Ecobios Journal of Environmental Science
Issue 1 Number 1 (June 2024): 28-36
ISSN (Online): 3064-1470 | DOI: 10.71024/ecobios/2024/v1i1/14

Makrofungi Diversity In The Sesaot Aik Nyet Forest Area, Buwun True Village, West Lombok, West Nusa Tenggara

Liza Fitriani[1], Cantika Agustina[2], Huru'in[3], Erlin Apriani[4], Firman Ali Rahman[5], Meilinda Pahriana Sulastri[6], Mai Rizali[7]

[1,2,3,4,5]Biology Science Education, Faculty of Education and Teacher Training, State Islamic University of Mataram, Mataram, West Nusa Tenggara, Indonesia.
[6]Biology Study Program, Faculty of Mathematics and Natural Sciences, Al-Azhar Islamic University of Mataram, Mataram, West Nusa Tenggara, Indonesia.
[7]Department of Environment, East Lombok Regency

*email: lizafitriani136@gmail.com

Received: 11 March 2024, Revised: 11 May 2024, Accepted: 29 June 2024

Abstract. This research aims to map and identify the types of macrofungi that exist in the Sesaot forest, understand the ecological role played by macrofungi in maintaining the balance of the forest ecosystem, and provide recommendations on sustainable forest management practices. The activity method can be referred to as "Macrofungi Field Survey" . This method involves direct observation in the field to search for, identify and record various types of macrofungi in the environment. The diversity of macrofungi in the Sesaot forest area, Aik Nyet Hamlet, Buwun Sejati Village, West Lombok, West Nusa Tenggara shows significant variation and represents the high richness of the ecosystem in the region. Studies carried out in this area identified various species of macrofungi distributed in a variety of forest habitats, from damp forest floors to dead tree trunks. Macrofungi are an important part of the biodiversity in forest ecosystems. Macrofungi diversity includes many species with various forms ranging from size, color and ecological function. Macrofungi also have a big role, namely as decomposers which help decompose organic matter, develop nutrients into the soil, and establish symbiotic relationships with other plants through microbes.

Keywords: macrofungi, fungi, forests, diversity, ecosystem.

INTRODUCTION

Macrofungi or mushrooms are one of the important organisms in supporting the life of ecosystem components on earth (Namidya & Handayani, n.d.). Their role as decomposers is an important key in many cycles in the environment to remain sustainable. Fungi are heterotrophic organisms (cannot make their own food) that use organic materials formed by other organisms (Lestari & Febrianti, 2018). These organisms can help in the process of degrading organic material in the environment in addition to bacteria and other organisms. Fungi also help in fertilizing the soil by providing nutrients for plants so that plants around the forest grow well (Arini & Christita, 2016). Someone stated that fungi are one of the important components of the ecosystem that are ignored when exploring biodiversity. Fungi or macrofungi are predicted to have 530,000 to 1.1 million species on earth. Fungi can be found in between leaf litter, soil, and attached to tree trunks. These organisms utilize organic materials to grow which are found in the substrate. Macrofungi are taxonomically distributed in two phyla, namely Ascomycetes and Basidiomycetes. In addition to having a role in the ecosystem, fungi are also used in various fields such as industry, agriculture, sources of medicine, food, textiles, and bioremediation agents. Edible mushrooms are known as one of the food ingredients that have high nutrition. The nutritional content is generally protein, lipids, amino acids, glycogen, vitamins, and minerals. (Mahardhika et al., 2021).

Based on their shape and size, fungi can be divided into macroscopic and microscopic fungi. Macroscopic fungi have large fruiting bodies and are known as macrofungi. Most macrofungi come from the Basidiomycota division, but some also come from the Ascomycota division. Fungi are heterotrophic organisms that obtain nutrients from the environment in which they live, such as rotting wood, soil, rocks, or leaf sheaths, litter in the form of piles of dry leaves, twigs, and various other vegetation remains on the forest floor or gardens that have dried out and changed from their original color. And some litter has carbon-based compounds. Macrofungi play an important role in the soil biogeochemical cycle and decomposition process, especially as decomposers. These organisms form very beneficial interactions with plant roots, which are important for the survival of the plant and increase food sources for other organisms. In addition, macrofungi also have a role as biocontrol agents in the pharmaceutical field. Its use in the health sector is used as a raw material for making medicines. Macrofungi are not only important in the decomposition process of organic matter but also have wide applications in various fields, including agriculture, ecology, and the pharmaceutical industry. In agriculture, macrofungi can be used to increase soil fertility through the mycorrhiza process, where they form a symbiosis with plant roots and help absorb nutrients. Mycorrhiza is formed due to the mutualistic symbiosis between fungi or fungi with the plant root system and both benefit each other.

