

Original Article

Mycological Profiling and Taxonomic Inventory of Macrofungi in Biliran Province, Philippines: Insights into Island Biodiversity Records and Conservation

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Abstract

Background: Macrofungi serve essential ecological functions as decomposers, nutrient recyclers, and symbionts; however, their diversity across many regions of the Philippines remains insufficiently documented. In Biliran Province, researchers have conducted only limited surveys to record local macrofungal species. This study aimed to document the macroscopic fungi present in Barangay Iyusan, Almeria, Biliran, and to develop a taxonomic checklist that contributes to the province's growing inventory of macrofungi.

Methods: This investigation involved field sampling across different microhabitats, and specimens were described and identified based on their macroscopic characteristics using standard taxonomic keys. The team conducted classification following established hierarchies at the order, family, genus, and species levels.

Results: Overall, 169 macrofungal specimens were documented, comprising seven orders, 19 families, 34 genera, and 69 species. Of these, 28 were identified to genus level and 41 to species level. Agaricales was dominant, with *Marasmiellus*, *Marasmius*, *Lycoperdon*, *Delicatula*, and *Mycena* distributed across substrates including wood, leaf litter, twigs, soil, and manure.

Conclusion: The study highlights the rich yet understudied macrofungal diversity of Biliran Province, emphasizing the need for further systematic surveys to enhance the Philippines' mycological database.

Keywords

macrofungi, taxonomic checklist, Agaricales, *Marasmius*, *Mycena*, biodiversity, fungal ecology, species distribution

INTRODUCTION

With an estimate of 2.2 million to 3.8 million, fungi are one of the most diverse groups of organisms on Earth (Hawksworth & Lucking, 2017). Biologists once considered them to be plants because they possess stem-like and root-like structures, as well as cell walls. However, they cannot photosynthesize like plants; instead, they obtain their nutrition from organic substances in their environment by secreting enzymes that digest organic matter (Cullen, 2009). This makes fungi ecologically important because they decompose and recycle nutrients for plant use (Britto Martins de Oliveira et al., 2025). The bodies of fungi consist of filaments called hyphae, which make up the mycelium of the fungus (Cullen, 2009). The mycelium is commonly found underground and

creates the fruiting body that produces and releases spores necessary for fungal reproduction. These groups of fungi, distinguished by having spore-bearing structures visible to the naked eye, such as mushrooms, brackets, puffballs, false truffles, and cup fungi, are known as macrofungi (Mueller et al., 2007).

Macrofungi estimates range from 53,000 to 110,000 species, with the majority belonging to the Phylum Basidiomycetes and Ascomycetes (Sridhar & Deshmukh, 2019). Studies from the Philippines, such as those by Jacob et al. (2022) and Guerrero et al. (2020), have identified macrofungi that belong to the Phylum Basidiomycota. They cover 3,956 species and 818 genera, based on old published enumerations from studies conducted in the 1930s and 1977 (Nacua et al., 2018). The majority of these are saprobes or mycorrhizal symbionts, but some are pathogens of plants or fungi (Gatan et al., 2023; Priyashantha, et al., 2024). According to Hawksworth and Lucking (2017), an overall estimate of 2.2 million to 3.8 million fungal species exists worldwide. However, the recent estimate of fungi is higher than that, at 12 million, as assumed by Blackwell in 2011 (Wu et al., 2019).

Despite this number, literature agrees that fungal diversity is understudied and poorly documented (Mueller et al., 2007). The same is true in the Philippine setting, where a diverse macrofungi flora exists, but only a few regions have documented these data. These regions, among others, include Provinces such as Nueva Ecija, Bulacan, Isabela, Aurora, Tarlac, Pampanga, Zambales, Cavite, Laguna, Albay, Batangas, Camarines Sur, and Northern Samar. Many areas remain undiscovered, necessitating much more taxonomic research (Torres et al., 2020). One of which is Region VIII, where there has been only a single published research by Jusayan and Vicencio in 2019.

Wild macrofungi collection and identification could help develop a national macrofungi database (Guerrero et al., 2020; Torres et al., 2020). It can also help promote and protect mushroom biodiversity (Nacua et al., 2018) and forest biodiversity in general (Basalo et al., 2014). To advance biodiversity conservation strategies, identifying fungal species is essential for generating estimates and abundance trends through baseline and monitoring operations (Dhalberg & Mueller, 2011). This is often the case, as fungal diversity often functions in tandem with initiatives like "rainforestation," which promote environmental conservation and sustainable development (Fernandez & Bande, 2019). Furthermore, fungi are linked with air quality. Fungi can be of great help in understanding and formulating strategies to reduce air pollution, which, according to Castro e Silva et al. (2020), is evidently high in Southeast Asian countries, such as the Philippines. Despite their ecological significance, there is no existing documentation on the distribution and species listing of wild mycoflora in Biliran Province. Thus, this study aimed to document and identify the macrofungal diversity in Barangay Iyusan, Almeria, Biliran, and to provide a preliminary taxonomic checklist that will serve as a foundational reference for future mycological and biodiversity research in the region.

