

A Preliminary Study of Moss Flora of Murlen National Park Mizoram India

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Abstract: A survey of the moss flora of Murlen National Park, Champhai District, Mizoram was conducted during July 2016. The occurrence of 25 taxa of mosses distributed under 23 genera and 17 families has been recorded. Bryaceae, Dicranaceae and Neckeraceae are the most dominant families in the study area. All the species recorded here are New to the Moss flora of Murlen National Park.

Keywords: Mosses, Murlen National Park, Mizoram, India.

I. INTRODUCTION

Mosses are small plants that usually grow in tufts or mats, they contribute much, in the aggregate, to the green color of forests, mountains and moors, especially in rainy weather [1]. They are a much evolved group of bryophytes with about 17,000 species under 3 subclasses, 4 orders, 89 families and about 900 genera across the world [2],[3]. A number of mosses evolved in response to special ecological, morphological and physiological adaptations to demanding environmental conditions in which the other group of plants generally fail to survive and also tend to be highly specific for particular microenvironment [4]. Bryophytes as a whole are the second largest group of plants, with about 25,000 species worldwide [5]. They are ecological indicators of air pollution. A total of 2489 taxa of bryophytes are reported from India, of which 1786 species belonging to 355 genera are mosses [6].

Included in the eastern Himalayan region, Murlen National Park is located in Champhai district, Mizoram, North east India. The park is situated about 245 km east of Aizawl, and is close to the Chin Hills. It covers an area of approximately 100 km². The tropical, semi-evergreen and sub-montane Forests of Murlen National Park are home to a rich variety of flora and fauna. There is a lack of information of mosses (Bryophytes) from this region and this is an attempt to fill the gap of knowledge.

II. MATERIALS AND METHODS

Simple methodology was used for collection of plant specimens from the field. Several epiphytic and terrestrial populations of mosses were collected from different habitats in the field during July, 2016. Photographs were made from actual observations in the field as to the species natural habitat. The collected specimens were dried at room temperature and stored in thick paper packets. All the crucial field data were noted down including collection number, locality, date of collection, altitude, habitat and substrate information on the packet. Various relevant literatures were consulted for identification work [7],[8],[9],[10] and Identifications of some specimens were done at Botanical Survey of India (BSI), Kolkata. Voucher specimens were deposited to Ecology Laboratory, Department of Botany, School of Life Science, Mizoram University, Tanhril, Mizoram.



Fig 1: Map showing study area, Murlen National Park, Mizoram, India

III. RESULT AND DISCUSSION

In the present investigation, a total of 25 taxa of mosses distributed under 23 genera and 17 families have been recorded. Of these, Bryaceae, Dicranaceae and Neckeraceae are the most dominant families in the study area represented by three species each, followed by Funariaceae and Politrachaceae both represented by two species each. The rest of the families are represented by one species each. All the species recorded here are New to the Moss flora of Murlen National Park. The presence of 25 species of mosses indicates the potential of this region in nourishing the bryo-diversity. Among the more interesting mosses are 3 rare species in the study area- *Hookeria acutifolia*, *Hypopterygium tamarisci*, *Cyathophorella tonkinensis* which are described and illustrated below.

TABLE I: FONT AND PARAGRAPH SPECIFICATIONS

Sl.No.	Name of the species of Bryophytes	Family
1	<i>Philonotis fontana</i> (Hedwig) Bridel.	Bartramiaceae
2	<i>Trematodon longicollis</i> Michx.	Bruchiaceae
3	<i>Bryum argenteum</i> Hedw.	Bryaceae
4	<i>Bryum coronatum</i> Schwägr.	
5	<i>Rhodobryum giganteum</i> (Schwägr.) Paris.	
6	<i>Schoenobryum concavifolium</i> (Griff.) Gangulee	Cryphaeaceae
7	<i>Cyathophorella tonkinensis</i> (Broth. & Paris) Broth.	Daltoniaceae
8	<i>Campylopus introflexus</i> (Hedw.) Brid.	Dicranaceae
9	<i>Leucobryum glaucum</i> (Hedw.) Ångstr.	
10	<i>Dicranum scoparium</i> Hedw.	
11	<i>Funaria hygrometrica</i> Hedw.	Funariaceae
12	<i>Physcomitrium pyriforme</i> (Hedwig) Hampe, Linnaea.	
13	<i>Meteoriopsis reclinata</i> (Müll. Hal.) M. Fleisch.	Meteoriaceae
14	<i>Plagiomnium undulatum</i> (Hedw.) T.J. Kop.	Mniaceae
15	<i>Neckera pennata</i> Hedw.	Neckeraceae
16	<i>Neckeropsis semperiana</i> (Hampe ex C. Müll.) Touw.	