In the field of ecology, they play a role in maintaining the balance of the ecosystem through the nutrient cycle and decomposition process they carry out. The use of macrofungi in the health sector is not only limited to traditional medicines but also includes modern research for the development of antibiotics, anticancer, and other therapeutic agents. Further research is being carried out to explore the full potential of macrofungi, given the diversity and benefits they offer in various aspects of human life and the environment. Fungi, or better known as mushrooms, are a group of organisms that play a very important role in various ecosystems. Fungi can be found in various habitats, from terrestrial environments such as forests and grasslands, to aquatic environments such as rivers and lakes. They act as the main decomposers in the ecosystem, helping in the decomposition of complex organic matter into simpler substances that can be reused by other organisms. Macrofungi, as part of fungi, have fruiting bodies that can be seen with the naked eye, in contrast to microscopic fungi that can only be observed with the aid of a microscope. The fruiting bodies of macrofungi can vary in size and shape, from small to very large and striking. The shape of the fruit body is very diverse, ranging from the umbrella that we know as mushrooms, to more complex and unique shapes.

The interaction between macrofungi and plant roots is known as mycorrhiza. Mycorrhiza is a symbiotic relationship that is very beneficial for both plants and fungi. Through mycorrhiza, fungi help plant roots absorb water and nutrients from the soil, especially phosphorus, which is difficult for plant roots to absorb without the help of fungi. In return, plants provide carbohydrates produced from photosynthesis as an energy source for fungi. This relationship improves plant growth and health, as well as increasing agricultural productivity.

Research on macrofungal diversity in the Sesaot forest area, Aik Nyet Hamlet, Buwun Sejati Village, West Lombok, is very urgent and important to do. Sesaot Forest is known to have high biodiversity, including various types of macrofungi that play a crucial role as decomposers in the ecosystem. The ecological role of macrofungi in decomposing organic matter and returning nutrients to the soil is very important for maintaining forest health. In addition, macrofungi also have great economic potential, such as a source of food, medicine, and industrial materials, which can be developed to improve the welfare of local communities. Therefore, inventory and research of macrofungi in this area is very rational to do in order to understand the types that exist and their ecological roles. Monitoring macrofungal populations and their interactions with the environment is also important for early detection of changes that threaten macrofungal diversity.

RESEARCH METHODS

The method of macrofungal diversity observation activities in the Sesaot forest, Buwun Sejati Village, West Lombok, can be called "Macrofungal Field Survey". This method involves direct observation in the field to search for, identify, and record various types of macrofungi in the environment. Macrofungal field surveys are usually carried out by walking around the forest, observing and recording macrofungi found in various habitats and different environmental conditions. After that, the collected data can be analyzed to understand the diversity, distribution, and composition of macrofungal species in the research area. This method is generally the first step in macrofungal diversity research and helps in building a basic understanding of fungal ecology in an area.

RESULT AND DISCUSSION

From the results of observations that have been made, we can see that the diversity of macrofungi in the Sesaot forest area, Aik Nyet Hamlet, Buwun Sejati Village, West Lombok, West Nusa Tenggara shows significant variation and reflects the high ecosystem richness in the area. Studies conducted in this area identified various species of macrofungi spread across various forest habitats, from the damp forest floor to dead tree trunks. The types of macrofungi found include fungi that have an important role in the decomposition of organic matter, thus helping in the forest nutrient cycle and increasing soil fertility. Among the types of macrofungi found, some are included in categories that have economic value, such as edible mushrooms, and medicinal potential, which offer benefits to human health and the possibility of developing pharmaceutical products. Types such as oyster mushrooms, wood ear mushrooms, and several species from the genus Ganoderma are examples that are commonly found and have commercial value. Variations in macrofungal diversity are influenced by various local environmental factors, such as high humidity, stable temperatures, and the availability of organic matter from leaf litter and abundant dead wood. The diversity of microhabitats in the Sesaot forest, which includes various types of vegetation and forest structures, also contributes to the high diversity of macrofungi. The macrofungi that we found include candolleomyces, cyclocybe aegrita, termitomyces schimperi, leucocopinus fraggilissimus, oudemansiellla mucida, psylocibe, caraterellus leopita, and stipicus.