METHODS

Research Design

This research employed a descriptive research design, utilizing a quantitative approach, deemed appropriate for identifying characteristics, frequencies, trends, and taxonomic categories relevant to the abundance and distribution of macrofungi in the study area. Specifically, the documentary survey method was employed to systematically gather and analyze information from existing sources, including published research papers, review articles, books, and official records. Field observations and specimen documentation complemented these secondary data to ensure comprehensive coverage and validation of macrofungal diversity. Through this design, the study sought to establish a preliminary taxonomic profile of macrofungi in Barangay Iyusan, Almeria, Biliran, thereby contributing baseline information to the growing body of mycological research in the Philippines.

Research Locale

The study site of this research is located in Brgy. Iyusan, Almeria, Biliran. It is situated in the eastern part of the municipality at a distance of 7 kilometers from the Poblacion, and is located at 11°37'32" N latitude and 124°2'19" E longitude. The Barangay is situated on a 483.07-hectare land area that also features waterfalls, forests, mountainous regions, and rice terraces, which are the people's primary source of livelihood. The research team conducted an identification and documentation of macroscopic fungi in one of the mountainous areas, named Duwang-Duwang, which has an approximate land area of 7-10 hectares (Figures 1 & 2). The area is a perfect study site due to its mountains and forests, which have a sufficient amount of humidity to encourage the growth of macrofungi.

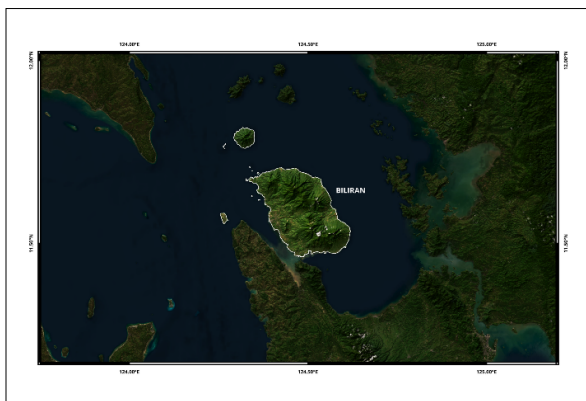


Figure 1. Map of Biliran Island



Figure 2. Map of Iyosan, Almeria, Biliran, Philippines

Data Gathering Procedure

The study was conducted from June to August of the current year, which is a favorable time for collection, as the rainy season promotes macrofungal growth. In addition to this, the researchers coordinated with knowledgeable locals to establish the transect lines and quadrats along the approximately 7-10-hectare site.

The researchers visited the sampling site for four consecutive days from the onset of the field study. The specimens were photo-documented in their natural habitat, carefully collected by wrapping them in tissue paper, and labeled according to the transect and quadrat to which they belonged, before being sealed in a zip-lock bag. Each specimen was preserved by air-drying. The researchers further identified the specimens at home.

Research Sampling

This research employs field sampling. The field samples utilize transect lines and quadrats in the study site to determine the abundance of species within the area. A total of 4 transect lines and 27 quadrats were established at the sampling site. Transect 1 measures 100 meters with a total of 9 quadrats, each with a 5m x 5m dimension. Transects 2, 3, and 4 measure 85 meters with six quadrats of 5m x 5m dimensions.

Data Analysis

The specimens were identified according to their external features (fruiting bodies). These are the different features of the pileus, gills, pores, and stipe (Torres et al., 2020). Substrates and growth habits were also identified. Data were cross-referenced to catalogs from published research inside and outside of the Philippines, which include studies by Lodge et al. (2004), Arenas et al. (2015), Ao et al. (2016), Nacua et al. (2018), Ao (2019), and Torres et al. (2020). Macrofungi distribution was determined using the frequency of macrofungi genera along the transect lines and quadrats.

