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Diversity and Morphological Characterization of Basidiomycota Macrofungi in Suco Manusae, Ermera Municipality

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Abstract

Macrofungi are an important group of fungi that play a key role in ecosystem processes, particularly in organic matter decomposition and nutrient cycling. This study aimed to identify macrofungal species and describe their morphological characteristics in Suco Manusae, Hatulia A Administrative Post, Ermera Municipality, Timor-Leste. An exploratory field survey was conducted during June 2025 using direct observation and specimen collection. Morphological identification was performed based on macroscopic features, including pileus shape and color, lamellae or pore structures, stipe characteristics, and substrate type. A total of 15 macrofungal species belonging to 9 families were recorded in the study area. Most species were found growing on decaying wood, while others were associated with soil and animal feces substrates. The results indicate that substrate availability and environmental conditions, particularly humidity and temperature, are important factors influencing macrofungal distribution and occurrence. This study provides baseline information on macrofungal diversity in Suco Manusae and contributes to the understanding of fungal ecological roles in tropical forest ecosystems. The findings may support future biodiversity monitoring and conservation strategies in the region.

Keywords: Basidiomycota, biodiversity, Ecological distribution, Morphology, Macrofungi

1. Introduction

Macrofungi represent an ecologically significant group of fungi that play essential roles in terrestrial ecosystems, particularly in organic matter decomposition, nutrient cycling, and forest ecosystem stability. Due to their ability to degrade lignocellulosic materials, macrofungi contribute substantially to soil fertility and plant nutrient availability, making them key components in maintaining ecosystem functionality in both tropical and temperate regions.

Despite their ecological importance, macrofungal diversity remains insufficiently documented in many tropical regions, particularly in island ecosystems where biodiversity is often high but understudied. Previous studies have reported that macrofungal communities are strongly influenced by environmental factors such as humidity, substrate availability, vegetation structure, and microclimatic conditions (Asis, 2021). However, most biodiversity assessments have been concentrated in well-studied regions, while remote forest areas remain underrepresented in scientific literature.

In Timor-Leste, particularly in Ermera Municipality, ecological information regarding macrofungal diversity is still limited. Suco Manusae, which is characterized by mountainous terrain, humid microclimate, and diverse vegetation types, provides a potentially suitable habitat for macrofungal growth. However, systematic documentation of macrofungal species in this area has not been extensively conducted. This lack of baseline data limits understanding of species composition, habitat association, and ecological roles of macrofungi in local forest ecosystems.

Given this gap, baseline biodiversity studies are necessary to support conservation planning and sustainable utilization of fungal resources. Such information is also important for understanding the ecological functions of macrofungi as decomposers in tropical forest ecosystems and their potential value for local communities. Therefore, this study aims to identify macrofungal species and describe their morphological characteristics in Suco Manusae, Hatulia A Administrative Post, Ermera Municipality, Timor-Leste. The findings are expected to provide foundational data for future biodiversity assessments and ecological studies in the region. This study considers macrofungi from both Basidiomycota and Ascomycota groups due to field-based morphological identification limitations.

2. Literature Review

2. 1. Definition of Macrofungi

The term macrofungi is derived from the Greek words *makros* meaning "large" and *mykes* meaning "fungus." Macrofungi are responsible for the decomposition of organic matter, which is essential for maintaining the balance of biological organisms in various ecosystems and for recycling materials in nature. These fungi can be observed directly with the naked eye (Suryani & Cahyanto, 2022). Macrofungi are fungi that grow to relatively large sizes (Handayani, 2021). They produce macroscopic reproductive structures known as carpophores, sporocarps, or mushrooms that are visible without magnification (Amazenos, 2003). As decomposers, they are among the principal components of terrestrial ecosystems (Naufal et al., 2021). Although fungi possess cell walls similar to those of plants, they lack chlorophyll and do not have true roots, stems, or leaves. Nevertheless, they are extremely important for living organisms, including humans.

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2. 2. General Characteristics of Macrofungi

The characteristics of macrofungi are important for species identification, including their color, shape, and size. However, fungal coloration may vary depending on environmental conditions, and pigments can sometimes be influenced by weather factors such as wind (Suryani & Cahyanto, 2022). Macrofungi found on decaying wood exhibit diverse macroscopic forms, including small bracket-shaped, fan-shaped, and umbrella-shaped fruiting bodies. Their colors may range from white, cream, dark brown, orange, yellow, brown, to black (Nurromadhon & Roziaty, 2022). Therefore, macroscopic characteristics used for identification include the shape, cap surface color, fruiting body texture, gill or pore structure, and mushroom diameter.

