SPECIES RICHNESS OF MACROLICHENS IN MT. SAPINIT, SITIO DAGULOS, LA ROXAS, MARAMAG, BUKIDNON

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DOI: https://doi.org/10.56293/IJASR.2022.5495

IJASR 2023
VOLUME 6
ISSUE 1 JANUARY - FEBRUARY **ISSN: 2581-7876**

Abstract: The species richness of macrolichens in Mt. Sapinit, SitioDagulos, and MaramagBukidnon was investigated. The main objective of the study is to determine the species richness of macrolichens in the vicinity of Mt. Sapinit. Transect walk and quadrat sampling were carried out in the collection of macrolichens. The gathering and identification of specimens collected was based on standard taxonomical procedure. Results of the study revealed a total of 20 species classified into 7 genera and 13 families. The most family-rich species belong to the family Lobariaceae, and the least family-rich belong to Ramalinaceae, Collemataceae, and Dictyonemaceae. Most of the epiphytic macrolichens belong to the family Parmeliaceae, which dominates the entire montane forest. The distribution of macrolichens across the area occurs in the bark of the tree, logs and twigs, and in tree branches.Elevation also have impact to the growth of lichen species. Higher elevations appear to provide suitable condition for many lichen species to thrive. Thus, the need to preserve the forest ecosystem is essential in order to conserve the lichen communities.

Keywords: Species Richness, Macrolichens

INTRODUCTION

Background of the Study

The high diversity of epiphytes found in montane tropical forests accounts for a significant portion of biodiversity and green biomass, especially in areas where fog occurs daily. Macrolichens make up a substantial part of these epiphytes (Chavez et al., 2012). They are essential components of forest biodiversity and are vital to the health and well-being of an entire ecosystem. It provides a wealth of information about the health of our natural areas.

In almost all terrestrial habitats, lichens can be found and cover around 8% of the Earth's land area. Despite their potential role in the ecosystem, lichens' impact on community processes and ecosystem functioning has received little attention (Asplund and Wardle, 2017). Lichens are valuable bio-indicators for assessing the effects of human activities on the Earth's ecosystems, which are changing at an increasing rate.

Mt. Sapinit is a newly opened tourist destination for the general public, and as such, it faces a high risk of extinction if it is not adequately conserved. Since it was opened to the public not too long ago, no comprehensive studies have been conducted on the current species richness of macrolichens on the mountain. Species richness is used to assess the diversity of the abundance of lichens. If there were a more significant number of species, there would be more species richness and hence the ecosystem would be more stable, and will also contribute to an increase in biodiversity.

Lichens are a symbiotic relationship between a filamentous fungus, known as a "mycobiont," and at least one photosynthetic organism, known as a "photobiont," which can be a microalga, a cyanobacterium, or both. They are a highly successful group of symbiotic organisms that thrive in various environments worldwide. Unlike trees and flowers that get their nutrients from soil and rain, and get their food from the air, and they rely on the atmosphere for all of their nutrients.

Lichens can be divided into macrolichens and crustose lichens. Macrolichens are large enough to notice and come in various growth types, whereas crustose lichens (or microlichens) are tiny and appressed to the substrate. They grow in multiple ways, with the most common morphological types being crustose, foliose, and fruticose. The crustose have a "crust-like" appearance and are tightly attached to or embedded in their substrate. They have no cortex and colonize and persist on rocks and trees in large patches. The foliose have a leaf-like appearance and structure and are loosely adhered to the substrate and the fruticose have a shrub-like or branched appearance with no distinct top and bottom and are often round in cross-section (De Santis, 1999; Magday et al., 2019).

Mount Sapinit is a tourist mountain destination in Bukidnon. It has a panoramic view of the province's mountains and has a wide grassland, untouched rainforests, and waterfalls. The altitude is 1620 meters (5315 ft) and is located at SitioDagulos, Brgy. La Roxas, Maramag, Bukidnon province in Region X.

Information on species richness is crucial for guiding biodiversity conservation and management, but it is scarce in the Philippines' megadiverse biodiversity conservation hotspot (Supsup et al., 2020). This study aims to examine the species richness of macrolichens and evaluate their distribution statues in Mt. Sapinit. The researchers hope to contribute information to future researchers interested in studying the diversity of lichens and raising conservation awareness of the newly discovered mountain site.

Objectives of the Study

The main objective of the study is to determine the species richness of macrolichens in the vicinity of Mt. Sapinit, Sitio Dagulos, La Roxas, Maramag, and Bukidnon, Philippines.

Specifically, it aimed to:

1. Identify the different species of macrolichens in the study site;
2. Determine the macrolichens in terms of:

    a. species richness
    b. species composition
    c. species distribution in terms of microhabitat preferences.