RESULTS

Macrofungal Identification Based on External Features

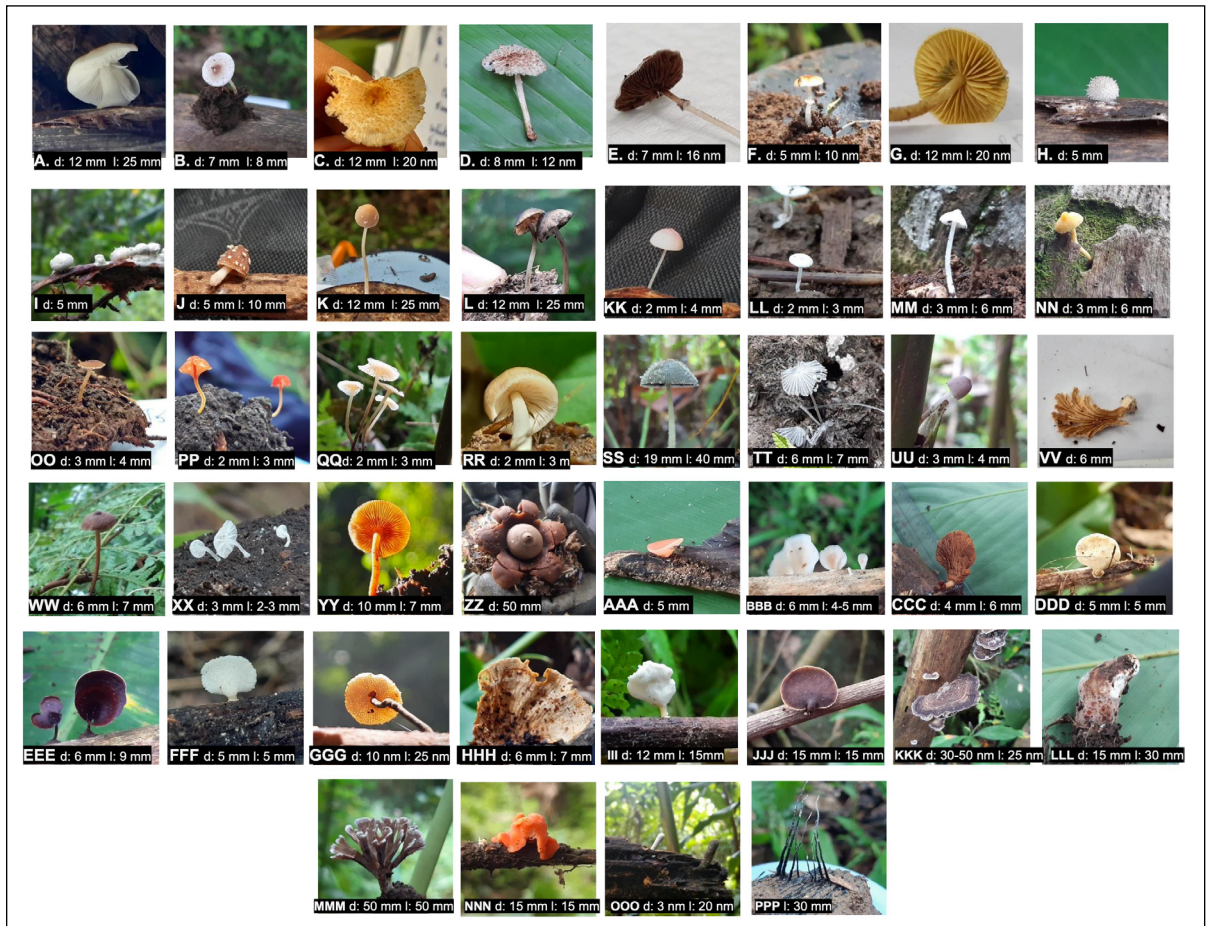
Table 1 presents the morphological characteristics of macrofungi collected and identified in Barangay Iyosan, Almeria, Biliran. The characterization of specimens was made possible with the aid of established taxonomic references, including those of Mueller (2007), Tadosa et al. (2011), and Torres et al. (2020). Recorded features include variations in the pileus (color, shape, and surface texture), stipe (color and form), gills (attachment and margin), pores (color and shape), and annulus (when present). Most specimens consisted of gilled mushrooms exhibiting diverse pileus and stipe characteristics, while several species displayed porous structures ranging from microporous to polyporous types. The data also noted substrate preference and growth habit, showing that most macrofungi were found on leaf litter, wood, and twigs, while a smaller number grew on soil and animal manure. The majority of the collected macrofungi exhibited solitary growth patterns rather than gregarious ones. Specimens were organized by taxonomic classification, ordered by Family, and then alphabetically by genus within each Family. Representative photographs of these macrofungi are shown in Figure 3.

Table 1. Characteristics of Macrofungi at Duwang-Duwang, Iyusan, Almeria, Biliran