2. 3. Anatomy and Morphology of Macrofungi

Macrofungi are commonly characterized by umbrella-shaped fruiting bodies consisting of a cap and a stalk. They do not contain chlorophyll and therefore are unable to produce their own food through photosynthesis. Instead, they obtain nutrients by secreting enzymes that break down organic matter into simpler compounds that can be absorbed by their bodies (Khosi'in, 2021). Macrofungi exhibit a wide range of colors depending on the species, including orange, off-white, yellow, dark gray, and light gray (Suryani & Cahyanto, 2022). The body structure of macrofungi consists of the following components:

a. Hyphae and Mycelium:
   Fungi are composed of somatic or vegetative structures known as hyphae(Hendritomo cited in Suryani & Cahyanto, 2022). A collection of hyphae forms a mycelium, which is multicellular and filamentous in nature. The fruiting body (basidiocarp) develops from these interconnected hyphal structures (Suryani, 2020).
b. Cell Wall or Septa:
   The septa are transverse partitions within the hyphae that surround the plasma membrane and cytoplasm. These septa contain pores large enough to allow ribosomes, mitochondria, and nuclei to pass from one cell to another (Suryani & Cahyanto, 2022).
c. Prosenchyma:
   Prosenchyma is a tissue formed from compact mycelium and occurs in two forms: prosenchyma and pseudoparenchyma (Suryani, 2020).
d. Stroma:
   Stroma is a dense mass of hyphae that functions as a supporting structure for the growth of other fungal tissues.

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e. Sclerotia:
Sclerotia are hardened vegetative structures capable of surviving for long periods in the soil under unfavorable conditions (Pinaria, 2023).

2. 4. Physiology of Macrofungi

Macrofungi lack chlorophyll and therefore cannot photosynthesize or produce their own food. As heterotrophic organisms, they obtain nutrients by absorbing organic matter from living or dead organisms. They decompose complex organic compounds into simpler molecules, which are then absorbed through the hyphal walls (Suryani & Cahyanto, 2022). External nutrient sources are essential for synthesizing the various substances required for growth and development (Pinaria, 2023).

2. 5. Reproduction of Macrofungi

Macrofungi reproduce both sexually and asexually, producing spores that function as units for survival and dispersal (Pinaria, 2023). Asexual reproduction in unicellular fungi occurs through budding, whereas multicellular fungi reproduce through fragmentation, sporangia formation, or conidiospore production. Sexual reproduction occurs through haploid sexual spores such as zygospores, ascospores, or basidiospores (Khosi'in, 2021).

a. Sexual Reproduction
Sexual reproduction requires two compatible fungal types possessing reproductive structures known as gametangia. The sexual cells, or gametes, are differentiated into male (*antheridium*, +) and female (*ascogonium*, –) types. In many cases, male and female gametes are morphologically indistinguishable and are therefore referred to as isogametes (Suryani & Cahyanto, 2022).

b. Asexual Reproduction
Asexual reproduction generally occurs through the production of asexual spores. These spores are produced in large quantities, are often lightweight, and can withstand dry or extreme environmental conditions. Under suitable conditions, the spores germinate into mycelia and develop into new fungal individuals (Suryani & Cahyanto, 2022).

2. 6. Classification of Macrofungi

Macrofungi belong to one of the kingdoms in the classification system of living organisms. This group represents one of the most diverse forms of life after insects. Only about 7–10% of the estimated 1.5 million fungal species have been identified, amounting to approximately 105,000–150,000 species. Based on spore formation, fungi are classified into four divisions: Ascomycota, Basidiomycota, Deuteromycota, and Zygomycota (Hendritomo cited in Suryani & Cahyanto, 2022).

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The term Basidiomycota originates from the word *basidium*, meaning "base." Members of this division produce multicellular fruiting bodies called basidiocarps, which consist of hyphae with transverse septa (Amazenos, 2003). Basidiomycota are among the few organisms capable of efficiently decomposing lignified plant materials. According to (Santos & Junior, 2015), Basidiomycota are cosmopolitan organisms found in nearly all regions of the world and play crucial ecological roles as decomposers and participants in various symbiotic relationships, including parasitism and mutualism.

2. 7. Ecological, Nutritional, and Health Importance of Macrofungi

Macrofungi possess significant potential as food sources and medicinal resources (Tristina et al., 2022). They contain valuable pharmacologically active compounds and have been widely recognized for their antibacterial and antioxidant properties.

Ecologically, macrofungi play essential roles in maintaining ecosystem balance and improving soil fertility. (Sulastri & Basri, 2019) reported that macrofungi function as decomposers, accelerating the breakdown of organic matter and facilitating nutrient cycling within forest ecosystems.

2. 8. Habitat of Macrofungi

Macrofungal diversity is influenced by habitat conditions and environmental factors, making macrofungi important indicators of dynamic forest communities (Naufal et al., 2021). Macrofungi are distributed across tropical, subtropical, and polar regions and can inhabit terrestrial and aquatic environments, including freshwater and marine ecosystems. They are most commonly found in moist habitats rich in organic matter, such as soil, litter, fruits, leaves, living plants, shaded areas, and locations with limited sunlight (Rakhmawati, 2010).