The results of the study also show that the Sesaot forest has great potential for conservation and further research on biodiversity. Macrofungal species that may not have been previously documented can be found in this area, providing a great opportunity for scientists to uncover new species and understand their ecological roles. In addition, sustainable conservation and forest management efforts are needed to maintain this diversity, given the important role of macrofungi in nutrient cycles and the health of forest ecosystems. This study was conducted to identify and document macrofungal diversity in the Sesaot forest area, Aik Nyet Hamlet, Buwun Sejati Village, West Lombok, West Nusa Tenggara. In addition, this study aims to understand the ecological role of macrofungi in forest ecosystems, including their contribution to organic matter decomposition and nutrient cycling. Other objectives are to evaluate the economic potential and health benefits of various macrofungal species found, as well as to identify species that have commercial value and medicinal potential. This study is also intended to provide a scientific basis for sustainable forest conservation and management efforts, with the hope of maintaining and preserving the biodiversity in the area. The results of this study are expected to provide important contributions to science, as well as support better environmental management policies. The following table shows the results of observations from observations of macrofungal diversity that we have conducted in Aik Nyet Village, Buwun Mas Hamlet, West Lombok Regency, West Nusa Tenggara.

Table 1. Macrofungal inventory in Sesaot Forest, West Lombok.

No.	Station	Species	Number	Description
1	I	*Large cluster*	40	Grows on fallen and rotten trees
	I	*Marasimus oreades*	6	Grows on the ground
2	II	*Leucocoprinus fragillissimus*	50	Grows on dead trees
	II	*Lactifluus sp*	50	Grows on fallen tree trunks
3	III	*Marasimus oreades*	6	Grows on the ground
	III	*Lactifluus sp*	50	Grows on fallen tree trunks
4	IV	*Phlebia spp*	50	Growing on fallen bamboo trees
5	V	*Candolleomyces*	20	Grow in the wilderness
	V	*Leucoagaricus sp*	1	growing on rocks
	V	*Cilocybe aegerita*	6	Grows on the ground
6	VI	*Leopita cristata*	50	Grow in the wilderness
	VI	*Craterellus tubaeformis*	20	Grows on the ground
	VI	*Candolleomyces*	20	Grow in the wilderness
	VI	*Marasimus oreades*	6	Grows on the ground
	VI	*Cilocybe aegerita*	6	Grows on the ground

From the observation results table above, we can see that the diversity of macrofungi in the Sesaot forest area, Aik Nyet hamlet, Buwun Sejati village has high diversity with various types of fungi that we have successfully identified and documented, both in terms of appearance, color, habitat and of course the benefits of each macrofungi that we have observed. This diversity is influenced by environmental factors such as humidity, temperature, and the type of substrate available around the Sesaot forest area, Aik Nyet hamlet, Buwun Sejati hamlet, West Lombok. We also found that macrofungi have significant economic and ecological potential such as sources of medicine, food ingredients, and as raw materials for industry. The following is a picture of the results of macrofungal observations in the Sesaot forest area, Aik Nyet hamlet, Buwun Sejati village, West Lombok district, West Nusa Tenggara.