Macrofungi	Description	Substrate	Growth Habit
<i>Agaricus sp.</i>	Creamy cap, closed attached gills, white stipe.	Banana stem	Solitary
<i>Lepiota cristata</i> (Bolton) P.Kumm.	White spotted cuspidate cap, free gills, white stipe	Soil	Solitary
<i>Lepiota sp. 1</i>	Scrobiculate golden brown cap, free gills, golden brown stipe	Soil	Solitary
<i>Lepiota sp. 2</i>	Scrobiculate white cap, free gills, Single edge annulus, white stipe	Soil	Solitary
<i>Lepiota sp. 3</i>	Smooth brown plane cap, free gills, single edge annulus, light brown stipe	Decaying wood	Solitary
<i>Lepiota trichoma</i> (Montoya & Bandala, 2006)	Broadly convex brwo spotted cap, adnate gills, single edged annulus, white clavate stipe	Soil	Solitary
<i>Leucogaricus rubrotinctus</i> (Peck & Singer, 1948)	Plane yellow cap, free gills, yellow stipe	Soil	Solitary
<i>Lycoperdon echinatum</i> Pers. (1797)	White spikey puffball	Decaying leaf	Solitary
<i>Lycoperdon perlatum</i> Pers. (1796)	Smooth white puffball	Decaying wood	Gregarious
<i>Conocybe sp. 1</i>	Parabolic warty cap, adnexed gills, white clavate stipe	Twig	Solitary
<i>Conocybe sp. 2</i>	Warty light brown cap, free gills, white stipe	Decaying leaf	Solitary
<i>Panaeolus cyanescens</i> (Berk. & Broome) Sacc.	Smooth convex brown cap, adnate gills, brown stipe	Decaying leaf	Gregarious
<i>Panaeolus cinctulus</i> (Bolton) Sacc. (1887)	Convex brown cap, attached gills, brown stipe	Soil	Solitary
<i>Ramariopsis kunzei</i> (Fr.) Corner (1950)	White coral fungus	Soil	Solitary
<i>Crepidotus applanatus</i> (Pers.) P.Kumm.	Plane Light brown cap, , lateral attachment, no stipe	Twig	Solitary
<i>Crepidotus sp. 1</i>	Irregular -shaped white cap, free gills, lateral attachment, no stipe	Twig	Solitary
<i>Crepidotus sp. 2</i>	Plane white cap, marginate gills, no stipe	Twig	Solitary
<i>Crepidotus sp. 3</i>	Plane light brown cap, adnate gills, lateral attachment, no stipe	Twig	Solitary
<i>Calyprella capula</i> (Holmsk.) Quel (1888)	Radially fibrillose white cap, decurrent gills, white stipe	Branch	Gregarious
<i>Campanella caesia</i> (Romagn.)1981	Creamy netted cap, decurrent gills, no stipe	Twig	Solitary
<i>Campanella sp.</i>	Netted white cap, free gills, no stipe	Twig	Solitary
<i>Collybiopsis sp.1</i>	Concave light brown cap, attached gills ,light brown stipe	Coconut husk	Gregarious
<i>Marasmiellus candidus</i> Murril (1915)	Irregular-shaped white cap, adnex gills, no stipe	Twig	Gregarious
<i>Maramiellus ramealis</i> (Bull.) Singer (1948)	Moderate indented white cap, decurrent gills, white stipe	Tree bark	Pair
<i>Marasmius calhouniae</i> Singer (1989)	Moderate indented light brown cap, decurrent gills, light brown stipe	Soil	Pair
<i>Marasmius crinis-equi</i> (F.Muell. ex Berk.)	Smooth light brown cap with pipella, attached gills, black stipe	Twig	Solitary
<i>Marasmius siccus</i> (Schwein. ex Fr.)	Smooth orange cap with pipella, attached gills, black stipe	Twig	Solitary
<i>Marasmius sp.1</i>	Smooth white cap with pipella, decurrent gills, white stipe	Twig	Solitary
<i>Marasmius sp. 2</i>	White, vellose pane cap, decurent gills, black stipe	Decayed leaf	Gregarious
<i>Marasmius sp. 3</i>	Deeply indented White cap, decurrent gills, black stipe	Decayed leaf	Gregarious
<i>Favolaschia pustulosa</i> (Jungh.) Kuntze	Plane Light brown cap, net-like lateral gills, no stipe	Decayed leaf	Gregarious
<i>Hymimycena epichloe</i> (Kuhner) Singer	Deeply indented white cap, decurrent gills, white stipe	Decayed leaf	Solitary
<i>Hemimycena ignobilis</i> (Joss. ex Bon)	Broadly convex white cap, free gills, white stipe	Decayed leaf	Solitary
<i>Mycena adscendens</i>	Plane white cap, decurrent gills, white stipe	Decayed wood	Solitary

Table 1. continued

Macrofungi	Description	Substrate	Growth Habit
<i>Mycena chlorophos</i> (Berk. & M.A. Curtis) Sacc. (1887)	Radially fibrillose white cap, free gills, white stipe	Soil	Solitary
<i>Mycena</i> sp. 1	Smooth white cap, free gills, white stipe	Twig	Solitary
<i>Mycena</i> sp. 2	Convex Light pink cap, free gills, white stipe	Twig	Solitary
<i>Mycena</i> sp. 3	Smooth white cap, adnate gills, white stipe	Soil	Solitary
<i>Mycena</i> sp. 4	Campanulate white, cap, free gills, white stipe	Soil	Solitary
<i>Mycena</i> sp. 5	Camapanulate yellow cap, free gills, yellow stipe	Tree bark	Solitary
<i>Mycena</i> sp. 6	Scrobiculate brown, cap, adnate gills, light brown stipe	Soil	Solitary
<i>Mycena</i> sp 7	Broadly parabolic Red -orange cap, decurrent gills , orange stipe	Soil	Pair
<i>Roridomyces roridus</i> (Fr.) Rexer (1994)	Radially fibrillose white cap, decurrent gills, light- brown stipe	Soil	Gregarious
<i>Pluteus podospileus</i> Sacc. & Cub. (1887)	Convex light- brown cap, free gills, white clavate stipe	Soil	Solitary
<i>Coprinopsis lagopus</i> (Fr.) Redhead, Vilgalys & Moncalvo (2001)	Radially fibrillose surface with hairy hemispheric gray cap, free gills, gray tapered stipe	Soil	Solitary
<i>Parasola plicatilis</i> (Curtis) Redhead, Vilgalys & Hopple (2001)	Radially firebrellose Gray cap, adnate gills, gray stipe	Animal manure	Gregarious
<i>Parasola</i> sp.	Radially fibrillose broadly parabolic Lavender cap, free gills, white stipe	Tree bark	Solitary
<i>Schizophyllum commune</i> (Fr., 1815)	Irregular -shaped light- brown cap, decurrent gills, no stipe	Decayed wood	Solitary
<i>Psilocybe medullosa</i> (Bres.) Borovicka, 2007	Dark- brown cap with papillae, free gills, dark -brown stipe	Soil	Solitary
<i>Delicatula integrella</i> (Pers.) Fayod, 1889	Smooth White cap with pepilla, decurrent gills, white stipe	Soil	Gregarious
<i>Tubaria furfuracea</i> (Pers.) Gillet, 1876	Plane golden -yellow cap, adnate gills, golden -yellow stipe	Soil	Solitary
<i>Geastrum saccatum</i> (Fr. 1829)	Flower- shaped	Soil	Solitary
<i>Sarcoscypha occidentalis</i> (Schwein.) Sacc.	Pink, jelly-like cap	Decayed branch	Solitary
<i>Podoscypha venustula</i> (Speg.) D.A.Reid, 1965	White , smooth, micropuros	Tree bark	Gregarious
<i>Daedalopsis tricolor</i> (Bull.) Bondartsev & Singer, 1941	PlaneDark –orange cap, adnexed gills,no stipe	Tree bark	Solitary
<i>Microporus</i> sp.	White, polypore	Twig	Solitary
<i>Microporus xanthopus</i> (Fr.) Kuntze, 1898	Dark brown, smooth surface	Tree bark	Pair
<i>Polyporus ianithus</i> (Gibertoni & Ryvaden)	White polypore, frilled margin	Tree bark	Solitary
<i>Polyporus</i> sp. 1	Orange, plane cap, brown stipe	Tree bark	Solitary
<i>Polyporus</i> sp. 2	Light brown, irregular shaped	Twig	Solitary
<i>Polyporus</i> sp. 3	White polypore	Twig	Solitary
<i>Polyporus</i> sp. 4	Brown polypore	Twig	Solitary
<i>Trametes versicolor</i> (L.) Lloyd (1920)	Irregular shaped, color striations	Tree bark	Gregarious
<i>Hydrellum peekii</i> Banker (1912)	Irregular shaped, red spots	Soil	Solitary
<i>Thelephora anthocephala</i> (Bull.) Fr. (1838)	Brown, coral-like	Soil	Solitary
<i>Tremella</i> sp.	Orange, jelly-like	Twig	Solitary
<i>Xylaria cubensis</i> (Mont.) Fr.	Black and white, erected	Tree bark	Pair
<i>Xylaria culleniae</i> Berk. & Broome, 1873	Black, spikey, white tipped	Twig	Gregarious



