

# Diversity of Bryophytes in Aizawl District, Mizoram, Northeast India

Ramachandra Laha<sup>1</sup>, Lalhriatpuia<sup>2</sup>

<sup>1</sup>Department of Botany, School of life Science, Mizoram University, Tanhril-796004, Mizoram, India

<sup>2</sup>Department of Botany, School of life Science, Mizoram University, Tanhril-796004, Mizoram, India

**Abstract:** *The present study deals with the investigation of bryophytic flora of Aizawl District, Mizoram. In the present investigations a total of 41 taxa of Bryophytes distributed under 34 genera and 23 families have been recorded. Of these, the mosses are represented by 23 species of 20 genera and 14 families, while Liverworts are represented by 15 species of 12 genera and 8 families. Hornworts are represented by 3 species of 2 genus belonging to 1 family. The present study reveals that Bryaceae, Dicranaceae, Ayttoniaceae, Marchantiaceae, Funariaceae and Anthocerotaceae are dominant families in the study area.*

**Keywords:** Diversity, Aizawl, Mizoram, Northeast, Bryophytes

## 1. Introduction

The bryophytes which comprises liverworts, hornworts and mosses are widely distributed, generally dominate in between the altitude 1000-8000 metres and they are important components of the vegetation in many regions of the world and are important components in many forest ecosystems and constitute a major part of the biodiversity in moist environments, wetland, and mountain ecosystems [Hallingback and Hotsgetts, 2000]. They are pioneers of the terrestrial vegetation. They grow in variety of life forms contributing to the main component of mountain forest due to high degree of soil binding capacity besides the water retention characteristics [Alam, 20011, Smith 1982]. Bryophytes play a significant role as indicators of environmental pollution [Bates, 2000]. They are ecologically significant in playing a key role in ecosystem dynamics [Vanderpoorten and Goffinet, 2009]. Bryophytes are also potential sources of new antibiotics and anticancerous substances [Chopra and Vasishtha, 1994].

Bryophytes are one of the richest group of plants in India and occupy a wide range of substrata. Currently, about 2489 taxa of bryophytes are reported from India comprising about 1786 species in 355 genera of mosses, 675 species in 121 genera of liverworts and 25 species in six genera of hornworts [Dandotiya et al., 2011]. The present knowledge on the bryophytes of India began with studies by European bryologists such as Montagne [1842a], Müller [1853], Mitten [1859, 1861] and Dixon [1914]. The works of Stephani [1900–1924], Benedix [1953], Chopra [1938], Udar [1976], Udar and Srivastava [1975, 1977], Asthana and Srivastava [1991], Asthana et al., [1995], Nath and Asthana [1998], Parihar et al., [1994], Singh [1994, 2002] and Srivastava and Srivastava [2002], Lal , [2005] and many others, contain records of collections from India. Recently, many workers have made important contribution to the Bryophyte flora of the eastern region of India and adjacent plains [Gangulee, 1980], Meghalaya [Singh and Nath, 2007], Nagaland [Bansal et al., 2011]. Most recently, Singh and Barbhuiya [2012] reported several liverworts and hornworts from Assam.

Aizawl district, Mizoram occupies an area of approximately 3577 sq. km, located north of the Tropic of Cancer in the northern part of Mizoram. The altitude ranges between 500m to 1800m above sea level. The climate pattern is moist tropical to moist sub-tropical due to its location and elevation with an average annual rainfall of 215cm. In the summer the temperature ranges from 20–32 °C and in the winter 11–21 °C. Aizawl district harbours quite rich bryodiversity, however no attempt had been made to assess the diversity of Bryophytes of this area. To cover the knowledge gap and keeping in view the need for generation of floral diversity lists of this region as these are the most important tools for species and ecosystem conservation, taxonomic studies and other aspects, present study was undertaken in Aizawl district, Mizoram, Northeast India.