Macrofungi grow on decaying wood, living trees, plant leaves, and soil containing organic materials that serve as nutrient sources (Handayani, 2021). Depending on habitat conditions, macrofungi can be found in cool environments, litter layers, dead or living trees, and soil substrates.

2. 9. Factors Affecting Macrofungal Growth

Environmental factors influencing fungal growth include temperature, pH, oxygen availability, and nutrient content (Rakhmawati, 2010). Both biotic and abiotic factors significantly affect fungal survival and distribution (Suryani & Cahyanto, 2022).

a. Humidity

   Different macrofungal species require varying levels of moisture, although most thrive on substrates that are not water-saturated. Water availability is essential for maintaining cellular water content and facilitating nutrient transport. Most fungi grow optimally under moisture conditions ranging from 70–90% (Suryani &

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Cahyanto, 2022). Humidity also influences fungal reproduction, spore production, morphology, and spore release (Pasaribu, cited in, Putri, 2020).

b. Substrate
The substrate serves as the primary nutrient source for fungi. Nutrients are derived from organic compounds such as cellulose, hemicellulose, and lignin found in wood and plant debris. The quality and quantity of substrate significantly influence macrofungal growth (Suryani & Cahyanto, 2022).

c. pH
Substrate acidity (pH) indirectly affects fungal growth by influencing nutrient availability. Most fungi prefer acidic environments and can survive at pH levels below 5.5 (Suryani & Cahyanto, 2022). Generally, the optimal pH range for fungal germination is 5.5–6.5, although fungi may tolerate pH values ranging from 3 to 8 (Pasaribu, cited in, Putri, 2020).

d. Temperature
Based on temperature preference, fungi are categorized into thermophiles (high temperature), mesophiles (moderate temperature), and psychrophiles (low temperature) (Rakhmawati, 2010). Macrofungi thrive particularly well during rainy seasons and in cool to warm climates with temperatures between 20–30°C (Suryani & Cahyanto, 2022). In general, fungal growth occurs within a temperature range of 0–35°C (Pinaria, 2023).

e. Light Intensity
Most fungi grow well under low-light conditions. Although light intensity varies among habitats, even low levels of light can stimulate phototropic responses, spore production, spore dispersal, and fruiting body formation (Suryani & Cahyanto, 2022).

2. 10. Research Area Map

Figure 1. (A) Map of Ermera Municipality and (B) Map of the Research Area.
Source: Google LLC (2025)

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The study site represents an important location for conducting research according to the objectives established by the researcher. Preliminary observations indicated that Manusae Village was an appropriate area for this study. Field research was conducted from 7–11 June 2025 in Manusae Village, Hatulia A Administrative Post, Ermera Municipality. The site was selected because of its suitability for investigating macrofungal diversity and supporting the achievement of the study objectives.

3. Research Method

3.1. Study Design

This study employed a qualitative descriptive approach using an exploratory field survey to document macrofungal diversity in Suco Manusae, Hatulia A Administrative Post, Ermera Municipality. According to Prodanov & Freitas (2013), qualitative research emphasizes the relationship between observed field conditions and researcher interpretation in describing ecological phenomena.

3.2. Population and Sample

a. Population

According to Sugiyono (2007), a population is a general area consisting of objects or subjects that possess specific qualities and characteristics determined by the researcher to be studied and from which conclusions are drawn. Based on this definition, the population of this study consisted of all macrofungi occurring in Manusae Village, Hatulia Administrative Post, Ermera Municipality.

b. Sample

A sample can be simply defined as a proportion of the population that serves as the actual source of data for a study. In other words, a sample is a subset of the population that represents the entire population (Amin et al., 2023). Accordingly, the samples in this study were the macrofungal specimens collected from the research area as representatives of the macrofungal population found within the study site.

3.3. Study Area and Survey Approach

Field observations were conducted in Suco Manusae, Hatulia A Administrative Post, Ermera Municipality. The study area was surveyed through systematic walking exploration across forested habitats, including decaying wood substrates, soil surfaces, and leaf litter zones to ensure representation of different microhabitats.

3.4. Data Collection Instruments

The instruments used in this study included:

a. Soil thermometer for measuring soil temperature
b. pH meter for determining soil acidity

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c. GPS (Global Positioning System) for recording sampling locations
d. Digital camera for documenting macrofungal specimens
e. Field notebook for recording ecological and morphological observations

3.5. Data Collection Procedures

Data were collected through direct field observation using an exploratory sampling approach. The procedures included:

a. Preliminary survey to identify potential macrofungal habitats
b. Systematic field exploration across different microhabitats
c. Collection and documentation of macrofungal specimens
d. Recording morphological characteristics such as pileus shape, color, stipe structure, lamellae or pore configuration, and substrate type
e. Recording environmental parameters including temperature and soil pH where applicable

3.6. Morphological Identification

Macrofungal identification was conducted based on macroscopic morphological characteristics, including cap morphology, hymenophore structure, stipe features, and habitat preference. Identification was supported by comparison with relevant mycological references and published taxonomic guides used in previous studies (Figueiredo et al., 2019; Komura et al., 2023; Suryani & Kulsum, 2020; Suryani & Cahyanto, 2022).