Legends: d – Diameter, l – Length of Stipe

A. *Agaricus* sp. B. *Lepiota cristata* (James Bolton) C. *Lepiota* sp. 1 D. *Lepiota* sp. 2 E. *Lepiota* sp. 3 F. *Lepiota trachoma* G. *Leucogarius rubrotinctus* H. *Lycoperdon echinatum* I. *Lycoperdon perlatum* J. *Conocybe* sp. 1 K. *Conocybe* sp. 2 L. *Panaeolus cyanescens* (Berkeley and Broome) M. *Panaeolus cinctulus* (Bolton Saccardo) N. *Ramariopsis kunzei* O. *Crepidotus applanatus* (Paul Kummer) P. *Crepidotus* sp. 1 Q. *Crepidotus* sp. 2 R. *Crepidotus* sp. 3 S. *Calyptella capula* (Holmsk 1886 T. *Campanella caesia* U. *Campanella* sp. V. *Collybiopsis* sp. 1 W. *Marasmiellus candidus* (William Murrill) X. *Marasmiellus ramealis* (Bull.) Y. *Marasmius calhouniae* (Fieldiana) Z. *Marasmius crinis-equi* (F. Muell. ex Berk.) AA. *Marasmius siccus* (Schwein. ex Fr.) BB. *Marasmius* sp. 1 CC. *Marasmius* sp. 2 DD. *Marasmius* sp. 3 EE. *Favolaschia pustulosa* (Jung.) Kuntze FF. *Hymenocyna epichloe* GG. *Hemimycena ignobilis* (Joss. ex Bon) HH. *Mycena adscendens* (Wilhelm Gottfried Lasch) II. *Mycena chlorophos* (Miles Berkeley and Moses Ashley Curtis) JJ. *Mycena* sp. 1 KK. *Mycena* sp. 2 LL. *Mycena* sp. 3 MM. *Mycena* sp. 4 NN. *Mycena* sp. 5 OO. *Mycena* sp. 6 PP. *Mycena* sp. 7 QQ. *Roridomyces roridus* (Rexer) RR. *Pluteus podospileus* (Pier Andrea Saccardo and Giuseppe Cuboni) SS. *Coprinopsis lagopus* (Redhead, Vilgalys & Moncalvo TT. *Parasola plicatilis* (Elias Magnus Fries) UU. *Parasola* sp. VV. *Schizophyllum commune* (John Raper) WW. *Psilocybe medullosa* (Giacomo Bresadola) XX. *Delicatula integrella* (Fayod) YY. *Tubaria furfuracea* (Christiaan Hendrik Persoon) XX. *Geastrum saccatum* (Elias Magnus Fries) AAA. *Sarcoscypha occidentalis* (Schwein.) Sacc. BBB. *Podoscypha venustula* (Speg.) D.A. Reid CCC. *Daedalopsis tricolor* DDD. *Microporus* sp. EEE. *Microporus xanthopus* (Fr.) Kuntze FFF. *Polyporus ianithus* GGG. *Polyporus* sp. 1 HHH. *Polyporus* sp. 2 III. *Polyporus* sp. 3 JJJ. *Polyporus* sp. 4 KKK. *Trametes versicolor* LLL. *Hydrellum peekii* MMM. *Telephora anthocephala* NNN. *Tremella* sp. OOO. *Xylaria cubensis* PPP. *Xylaria culleniae*

Figure 3. Photo-documents of the Identified Macrofungi at Duwang-Duwang, Iyusan, Biliran

Distribution of Macrofungi in the Area

Table 2 presents the distribution of macrofungi recorded across four established transects and 27 quadrats within the approximately two-hectare study site. Transect 1 measured 100 meters with nine 5 m x 5 m quadrats, while Transects 2, 3, and 4 each measured 85 meters with six 5 m x 5 m quadrats. The presence of macrofungi in specific transects and quadrats was indicated by plus (+) signs, with varying colors representing different species observed within a genus.

