



BRYOPHYTE DIVERSITY IN MAMIT DISTRICT, MIZORAM, NORTHEAST INDIA

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ABSTRACT

Bryoflora of Mamit District, Mizoram has been assessed for the first time. In the present investigation, a total of 65 taxa of Bryophytes distributed under 50 genera and 36 families have been recorded. Of these, the mosses are represented by 37 species of 28 genera and 17 families, while Liverworts are represented by 26 species of 20 genera and 18 families. Hornworts are represented by 2 species of 2 genus and 1 family. The present study reveals that Bryaceae, Dicranaceae, Frullaniaceae, Meteoriaceae and Polytrichaceae are dominant families in the study area.

KEYWORDS: Bryoflora, Mamit, Mizoram, Northeast, India.



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INTRODUCTION

Bryophytes are spore-bearing nonvascular plants and unique among land plants in having relatively large photosynthetic and free living haploid gametophytes, unbranched diploid sporophytes that remain attached to the maternal gametophyte throughout their life span, thus it is heteromorphic in their life cycle¹. Bryophytes grow in practically every kind of habitat with the exception of hot springs and oceans. They flourish particularly well in moist and humid forests, commonly grow clumped together in mats or cushions on trees, logs, rocks, and soil, and may be submerged in or floating on water. Bryophyte communities are known for the fact that their species composition and richness is strongly influenced by external factors, especially water, light and temperature which makes them efficient bioindicators^{2,3}. Therefore, they constitute an important component of tropical rain forests, which provide microhabitats with diverse substrates and moderate luminosity, important factors for the establishment of members of this plant group^{4,5,6}. Bryophytes play a significant role in the ecosystem in a variety of ways such as biological indicator of air pollution, excellent indicators of climate change; and as a model system for research; some species are used in herbal medicine; invaluable in the construction of moss gardens; few species plays a 'key stone' role in mineral cycling and regulation of microclimate in the forests canopy; they provide food and habitat for a host of invertebrates⁷. Despite their small size, they comprise major components of the biomass and photosynthetic production in forest ecosystems⁸. According to the most recent

classification the three groups of bryophytes (liverworts, mosses and hornworts) are recognized as three phyla; Bryophyta (mosses), Marchantiophyta (liverworts) and Anthocerotophyta (hornworts), based on both morphological and molecular data⁹. Bryophytes are the second largest group of plants, with about 25,000 species worldwide¹⁰. India reports total 2489 taxa of bryophytes from India, comprising 1786 species in 355 genera of mosses, 678 species in 121 genera of liverworts and 25 species in six genera of hornworts¹¹. In India, bryophyte diversity of these regions have been explored such as Eastern Himalayas, Western Himalayas, Nilgiri and Palni hills (South India), and Central India^{12,13,14,15,16,17}. Bryophytes of several regions have been explored recently^{18,19,20}. Mamit district of Mizoram is situated in the western part of Mizoram and occupies an area of 3025.75 km sq. The district is bounded on the north by Hailakandi district of Assam state, on the west by North Tripura district of Tripura state and Bangladesh, on the south by Lunglei District and on the east by Kolasib and Aizawl districts. The temperature ranges from 9°C to 24°C and from 24°C to 36°C during winter and summer respectively. The District receives abundant rainfall with an average annual rainfall of 220 cm. The region falls within the sub-tropical rain forest region, the vegetation of the district are Tropical wet Evergreen Vegetation, Tropical Semi-Evergreen Vegetation and Mountain Sub-Tropical Pine Forest. Mamit district is rich in biodiversity; however no study has been carried out on bryophytes of this region. In view of this gap, an attempt has been made for the first time to explore and document the Bryophytes of Mamit district of Mizoram (Figure 1).

