

## Distribution and Conservation Status of Moss Flora in Mt. Pigmalngalan, Kalatungan Range, Lourdes, Valencia City, Bukidnon, Philippines

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### ABSTRACT

Moss flora in Mindanao, Mt. Pigmalngalan, Kalatungan Range is poorly known and understudied. The study aimed to record the moss species and determine its distribution with respect to its microhabitat preferences and ecological distribution. Totally, there were 38 species collected in the area, encompasses 14 families and 21 genera. Most of the species collected are found on moist rock and decayed logs. Mosses are reliable signs and indicators of air pollution as they are easy to grip and show a gigantic range of specific sensitivity and noticeable signs to pollutants and greatly exceeding that of higher plants which must be conserve for it devours the significance of environmental cause and discussed the relationship to the ecology of the species.

**Keyword:** Moss flora, Pigmalngalan, microhabitat

### INTRODUCTION

Moss flora are among the smallest non-vascular plant species in Kingdom Plantae that do not have an internal system for conduction of water and nutrients. They are embryo-bearing plants divided into three main divisions: the Bryophyta (mosses about 15, 000 species), the Hepatophyta (liverworts about 8,500 species), and the Anthocerophyta (hornworts about 300 species). Their fertilized egg is similar to higher plants because it develops into an embryo; however, unlike higher plants, fertilized egg further develops into sporophytes (Azuelo et al., 2009). Generally, the Moss flora prefers to grow in moist areas like rocks, trees, dead trees, or even moist soil and do not have true stems, leaves and roots. Their moisture loving-characteristics make it noticeable that as the elevation of an area increases or as they get nearer to the source of moisture, species and number vary (Borres et al., 2014).

Mt. Pigmalngalan is one of the Range in Mt. Kalatungan Which is considered as the 5th highest mountain in the Philippines is located at Brgy Lourdes, Valencia City, Bukidnon. And it is surrounded with vegetative and scattered natural forest making it an efficient habitat for Moss flora. The distribution of Moss flora in Mt. Pigmalngalan needs further study and exploration to fully assess the biodiversity status of Moss flora.

### METHODS AND STUDY AREA

#### Entry Protocol

Prior to the conduct of the study, formal letters noted by the school head were given to Hon. Eva E. Tinamban, the Barangay Captain of Barangay Lourdes, Valencia City, Bukidnon, To Datu Samuel T. Domia, the Indigenous People (IP) head of the area and Forest Rangers of the said area for the awareness of the said research.

#### Location of the Study

The collection of Moss flora was conducted in two selected sites in Bukidnon Mt. Pigmalngalan located in Brgy. Lourdes, Valencia City, Bukidnon The first site which is Mt. pigmalngal, is situated in northern Mindanao, it is surrounded with various crops such as Sugarcanes, Banana and Corn farm. It has a distance of 20 km from the sayre highway of Valencia City, and has an Elevation of 2,537 meters above sea level. And it is one of Kalatungan Range in Bukidnon.

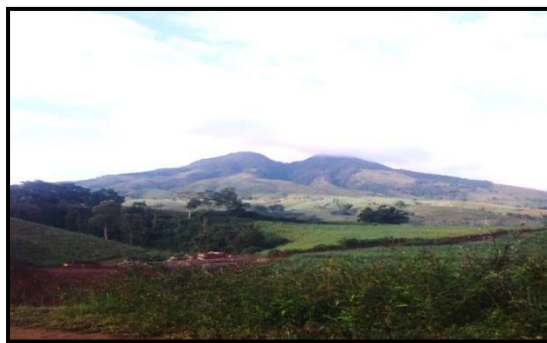


Figure 1. Aerial view of Mt. Pigmalngalan, Kalatungan Range, Lourdes, Valencia City, Bukidnon, Philippines.

#### Sampling and Collection of Specimen

Sampling of the specimen was done by the researchers by doing effort on forests trails which ascends to the mountains as wells as to the trails going to the rivers, creeks and streams. Likewise, opportunistic sampling was also done whenever there is the presence of moss species and opportunity to collect the said species in the area.

