		*Microporus*
		Polyporaceae	*Pycnoporus*
			Trametes (4)
			Tyromyces
	Russulales	Stereaceae	*Stereum*
Ascomycota	Pezizales	Pyronemataceae	*Scutellinia*

In the phylum Basidiomycota there are 14 genera consisting of, Auricularia, Marasmius, Mycena, Coprinellus, Parasola, Dacryopynax, Hymenochaete, Ganoderma, Lentinus, Microporus, Pycnoporus, Trametes, Tyromyces,

Quagga
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and Stereum. Then 9 families consisting of, Auricu-lariaceae, Marasmiaceae, Mycenaceae, Psathyrellaceae, Dacrymytaceae, Hymenochaetaceae, Ganodermataceae, Polyporaceae, and Stereaceae. 6 Orders consisting of Auriculariales, Agaricales, Dacrymycetales, Hymenochaetales, Polyporales, and Russulales.

Then, for the phylum Ascomycota, only one type of fungus was found which came from the genus Scutellinia, Family Pyronemataceae, Order Pezizales. In accordance with what Tanti et al., (2018) stated, the majority of large or macro-sized fungi come from the Basidiomycetes class and a small part come from the Ascomycetes class. Apart from that, Santoso (2004) in (Audina Nurhikmawati & Taufik, 2022) also believes that the phylum Basidiomycota is a representation of macroscopic fungi. Therefore, in this study, the phylum Basidiomycota was more commonly found because of its characteristics, namely, macroscopic, or large, has a fruiting body so that it can be seen directly with the naked eye.

Most of the types of mushrooms obtained were from 25 types, 22 types of which were found growing on dead/rotten wood. The fungi found on dead/rotten wood consist of the genera Auricularia, Mycena, Coprinellus, Parasola, Dacryopynax, Hymenochaete, Ganoderma, Lentinus, Microporus, Pycnoporus, Trametes, Tyromyces, Stereum, and Scutellinia. Then, 1 type was found growing on dead twigs, namely, from the genus Marsamius, 1 type was found growing on living trees, namely, from the genus Trametes, and 1 type was found on the ground, namely, from the genus Coprinellus. Lailiyah et al., (2019) found a diversity of macroscopic fungi in the Bandealit resort, Meru Betiri, Jember Regency, totaling 33 species and 8 orders. The Basidiomycota class dominates the most and the Polyporales order is the most frequently found.

The physical factors in the environment where fungi grow are also factors that support fungal growth. Examples include air temperature, humidity and light intensity. The fungi found at the 3 search locations were found at different temperatures, namely in the range of 23 ˚C to 30 ˚C. This is quite in line with the opinion of Waretno (2017) that the growth of fungi depends on environmental factors such as temperature, oxygen and pH which help in the growth of fungi. For example, temperature, the optimum temperature varies for each type of fungus, but generally ranges from 22˚C to 35˚C (Waretno, 2017). Lailiyah et al., (2019) found that many fungi grow on soot and rotting wood substrates.

Then, for humidity, the 3 search locations were found to have air humidity in the range of 80% to 85%. This is quite in line with the opinion expressed by Elis (2016) that fungal growth is generally found at air humidity of 70% to 100% (Purwanto et al., 2017). Apart from that, the light intensity in the environment where the fungus grows is found to be quite low, namely, around 62 lux to 789 lux, because, if the light intensity is high enough it can inhibit the growth of the fungus or make the place dry and not damp. Meanwhile, fungi grow in damp places.

Based on data obtained from three search locations, the environmental conditions where mushrooms grow, including temperature, humidity, and light intensity, do not differ much, because the three location points (Curug Goong, Pamayoran and Pasir Panon) are still in the same area. the same, namely, Tegallega Resort, Mount Gede Pangrango National Park.

4. CONCLUSION

From the research that has been carried out, it can be concluded that, from searches at 3 research locations, 25 types of fungi were found which were classified into 14 genera of the phylum Basidiomycota consisting of, Auricularia, Marasmius, Mycena, Coprinellus, Parasola, Dacryopynax, Hymenochaete, Ganoderma, Lentinus, Microporus, Pycnoporus, Trametes, Tyromyces, and Stereum. In the Ascomycota phylum, only one type of fungus is found, which comes from the genus Scutellinia.