Significance of the Study

Identifying species richness provides key data that enables researchers to determine the number of species within a defined region. The study's findings will include information on the many macrolichens species present on Mt. Sapinit, as well as their habitats and diversity. Significantly, the outcome of this study will provide an assessment as to which species of macrolichens are most abundant and least abundant in the area. This will also ensure the protection and conservation of the macrolichens and their associated habitats. Thus, the result of this study will provide additional data on the identified species of macrolichens in Bukidnon, Philippines.

Scope and Limitations of the Study

This study focuses on the species richness of macrolichens in Mt. Sapinit, Dagulos, Maramag, Bukidnon. It covers the identification of the different species of macrolichens present in the area, from the most abundant to the least abundant, and the ecological importance of macrolichens in the location. The researchers collected the data samples through the transect walk and quadrat sampling methods. The sampling gathering procedure might have been affected by the following circumstances: Firstly, the forest area of Mt. Sapinit where the samples were taken was highly unfavourable due to its elevation, and secondly, some species of macrolichens whose substrates were on the top of trees were not taken due to high risk.

REVIEW OF LITERATURE AND STUDIES

This section presents the review of literature related to the current research on Species Richness of Lichens, Ecology, Taxonomy, and Significance of Lichens

Lichens are one of the outstanding groups of symbiotic organisms utilizing a wide range of habitats worldwide. Though this nonvascular plant is often small and inconspicuous, it plays a vital role in the forest ecosystem (Balaji&Hariharan, 2013). They get most of their minerals and nutrients from the air. They need clean air to grow (Rapai et al., 2012). Lichens grew slowly and were the most advanced organisms in harsh environments such as the cold arctic and alpine environments, where few other plants could survive (Baniya et al., 2009).

In the study by Magday et al. (2020), the species distribution and species richness of macrolichens are related to substrate similarity and microhabitat diversity. Regarding microhabitat specificity, 19 species occurred exclusively on tree trunks, 12 species on rocks, and 36 were confined to canopy branches. On the tree trunks as well as on rocks, the majority of the lichens observed were cyanolichens. This proves that macrolichen has light specificity since there are species inhabiting tree trunks and their canopy branches. Sequiera and Kumar (2008) further investigated and concluded that specific macrolichens could thrive in specific hosts such as trees due to the species' ecological conditions. The parameters like bark pH, nutrient status, water holding capacity, and buffer capacity of host trees are the factors to consider. Lichens are not parasites when they grow on other plants; they do not consume any parts of the plant or poison it, and they are not known to harm the trees they grow on directly. (Colley, 2008). Because sensitivity to prevalent anthropogenic contaminants varies by species, epiphytic lichen is widely known as a good bioindicator of air quality. (Mc Cune and Jovan, 2015). Recent research on bryophyte diversity in northern South American lowland forests have revealed the existence of a new cloud forest type, the "tropical lowland cloud forest" (LCF). LCF is abundant in epiphytes and appears in river valleys with high air humidity and radiation fog. (Normann et al., 2010). Lichens thrive in moist, humid environments, and the ideal temperature for macrolichen growth is 20–250°C (Mishra &Upreti, 2016).

The species richness of macrolichens cannot be assumed to decrease linearly along elevation gradients. Elevation changes include changes in precipitation, temperature, humidity, and light, which are factors known to influence the distribution of lichen communities. Lichens may be less observable at low altitudes because of dense forest canopies and intensive land use. Moreover, as lichen species richness tends to be universally greater in cool or cold climates, research believes that the substantial reduction in lichen richness at low elevations is real and not a sampling artifact (Baniya et al., 2009). This type of plant needs suitable habitat because it needs a suitable habitat, reflecting that varying ecological conditions (water, light, temperature, and dominant substrate) that influence growth are important (Rapai et al. 2012). Studies concluded that vascular plants, along with lichens and bryophytes, have different distribution patterns across an elevation gradient.

Taxonomy

Lichens are one of the first symbiotic organisms discovered. Lichens consist of a fungus that gives structure and an alga that supplies energy through photosynthesis. However, attempts to recreate a lichen in the lab using only these two partners were never successful. The researchers used current tools to find a third symbiont that helps the lichen grow its outer cortex. (Spiribell et al., 2014). Higher epiphyte diversity was associated with a mixed tree species composition in the stand. (Cleavitt et al., 2009). For over 140 years, lichens have been thought of as a symbiosis between a single fungus, usually an ascomycete, and a photosynthesizing partner. Other fungi have long been recognized as parasites or endophytes on lichens, but the one lichen–one fungus paradigm has rarely been challenged.