Figure (a). Candolleomyces

Figure (b). Cyclocybe aegrita

Description

a. Candolleomyces is a genus of fungi in the family Psathyrellaceae. This genus was recently separated from the genus Coprinellus, and includes several species previously classified in that genus. Fungi in the genus Candolleomyces are commonly found on decaying wood and in soil rich in organic matter. They often have small to medium-sized caps, which are usually brown to gray, and brittle, easily broken stems. These fungi are approximately 1.2 cm in diameter and number approximately 20 fungi. They play an important role in the ecosystem because they are natural decomposers that help in the process of decomposing organic matter. Through the process of decomposition, they break down complex organic compounds into simpler forms, providing valuable nutrients back to the soil so that the soil remains fertile. In addition, some species of Candolleomyces fungi can also form symbiotic relationships with plant roots (for example as mycorrhizae) which help plants in absorbing nutrients and water from the soil. So, Candolleomyces fungi have a crucial role in maintaining the balance of the ecosystem.

b. Cyclocybe aegrita or also known as Agrocybe aegrita or "pioppino", is a species of edible mushroom and is often cultivated because of its delicious taste and good texture. This mushroom has white or cream gills. The color of this mushroom also continues to change as the mushroom ages. This mushroom is a mushroom that can grow in the soil or grow on rotten tree trunks. The diameter of this mushroom is approximately 2.5 cm and there are approximately 6 mushrooms. They have an important role in the world of agriculture because they are able to decompose organic matter such as leaf litter and dead wood into nutrients that can be absorbed by plants. In addition, this mushroom also plays a role in maintaining ecosystem balance and helping to provide nutrients for plants.

Figure (a). Leopita cristata

Figure (b). Mycena laevigata

Description

a. Leopita cristata is a type of gilled fungus in the agaricaceae family. All lepiota species are saprotrophs that live in the soil with a preference for rich and loose soil. This fungus has a diameter of approximately 2.2 cm. The number of fungi at the research location and at station 3 was approximately 15 fungi. They have a role as decomposers in the ecosystem. They help in the process of decomposing dead organic matter, such as fallen leaves, into nutrients that can be reabsorbed by plants. In addition, this fungus can also help improve soil health by breaking down complex organic compounds into simpler forms.

b. Mycena laevigata is one of the species of fungi in the genus Mycena. This fungus has characteristics such as a thin mushroom cap, light brown to gray in color, and a slender stem with a color similar to the cap. Mycena laevigata is usually found growing in forests, especially on leaf litter and rotting wood. Mycena laevigata mushrooms are generally non-toxic and are often considered aesthetically pleasing. They play an important role in the ecosystem as decomposers of decaying organic matter.

Figure (a)

Figure (a)

Description

a. Leucoagaricus is a genus of mushrooms belonging to the Agaricaceae family. Mushrooms in the genus Leucoagaricus generally have the characteristics of a round or oval mushroom cap with a white to cream color, a slender stem, and gills (sheets under the

cap) that are initially white and then turn pink or brown when the mushroom is mature. Some species of Leucoagaricus are edible and used in cooking, but keep in mind that proper mushroom identification is very important because some species of mushrooms can be poisonous. This type of mushroom can grow in various places such as on rocks, rotten wood, and can also grow on the ground, the diameter of this mushroom is approximately 2 cm and when conducting research we only found one mushroom of this type. This mushroom has an important role in the ecosystem as a decomposer of organic matter.

b. Clover Mushroom, also known as "Marasmius oreades," is a type of mushroom that is often found in meadows and mown pastures and this mushroom is also often found growing in loose soil. This mushroom is characterized by a thin, convex cap, and is light brown to cream in color and has a diameter of approximately 2.5 cm. The number of mushrooms is around 6 mushrooms. Clover mushrooms usually grow in large clusters and have slender stems. They are known for their delicious flavor and are often used in cooking, especially in sauces or stir-fries. However, it is important to ensure proper identification when collecting mushrooms from the wild. This mushroom plays an important role in the ecosystem because of its ability to recycle dead organic matter. This mushroom helps in breaking down plant debris and enriching the soil with essential nutrients. The diameter of this mushroom is approximately 2 cm and when conducting our research we only found one type of mushroom. This mushroom plays an important role in the ecosystem as a decomposer of organic matter.

