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Innovation The Research Concept

Preliminary Survey of Mosses and Liverworts of Pahalgam Town of Anantnag District of Kashmir, J&K

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Abstract

Pahalgam town of Anantnagis located in north western part of Jammu & Kashmir,located on the banks of riverLidder at an altitude of 7240 m.The cool,mild and cold climate and dense coniferous and mixed temperate forest of Anantnag district offers a perfect and diverse habitat for shade loving bryophytes. Further, the organic rich soil of the dense forest favors the growth of endemic species andalso aids in enhancing the diversity of the mosses and the liverworts. Keeping in view the above, the present study was conducted tomap the species diversity of bryophytes of district Anantnag of Jammu and Kashmir. In this preliminary survey, a total of 14bryophyte species(12 mosses and two liverworts) were recorded.

keywords: Anantnag, Pahalgam,endemic,liverworts, mosses, biodiversity

Introduction

Globally, the bryophytes comprise of 20000 species belonging to 1050 genera (Beike and Rensing 2010) and represents the second largest group of plants after angiosperms. In India, the bryoflora is represented by about 2489 taxa comprising of 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). They are one of the oldest group of plants and constitute an important factor of diverse vegetation complex. Majority of them are damp loving, predominately terrestrial and occur in shaded condition. They also prefer to grow on tree bark, tree bases and branches. They usually inhibit micro climatic niche (Melick and Seppelt 1997). From the ecological point of view, they are very important as they are the soil binders and form the pioneer vegetation after lichens during succession, provided the habitat to small animals and promote seed germination of higher plants. They are also known to have antifungal and antimicrobial activity (Frahm 2004; Alam 2014) and were used as a natural medicine in Indian culture (Frahm 2001).

Bryophytes, despite of their significant role in the ecosystem structure and function continue to remain a highly neglected area in plant scientific research. This is perhaps mainly due to their diminutive stature, difficulties in identification, less reported economic uses and fewer specialists in field. District Anantnag of Jammu and Kashmir, largely remains unattended because of its diverse topography and extreme climatic conditions which indicates that there are fair chance of unearthing the unique kind of bryophyte diversity.

As far as the systematics of this group is concerned, the majority of published literature inis in scattered form. However, a good account of literature is available in India.The notable ones are: *Liverworts of western Himalaya and Punjab plains* (Kashyap 1929-1932), *Indian Lepidoziineae*(Sharma and Srivastava,1993),*Hepaticae and anthocerotae of Great Himalayan National Park and its environs (HP),India* (Singh & Singh 2009),*Mosses of eastern India and adjacent regions*(Gangulee 1969-1980),*Taxonomy of Indian Mosses*(Chopra 1975). The present study was undertaken in the Pahalgam town of Anantnag district with an aim to survey the area to collect the samples of endemic and widely distributed mosses and liverworts.

Objective of study

The objective of research is to survey the area to collect the samples of endemic and widely distributed mosses and liverworts and its identification.

Methodology

Table 1.1: List of mosses and liverworts identified from Pahalgham.

Sno	Name of species	Family	Habitat
1.	*Anoectangium thomsonii* Mitt.	Pottiaceae	Near dirty drain
2.	*Catharinea aculeata* (Cardot & P. de la Varde) Broth.	Polytrichaceae	Road side Chandanwari
3.	*Brachythecium populeum (*Hedw.)Schimp.	Brachytherapy	On the tree bark
4.	*Bryum argenteum* Hedw.	Bryaceae	Cemented wall,on way to Pehalgam
5.	*Ptychostomum capillare* (Hedw.) D. T. Holyoak & N. Pedersen	Bryaceae	Road side aru valley
6.	*Entosthodon wichurae* M. Fleisch.	Funariaceae	On cemented wall
7.	*Fabronia ciliaris* (Brid.)Brid.	Fabroniaceae	Wood log
8.	*Funaria hygrometrica* Hedw.	Funariaceae	Near base of rock
9.	*Hydrogonium pseudoehrenbergii* (M. Fleisch.) P.C. Chen	Pottiaceae	On barren rock
10.	*Hymenostylium recurvirostrum* (Hedw.) Dixon	Pottiaceae	At Aru valley
11.	*Jungermannia tetragona* Lindenb.	Jungermnniaceae	Barren rocks on Pehalgham
12.	*Marchantia polymorpha* L	Marchantiaceae	At the base of rock Mundlan,Pehalghaam
13.	*Oxystegus stenophyllus* (Mitt.) Gangulee	Pottiaceae	Roadside Rotten wood log
14.	*Timmiella anomala* (Bruch & Schimp.) Limpr.	Pottiaceae	On the snow cliff Chandanwari

Table 1.2: Prominent features of identified mosses and liverworts.

Anoectangium thomsoni (Potticceae)	Plants yellow green above and green to brown below, lamina base cells brown, upper lamina cells chlorophyllose
Atrichum aculeatum (Polytrichaceae)	Four green layers in midrib and lamina always tall and distinct , plant dioecious
Brachythecium populeum (Brachytherapy)	Leave cell smooth, thick-walled, rhomboid, margins half
Bryum argenatum (Bryaceae)	Costa percurrent or ending in hyaline arista in top leaves .upper leaf cells hyaline and chlorophyllous below ,bud like gammae found in sterile shoots
Ptychostomum capillare (Bryaceae)	Costa percurrent .leaves cell different hyaline upper cell and green lower cell
Entostodon wichurae (Funariraceae)	Midrib entire, base broad
Fabronia ciliaris (Fabroniaceae)	Leaf margins entire ,midrib half, basal cell rectangular
Funaria hygrometrica	Mid rib entire, base broad ,margins smooth

(Funariaceae)	
Hydrogonium pseudoehrenbergii (Pottiaceae)	Leaves carinate with small projections .base broad and leaf margin unbroken. leaf base hyaline
Hymenostylium javanicum (Pottiaceae)	Leaf base papillate
Jungermannia tetragona (Jungermanniaceae)	Shoot 20 to 30 mm long ,stem elliptical, leaves imbricate ,median leaf cells polygonal, trigones indistinct oil cells differentiated
Marchantia polymorpha (Marchantiaceae)	Gemmae present ,plant dioecous, archogonia and antheridia present
Oxystegus stenophyllus (Pottiaceae)	Leaf base cells rectangular with slightly rounded ends, smooth hyaline near costa becoming narrower towards margin
Timmiella anomala (Pttiaceae)	Spirally twisted peristome, adaxial surface cell larger than tbne abaxial surface cell

Result

The preliminary study revealed a total of 14 bryophyte species in which 12 belong to mosses and two species were of liverworts (Table 1.1). Out of 12 mosses, five species belong to Pottiaceae, one to Fabroniaceae, two to Bryaceae, one to Polytrichaceae,two to Funariaceae and one from Brachytheciaceae. Some of the key characters of the identified mosses and liverworts are also given (Table 1.2).

Future Scope

The study showed that Bryophyte occupied the different Micro and macro habitat. Since not much has been done so for , the future study has potential of unearthing the endemic and not reported species.

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Conclusion

There is high diversity and abundance of endemic and rare species because of favourable atmosphere and gradient in elevation Therefore The more explorations should be done to record all the species which will be helpful in conservation programme

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