Many common lichens are made up of the well-known ascomycete, the photosynthesizing partner, and, surprisingly, certain basidiomycete yeasts. These yeasts live in the cortex, and their abundance is linked to previously unexplained phenotypic variances. Basidiomycete lineages have been detected on six continents and maintain intimate connections with specific lichen species over long distances. Long thought to be a zone of differentiated ascomycete cells, the structurally crucial lichen cortex now appears to include two unrelated fungi. The number of fungi is estimated to be between 1.5 and 3 million. Lichenized species are thought to make up only a small percentage of this total, with undiscovered species richness concealed within tropical microlichens. On the other hand, recent discoveries imply that some macrolichens contain a huge number of previously unknown taxa, potentially boosting known species diversity by order of magnitude or more. (Lucking et al., 2014).

Lichens can be classified as macrolichens (all foliose and fruticose lichens) and micro-lichens (crustose lichens) based on their growth form. While many macrolichens are very straightforward to sample and identify, microlichens require significantly more effort from expert taxonomists to identify species (Dietrich &Scheidegger 1996; Ellis &

Coppins 2006). Some epiphytic macrolichens have been used to identify forests with high conservation importance for the preservation of biodiversity. (Uliezka and Angelstam, 1999). Understanding species richness along elevation gradients might help conservationists develop more successful tactics, especially in locations where local anthropogenic stressors and climate change are prominent. (Nanda et al., 2021). Finding inexpensive ways to quantify species richness or vulnerable species richness for a specific region, site, or habitat is a prominent and significant research problem in conservation biology (Gaston 1996, EASAC 2005).

A certain number of undescribed species is to be expected in a poorly researched region. Because some of these species' importance was ignored in the field, the amount of material collected was not always as large as it could have been. In certain circumstances, however, recognizing the species appeared preferable, even if all features of variation within the species could not be covered. A portion of the material is yet unknown (Krog, 1968). Many lichen species are difficult to identify. Lichens create a variety of secondary chemicals, some of which have been exploited as dyes and medicines. Specific lichen identification requires chemical tests and close inspection of these chemicals to establish which species has been gathered. (Colley, 2008).

Morphology

Morphologically, lichens have three growth forms: crustose (crust-like and closely attached to the substratum), foliose (leaf-likeleaf-like and loosely attached to the substratum), and fruticose (shrubs like hanging or erect growing on the substratum). Awasthi (2007) Lichens are categorized into two groups: microlichens (crustose and squamulose) and macrolichens (dimorphic, foliose, and fruticose) growth forms of lichens. Based on the substratum, lichens are divided into corticolous (growing on bark), saxicolous (growing on rock and boulders), terricolous when growing on soil, musicolous (on mosses), ramicolous (on twigs), foliicolous grows on leaves, lignicolous (on dead wood), humicolous (on hummus), and calcicolous (on lime or cement plaster) (Mishra &Upreti, 2016). Lichens show a huge diversity as epiphytes and may benefit from the great diversity of trees and shrubs with species-specific bark chemistry, texture, and stability (Baniya et al., 2009). Humidity may also facilitate lichen growth, with open canopies and enough light for lichens to grow and multiply.

Economic Significance

Lichens are unique in that their life forms can significantly contribute to the upkeep of the ecosystem, mainly since they are effective bioindicators. This characteristic alone should be enough to pique our interest. Additionally, lichens can benefit nearby plants and animals in various ways, such as supplying food and reducing soil erosion. Macrolichens are bioindicators of forest development and indicators of ecosystem health and air quality (Rapaiet al., 2012). In order to grow, they consequently take in everything from the environment, including carbon dioxide and heavy metals. Scientists can use lichens to assess the area's air pollution levels. Given the importance of lichens to the ecosystem, a better understanding of their community is required.

In the field of medicine, there are macrolichen species with medicinal uses such as Cladoniabellidiflora (Ach.) Schaerer, Lobariapulmonaria (L.)Hoffm., Parmotremareticulatum (Taylor) M. Choisy, Parmotrematinctorum (Nyl.) Hale, Peltigeracanina (L.) Willd., Usneaarticulata L. Hoffm., Usneahirta (L.) F.H. Wigg., and Usnealongissima Ach. These species have active components for antimicrobial activity, antiseptics, and healing agents. It may also help treat blurred vision, hair loss, kidney disorders, stomachaches, wounds, and even cancer (Magday et al., 2020).

METHODOLOGY

Entry Protocol

A letter of permit was secured before the conduct of the study by the elders of the tribe of Mt. Sapinit.

Location of the Study Area

The study site was conducted on the forest area of Mt. Sapinit, SitioDagulos, La Roxas, Maramag, and Bukidnon with geographic coordinates of 7.9168° North, 124.8719° East. The elevation at these coordinates is estimated at 1620 meters or 5314.96 feet above mean sea level.