Table 2. Distribution of Macrofungi in different transects and quadrats in the study area at Iyusan, Almeria, Biliran

Transect	Transect 1									Transect 2						Transect 3						Transect 4											
Quadrat	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6						
ORDER: Agaricales																																	
Agaricaceae																																	
Agaricus																																	
Lepiota		+							+		+																					+	+
Leucogaricus															+																		
Lycoperdon						+	+				+	+	+	+	+																	+	+
Bolbitiaceae																																	
Conocybe											+																					+	+
Panaeolus																																	+
Clavariaceae																																	
Ramariopsis																																	+
Crepidotaceae																																	
Crepidotus									+					+																	+	+	
Marasmiceae																																	
Calyptella															+																		
Campanella														+	+																		
Collybiopsis																																+	+
Marasmiellus																																+	+
Marasmius																																+	+
Mycenaceae																																	
Favolaschia																																+	+
Hemimycena															+																		
Mycena																																+	+
Roridomyces																																	
Pluteaceae																																	
Pluteus																																	
Psathyrellaceae																																	
Coprinopsis																																	
Parasola																																	
Schizophyllaceae																																	
Schizophyllum																																	+
Strophariaceae																																	
Psilocybe																																	
Tricholomataceae																																	
Delicatula																																+	+

Table 2. continued

Transect	Transect 1									Transect 2						Transect 3						Transect 4					
Quadrat	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6
Tubariaceae																											
Tubaria											+				+												
ORDER: Geastrales																											
Geastreaceae																											
Geastrum																	+		+						+		
ORDER: Pezizales																											
Sarcoscyphaceae																											
Sarcoscypha																											+
ORDER: Polyporales																											
Meruliaceae																											
Podoscypha																		+	+								+
Polyporaceae																											
Daedalopsis																									+		
Microporus																		+							+	+	
Polyporous			+															+	+						+		
Trametes																											+
ORDER: Thelephorales																											
Bankeraceae																											
Hydrellum																											+
Thelephoraceae																											
Thelephora														+	+											+	
ORDER: Tremellales																											
Tremellaceae																											
Tremella						+																					
ORDER: Xylariales																											
Xylariaceae																											
Xylaria														+	+											+	
Total Genera (TL)	15									16						20						16					
Composition (%)	62.5									66.66						83.33						66.66					

+ = observed

Composition (%) = observed Genus in TL divided by total Genera x 100%

Fifteen genera (62.5%) were recorded in Transect 1, dominated by *Marasmius*, *Marasmiellus*, *Lycoperdon*, and *Delicatula*, while the remaining 11 genera appeared once or twice. Transect 2 yielded 16 genera (66.66%), with *Maramius* as the most dominant. Transect 3 recorded the highest occurrence with 20 genera (83.33%), dominated by *Lycoperdon*, while Transect 4 had 16 genera (66.66%), dominated by *Mycena*. Overall, the genera *Marasmiellus*, *Marasmius*, *Lycoperdon*, and *Mycena* were the most widely distributed, appearing in all transects and most quadrats. Less frequent genera included *Gymnopus*, *Calyptella*, *Parasola*, *Schizophyllum*, *Geastrum*, *Sarcophylla*, *Polyporus*, *Hydnellum*, and *Tremella*.

Environmental observation also showed that Transect 3 exhibited the highest macrofungal abundance, corresponding to areas with secondary forest cover and agroforestry systems rich in decomposing organic matter. In contrast, Transect 1, characterized by a more disturbed ecosystem, exhibited the lowest diversity and abundance.

Based on the taxonomic checklist (Table 3), a total of 69 macrofungal species were identified, representing 34 genera, 19 families, and seven orders: Agaricales, Geastrales, Pezizales, Polyporales, Thelephorales, Tremellales, and Xylariales. Among these, Agaricales was the most dominant order, comprising 11 families, 24 genera, and 51 species. Polyporales followed with two families, five genera, and nine species, while Thelephorales consisted of two families, two genera, and two species. The remaining orders – Geastrales, Pezizales, Tremellales, and Xylariales – each contained a single family, genus, and species. Of the total, 41 macrofungi were identified to the species level, while 28 were determined only to the genus level. These data are graphically summarized in Figure 3.