3.7. Data Analysis Methods

Data were analyzed using a qualitative descriptive method with a narrative approach to interpret field observations. This method allows for systematic description of ecological patterns without transforming observations into numerical datasets (Prodanov & Freitas 2013). Macrofungal species were classified and compared using established taxonomic references and illustrated guides.

4. Result

4.1. Macrofungal Species Composition

Field observations in Suco Manusae, Hatulia A Administrative Post, Ermera Municipality recorded a total of 15 macrofungal species belonging to 9 families. The complete species composition is presented in Table 1.

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Table 1. Macrofungal species recorded in the study area

Family	Species	Habitat
Xylariaceae	Pleurotus pulmonarius	Growing on dead trees or decayed wood
Xylariaceae	Daldinia childiae	Growing on dead trees or decayed wood
Strophariaceae	Hypholoma capnoides	Growing on dead trees or decayed wood
Stereaceae	Stereum ostrea	Growing on dead trees or decayed wood
Psathyrellaceae	Coprinellus disseminatus	Growing on dead trees or decayed wood
Pluteaceae	Pluteus longistriatus	Growing on dead trees or decayed wood
Phallaceae	Phallus indusiatus	Growing on soil
Bolbitiaceae	Panaeolus antilarum	Growing on dried animal feces
Auriculariaceae	Auricularia polytricha	Growing on decayed wood
Polyporaceae	Favolus brasiliensis	Growing on decayed wood
Polyporaceae	Hexagonia tenuis	Growing on decayed wood
Polyporaceae	Pycnoporus coccineus	Growing on decayed wood
Polyporaceae	Pycnoporus sanguineus	Growing on decayed wood
Polyporaceae	Trametes elegans	Growing on decayed wood
Polyporaceae	Trametes ochracea	Growing on decayed wood

The results indicate that the family Polyporaceae was the most dominant group, represented by six species (Favolus brasiliensis, Hexagonia tenuis, Pycnoporus coccineus, Pycnoporus sanguineus, Trametes elegans, and Trametes ochracea). Other families were represented by one or two species, indicating an uneven distribution of macrofungal diversity across taxa.

Overall, macrofungal species richness was primarily associated with decaying woody substrates, suggesting that forest decomposition processes play a key role in structuring fungal communities in the study area.

4.2. Habitat Distribution of Macrofungi

Based on field observations, macrofungal species were distributed across three main habitat types:

- Decaying wood / dead trees: the dominant substrate, supporting most recorded species such as Pleurotus pulmonarius, Daldinia childiae, Stereum ostrea, and all members of Polyporaceae.
- Soil: represented by Phallus indusiatus.
- Animal feces: represented by Panaeolus antilarum.

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The dominance of wood-associated species indicates that lignocellulosic decomposition is the primary ecological process supporting macrofungal communities in Suco Manusae.

4.3. Environmental Conditions

Environmental parameters recorded during field sampling are summarized in Table 2.

Table 2. Environmental conditions associated with macrofungal occurrence

Species Name	Temperature (°C)	pH
Pleurotus pulmonarius	26°C	–
Daldinia childiae	26°C	–
Hypholoma capnoides	23°C	–
Stereum ostrea	28°C	–
Coprinellus disseminatus	27°C	–
Pluteus longistriatus	27°C	–
Phallus indusiatus	23°C	7.0
Panaeolus antilarum	26°C	7.2
Auricularia polytricha	26°C	–
Favolus brasiliensis	26°C	–
Hexagonia tenuis	26°C	–
Pycnoporus coccineus	26°C	–
Pycnoporus sanguineus	26°C	–
Trametes elegans	26°C	–
Trametes ochracea	26°C	–

Note: The symbol (–) indicates that no specific measurements were recorded for the corresponding variable.

Temperature during sampling ranged from 23°C to 28°C, indicating stable tropical forest conditions favorable for fungal growth. Soil pH measurements were only available for selected species, ranging from 7.0 to 7.2, while several species lacked recorded pH values due to field measurement limitations.

Despite incomplete measurements, macrofungal occurrence was consistently observed in humid and shaded microhabitats, particularly in areas with high organic matter accumulation.

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4.4. Ecological Pattern of Macrofungal Distribution

The distribution pattern observed in this study shows a strong dependence of macrofungal communities on substrate availability, particularly decaying wood. This indicates that saprotrophic fungi play a central role in nutrient cycling processes within the forest ecosystem of Suco Manusae.

Wood-decaying taxa (especially Polyporaceae) dominate the ecosystem, reflecting active lignocellulose degradation. In contrast, soil- and dung-associated fungi were less frequent, suggesting narrower ecological specialization for these groups.