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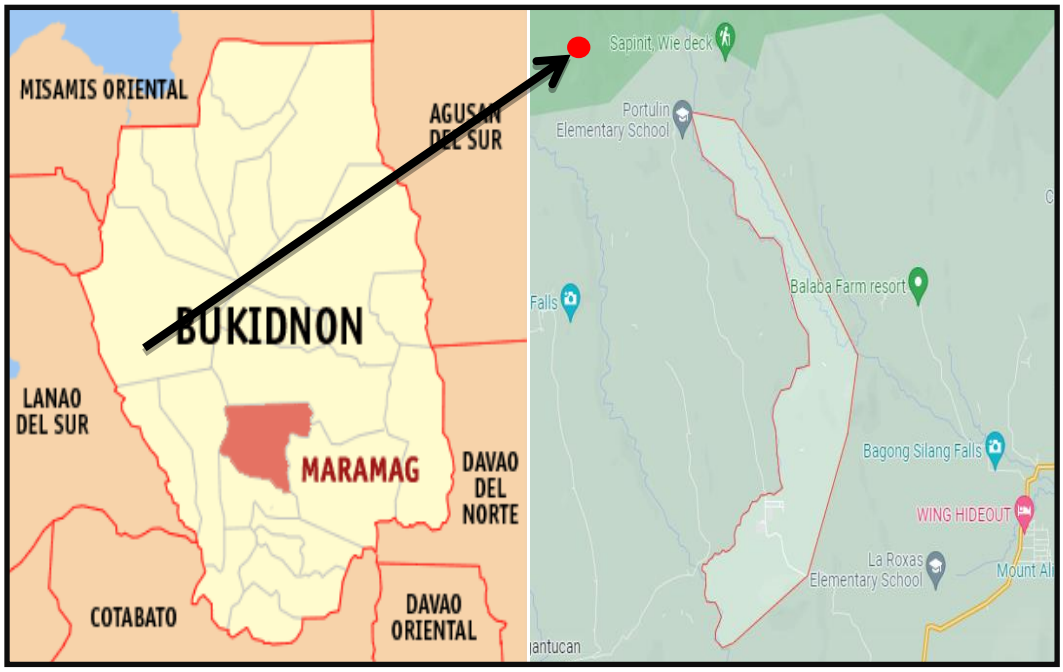


Figure 1. The geographic location of the study area in Mt. Sapinit, SitioDagulos, La Roxas, Maramag, Bukidnon

Materials used in the Study

The materials used in the study are the following: collected samples, field notebook, pencil, GPS, smartphone, camera, bolo or garden shovel, plastic container, scratch papers, rope, markers, paper bags, and software applications.

Establishment of the Study Area

The collection of macrolichens at the fieldwork was carried out employing a transect walk and a quadrat of three (3) sampled plots of 20x20 meters each. The total area sampled is about a hectare.

Methods of Collection and Preparation

The macrolichens were collected randomly in all microhabitats within the plots, as well as along the trail and outside of the plots. The macrolichen present on the study site was collected using a sharp tool. The representative macrolichen specimen was listed properly in the field notebook and was placed in a paper packet and properly labelled with the collection number, location, date and time of collection, the substrate of the sample, the geographical coordinates and elevation as well as the temperature of the study site and the collectors' names. Photodocumentation was done in the field.

Species Identification, Classification, Description and Confirmation

The gathering and identification of specimens collected was based on standard taxonomical procedure. Manuals, books, photo images from internet sources, and related literature were used.The species identification was then referred to an expert, a Lichenologist from Central Mindanao University based in the Philippines. Specimen vouchers were deposited in the Science Laboratory Room of the Central Mindanao University's College of Education.

RESULTS AND DISCUSSION

Species Richness

The study revealed that there are 20 species of Macrolichens gathered. The Macrolichens are classified into 7 families and 13 Genera. (Table 1). As we have examined 3 quadrat plots, Q1 contains the greatest number of species (7). Q3, on the other hand contains the least number of species, which is only four species (4).

Table 1. Number of families, genera, and species of Macrolichens collected at Mt. Sapinit

	Family	Genera	Species
MACROLICHENS	7	13	20

Table 2. Number of species per quadrat

Quadrat	Number of Species
Q1	7
Q2	5
Q3	4

Number of species per quadrat

Among the specimens collected, the most species-rich belongs to the family Lobariaceae, followed by Physiaceae, Gyalectaceae, Collemataceae, and the least species is represented by Dictyonemaceae and Ramalinaceae (Table 3; Figure 9).