Most fungi come from the Basidiomycota phylum because the Basidimycota phylum is a representation of macroscopic fungi. Apart from that, the environmental conditions where the mushrooms grow are not very different, because the three search locations are still in the same area.

5. REFERENCES

Al-amin, B. J. R. (2020). Inventarisasi Jamur Makroskopis Basidiomycota Di Hutan Hujan Tropis Dataran Rendah Pulau Karimunjawa Taman Nasional Karimunjawa.

Asis, S. F. (2021). Karakteristik Habitat Dan Pemanfaatan Jamur Makroskopis Pada

p-ISSN 1907-3089, e-ISSN 2615-5869
Vol 16, No. 1, 2024, pp 28 - 33
Available online https://journal.fkip.uniku.ac.id/quagga/index
DOI: 10.25134/quagga.v16i1.51

Sekitar Kawasan Hutan Di Kecamatan Duampanua Kabupaten Pinrang. 7, 6.

Audina Nurhikmawati, M., & Taufik, M. (2022). Keanekaragaman Jamur Makroskopis Di Jalur Curug Cibeureum, Taman Nasional Gunung Gede Pangrango. *Ekologia : Jurnal Ilmiah Ilmu Dasar Dan Lingkungan Hidup*, *22*(1), 1–8. www.indexfungorum.org.

Desmiwati, & Surati. (2019). Jurnal Penelitian Kehutanan Wallacea. *Jurnal Penelitian Kehutanan Wallacea*, *8*(2), 125–133.

Firdaushi, N. F., & Muchlas Basah, A. W. (2018). Inventarisasi Jamur Makroskopis Di Kawasan Hutan Mbeji Lereng Gunung Anjasmoro. *Biosel: Biology Science and Education*, *7*(2), 142. https://doi.org/10.33477/bs.v7i2.651

Fitriani, L., Krisnawati, Y., Anorda, M. O. R., & Lanjarini, K. (2018). Jenis-Jenis Dan Potensi Jamur Makroskopis Yang Terdapat Di Pt Perkebunan Hasil Musi Lestari Dan Pt Djuanda Sawit Kabupaten Musi Rawas. *Jurnal Biosilampari: Jurnal Biologi*, *1*(1), 21–28. https://doi.org/10.31540/biosilampari.v1i1.49

Fitriyanti, I. (2016). Inventarisasi Jamur (Basidiomycota) Di Hutan Raya Raden Soerjo Cangar Kota Batu Sebagai Sumber Belajar Biologi. *Skripsi Universitas Muhammadiyah Malang*, *53*(9), 1689–1699. file:///C:/Users/User/Downloads/fvm939e.pdf

Hiola, S. F. (2011). Keanekaragaman Jamur Basidiomycota Di kawasan Gunung Bawakaraeng (Studi Kasus: Kawasan Sekitar Desa Lembanna Kecamatan Tinggi Moncong Kabupaten Gowa). *Bionature*, *12*(2), 93–100.

Khayati, L., & Warsito, H. (2016). Kawasan Lindung KPHP Sorong Selatan *(The Biodiversity of Fungi from Basidiomycetes Class in KPHP Sorong Selatan ' s Protected Area)*. 213–222.

Kristin, R., Rahmawati, R., & Mukarlina, M. (2020). Inventarisasi Jamur Makroskopis Filum Ascomycota Di Kawasan Universitas Tanjungpura Pontianak Kalimantan Barat. *Jurnal Protobiont*, *9*(1), 36–40. https://doi.org/10.26418/protobiont.v9i1.40555

Lailiyah, S.F. Muhammad Z.A. Fikri, S. F. Wahyudi, F. T. Pradiphta, O. Annas A. H & Elis N. H. (2019). Studying macroscopic mushroom diversity at Bandealit Resort, Meru Betiri National Park, Jember. IOP Conf. Series: Earth and Environmental Science 394.

Mahardhika, W. A. J. I., Sibero, M. T., Hanafi, L., & Putra, I. P. (2021). *Keragaman Makrofungi di Lingkungan Universitas Diponegoro dan Potensi Pemanfaatannya*. *November*.