5. Discussion

5.1 Macrofungal Diversity and Species Composition

The results of this study indicate that Suco Manusae hosts a relatively diverse macrofungal community, with 15 species distributed across 9 families. The dominance of the family Polyporaceae suggests that wood-decaying fungi play a major ecological role in the studied forest ecosystem. This finding is consistent with previous studies reporting that Polyporaceae is commonly dominant in tropical forest environments due to its strong lignocellulose-degrading capabilities (Suryani & Cahyanto, 2022; Naufal et al., 2021). The diversity of macrofungal species in the study area was further assessed using the Shannon–Wiener diversity index (H’), which provides an estimate of species diversity based on richness and distribution. Based on the recorded species composition, the Shannon diversity value indicates a moderate level of macrofungal diversity in Suco Manusae, suggesting a relatively balanced but wood-dominated fungal community structure.

The presence of multiple saprotrophic taxa such as Trametes, Pycnoporus, and Stereum indicates that deadwood availability is a key driver of fungal diversity in Suco Manusae. These genera are known for their ability to decompose complex organic compounds such as lignin and cellulose, contributing significantly to nutrient cycling processes in forest ecosystems (Sulastri & Basri, 2019).

However, the observed species richness should be interpreted as a baseline inventory rather than a complete representation of fungal diversity in the region. The exploratory sampling approach used in this study may underestimate cryptic or seasonally variable species. Similar limitations have been reported in biodiversity surveys relying solely on macroscopic observation methods without molecular confirmation (Handayani, 2021).

An important taxonomic consideration in this study is the classification of macrofungi based on morphological identification only. While this approach is widely used in preliminary biodiversity assessments, it may introduce uncertainty in species delimitation, particularly among morphologically similar taxa within Polyporaceae and related groups. Therefore, future studies incorporating molecular tools such as ITS rDNA sequencing are recommended to strengthen species-level identification accuracy.

5.2 Habitat Preference and Ecological Distribution

The results show that macrofungal distribution in Suco Manusae is strongly influenced by substrate type, with decaying wood serving as the primary habitat for most recorded species. This dominance reflects the ecological function of macrofungi as decomposers in forest ecosystems, where they contribute to the breakdown of lignocellulosic materials and nutrient recycling processes. The high occurrence of wood-inhabiting fungi such as Trametes spp., Pycnoporus spp., and Pleurotus pulmonarius suggests that the forest ecosystem provides sufficient deadwood resources to support saprotrophic fungal communities. This pattern is consistent with ecological studies indicating that deadwood availability is a key determinant of fungal community structure in tropical forests (Asis, 2021).

In contrast, soil-associated and coprophilous fungi were less frequently encountered, with only Phallus indusiatus and Panaeolus antilarum representing these ecological niches. The limited representation of these groups may be associated with microhabitat specificity and lower sampling probability in the exploratory survey design. Environmental conditions recorded during the study, particularly temperature ranging from 23–28°C and humid forest microclimates, further support the occurrence of macrofungi. These conditions fall within the optimal range for fungal growth, as most macrofungi thrive in warm and moist environments that facilitate spore germination and mycelial development (Rakhmawati, 2010; Suryani & Cahyanto, 2022).

Overall, the ecological distribution pattern suggests that macrofungal communities in Suco Manusae are primarily structured by substrate availability and microclimatic conditions. This reinforces the role of macrofungi as key decomposers in maintaining ecosystem functionality and nutrient cycling in tropical forest environments.

5.3 Morphological Characteristics of Macrofungi in Suco Manusae

The morphological characteristics of the macrofungi identified in the study area were described through direct field observations and comparison with published references.

a. Family Xylariaceae – Pleurotus pulmonarius

The fruiting body of Pleurotus pulmonarius is initially convex before becoming flat or slightly depressed at maturity. The cap is fan-shaped, semicircular to nearly circular, and typically grows on dead wood or decaying logs. The margin is initially curved and later becomes wavy. The gills are close together, short, and decurrent, while the stipe is thick and white with a white basal mycelium. According to Florianópolis (2019), the cap measures

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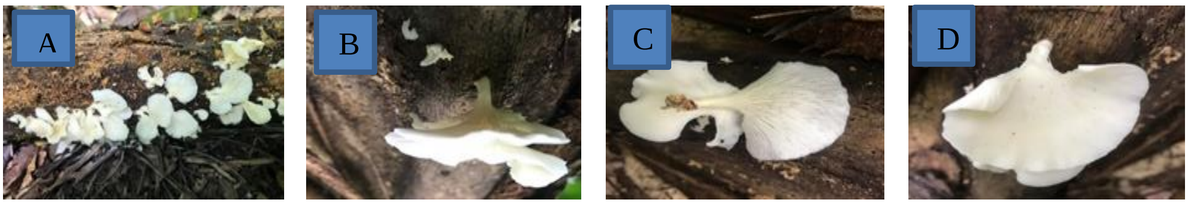
approximately 27–30 mm in diameter and 15–17 mm in length, with a smooth surface and a color ranging from white to dark shades with whitish patches. The lamellae are cream to yellow when dry, and the lateral stipe is smooth, measuring 2–10 mm long and 2–6 mm wide.