Fig: Map showing location of study area, Aizawl District, Mizoram, India

## 2. Material and Methods

Samples were collected from different habitats including natural forests, agro-forests, urban ecosystems and road sides from different localities of Aizawl district, Mizoram during March, 2014 to November, 2014. Simple methodology was adapted to collect specimens in the field. A simple knife was

used to peel off specimens from substratum. The collected materials were dried at room temperature on blotting paper and placed carefully in simple thick paper envelopes. Date of collection, locality and habitat along with the substratum type etc. were recorded in the field note-book and also on the packets containing the materials. The collected bryophytes were identified carefully and deposited to Ecology Laboratory, Department of Botany, School of Life Science,

Mizoram University, Tanhril, Mizoram. The identification of taxa has been done in the laboratory by studying the specimens and consulting various relevant literatures, flora, monographs and publications, [Bansal and Nath, 2012a, 2012b; Schuster, 1979; Schuster, 1984a; Schuster 1984b; Singh and Singh 2003].

**Table:** List of the Bryophytes species with family, habitat and altitude of occurrence in Aizawl District, Mizoram

Sl.No.	Name of the Species	Family	Habitat	Altitude
1.	<i>Aneura pinguis</i> (L.) Dumort.	Aneuraceae	Rock	450m
2.	<i>Anthoceros erectus</i> Kashyap.	Anthocerotaceae	Soil	930m
3.	<i>Anthoceros formosae</i> Stephani.	Anthocerotaceae	Soil	1050m
4.	<i>Asterella khasiana</i> (Griff.) Grolle.	Aytoniaceae	Soil	1670m
5.	<i>Asterella leptophylla</i> (Mont.) Grolle.	Aytoniaceae	Soil	880m
6.	<i>Atrichum undulatum</i> (Hedw.) P. Beauv.	Polytrichaceae	Soil	1670m
7.	<i>Bryum alpinum</i> Huds. ex With.	Bryaceae	Rock	450m
8.	<i>Bryum argenteum</i> Hedw.	Bryaceae	Rock	930m
9.	<i>Bryum coronatum</i> Schwägr.	Bryaceae	Rock	440m
10.	<i>Campylopus introflexus</i> (Hedw.) Brid.	Dicranaceae	Soil	1620m
11.	<i>Cyathodium cavernarum</i> Kunze.	Targioniaceae	Rock	1100m
12.	<i>Cyathophorella tonkinensis</i> (Broth. & Paris) Broth.	Daltoniaceae	Tree bark	1580m
13.	<i>Dumortiera hirsuta</i> (Sw.) Nees.	Marchantiaceae	Rock	390m
14.	<i>Entosthodon wichuriae</i> M. Fleisch.	Funariaceae	Soil	1670m
15.	<i>Funaria hygrometrica</i> Hedw.	Funariaceae	Soil	1450m
16.	<i>Hyophila involuta</i> (Hook.) A. Jaeger	Pottiaceae	Rock	430m
17.	<i>Leucobryum crispum</i> Müll. Hal.	Dicranaceae	Soil	1010m
18.	<i>Leucobryum glaucum</i> (Hedw.) Ångstr.	Dicranaceae	Soil	1490m
19.	<i>Macromitrium involutifolium</i> (Hook. & Grev.) Schwägr.	Orthotrichaceae	Tree bark	1670m
20.	<i>Marchantia emarginata</i> Reinw., Blume & Nees.	Marchantiaceae	Soil	930m
21.	<i>Marchantia paleacea</i> Bertol.	Marchantiaceae	Soil	950m
22.	<i>Meteoriopsis reclinata</i> (Müll. Hal.) M. Fleisch.	Meteorioaceae	Tree bark	1060m
23.	<i>Metzgeria furcata</i> (L.) Corda.	Metzgeriaceae	Tree bark	1610mm
24.	<i>Neckera pennata</i> Hedw.	Neckeraceae	Tree bark	1650m
25.	<i>Neckeropsis semperiana</i> (Hampe ex C. Müll.) Touw.	Neckeraceae	Tree bark	390m
26.	<i>Octoblepharum albidum</i> Hedw.	Dicranaceae	Tree bark	400m
27.	<i>Pallavicinia lyellii</i> (Hook.) Gray.	Pallaviciniaceae	Soil	880m
28.	<i>Phaeoceros laevis</i> (L.) Prosk.	Anthocerotaceae	Soil	950m
29.	<i>Philonotis fontana</i> (Hedwig) Bridel.	Bartramiaceae	Soil	950m
30.	<i>Physcomitrium pyriforme</i> (Hedwig) Hampe, Linnaea.	Funariaceae	Soil	950m
31.	<i>Plagiochasma appendiculatum</i> Lehm. & Lindenb.	Aytoniaceae	Rock	910m
32.	<i>Plagiomnium ellipticum</i> (Brid.) T. Kop.	Mniaceae	Soil	420m
33.	<i>Ptychanthus striatus</i> (Lehm. et Lindenb.) Nee.	Lejeuneaceae	Tree bark	1080m
34.	<i>Racopilum cuspidigerum</i> (Schwägr.) Ångström.	Racopilaceae	Tree bark	1550m
35.	<i>Rhodobryum giganteum</i> (Schwägr.) Paris.	Bryaceae	Soil	1590m
36.	<i>Riccardia chamedryfolia</i> (With.) Grolle.	Aneuraceae	Rotten log	400m
37.	<i>Riccia fluitans</i> L.	Ricciaceae	Submerged rock	950m
38.	<i>Riccia glauca</i> L.	Ricciaceae	Soil	1050m
39.	<i>Targionia hypophylla</i> L.	Targioniaceae	Rock	890m
40.	<i>Taxiphyllum barbieri</i> (Cardot & Copp.) Z. Iwats.	Hypnaceae	Submerged rock	950m
41.	<i>Trematodon longescens</i> Müll. Hal.	Bruchiaceae	Soil	1030m