Napitupulu, D. S., & Situmorang, P. R. (2020). Jenis-Jenis Jamur Makroskopis Kelompok Divisio Basidiomycetes Di Taman Hutan Raya Bukit Barisan Tongkoh Kabupaten Karo Sumatera Utara. *Elisabeth Health Jurnal*, *5*(02), 1–8. https://doi.org/10.52317/ehj.v5i02.302

Nasution, F., Rahayu Prasetyaningsih, S., & Ikhwan, M. (2018). Identifikasi Jenis Dan Habitat Jamur Makroskopis Di Hutan Larangan Adat Rumbio Kabupaten Kampar Provinsi Riau. *Wahana Forestra: Jurnal Kehutanan*, *13*(1), 64–76. https://doi.org/10.31849/forestra.v13i1.1556

Noverita, N., Armanda, D. P., Matondang, I., Setia, T. M., & Wati, R. (2019). Keanekaragaman Dan Potensi Jamur Makro Di Kawasan Suaka Margasatwa Bukit Rimbang Bukit Baling (SMBRBB) Propinsi Riau, Sumatera. *Pro-Life*, *6*(1), 26. https://doi.org/10.33541/pro-life.v6i1.935

Purwanto, P. B., Zaman, M. N., Yusuf, M., Romli, M., Syafi, I., Hardhaka, T., Fuadi, B. F., Saikhu, A. R., Rouf, M. S., Adi, A., Laily, Z., & Yugo, M. H. (2017). Inventarisasi Jamur Makroskopis di Cagar Alam Nusakambangan Timur Kabupaten Cilacap Jawa Tengah. *Proceeding Biology Education Conference*, *14*(1), 79–82.

Putra, I. (2021). Catatan Kelompok Ascomycota Makroskopik Di Indonesia. http://www.indexfungorum.org/Nam

Rahma, K., Mahdi, N., & Hidayat, M. (2018). Karakteristik Jamur Makroskopis di Perkebunan Kepala Sawit Kecamatan Meureubo Aceh Barat. *Prosiding Seminar Nasional Biotik 2018*, *6*(1), 157–164. https://www.jurnal.ar-raniry.ac.id/index.php/PBiotik/article/view/4

p-ISSN 1907-3089, e-ISSN 2615-5869
Vol 16, No. 1, 2024, pp 28 - 33
Available online https://journal.fkip.uniku.ac.id/quagga/index
DOI: 10.25134/quagga.v16i1.51

252

Sharma, N. K., Rai, P. K., & Singh, S. (2015). *Environmental factors affecting edible and medicinal mushroom production Consumption risk of Rainbow trout in Nepal and impacts of trout farm effluents on water quality of streams View project Ethnobotany & Socioecology View project*. https://www.researchgate.net/publication/281646500

Tampubolon, S. D. B. M., Utomob, B., & Yunasfi. (2013). Keanekaragaman jamur makroskopis di hutan pendidikan Universitas Sumatera Utara desa Tongkoh kabupaten Karo Sumatera Utara. *Peronema Forestry Science Journal*, *2*(1), 176–182.

Tanti, N. Y., Rahmawati., & Linda, R. (2018). Jenis-Jenis Jamur Makroskopis Anggota Kelas Ascomycetes Di Hutan Bayur Kabupaten Landak Kalimantan Barat. *7*, 38–44.

Wahyudi, T. R., P, S. R., & Azwin, A. (2016). Keanekaragaman Jamur Basidiomycota Di Hutan Tropis Dataran Rendah Sumatera, Indonesia (Studi Kasus di Arboretum Fakultas Kehutanan Universitas Lancang Kuning Pekanbaru). *Wahana Forestra: Jurnal Kehutanan*, *11*(2), 21–33. https://doi.org/10.31849/forestra.v11i2.148

Waretno, L. 2017. Inventarisasi Jamur Makroskopis di PT. Perkebunan Nusantara III Perkebunan Karet Sarang Giting Dolok Masihul.

Zulpitasari, M., Ekyastuti, W., & Oramahi, H. A. (2019). Keanekaragaman Jenis Jamur Makroskopis Di Bukit Wangkang Desa Sungai Ambawang Kabupaten Kubu Raya. *Jurnal Hutan Lestari*, *7*(3), 1147–1157. https://doi.org/10.26418/jhl.v7i3.37270