A) the species is still young | B) the species is slightly older | C) the species is observed from the inside | D) the species is observed from the outside

Figure 2. Pleurotus pulmonarius

b. Family Xylariaceae – Daldinia childiae

The fruiting body of Daldinia childiae is globose to oval in shape. The outer stromatic surface is initially smooth and brown to black, becoming increasingly wrinkled with age. Internally, the stroma exhibits concentric zonation consisting of alternating brown and black layers. The texture is hard and solid. Florianópolis (2019) described this species as having a characteristic spherical shape with a smooth surface and producing brown pigmented spores measuring approximately 12–16 × 5.5–7.5 μm.

A) the species is still young | B) the species is slightly older | C) the species is observed from the outside | D) the species is observed from the inside

Figure 3. Daldinia childiae

c. Family Strophariaceae – Hypholoma capnoides

The pileus of Hypholoma capnoides is bell-shaped to convex, grayish with orange or brown hues. The gills are attached to the stipe and initially appear

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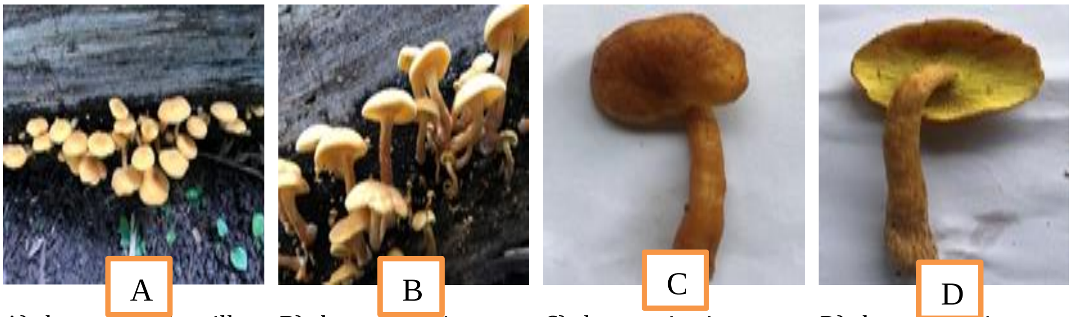
whitish before gradually darkening as the mushroom matures. Leon et al. (2023) reported that young specimens are light brown and become dark brown at maturity, with fruiting bodies measuring approximately 2–3 cm in length and 1–2 cm in width.



A) the species is still young | B) the species is slightly older | C) the species is observed from the outside | D) the species is observed from the inside

Figure 4. Hypholoma capnoides

d. Family Stereaceae – Stereum ostrea

Stereum ostrea produces fan-shaped, semicircular, or irregular fruiting bodies attached laterally to the substrate. Young specimens are irregular and rough, becoming more textured with age. The surface is yellowish and concentrically zoned. Florianópolis (2019) reported dimitic hyphae, basidia measuring 28–30 × 5–6 µm, the presence of pseudocystidia, and cylindrical to ellipsoid basidiospores measuring 5.2–6.4 × 2.8–4 µm.

A) the species is still young | B) the species is slightly older | C) the species is observed from the inside | D) the species is observed from the outside

Figure 5. Stereum ostrea

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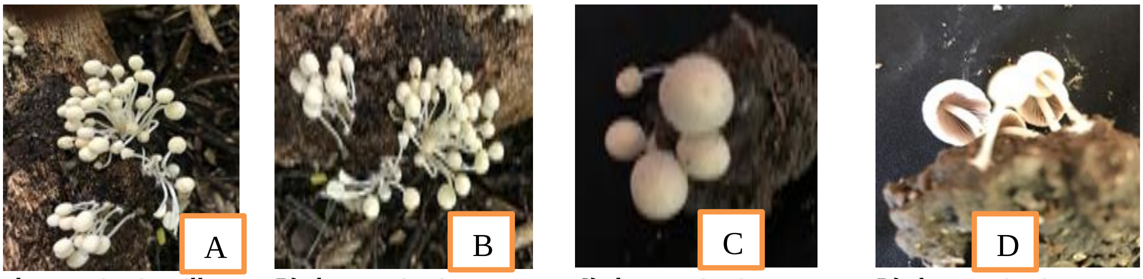
e. Family Psathyrellaceae – Coprinellus disseminatus

The cap of Coprinellus disseminatus is initially spherical and convex, becoming expanded as it matures. The surface is smooth and translucent when moist. Young fruiting bodies are white to cream-colored, gradually turning grayish-white with age. The gills are free and closely spaced, while the stipe is slender, cylindrical, fragile, and lacks a ring. Hussain et al. (2018) described the cap as parabolic to bell-shaped with fine powdery hairs and distinct radial folds extending from the center to the margin.