17	<i>Neckeropsis undulata</i> (Hedw.) Reichardt	
18	<i>Octoblepharum albidum</i> Hedw.	Octoblepharaceae
19	<i>Macromitrium sulcatum</i> (Hook.) Brid.	Orthotrichaceae
20	<i>Atrichum undulatum</i> (Hedw.) P. Beauv.	Polytrichaceae
21	<i>Pogonatum urnigerum</i> (Hedw.) P. Beauv.	
22	<i>Racopilum cuspidigerum</i> (Schwägr.) Ångström.	Racopilaceae
23	<i>Thuidium cymbifolium</i> (Dozy & Molke.) Dozy & Molke.	Thuidiaceae
24	<i>Hypopterygium tamarisci</i> (Sw.) Brid. ex Müll. Hal.	Hypopterygiaceae
25	<i>Hookeria acutifolia</i> Hook. & Grev.	Hookeriaceae

1. *Hookeria acutifolia* Hooker & Greville, Edinburgh J. Sci. 2: 225, 1825 [11]

Description:

Plants pale green, Monoicous, medium to large in size, 1.8–3.5 cm long, 1.5–2.0 cm wide with leaves, simple without costa, gemmiferous leaves present, sparingly branched, creeping and tightly adherent to substrate. Rhizoids colorless to reddish. Stems green to yellowish green, prostrate. Leaves lanceolate with acute apex, heteromorphic, complanate, widely spreading, somewhat curved when dry, ovate to narrowly ovate, 2.0–5.2 mm long, 0.4–1.5 mm wide, widest at base, margins entire, leaf cells large, thin-walled, laminal cells homogeneous; marginal cells narrower than medial cells. Seta slender, reddishbrown to yellowish brown, smooth. Capsule inclined, ovoid-oblong. Asexual reproduction by gemmae on leaf tip.

Habitat:

In moist shady open areas on soil in evergreen forests.

Distribution:

China, India, Indonesia, Nepal, Philippines, Turkey, Africa, Thailand, Canada, U.S.A., Mexico, Caribbean, Brazil, Caucasus, North-Central Pacific [12].