Table 3. List of Macrolichens collected at Mt. Sapinit

Lichens	Foliose	Genera	Species
	COLLEMATACEAE	1	1
	DICTYONEMACEAE	1	1
	GYALECTACEAE	1	1
	LOBARIACEAE	3	7
	PARMELIACEAE	3	4
	PHYSIACEAE	3	5
	Fruticose		
	RAMALINACEAE	1	1

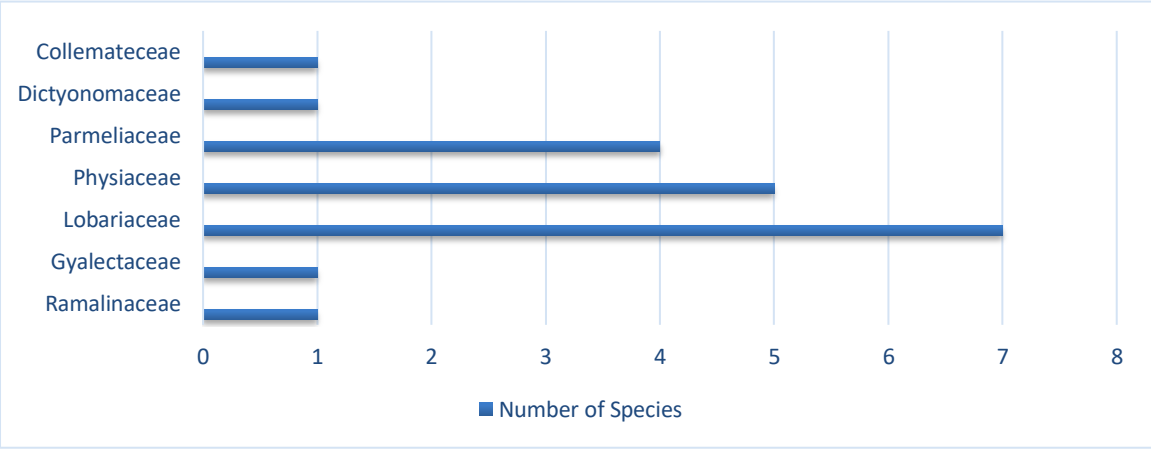


Figure 2. The number of the Macrolichens species for each family

Species richness, their composition and distribution is reflected in this study. As observed, macrolichens gathered showed close relationship with their habitat within the area. There are macrolichens found in the different substrata including trees, decayed log, and leaves.In the study conducted by Magday et al. (2020), the species distribution and species richness of macrolichens is related to substrate similarity and microhabitat diversity. Most of them are epiphytic floral species, and as observed are more rich in higher elevation of the montane forest.

Epiphytic macrolichens are found on trees, rotting litter and logs, fallen branches, twigs, soil, and surface leaves, according to the findings. Several macrolichen species were found in all quadrat plots, while others were not found in all quadrat plots, according to the data. This explains why some species are substrate specific, while others may be found in small microhabitats like rotting logs and leaves (Magdat et al, 2020). Understanding species richness along elevation gradients might help conservationists develop more effective conservation strategies, especially in areas where anthropogenic stress and climate change are substantial.

In our study area, the number of species varies from quadrat-to-quadrat, and thus indicates that elevation plays a great role in the survival of these species. Aside from elevation, light and nutrient availability also contributes to factors that determine the survival of the species. This is also reflected in the study of Lucking (2008), that there is a significant difference between microlichen species between gaps and understories.

Table 4. Distribution of various macrolichens at Mt. Sapinit

S.N	Lichen Taxa	T. W	Q1	Q2	Q3	Substrate
	COLLEMATACEAE					
1	*Leptogiumfurfuraceum*	+	+	-	-	Bark
	DICTYONEMACEAE					
2	*Dictyonemasericeum (Swartz.) Berk.*	+	-	-	+	Bark
	GYALECTACEAE					
3	*CoegnogiumlinkiiEhrebb*	+	-	-	-	Bark
	LOBARIACEAE					
4	*Lobariadiscolour (Bory) Hue.*	+	+	-	-	Bark
5	*Lobariapulmonaria (L.) Hoffm*	+	+	-	-	Branch
6	*Lobariaretigera (Bory) Trevis*	+	-	-	-	Decayed logs/twigs
7	*Pseudoocyphellariaaurata (Ach.) Vainio*	+	-	-	-	Decayed logs/twigs
8	*StictadichotomaDelise*	+	-	-	-	Bark
9	*Stictalimbata (Sm.) Ach*	+	-	+	-	Bark
10	*Stictaweiglii (Ach.) Vainid*	+	-	-	-	Bark
	PARMELIACEAE		-	-	-	
11	*Parmeliaeciliatum (Nyl.) Hale*	+	+	+	+	Branch
12	*Parmotremagardneri (C.W. Dodge) Serus*	+	+	-	-	Bark
13	*UsneaflammeaStirt*	+	+	+	+	Branch
14	*Usnealongissima Ach*	+	+	+	+	Branch
	PHYSIACEAE					
15	*Heterodemiaechinata (Taylor) culb.*	+	-	-	-	Decayed logs/twigs
16	*Heterodemia sp.*	+	-	-	-	Bark
17	*Heterodemia speciose (Walter) Trevis*	+	-	+	-	Branch
18	*Physia sp.*	+	-	-	-	Decayed logs/twigs
19	*Pyxine sp.*	+	-	-	-	Branch
	RAMALINACEAE					
20	*Ramalina sp.*	+	-	-	-	Bark