Table 3. Taxonomic List of Macrofungi at Duwang-Duwang, Iyusan, Almeria, Biliran

Order	Family	Genus	Species	
Agaricales	Agaricaceae	<i>Agaricus</i>	<i>Agaricus</i> sp.	
		<i>Lepiota</i>	<i>Lepiota cristata</i> (James Bolton)	
			<i>Lepiota</i> sp. 1	
			<i>Lepiota</i> sp. 2	
			<i>Lepiota</i> sp. 3	
			<i>Lepiota trichoma</i>	
		<i>Leugaricus</i>	<i>Leugaricus rubrotinctus</i>	
		<i>Lycoperdon</i>	<i>Lycoperdon echinatum</i>	
			<i>Lycoperdon perlatum</i>	
		Bolbitiaceae	<i>Conocybe</i>	<i>Conocybe</i> sp. 1
				<i>Conocybe</i> sp. 2
	<i>Panaeolus</i>	<i>Panaeolus cyanescens</i> (Berkeley and Broome)		
		<i>Panaeolus cinctulus</i> (Bolton Saccardo)		
Clavariaceae	<i>Ramariopsis</i>	<i>Ramariopsis kunzei</i>		
Crepidotaceae	<i>Crepidotus</i>	<i>Crepidotus applanatus</i> (Paul Kummer)		
		<i>Crepidotus</i> sp. 1		
		<i>Crepidotus</i> sp. 2		
Marasmiaceae	<i>Calyprella</i>	<i>Calyprella capula</i> (Holmsk)		
		<i>Campanella</i>		
	<i>Collybiopsis</i>	<i>Campanella caesia</i>		
		<i>Campanella</i> sp.		
	<i>Marasmiellus</i>	<i>Collybiopsis</i> sp.		
		<i>Marasmiellus candidus</i> (William Murrill)		
	<i>Marasmius</i>	<i>Maramiellus ramealis</i> (Jean Baptiste Francois "Pierre" Bulliard)		
		<i>Marasmius calhouniae</i> (Fieldiana)		
		<i>Marasmius crinis-equi</i> (F.Muell. ex Berk.)		
		<i>Marasmius siccus</i> (Schwein. ex Fr.)		
<i>Marasmius</i> sp. 1				
<i>Marasmius</i> sp. 2				
Mycenaceae	<i>Favolaschia</i>	<i>Marasmius</i> sp. 3		
		<i>Favolaschia pustulosa</i> (Jungh.) Kuntze		
		<i>Hemimycena</i>		
	<i>Hemimycena</i>	<i>Hemimycena epichloe</i>		
		<i>Hemimycena ignobilis</i> (Joss. ex Bon)		

Table 3. continued

Order	Family	Genus	Species
		<i>Mycena</i>	<i>Mycena adscendens</i> (Wilhelm Gottfried Lasch) <i>Mycena chlorophos</i> (Miles Berkeley and Moses Ashley Curtis) <i>Mycena</i> sp. 1 <i>Mycena</i> sp. 2 <i>Mycena</i> sp. 3 <i>Mycena</i> sp. 4 <i>Mycena</i> sp. 5 <i>Mycena</i> sp. 6 <i>Mycena</i> sp. 7
		<i>Roridomyces</i>	<i>Roridomyces roridus</i> (Rexer)
	Pluteaceae	<i>Pluteus</i>	<i>Pluteus podospileus</i> (Pier Andrea Saccardo and Guisepe Cuboni)
		<i>Coprinopsis</i>	<i>Coprinopsis lagopus</i> (Redhead, Vilgalys & Moncalvo)
		<i>Parasola</i>	<i>Parasola plicatilis</i> (Elias Magnus Fries) <i>Parasola</i> sp.
	Schizophyllaceae	<i>Schizophyllum</i>	<i>Schizophyllum commune</i> (John Raper)
	Strophariaceae	<i>Psilocybe</i>	<i>Psilocybe medullosa</i> (Giacomo Bresadola)
	Tricholomataceae	<i>Delicatula</i>	<i>Delicatula integrella</i> (Fayod)
	Tubariaceae	<i>Tubaria</i>	<i>Tubaria furfuracea</i> (Christiaan Hendrik Persoon)
Geastrales	Geastreaceae	<i>Geastrum</i>	<i>Geastrum saccatum</i> (Elias Magnus Fries)
Pezizales	Sarcoscyphaceae	<i>Sarcoscypha</i>	<i>Sarcoscypha occidentalis</i> (Schwein.) Sacc.
Polyporales	Meruliaceae	<i>Podoscypha</i>	<i>Podoscypha venustula</i> (Speg.) D.A.Reid
	Polyporaceae	<i>Daedalopsis</i>	<i>Daedalopsis tricolor</i>
		<i>Microporus</i>	<i>Microporus</i> sp. <i>Microporus xanthopus</i> (Fr.) Kuntze
		<i>Polyporus</i>	<i>Polyporus ianithus</i> <i>Polyporus</i> sp. 1 <i>Polyporus</i> sp. 2 <i>Polyporus</i> sp. 3 <i>Polyporus</i> sp. 4
		<i>Trametes</i>	<i>Trametes versicolor</i>
Thelephorales	Bankeraceae	<i>Hydrellum</i>	<i>Hydrellum peekii</i>
	Thelephoraceae	<i>Thelephora</i>	<i>Thelephora anthocephala</i>
Tremellales	Tremellaceae	<i>Tremella</i>	<i>Tremella</i> sp.
Xylariales	Xylariaceae	<i>Xylaria</i>	<i>Xylaria cubensis</i> <i>Xylaria culleniae</i>

Table 4. A Summary of the Number of Macrofungi Families, Genera, and Species in Every Identified Macrofungi Order

Order	No. of Families	No. of Genus	No of Species
Agaricales	11	24	51
Geastrales	1	1	1
Pezizales	1	1	1
Polyporales	2	5	9
Thelephorales	2	2	2
Tremellales	1	1	1
Xylariales	1	1	1
TOTAL	19	34	69