In collecting specimens, ready available collecting packets will be used for visual research and it is used to follow the 10% rule. This rule simply states that only 10% or less must be collected from a population from a certain substrate. The small moss mats were lifted from the substratum and the collected specimens was placed directly into a small folded paper packet in order to consistently obtain, with the obtain samples were done transection walk with in 5 kilometer sampling path. The substrate plays important role in defining the existence of community types in Moss flora.

The field data included items such as type habitat, type of substrate (ground, rock or tree), Moisture and shade condition, elevation direction of exposure, data and collector's name were noted. All Moss species encountered in the field were photo-documented using a high resolution camera.

#### Descriptions of Specimens

The mosses that were collected was sorted, counted and recorded within transect walk. The identification, classification and description of Moss flora species were referred to herbarium biological science books, various recent studies of Moss flora and articles retrieved from the internet and through the of Bryologist from Central Mindanao University. Each species was described based on habitat, diagnostic characters such as color, leaf shape, leaf arrangement, leaf apex, leaf margin and presence of costa.

### Preparation of Herbarium Specimens

The Moss flora species were collected by the use of knife and were placed in the plastic cellophanes which were labeled with species numbers. The description includes color, leaf arrangement, shape, leaf margin, apex and presence or absence of capsule was done through microscopy examination. After the collection of the specimens, it was air dried and placed in a paper packet with a labeled data: family, scientific name, date of collection, locality, habitat, and description.

### Data Analysis

Descriptive statistics was used in analyzing the data collected, this include tables, figures and charts to summarize the data. International Union of Conservation of Nature or IUCN was used to determine the ecological status of species collected.

### RESULTS AND DISCUSSION

In total, 60 moss species collected in the area having 16 families and 25 genera. It is difficult to compare the moss flora of different areas due to differences in area, bryological action, and morphological idea that transform through time.

**Table 1. Number of Family, Genera and Species collected in Mt. Pigmalgalan, Kalatungan Range, Lourdes, Valencia City, Bukidnon**

Family	Genera	Species
14	21	38

**Table 2. Summary List of Families, Genera and Species collected in Mt. Pigmalgalan.**

FAMILY	GENERA	SPECIES
Bartramiaceae	<i>Philonotis</i>	<i>laxissima</i> (C. Mull). Mitt
Bryaceae	<i>Bryum</i>	<i>apiculatum</i> Schwaegr <i>capillare</i> Hedw
Entodontaceae	<i>Entodon</i>	<i>bandongiae</i> (C. Mull). Jaeg <i>ramulosus</i> Mitt <i>sanry</i>
	<i>Erythrodon</i>	<i>julaceum</i> (Schwaegr.) Par.
Fissidentaceae	<i>Fissidens</i>	sp1 sp2
Leucobryaceae	<i>Leucobryum</i> <i>Leucophanes</i> <i>Octoblepharum</i>	<i>bowringii</i> Mitt <i>glaucum</i> Schwaegr. sp <i>albidum</i> Hedw.
Meteoriaceae	<i>Aerobryopsis</i> <i>Barbella</i>	sp1 <i>flagellifera</i> (Card.) sp sp1

	<i>Floribundaria</i> <i>Meteoropsis</i>	sp2 sp
Mniaceae	<i>Plagiomnium</i>	<i>integrum</i> (Bosch & Lac.) T. Rop
Neckeraceae	<i>Himantocladum</i> <i>Neckeropsis</i>	<i>cyclophyllum</i> (C. Mull) Fleisch sp1 sp2 <i>lipeana</i> (Mont.) Fleisch
Pottiaceae	<i>Hyophila</i>	<i>rosea</i> Williams
Polytrichaceae	<i>Polytrichum</i>	Sp
Pterobryaceae	<i>Pterobryopsis</i>	<i>Gedehensis</i> Fleisch Sp
Racopilaceae	<i>Racopilum</i>	<i>johannis-winkleri</i> Broth. <i>schimidii</i> (C. Mull.). Jaeg. Sp
Rhizogoniaceae	<i>Pyrrhobryum</i>	<i>latifolium</i> (Bosch & Lac)  <i>spiniforme</i> (Hedw.) Mitt.
Sematophyllaceae	<i>Acroporium</i>	<i>hamulatum</i> Fleisch <i>stramineum</i> (Reinw. & Hornsch.) Fleisch
Thuidiaceae	<i>Thuidium</i>	<i>benguense</i> Broth. Ex Bartr. <i>Pristocalyx</i> (C. Mull.) Jaeg. Sp
16	25	60