Abbreviation**:** S.N –species number, T.W- Transect walk, + Present, - Absent

An index was created for all macrolichens collected for future research and analysis.

Figure 3. Macrolichens collected at Mt. Sapinit

FAMILY LOBARIACEAE
Pseudocyphellariaaurata(Ach.) Vainio

FAMILY LOBARIACEAE
*Stictadichotoma*Delise

FAMILY LOBARIACEAE
Stictalimbata(Sm.) Ach.

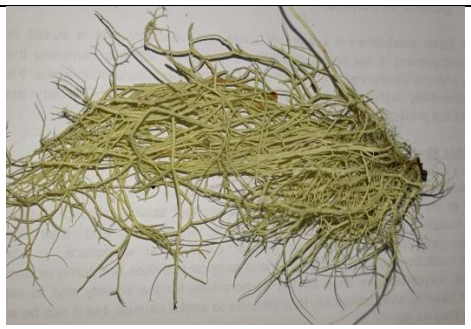
FAMILY LOBARIACEAE
Stictaweigelii(Ach.) Vainid

FAMILY PARMELIACEAE
Parmeliaeciliatum(Nyl.) Hale

FAMILY PARMELIACEAE
Parmotremagardneri(C.W. Dodge) Serus.

Figure 4. Macrolichens collected at Mt. Sapinit

FAMILY PARMELIACEAE



FAMILY PARMELIACEAE

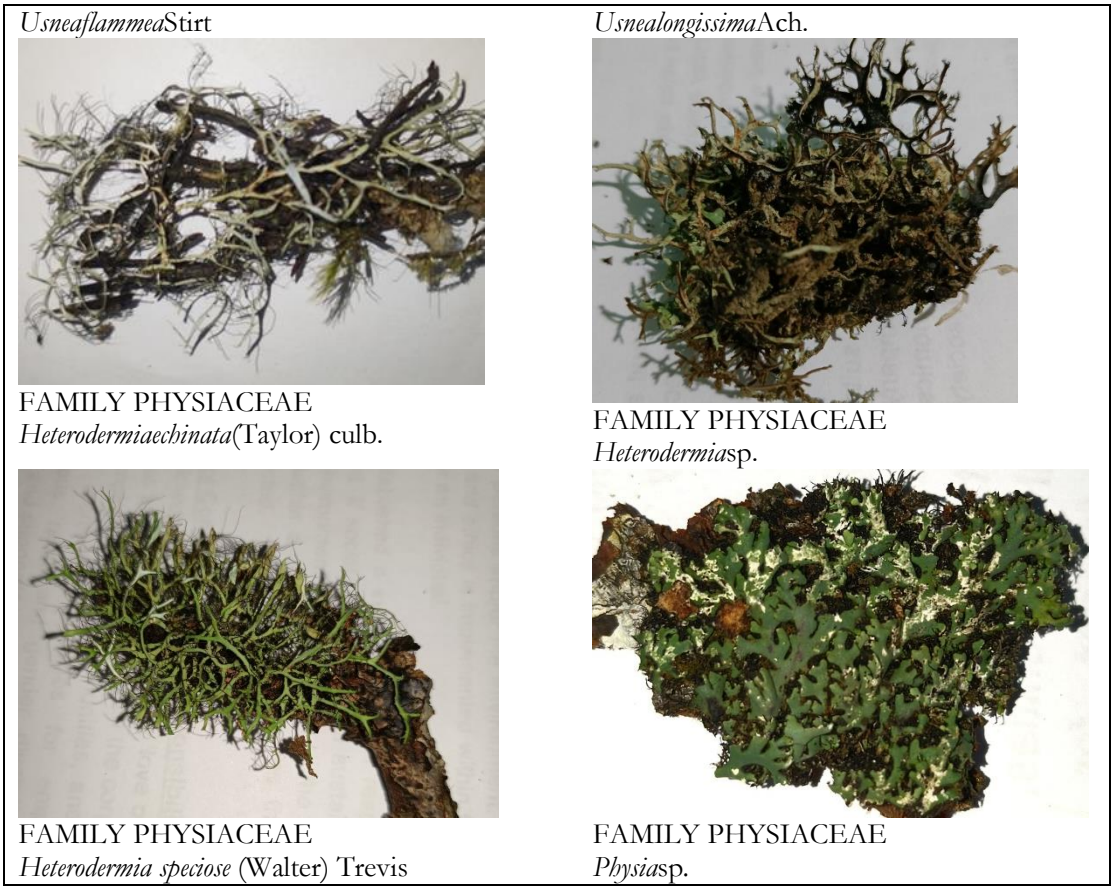


Figure 5. Macrolichens collected at Mt. Sapinit

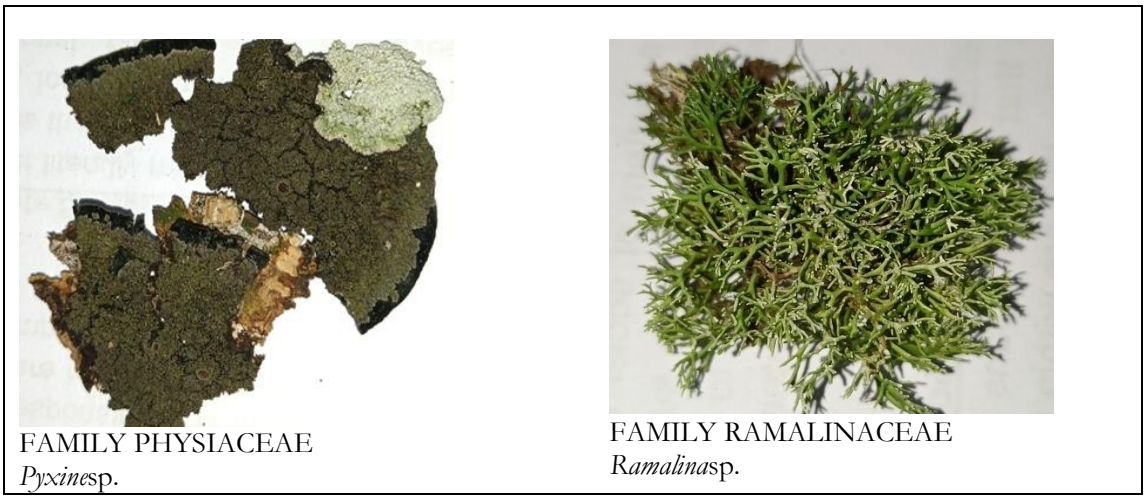


Figure 6. Macrolichens collected at Mt. Sapinit

Species Composition

The distribution of macrolichens differs in their microenvironment. As shown in table 4, the comparison of the macrolichen species per quadrat plot as well as in the transect walk is presented with its different substrate. In the forest area, the branches and bark of the trees, as well as fallen logs and twigs of trees, are the richest habitats for macrolichens in the study site.

According to Nascimbene, Marini, and Nimis (2009), trees have a significant influence on epiphytic lichen ecosystems. Also, Dellsala (2011) stated that rainforests are a globally important habitat for epiphytic lichens. Most

of the macrolichens collected in the area are found in trees, thus the richness of macrolichens depends on the substrate available and the ecological condition of the forest area.

The macrolichens collected along the transect walk and outside plot have a total of 20 species under 13 genera and 7 families. The largest family belongs to Lobariaceae, which has seven (7) species, and the least is represented by the families Collemataceae, Dictyonemaceae, and Ramalinaceae, with single species. Seventeen (17) of the species are foliose and three of the species are fruticose. The lichens collected are moisture-dependent and shade-adapted, as noted. The presence of Lobariaceae and Collemataceae in the transect walk indicated that the two families are more frequent in humid forests (Balaji and Hariharan, 2013; Azuelo and Puno, 2018).

The macrolichens collected in quadrat 1 have seven species under four genera and three families. Quadrat 2 has five species under three genera and three families. For quadrat 3, there are four species under three genera and two families. Each quadrat plotted is about 20 meters from the other. The lichen taxa were found in low, middle, and high areas of the forest, which also exhibit unique features such as color, size, shape, and structure. The foliose lichen was found more frequently during the collection period, with 85 percent for the foliose and 15 percent for the rest of the fruticose. It is also important to note that the total number of macrolichen species found in the area is influenced by its moisture and vegetation types.

The study area is associated with different elevations, yet the microclimate conditions were not differentiated due to the weather conditions, and the time of conduction is rainy season.