A) the species is still young
B) the species is slightly older
C) the species is observed from the inside
D) the species is observed from the outside

Figure 6. Coprinellus disseminatus

f. Family Pluteaceae – Pluteus longistriatus

The fruiting body is initially convex and bell-shaped with margins curved toward the center. The cap is pale white to grayish and the gills are free from the stipe. Color changes occur depending on environmental conditions, and mature specimens tend to deteriorate rapidly. (Campi et al., 2019) described the cap as 4–6 cm in diameter, convex in young specimens and plano-convex at maturity, with cream to gray coloration and small dark-brown scales.

A) the species is still young
B) the species is slightly older
C) the species is observed from the inside
D) the species is observed from the outside

Figure 7. Pluteus longistriatus

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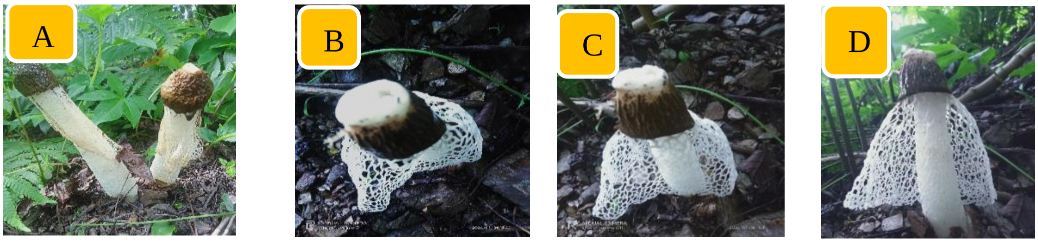
g. Family Phallaceae – Phallus indusiatus

Phallus indusiatus possesses a cylindrical fruiting body with a conical bell-shaped cap. The cap surface is cream-white and covered with a spore-bearing reticulate structure. A characteristic indusium extends downward from beneath the cap. The stipe is cylindrical, cream-colored, and connected to a white or pink volva through rhizomorphs. (Florianópolis, 2019) reported a height of 8–15 cm, cap width of 1–3.5 cm, and a stipe length of 7–12.5 cm. The species emits a strong odor and produces brown spores.



A) the species is still young

B) the species is slightly older

C) the species is observed from the inside

D) the species is observed from the outside

Figure 8. Phallus indusiatus

h. Family Bolbitiaceae – Panaeolus antillarum

The cap is conical at first and later develops a central depression. Its color ranges from grayish-white to brownish, with a darker center. The surface is smooth, and the gills are widely spaced. The slender stipe is often curved and slightly swollen at the base. Desjardin & Perry (2017) described the cap as 20–80 mm in diameter, sharply conical, radially wrinkled, and hygrophanous when young.

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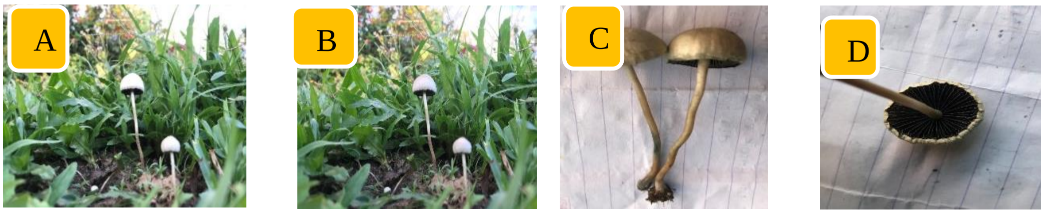

A) the species is still young | B) the species is slightly older | C) the species is observed from the outside | D) the species is observed from the inside

Figure 9. Panaeolus antillarum

i. Family Auriculariaceae – Auricularia polytricha

The fruiting body is gelatinous and elastic when fresh but becomes hard and leathery during dry conditions. It resembles a human ear in shape and is brown to whitish-brown in color. The upper surface is finely hairy and grayish with yellowish margins that are wavy and lobed. Florianópolis, (2019) described the basidioma as gelatinous, 7–40 mm in diameter, convex, brown, and densely hairy, with a cylindrical stipe measuring 5–20 × 4–10 mm.

A) the species is still young | B) the species is slightly older | C) the species is observed from the inside | D) the species is observed from the outside

Figure 10. Auricularia polytricha

j. Family Polyporaceae – Favolus brasiliensis

The basidioma is semicircular, circular, or lobed with a dry white to gray surface. The pores are elongated, hexagonal, and brownish. (Florianópolis, 2019) described the pileus as flabelliform and coriaceous, reaching 5.5 cm from

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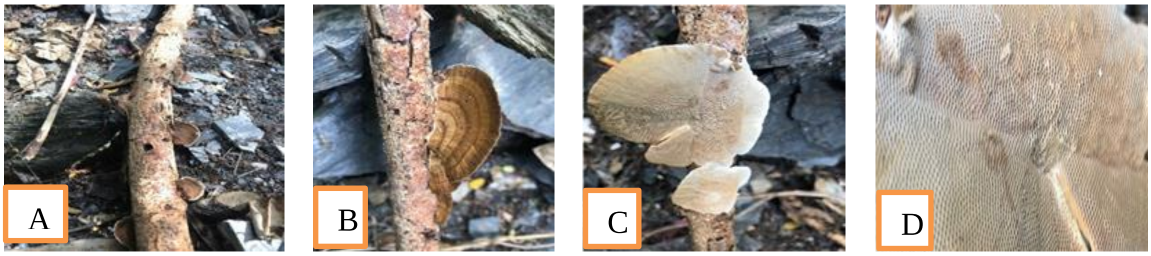
the base to the margin and 4.5 cm in width, with a smooth cream to gray surface when dry.