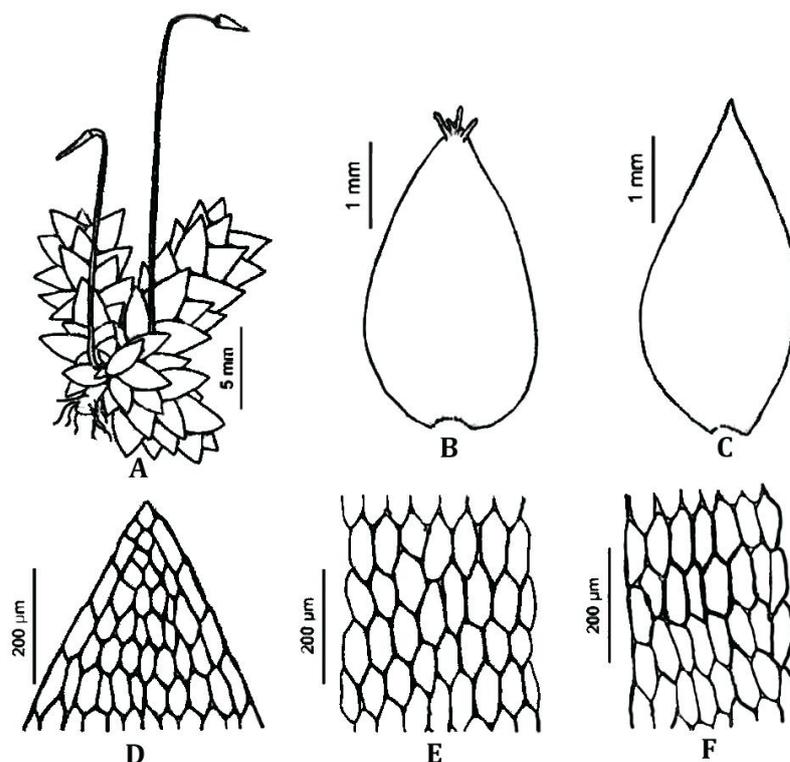


Fig 2: *Hookeria acutifolia*. A-Fertile habit, B- Leaf with gemmae, C- Normal Leaf, D- Cells at leaf apex, E-Cells at median part of leaf, F- Cells at leaf margin.

2. *Hypopterygium tamarisci* (Sw.) Brid. ex Müll. Hal. Syn. Musc. Frond. 2: 8 (1850) [13]

Description:

Plants dull green to brownish, stem creeping, densely tomentose, 2.5-3.3 cm long, secondary stem erect, dendroid, 1.2 cm long; lateral leaves 1-1.3 x 0.6-0.9 mm, ovate, short-acuminate, margin toothed at upper part, entire below, bordered all around by 1-2 rows of elongate hyaline cells, 40-140 x 6-10 μm ; costa single, reach up to midleaf; cells at middle hexagonal, 20-45 x 12-15 μm ; amphigastria 0.8 x 0.6-0.8 mm, orbicular, sharply apiculate, margin entire below, distantly toothed above, bordered all around by 1-2 rows of elongate hyaline cells; costa faint, extends $\frac{1}{2}$ of leaf length; median cells hexagonal, 20-35 x 13-20 μm ; seta elongate, smooth; capsule inclined to horizontal, ovoid to oblong, thick necked, orange-brown, calyptra naked, conical; spores very small, 8-10 μm diagonally.

Habitat:

In moist shady areas on rocks, logs, on bases of tree trunks and soil near stream.

Distribution:

South India, Sri Lanka, Brazil, Columbia, Ecuador, Java, Madagascar, Malaya, Mexico, New Guinea, Pacific Ocean Islands, Argentina, Bolivia, Borneo, Peru, Philippines, Sumatra, West Indies [14].