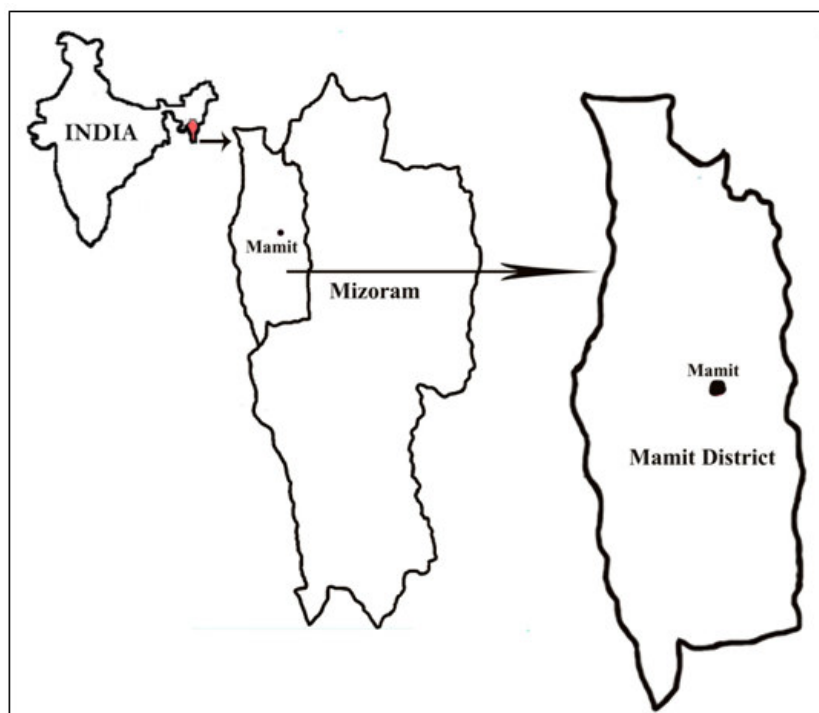


Figure
Map showing location of study area, Mamit District, Mizoram

MATERIALS AND METHODS

Samples were collected from different habitats through regular field visit including natural forests, agro-forests, urban ecosystems and road sides from different localities of Mamit district, Mizoram during January to December, 2014. Photographs were made from actual observations in the field as to the species natural habitat. The collected materials were dried at room temperature and stored in paper packets²¹. Date of collection, locality, type of bryophyte and habitat along with the substratum type were recorded in the field note-book and also on the packets containing the material. The collected bryophytes were identified carefully in the laboratory by studying the specimens and consulting various relevant literatures, flora, monographs and publications^{22,23,24,25,26,27,28}, and

deposited to Ecology Laboratory, Department of Botany, School of Life Science, Mizoram University, Tanhril, Mizoram.

RESULTS

In the present investigations a total of 65 taxa of Bryophytes distributed under 50 genera and 36 families have been recorded. Of these, the mosses are represented by 37 species of 28 genera and 17 families, while Liverworts are represented by 26 species of 20 genera and 18 families. Hornworts are represented by 2 species of 2 genus and 1 family. The name of species of bryophytes, family, habitat and altitude of occurrence are given in the table below.

Table

List of the Bryophytes species with family, habitat and altitude of occurrence in Mamit District, Mizoram