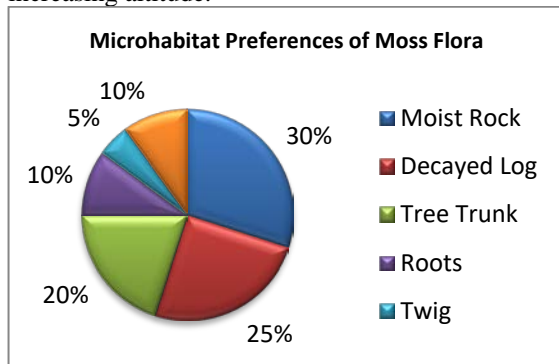
**Table 3. List and number of family, Genera species with respect to its microhabitat preferences in Mt. Pigmalgalan, Kalatungan Range, Lourdes, Valencia City, Bukidnon, Philippines.**

Family	Genera	Species	Habitat
Bartramiaceae	1	2	Moist Rock
Bryaceae	1	2	Moist Rock
Entodontaceae	2	6	Moist Rock, Decayed Log, Tree Trunk
Fissidentaceae	1	2	Moist Rock
Leucobryaceae	3	4	Soil, Decayed Log, Root
Meteoriaceae	4	6	Decayed Log, Roots, Twigs
Mniaceae	1	1	Moist

			Rock
Neckeraceae	2	4	Moist Rock, Tree Trunk
Potytrichaceae	1	1	Soil
Pottiaceae	1	2	Soil
Racopilaceae	1	1	Tree
Rhizogoniaceae	1	2	Tree, Decayed Logs
Sematophyllaceae	1	2	Decayed Log
Thuidiaceae	1	3	Moist Rock
<b>Total</b>	<b>21</b>	<b>38</b>	

Table 2 reveals that Family Meteoriaceae and Entodontaceae has the most dominating species collected in the area with 6 species which are commonly inhabiting on moist rock, decayed log, tree trunks, roots and twigs followed by family Leucobryaceae and Neckeraceae comprising 4 species.

There is suggestive evidence that moss diversity might be advanced in the higher elevation than in either the tropics or the lower elevation. Thus, the low species count of mosses in the study area confirmed the report and observation of Tan, Lubos, and Schwarz (2000) that mosses grow best in moist with increasing altitude.



**Figure 2. Frequency distribution of Moss flora collected with respect to its microhabitat preferences in Mt. Pigmalgalan, Kalatungan Range, Lourdes, Valencia City, Bukidnon, Philippines.**

As shown in table 2, the substrate most colonized by the moss flora was the moist rock, which proved to be the preferred for

many species, and show definite species patterns in relation to macroenvironmental gradients.

### CONCLUSION

The taxonomic characteristics of the Moss flora were analyzed and described according to leaf color, leaf shape, leaf arrangement, leaf margin, leaf apex, leaf cell shape. Notable differences in the structures and features were observed among taxa.

Morphological status and conservation status was also observed. The number of species inhabiting moist soil is greater than the number of species inhabiting trunk and rock. A total of thirty eight (38) species were collected of which four (4) species were considered endemic namely: *Bryum capillare* Hedw and *Leucobryum bowringii* Mitt., *Dawsonia superba* and *Pogonatum macrophyllum*. Further, Most of the species collected are found in moist rock which implies patterns and macroenvironmental gradients.

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