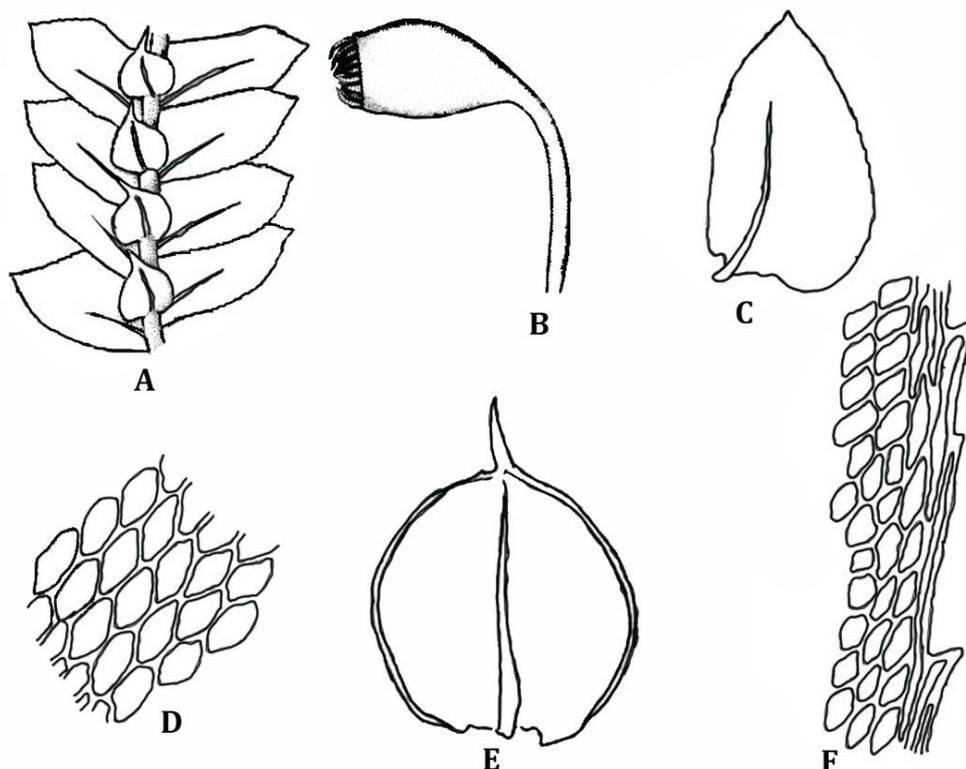


Fig 3: *Hypopterygium tamarisci*. A-A part of plant, B- Capsule, C- Lateral Leaf, D- Cells at median part of leaf, E- Ventral leaf/amphigastria, F- Cells at leaf margin.

3. *Cyathophorella tonkinensis* (Broth, et Par.) Broth. In Engler-Prantl. Nat. Pflanz-fam. ed. 2, 11:278, 1925 [15]

Distribution:

Dark green plants, dioecious. Primary stems prostrate, rhizomatous, with tomentose rhizoids at base; Secondary stem simple, 4-5 cm long, tips caudate and densely felted with abundant brood filaments. Leaves plane; lateral leaves asymmetrical, widely spreading, smaller toward the base and tip of stems, ovate, acuminate, narrowly bordered, the

border 1-2 celled wide, margin spinose-dentate, costa shortly unequally forked; cells elongate or oblong-hexagonal. Seta short, capsule erect, cylindrical, peristome teeth papillose, segments of endostome from a low basal membrane, cilia lacking. Amphigastria ovate, acuminate, costa obsolete or nearly ecostate.

Habitat:

Epiphytic on tree bark, in moist shady areas, base of tree and on soil.

Distribution:

China, Japan, Himalayas, Thailand and Vietnam.

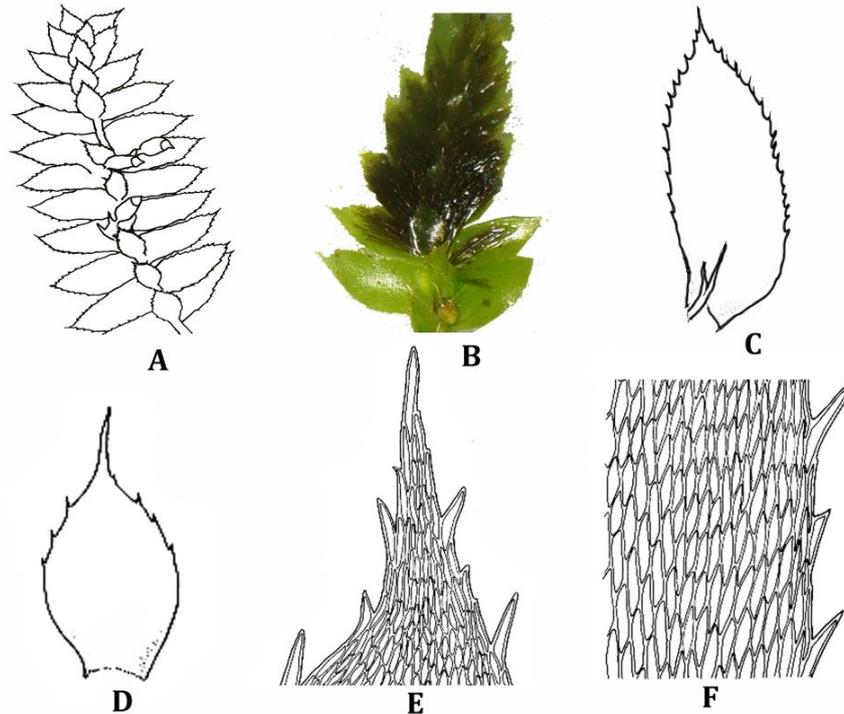


Fig 4: *Cyathophorella tonkinensis*. A-A part of plant with sporophyte, B- Leaf tip with brood filaments, C- Lateral Leaf, D- Amphigastria, E-Cells at leaf tip, F- Cells at leaf margin.

IV. CONCLUSION

The moss flora of Murlen National Park is still under explored. The region is rich with 25 species of mosses which indicates the potential of rich bryo-diversity because of their variety of microhabitat which is congenial for hosting rich diversity of bryophyte.

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