PRELIMINARY SURVEY ON THE LIVERWORT FLORA OF NAGBANI, JAMMU (NORTH - WESTERN HIMALAYAS).

Anil Sharma*, Madhu Bhagat and Anima Langer

Department of Botany, University of Jammu, Jammu - 180 006.
**e - mail: asanilsharma3@gmail.com*

Abstract: This paper deals with the distribution of liverwort taxa in Nagbani. It includes 9 species belonging to 6 genera, 4 families and 2 orders. The most prominent order is Marchantiales. District Jammu, a part of Jammu and Kashmir State (North- West Himalayas), exhibit remarkable topographic and edaphic diversity and therefore, offers congenial climatic conditions for the luxuriant growth of liverworts. Out of these, three taxa are either endemic or threatened. These are *Asterella angusta* (Steph.) Kachroo, *A. pathankotensis* (Kash.) Kachroo (endemic) and *Reboulia hemispherica* (L.) Raddi (threatened).

Keywords: Liverworts, NW Himalayas, nagbani

INTRODUCTION

The State of Jammu and Kashmir, which forms Northern most part of Western Himalayas, comprises three regions, i.e., Jammu, Kashmir and Ladakh. Nagbani is a small village at a distance of 14 km on the western outskirts of Jammu- Poonch National highway. The village is situated on the bank of Ranbir canal, which receives its water from Chenab River. On the banks of canal there are houses of local people, cultivation fields, a school, an orchard, a forest nursery and a brick kiln. The altitude of the area is 350 m. While more than 80 liverwort sps have been recorded from Poonch district (Tanwir, 2005) and 40 from Udhampur (Tanwir *et al.*, 2008), the number of liverwort taxa reported from Jammu is not more than 2 dozen (Langer *et al.*, 2003, Kapoor, 2009).

MATERIAL AND METHOD

Diverse habitats in Nagbani area were explored for their hepatic diversity from January 2009 to December 2009. Data on various ecological characters (altitude, habitat, soil, pH, plant associates, etc) were collected in the field itself. Details regarding the morphology and anatomy of various gametophytic and sporophytic characters were studied in the laboratory under stereo and compound microscopes.

RESULT AND DISCUSSION

A complete list of taxa collected presently is given in observation Table 1 and Table 2.

Metzgeriales

Pelliaceae
Pellia endivaefolia (Dicks.) Dum.

Marchantiales

Aytoniaceae
Asterella angusta (St.) Kachroo.
Asterella pathankotensis (Kash.) Kachroo.
Plagiochasma appendiculatum L.
Reboulia hemispherica (L.) Raddi.

Marchantiaceae

Marchantia polymorpha L.
M. nepalensis L.
M. palmata Nees.
Ricciaceae
Riccia cruciata Kash.

Table 1. Showing various types of habitats occupied by liverwort taxa.

S. No.	Taxa	Habitat Type			
		Epilithic			Non- Epilithic
		Cemented wall	Brick wall	Stone wall	Moist soil
1	*Plagiochasma appendiculatum*	+	+	_	+
2	*Marchantia palmata*	+	+	+	+
3	*M. nepalensis*	+	+	+	+
4	*M. polymorpha*	+	_	_	+

5	*Pellia endivaefolia*	+	+	_	+
6	*Asterella pathankotensis*	+	_	_	_
7	*A. angusta*	_	_	_	+
8	*Reboulia hemispherica*	_	_	_	+
9	*Riccia cruciata*	_	_	_	+

Table 2. Data on pH of various substrata at Nagbani.

S. No.	Taxa	Epilithic			Non Epilithic
		Cemented wall (pH - 7.6)	Brick wall (pH - 7.2)	Stone wall (pH - 6.5)	Moist Soil (pH - 7.5)
1	*Plagiochasma appendiculatum*	+	+	_	+
2	*Marchantia palmata*	+	+	+	+
3	*M. nepalensis*	+	+	+	+
4	*M. polymorpha*	+	_	_	+
5	*Pellia endivaefolia*	+	+	_	+
6	*Asterella pathankotensis*	+	_	_	_
7	*A. angusta*	_	_	_	+
8	*Reboulia hemispherica*	_	_	_	+
9	*Riccia cruciata*	_	_	_	+