A) the species is still young | B) the species is slightly older | C) the species is observed from the inside | D) the species is observed from the outside

Figure 11. Favolus brasiliensis

k. Family Polyporaceae – Hexagonia tenuis

The fruiting body is semicircular with concentric zones of varying colors ranging from white to brown. The cap surface is velvety and often wavy. Alam et al. (2024) reported that the fruiting body measures approximately 6 cm long and 5 cm wide, with a thin leathery texture and gray pore surfaces.



A) the species is still young | B) the species is slightly older | C) the species is observed from the outside | D) the species is observed from the inside

Figure 12. Hexagonia tenuis

l. Family Polyporaceae – Pycnoporus coccineus

The basidioma is shell-shaped or irregular with bright orange to reddish coloration. The lower surface contains small rounded pores that become darker with age. Godinez et al. (2016) described the species as annual, sessile, and

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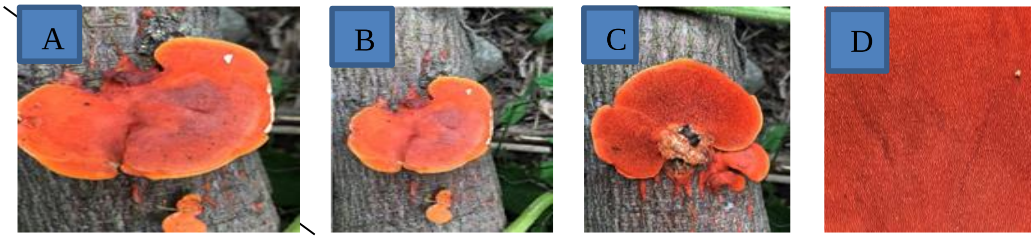
leathery, with mature specimens reaching up to 15 cm in width and displaying a vivid orange cap.



A) the species is still young
B) the species is slightly older
C) the species is observed from the inside
D) the species is observed from the outside

Figure 13. Pycnoporus coccineus

m. Family Polyporaceae – Pycnoporus sanguineus

The basidioma is semicircular and shell-like, displaying white-red to orange-red coloration when young. The color gradually becomes darker orange with age. The surface is softly hairy, and the lower side consists of small rounded pores. The pileus measures approximately 3.5–5 cm long and 1.5–2.5 cm wide (Godinez et al., 2016).

A) the species is still young
B) the species is slightly older
C) the species is observed from the outside
D) the species is observed from the inside

Figure 14. Pycnoporus sanguineus

n. Family Polyporaceae – Trametes elegans

This species produces annual to perennial basidiomata that are flabelliform, circular, or semicircular. The fruiting body is flexible and corky when fresh but becomes rigid when dry. The upper surface ranges from white

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and cream to gray and yellowish colors. (Sobrinho, 2024) described the basidioma as sessile or short-stalked, leathery when fresh, and rigid upon drying, with smooth to concentrically zoned surfaces.

A) the species is still young
B) the species is slightly older
C) the species is observed from the inside
D) the species is observed from the outside

Figure 15. Trametes elegans

o. Family Polyporaceae – Trametes ochracea

The basidioma is semicircular and laterally attached to the substrate. It exhibits conspicuous concentric zones of brown, gray, white, and yellow colors. The pore surface consists of small round pores that are white to cream when young and become yellowish or ochre with age. Gilbertson (2015) described this species as fan-shaped, kidney-shaped, or funnel-shaped, frequently growing in overlapping clusters and characterized by striking concentric color bands.

A) the species is still young
B) the species is slightly older
C) the species is observed from the inside
D) the species is observed from the outside

Figure 16. Trametes ochracea

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6. Conclusion

This study recorded 15 macrofungal species belonging to 9 families in Suco Manusae, Hatulia A Administrative Post, Ermera Municipality. The macrofungal community was dominated by wood-decaying taxa, particularly from the family Polyporaceae, indicating that decaying wood is the primary substrate supporting fungal diversity in the area. The application of the Shannon–Wiener diversity index suggests a moderate level of macrofungal diversity, reflecting a relatively stable but substrate-dependent ecological structure.

The findings highlight the ecological role of macrofungi as decomposers contributing to nutrient cycling in tropical forest ecosystems. This study provides baseline data for future biodiversity assessment and conservation planning in the region. Further studies incorporating molecular identification methods and quantitative ecological analysis are recommended to improve taxonomic accuracy and deepen understanding of fungal community structure.

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