### 3. Result and Discussion

In the present investigations a total of 41 taxa of Bryophytes distributed under 34 genera and 23 families have been recorded. Of these, the mosses are represented by 23 species of 20 genera and 14 families, while Liverworts are represented by 15 species of 12 genera and 8 families. Hornworts are represented by 3 species of 2 genus belonging to 1 family. The present study revealed that Bryaceae, Dicranaceae, Aytoniaceae, Marchantiaceae, Funariaceae and Anthocerotaceae are dominant families in the study area

given in the Table. In the terrestrial habitats, 20 of the reported species were found thriving on the surface of soil, 9 species were found growing on the surface of rocks, and 9 species namely *Cyathophorella tonkinensis*, *Macromitrium involutifolium*, *Meteoriopsis reclinata*, *Metzgeria furcata*,

*Neckera pennata*, *Neckeropsis semperiana*, *Octoblepharum albidum*, *Ptychanthus striatus* and *Racopilum cuspidigerum*, were epiphytic, 2 species *Taxiphyllum barbieri* and *Riccia fluitans* were found growing submerged under water and 1 species *Riccardia chamedryfolia* was found growing on

rotten bamboo surface. In the study, all the bryophytes specimens were collected within the altitudinal range of 390m to 1670m above sea level [Table]. Some of the reported species namely *Rhodobryum giganteum*, *Dumortiera hirsuta*, *Atrichum undulatum*, *Philonotis fontana* and *Marchantia* sp. are said to possess medicinal value.

It has been observed from the study that Aizawl district, Mizoram harbours rich bryodiversity. However, no attempt has been made to access the bryophytes of this region and there is no systematic data on bryophytes of this region. Therefore, the present study may serve as valuable contribution to the knowledge of the bryoflora of India, help to throw light on future research and give a base for the future biodiversity studies.

#### 4. Conclusion

Field observations revealed that the disturbances and threat to the bryodiversity of this region is associated with many human activities like expansion of agricultural land, the construction of road, destruction of forests, execution of unplanned developmental activities; and habitat destruction through expanding human activities such as over exploitation of resources, shifting cultivation, expanding human population and other anthropogenic factors have resulted in degeneration of bryodiversity in this region. Therefore, serious attentions and efforts are required to save valuable bryoflora of this region.

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### Author Profile



**Ramachandra Laha** received his PhD degree from Mizoram University in Forestry in 2003. Presently, he is Professor and Dean, School of Life Science, Mizoram University. His research interests are Biodiversity, Regeneration, Molecular Biology.



**Lalhriatpuia** received the M.Sc. degree in Botany from Mizoram University in 2011. He is currently a PhD student in Botany at Department of Botany, School of Life Science, Mizoram University, Mizoram, India. His research interests are Biodiversity, Ethnobotany, Phytochemicals and genetics.