Sl.No.	Name of the Species	Family	Habitat	Altitude
1.	<i>Aneura pinguis</i> (L.) Dumort.	Aneuraceae	Rock	450m
2.	<i>Anomobryum filiforme</i> ssp. <i>concinatum</i> (Spruc.) Amann	Bryaceae	Soil	1600m
3.	<i>Anthoceros erectus</i> Kashyap.	Anthocerotaceae	Soil	930m
4.	<i>Asterella khasyana</i> (Griff.) Grolle.	Aytoniaceae	Soil	1670m
5.	<i>Atrichum undulatum</i> (Hedw.) P. Beauv.	Polytrichaceae	Soil	1670m
6.	<i>Bartramia subpellucida</i> Mitt.	Bartramiaceae	Soil	1380m
7.	<i>Barbula convoluta</i> Hedw.	Pottiaceae	Rock	1200m
8.	<i>Brachymerium sikkimense</i> Renauld & Cardot	Bryaceae	Soil	1250m
9.	<i>Bryum alpinum</i> Huds. ex With.	Bryaceae	Rock	450m
10.	<i>Bryum apiculatum</i> Schwägr.	Bryaceae	Soil	1450m
11.	<i>Bryum argenteum</i> Hedw.	Bryaceae	Rock	930m
12.	<i>Bryum coronatum</i> Schwägr.	Bryaceae	Rock	440m
13.	<i>Calypogeia arguta</i> Nees & Mont. ex Nees	Calypogeiaceae	Soil	980m
14.	<i>Campylopus pilifer</i> Brid.	Dicranaceae	Soil	1000m
15.	<i>Campylopus introflexus</i> (Hedw.) Brid.	Dicranaceae	Soil	1620m
16.	<i>Cephalozia connivens</i> (Dicks.) Lindb.	Cephaloziaceae	Soil	1500m
17.	<i>Cyathodium cavernarum</i> Kunze.	Cyathodiaceae	Rock	1100m
18.	<i>Dicranum flagellare</i> Hedw.	Dicranaceae	Soil	1500m
19.	<i>Dumortiera hirsuta</i> (Sw.) Nees.	Dumortieraceae	Rock	390m
20.	<i>Erpodium mangiferae</i> C. Muell.	Erpodiaceae	Tree bark	1130m
21.	<i>Eurhynchium riparioides</i> (Hedw.) P.W. Richards	Brachytheciaceae	Rock	1300m
22.	<i>Fissidens polypodioides</i> Hedw.	Fissidentaceae	Soil	1150m
23.	<i>Fissidens nobilis</i> Griff.	Fissidentaceae	Rock	990m
24.	<i>Frullania acutiloba</i> Mitt.	Frullaniaceae	Tree bark	1000m
25.	<i>Frullania tamarisci</i> (L.) Dumort.	Frullaniaceae	Tree bark	800m
26.	<i>Frullania ericoides</i> (Nees) Mont.	Frullaniaceae	Tree bark	800m
27.	<i>Frullania neurota</i> Taylor	Frullaniaceae	Tree bark	750m
28.	<i>Frullania retusa</i> Mitt.	Frullaniaceae	Tree bark	1100m
29.	<i>Funaria hygrometrica</i> Hedw.	Funariaceae	Soil	1450m
30.	<i>Homalothecium sericeum</i> (Hedw.) Schimp.	Brachytheciaceae	Tree bark	1200m
31.	<i>Hyophila involuta</i> (Hook.) A. Jaeger	Pottiaceae	Rock	430m
32.	<i>Jungermania infusca</i> (Mitt.) Stephani	Jungermanniaceae	Soil	1300m
33.	<i>Lejeunea flava</i> (Sw.) Nees	Lejeuneaceae	Tree bark	1100m
34.	<i>Leucobryum crispum</i> Müll. Hal.	Dicranaceae	Soil	1010m
35.	<i>Leucobryum candidum</i> (Brid. ex P. Beauv.) Wilson	Dicranaceae	Soil	1400m
36.	<i>Marchantia paleacea</i> Bertol.	Marchantiaceae	Soil	950m
37.	<i>Marchantia subintegra</i> Mitt.	Marchantiaceae	Soil	1050m
38.	<i>Meteoriopsis reclinata</i> (Müll. Hal.) M. Fleisch.	Meteoriaceae	Tree bark	1060m
39.	<i>Meteoriopsis squarrosa</i> (Hook. ex Harv.) M. Fleisch.	Meteoriaceae	Tree bark	1100m
40.	<i>Metzgeria conjugata</i> Lindb.	Metzgeriaceae	Rock	700m
41.	<i>Neckeropsis undulata</i> (Hedw.) Reichardt	Neckeraceae	Tree bark	750m
42.	<i>Octoblepharum albidum</i> Hedw.	Octoblepharaceae	Tree bark	400m
43.	<i>Pallavicinia lyellii</i> (Hook.) Gray.	Pallaviciniaceae	Soil	880m
44.	<i>Papillaria leuconeura</i> (Müll. Hal.) A. Jaeger	Meteoriaceae	Tree bark	1500m