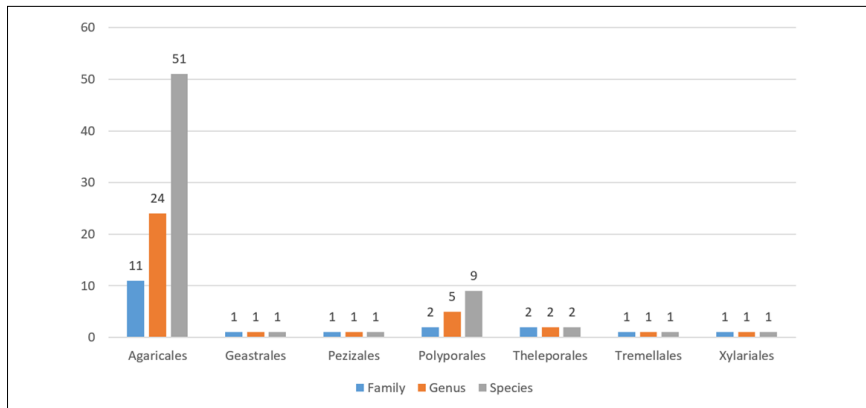


Figure 4. Number of Macrofungi Family, Genera, and Species in every identified Order

DISCUSSION

The diversity of macrofungal forms observed in Barangay Iyusan reflects the ecological characteristics of a typical rural forest ecosystem, where decaying wood, leaf litter, and twigs provide rich organic substrates for fungal growth. The predominance of gilled mushrooms and the presence of microporous and polyporous species align with the findings of [Dulay et al. \(2020\)](#) and [Tadiosa et al. \(2011\)](#), who emphasized that saprophytic macrofungi flourish in environments rich in lignin and cellulose. These species, primarily Basidiomycetes, play a crucial role in decomposing organic matter, enhancing soil fertility, and regulating nutrient cycling within the forest ecosystem.

The observed solitary growth habit among most specimens, similar to the report by [Torres et al. \(2020\)](#), may be attributed to the microclimatic conditions of the study site, particularly humidity, shade, and substrate availability. The shaded and moist areas of Barangay Iyusan create favorable microhabitats that support the proliferation and diversity of fungi. Collectively, these findings highlight that the area's microenvironmental heterogeneity and abundant organic debris foster a dynamic fungal community that significantly contributes to ecological balance.

Spatial variations in species distribution across transects further indicate the influence of environmental factors such as vegetation density, canopy cover, and substrate type on fungal occurrence. Transect 3, which exhibited the most remarkable species richness, contained secondary forests and agroforestry areas rich in organic matter and stable moisture, conditions also reported by [Dulay et al. \(2020\)](#) as ideal for macrofungal diversity. Conversely, the lower abundance in Transect 1 suggests habitat disturbance and reduced soil moisture, confirming that the presence of macrofungi can serve as a bioindicator of habitat quality and environmental stability.

Taxonomically, the dominance of the genera *Marasmiellus*, *Marasmius*, *Lycoperdon*, and *Mycena*, and the order Agaricales, corroborates previous local studies ([Tadiosa et al., 2011](#); [Torres et al., 2020](#)), indicating their ecological resilience and adaptability to various substrates and conditions. While Polyporales are often prevalent in other forest types, the predominance of Agaricales in Barangay Iyusan suggests that the area's specific climatic and edaphic factors favor their proliferation.

The macrofungal assemblage in Barangay Iyusan demonstrates considerable biodiversity value, reflecting the ecological richness and environmental stability of the site. These results underscore the crucial role of macrofungi in sustaining nutrient cycling and forest regeneration, highlighting the need for ongoing documentation of biodiversity and the implementation of practical conservation efforts.

CONCLUSION

Collectively, this study established a preliminary account of macrofungal diversity in Duwang-duwang, Iyusan, Almeria, and Biliran, documenting 69 species across 34 genera and 19 families. The dominance of Agaricales, particularly *Marasmiellus*, *Marasmius*, *Lycoperdon*, *Delicatula*, and *Mycena*, highlights the ecological adaptability of these genera to the area's organic-rich and humid environment. Most species were found growing solitarily on substrates such as leaf litter, wood, and twigs, reflecting the influence of

nutrient and climatic factors on fungal distribution. Serving as the first taxonomic record for the province, the findings provide a baseline for future biodiversity assessments and underscore the importance of sustained mycological documentation in strengthening fungal research and conservation efforts in the Philippines.

Author Contributions

M. B. Sulteras: Conceptualization, Data gathering, Writing – Original Draft, Writing – Review & Editing, Methodology; **L. M. E. Ligoyligoy:** Conceptualization, Data gathering, Writing – Original Draft; **A. A. Ebajan:** Conceptualization, Data gathering, Writing – Original Draft; **E. D. Sumayao:** Conceptualization, Supervision, Writing – Review & Editing, Methodology; **A. S. Dy:** Conceptualization, Supervision, Writing – Review & Editing.

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Ethical Approval

Informed consent was obtained from Biliran Province State University and the Local Government Unit of Municipality of Almeria, Biliran, prior to the conduct of the study.

Competing interest

The authors declare no conflicts of interest.

Data Availability

Data will be made available by the corresponding author on request.

Declaration of Artificial Intelligence Use

In this work, the authors utilized AI tools (ChatGPT Open AI) for language editing only. The content is originally composed by the authors. The authors take full responsibility for the published content.

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