Figure (a)

Figure (b)

Description

a. Leucocoprinus fragilissimus is a small, pale yellow fungus that is often found growing on rotten or decaying trees or can also grow in soil rich in organic matter. This fungus has a diameter ranging from 2cm, 3cm, 4cm and 5cm because it has a large number of approximately 50 fungi. They have an important role in decomposing organic matter in the environment. As a saprophytic fungus, Leucocoprinus fragilissimus eats organic matter that has begun to decompose, such as dead and decaying trees. By decomposing this organic matter, this fungus helps in the natural nutrient cycle in nature and helps maintain environmental balance.

b. White rot fungi are a group of fungi that are included in the wood rot fungi group. They are known as "white rot fungi" in English. This fungus has a diameter of approximately 1cm-3cm and amounts to approximately 50 fungi. These fungi have the ability to degrade cellulose and lignin, two major components of dead wood and bamboo. The white rot process carried out by these fungi involves the breakdown of lignin and cellulose in wood and bamboo, resulting in a white color on the wood and infected fungi. White rot fungi play an important role in the natural cycle of organic matter decomposition in nature.

Figure (a). Craterellus tubaeformis

Figure (b).

Description

a. Craterellus tubaeformis is an edible mushroom, also known as yellowfoot, winter mushroom, or chanterelle funnel. It was reclassified from Cantharellus, which has been supported by molecular phylogenetics. This mushroom numbers approximately 20 and has a diameter ranging from 1 cm - 2 cm. This mushroom is a type of mushroom that grows in loose soil. Craterellus tubaeformis acts as a natural decomposer that helps in the process of recycling nutrients in the forest. In addition, this mushroom is also a food source for certain animals in the forest, thus helping to maintain the balance of the ecosystem.

b. Psychocybe, a genus of mushrooms known for containing psilocybin, a psychoactive compound that causes hallucinogenic mushrooms often called "magic mushrooms". This mushroom is dangerous to consume because this mushroom will affect brain function and psychedelic effects such as visual hallucinations and changes in perception when consumed. This mushroom has a diameter of approximately 20 and has a diameter of 1 cm. These fungi play an important role in the forest ecosystem as organic decomposers. They help recycle dead or degraded organic matter in the forest environment. In addition, Psilocybe fungi can also help fertilize the soil by breaking down organic matter into nutrients that can be absorbed by other plants.

Figure (a)

Figure (b)

Description

a) Large cluster mushrooms are groups of large mushrooms that grow together in an area. They can be found in a variety of habitats, including soil, rotting wood, or other organic matter. The types of mushrooms that form these clusters vary, from edible to poisonous mushrooms. Mushrooms that grow in clusters are usually close together, often forming striking and easily recognizable formations. These large clusters are important in the ecosystem because they play a role in the decomposition of organic material, help the

nutrient cycle, and provide various benefits to humans. These mushrooms have a diameter of approximately 1-2 cm and number around 40 mushrooms. They play an important role in the ecosystem, especially in the process of decomposing organic matter. They help in digesting and breaking down organic matter such as dead leaves, rotten wood, or even animal carcasses. The decomposition process carried out by lorge cluster mushrooms produces important nutrients that can be reabsorbed by plants for their growth. Thus, lorge cluster mushrooms play a role in maintaining environmental balance and optimizing nutrient cycles in nature.

b) Lactifluus is a genus of mushrooms that belongs to the Russulaceae family. Mushrooms in the genus Lactifluus are generally known for their characteristics such as the presence of milky sap (latex) that comes out when the body of the mushroom is cut. This genus was previously included in the genus Russula before being separated into its own genus. Lactifluus are often found growing in forests, especially in soils with high humus. They have various species with various colors, shapes, and sizes. Some species of Lactifluus are edible, but as with other mushrooms, proper identification is essential to avoid poisonous mushrooms. This mushroom has a diameter of approximately 2cm and there are as many as 50 mushrooms. They play an important role in the nutrient cycle in the wild. These mushrooms usually live in soil and rotting wood and play a role in breaking down organic material. So, overall, Lactifluus mushrooms have an important role in maintaining the balance of the ecosystem.

CONCLUSION

From the results of the observations that have been made, it can be concluded that macrofungi are an important part of the biodiversity in the forest ecosystem. The diversity of macrofungi includes many species with various forms ranging from size, color and ecological function. Macrofungi also have a major role as decomposers that help decompose organic matter, develop nutrients into the soil, and establish symbiotic relationships with other plants through microbes. In addition, fungi also have high value because they are used as a source of food, medicine, play a role in the bioremediation process, and help decompose pollutants and so on.