45.	<i>Pellia epiphylla</i> (L.) Corda	Pelliaceae	Rock	1400m
46.	<i>Phaeoceros laevis</i> (L.) Prosk.	Anthocerotaceae	Soil	950m
47.	<i>Philonotis fontana</i> (Hedwig) Bridel.	Bartramiaceae	Soil	950m
48.	<i>Physcomitrium sphaericum</i> (C.F. Ludw.) Fűrnr.	Funariaceae	Soil	1120m
49.	<i>Plagiochasma appendiculatum</i> Lehm. & Lindenb.	Aytoniaceae	Rock	910m
50.	<i>Plagiochila spinulosa</i> (Dicks.) Dumort.	Plagiochilaceae	Tree bark	1450m
51.	<i>Plagiomnium ellipticum</i> (Brid.) T. Kop.	Mniaceae	Soil	420m
52.	<i>Pogonatum aloides</i> (Hedw.) P. Beauv.	Polytrichaceae	Soil	780m
53.	<i>Pogonatum contortum</i> (Menzies ex Brid.) Lesq.	Polytrichaceae	Soil	650m
54.	<i>Porella campylophylla</i> (Lehm. & Lindenb.) Trevis.	Porellaceae	Tree bark	860m
55.	<i>Ptychanthus striatus</i> (Lehm. et Lindenb.) Nee.	Lejeuneaceae	Tree bark	1080m
56.	<i>Racopilum cuspidigerum</i> (Schwägr.) Ångström.	Racopilaceae	Tree bark	1550m
57.	<i>Radula complanata</i> (L.) Dumort.	Radulaceae	Tree bark	560m
58.	<i>Rhodobryum giganteum</i> (Schwägr.) Paris.	Bryaceae	Soil	1590m
59.	<i>Riccia discolor</i> Lehm. & Lindenb.	Ricciaceae	Soil	1300m
60.	<i>Riccia fluitans</i> L.	Ricciaceae	Submerged	950m
61.	<i>Stereophyllum anceps</i> (Bosch & Sande Lac.) Broth.	Stereophyllaceae	Soil	1120m
62.	<i>Targionia hypophylla</i> L.	Targioniaceae	Rock	890m
63.	<i>Thuidium cymbifolium</i> (Dozy & Molk.) Dozy & Molk.	Thuidiaceae	Soil	1500m
64.	<i>Thuidium delicatulum</i> (Hedw.) Schimp.	Thuidiaceae	Soil	1350m
65.	<i>Trematodon longicollis</i> Michx.	Bruchiaceae	Soil	750m

Figure 1
Bryophytes



DISCUSSION

A total of 65 Species of bryophytes including 26 liverworts, 2 hornworts and 37 mosses under 36 families and 50 genera are reported here for the first time from Mamit district of Mizoram, Northeast India. The present study reveals that Bryaceae, Dicranaceae, Frullaniaceae, Meteorioceae and Polytrichaceae are dominant families in the study area. It has been observed from the study that Mamit district harbours rich bryodiversity and the reported taxa are adapted to a wide range of habitats preferring shady, moist places of the plains or slope of hills in the study area. However, the

area is still underexplored and the present study is the first ever preliminary attempt to bridge the gap. All the species reported here are new distributional records of occurrence for the State. So, the study may serve as valuable contribution to the knowledge of the bryoflora of India.

CONCLUSION

The present study indicates that Mamit district is rich in bryophytes. Currently the critical habitat of the bryophytes is under threat against the ongoing anthropogenic activities like construction of roads and

buildings, destruction of the forest and expansion of agricultural land in this region. The changes in the microhabitat of bryophytes may seriously affect the species composition very rapidly and thus upset the

ecological balance. Keeping in view the immense ecological importance of this lower group of plants suitable conservation measures should be taken to preserve the bryoflora of this region.

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