The Himalayas are one of the richest repositories of bryodiversity, ranking third at global (Uniyal, 1999) and first at National level (Pande, 1958). Out of 625 Himalayan liverworts, 30 % are endemic; maximum endemism being found in Eastern Himalaya (44 %), followed by Central Himalaya (31%) and Western Himalayas (25 %) (Udar and Srivastava, 1983). During the last few decades, the entire Himalayan range has suffered tremendous habitat destruction on account of tourism, urbanization, over-exploitation and deforestation, leading to the decline/disappearance of large number of bryophyte taxa including many rare and threatened ones. Need of the hour, therefore, is to explore unexplored areas and inventorize the diversity which is otherwise likely to disappear even before getting documented. Nagbani lies at an extremely low altitude (350m), yet it harbours rich hepatic diversity as a total of nine taxa have presently been collected from the area. The area is also a home to a number of endemic and threatened taxa like *Asterella angusta*, *A. pathankotensis* and *Reboulia hemispherica* respectively, which are reported to have disappeared from other parts of Western Himalayas (Nainital), where they used to grow luxuriantly during yesteryears (Pant, 1983). It would be worthwhile to mention that *Plagiochasma appendiculatum*, *Marchantia nepalensis*, *M. palmata*, and *Pellia endivaefolia* were the most luxuriant as they were recorded throughout the year. *Asterella pathankotensis* was the next to follow as it existed in the field for six months. Remaining taxa grew in the field for four (*Asterella angusta*), three (*Reboulia hemispherica*) or two (*Marchantia polymorpha, Riccia cruciata*) months only. While, *Marchantia palmata and M. nepalensis* coexisted in the field and showed similar trend of luxuriance, two sps. of *Asterella* (*A. pathankotensis* and *A. angusta*) occurred during entirely different months (*A. pathankotensis* during December to May and *A. angusta* during July to October). Bryophytes also exhibit habitat specificity. Out of the taxa collected four sps are habitat specific and grew on non epilithic as well as epilithic substrata whereas five remaining sps are nonspecific. Table1 shows habitat specificity of different taxa. pH of the soil ranges from 6.5 to 7.6. *Marchantia palmata and M. nepalensis* inhabited substrata ranging from slightly acidic (6.5) to slightly alkaline (7.6) pH, While all other taxa occupied neutral to slightly alkaline substrata (7.2-7.6) (Table2).

SUMMARY AND CONCLUSION

Although, Nagbani lies at a low altitude (350m), still it is rich in liverwort diversity, as total of nine

liverwort taxa have been collected from the area. *Plagiochasma appendiculatum* was the most luxuriant taxon, followed by *Marchantia palmata*, *M. nepalensis* and *Pellia endivaefolia*. On the other hand, *M. polymorpha*, *Riccia cruciata* and *Reboulia hemispherica* were the least luxuriant taxa.

ACKNOWLEDGEMENT

The authors thank Mr. Gopal Dass for rendering help during the field collections.

REFERENCES

Kapoor, R. (2009). Studies on the life history patterns of some species of *Riccia* (Mich) L. M.Phil. Dissertation, University of Jammu, Jammu.

Langer, A., Gupta, S. and Tanwir, M. (2003). Preliminary survey of Jammu district (North - West Himalaya) for liverwort and hornwort flora. Geophytology, **31** (1 & 2): 87 - 89.

Pant, G. (1983). Threatened bryophytes in Nainital. In: An assessment of threatened plants of India: 313-317. S. K. Jain and R. R. Rao (Eds.) Botanical Survey of India, Deptt. of Environment, Botanical Garden, Howrah.

Tanwir, M. (2005). Studies on the diversity of hepatic flora of district Poonch (North West Himalaya). Ph.D. thesis, University of Jammu, Jammu.

Tanwir, M., Langer, A. and Bhandari, M. (2008). Liverwort and hornwort flora of Patnitop and its adjoining areas (J&K), Western Himalaya, India Geophytology, **37:** 35 - 41.

Udar, R. and Srivastava, S. C. (1983). Rare and endangered liverworts of India. In: Jain S.K. and Rao R. R., (eds). An assessment of threatened plants of India. Botanical Survey of India, Department of Environmental Sciences, Botanical Garden Howrah, pp 303-312.

Uniyal, P. L. (1999). Role of bryophytes in conservation of ecosystem and biodiversity.The Botanica, **49**: 101 - 115.