Species Distribution

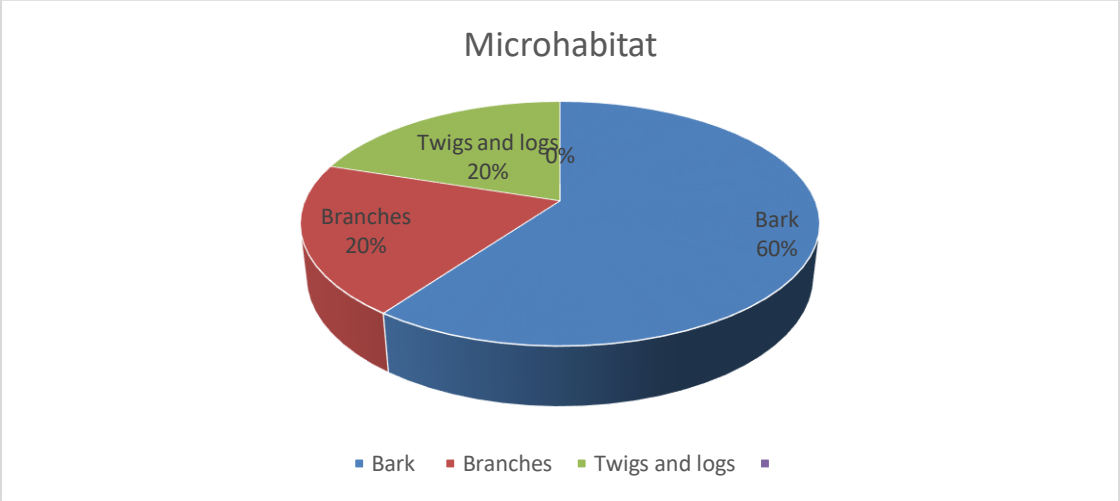


Figure 7. Habitat preferences of macrolichens

The forest of Mt. Sapinit in SitioDagulos showed the occurrences of diverse macrolichens. A total of seven (7) families, thirteen (13) genera, and twenty (20) species of macrolichens were recorded from the area. The distribution of macrolichens across the area occurs in the bark of the tree (60%), logs and twigs (20%), and in tree branches (20%). Macrolichens usually inhabit trees since it provides varied niches for the lichens to thrive, in its base surrounded mosses and soil, the bark, trunks, branches and twigs offers varied pH and texture that is suitable for lichens to grow (Mishra&Upreti, 2016).

Greater numbers of the macrolichens collected from the area were epiphytic lichens, they inhabit the branches of the trees where enough sunlight could penetrate. The temperature of the area which ranges from 18-19 degrees Celcius, its elevation and other climatic factors are to be considered in the distribution of macrolichens which agrees with the analyses of Rapai et al. 2012 that certain ecological conditions like water, light, temperature and substrate are to be consider in the distribution pattern of this kind of plants. As to the elevation, macrolichens tend to inhabit at the higher elevations compared to lower elevation. From the table 4 presented, quadrat 1 has higher elevation

compared to quadrats 2 and 3. In quadrat 1, seven species were collected, while in quadrats 2 and 3 there are five and four species found respectively. Elevations also have impact to the growth of lichen species. Higher elevations appear to provide suitable condition for many lichen species to thrive (Rapai et al. 2012). Also, at higher elevations have less human activities that can disturb the growth of macrolichens and even other species of plants and animals. Thus, the need to preserve the forest ecosystem is essential in order to preserve lichen communities.

CONCLUSIONS AND RECOMMENDATIONS

Mount Sapinit in Sitio Dagulos, La Roxas, Maramag features a diverse macrolichen community. These macrolichens can be found on a variety of surfaces, such as trees, rotting logs, branches, and leaves. A total of 20 species are found, that are further classified into 7 genera and 13 families. Most of the species gathered are found in the higher elevations of the montane forest and are usually epiphytic. The most family-rich species belong to the family Lobariaceae, and the least family-rich belong to Ramalinaceae, Collemataceae, and Dictyonemaceae. Most of the epiphytic macrolichens belong to the family Parmeliaceae, which dominates the entire montane forest.

Several species of macrolichens inhabit different substrates of the mountain. Most of the macrolichen's species are found to be dominant in the bark of the trees, in which sunlight could penetrate easily. Some species of the macrolichens, on the other hand are dominant in twigs and logs and branches of the trees.

For future studies, it is recommended to conduct follow-up research to help better create conservation plans and strategies to protect the macrolichens of the area. For future researchers, it is recommended responsibly check the weather before deciding to conducting the research. It is also recommended to allow more time in conducting the research, especially the sampling process.

Acknowledgment

The accomplishment of the goals of this research was made possible by the contributions of numerous individuals and institutions, most notably the Science Education Department, College of Education of Central Mindanao University together with the cooperation of Sitio Dagulos, La Roxas, Maramag, Bukidnon and the Department of Science and Technology Science Education Institute (DOST-SEI)for supporting the entire study.

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