REFERENCES

Amaria, W. (2013). Seleksi dan Identifikasi Jamur Antagonis Sebagai Agens Hayati Jamur Akar Putih Rigidoporus microporus pada Tanaman Karet.

Ambarawati, D., Hidayati, E., & Sukenti, K. (2023). Jenis-Jenis Makrofungi Filum Basidiomycota di Lingkungan Kampus Universitas Mataram.

Anjella, P. N., & Ardyati, D. P. I. (t.t.). Identifikasi jenis makrofungi di kawasan permandian kaliwuliwu desa pongkowulu kabupaten buton utara sulawesi tenggara. 2(1).

Arini, D. I. D., & Christita, M. (2016). Keanekaragaman makrofungi di cagar alam gunung ambang sulawesi utara dan peluang potensinya.

Ayu, N. H. D., Jumar, J., & Sari, N. (2021). Limbah Baglog Jamur Tiram Putih sebagai Kompos pada Cabai Rawit (Capsicum frutescens L.) Var. Hiyung. JURNAL BUDIDAYA PERTANIAN, 17(1), 83–88. https://doi.org/10.30598/jbdp.2021.17.1.83

Batubara, G. M. C., Desiani, A., & Amran, A. (2023). Klasifikasi Jamur Beracun Menggunakan Algoritma Naïve Bayes dan K-Nearest Neighbors. Jurnal Ilmu Komputer dan Informatika, 3(1), 33–42. https://doi.org/10.54082/jiki.68

Diharjo, D. (t.t.). Identifikasi Keanekaragaman Jenis Makrofungi di Kampus Universitas Sebelas Maret, Surakarta.

Fr, A. N. (t.t.). Penyusunan Modul Pengayaan Untuk Materi Fungi Kelas X Sma Berdasarkan Studi Keanekaragaman Makrofungi Di Hutan Turgo.

Kaplale, A. H., Rumondor, M. J., & Tangapo, A. M. (2013). Toksisitas Makrofungi Beracun dari Divisi Basidiomycota.

Kasi, P. D., & Wardi, R. Y. (2022). Keanekaragaman Jamur Makro Pada Limbah Ampas Sagu di Desa Pasamai Kecamatan Belopa Kabupaten Luwu.

Lestari, F., & Febrianti, Y. (2018). Identifikasi makrofungi ordo polyporales di kecamatan purwodadi kabupaten musi rawas. 2.

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

Muspiah, A. (t.t.). Keragaman ganodermataceae dari beberapa kawasan hutan pulau lombok.

Namidya, S. K., & Handayani, D. (t.t.). Diversity of Macro Fungi in Abi Housing Complex, Lubuk Minturun Sungai Lareh District, Koto Tangah Sub-District, Padang City.

Prasetyaningsih, A., & Rahardjo, D. (2015). Keanekaragaman Dan Potensi Makrofungi Taman Nasional Gunung Merapi.

Rahim, I. (2024). Karakterisasi Makrofungi di Kebun Raya Jompie Kota Parepare yang Tumbuh pada Musim Kering. 9.

Rahma, S. A., Dewi, R. S., & Mumpuni, A. (2023). Optimasi Pertumbuhan Miselium Jamur Trametes sp. Pada Media Membran Dekolorisasi dengan Komposisi Bahan Organik yang Berbeda. 5.

Sri, D., & Afriani, R. (2022). Identifikasi Makrofungi Di Dusun Sempetang Desa Sirang Setambang Kecamatan Sepauk Kabupaten Sintang. Edumedia: Jurnal Keguruan dan Ilmu Pendidikan, 6(1). https://doi.org/10.51826/edumedia.v6i1.598

Sulastri, M. P., & Basri, H. (2019). IDENTIFIKASI MAKROFUNGI DI TAMAN WISATA ALAM GUNUNG TUNAK KABUPATEN LOMBOK TENGAH.

Tristina, A., Fitiriani, N., Zulfah, S. A., Maryani, N., & Khastini, R. O. (2022). Biodiversitas Makrofungi Di Sekitar Kawasan Curug Leuwi Mangrod, Kabupaten Serang, Banten: Deskripsi Dan Potensi Pemanfaatan. Jurnal Biolokus, 5(1), 1. https://doi.org/10.30821/biolokus.v5i1.1293