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8. *SELAGINELLA RETICULATA* (HOOK. & GREV.) SPRING (SELAGINELLACEAE) – A NEW RECORD TO THE PTERIDOPHYTIC FLORA OF RAJASTHAN, NORTH-WESTERN INDIA

B.L. YADAV[1,2], K.L. MEENA[1,3], KANTA MEENA[1,4] AND SHAHDAB HUSSAIN[1,5]

[1]Department of Botany, M.L.V. Government College, Bhilwara 311 001, Rajasthan, India.
[2]Email: drblyadav@yahoo.com
[3]Email: kanhaiyameena211@yahoo.com
[4]Email: kantameenalectbotany@gmail.com
[5]Email: hshahdab@yahoo.in

Rajasthan in north-west India is the largest state with an area of 3,42,274 sq. km and lies between 23° 3'-30° 12' N and 69° 30'-78° 17' E. Aravalli ranges, which are one of the oldest mountain ranges of the world, diagonally divide the state into two distinct climatic regions. The region towards the north-western side of Aravalli is a desert or semi-desert characterized by sand dunes, high wind velocity, high temperature and thorny vegetation. The region towards the south-eastern side is a humid zone with hills of variable heights, ravines, plains, rivers and dense forests.

Sitamata Wildlife Sanctuary (Fig. 1) is one of the protected areas of Rajasthan with a wide range of habitats in the Aravalli ranges. It is exceptional for diversity and interspersed habitats, which includes areas of teak stands, perennial streams, sloping hills and fine groves of mixed woodlands. The Sanctuary lies on the Udaipur-Pratapgarh state highway at a distance of 100 km from Udaipur and 40 km from Pratapgarh. The major part of the Sanctuary lies in the newly formed civil district of Pratapgarh, only 74.21 sq. km comes under district Chittorgarh. The Sanctuary covers an area of 422.95 sq. km (195.09 sq. km core area and 227.86 sq. km buffer area) and lies between 24° 04'-24° 23' N and 74° 25'-74° 40' E. The occurrence of flying squirrel is the greatest attraction of the Sanctuary.

Geographically, there are three major operating systems, namely the Aravalli, the Vindhyan and Malva plateau, which result in a variety of habitats. The annual rainfall in the Sanctuary area ranges from 664.60 mm to 1,430.20 mm with an average 30 rainy days. The temperature varies from 18.6-33.6 °C.

Selaginella Beauv. with 700 species (Pichi-Sermolli 1977) is represented by 62 species in India (Alston 1945; Panigrahi and Dixit 1966, 1967, 1968; Dixit 1984, 1992). The first enumeration of the Indian species of *Selaginella* was provided by Alston (1945). Subsequently, Panigrahi and Dixit (1966, 1967, 1968) carried out prolonged research on this genus and dealt with 30 species of *Selaginella* in detail. Sharma and Bhardwaja (1976) have reported the occurrence of *Selaginella repanda* (Desv.) Spring for the first time from Gwaparnath, Kota (south-east Rajasthan). A new species of *Selaginella*, namely *Selaginella rajasthanensis* was described by Gena *et al.* (1979) from Kunda Khoh, Shahabad, Baran district of Rajasthan. Recently, Dulawat and Chaudhary (2008) have recorded *Selaginella ciliaris* (Retz.) Spring from Sitamata, Rajasthan. The present paper deals with the detailed taxonomic account, distribution and ecological notes of *Selaginella reticulata* recorded from Sitamata forest in Rajasthan.

An extensive survey of the area of Sitamata Wildlife Sanctuary was carried out during 2004-2009. Various localities which seem likely to support the growth of *Selaginella* were visited regularly, especially during rainy season (July-October). Field observations, such as habit, habitat, associated plants were recorded. Identification was done using Alston (1945), Panigrahi and Dixit (1966), and Dixit (1984, 1992). Morphological observations and camera

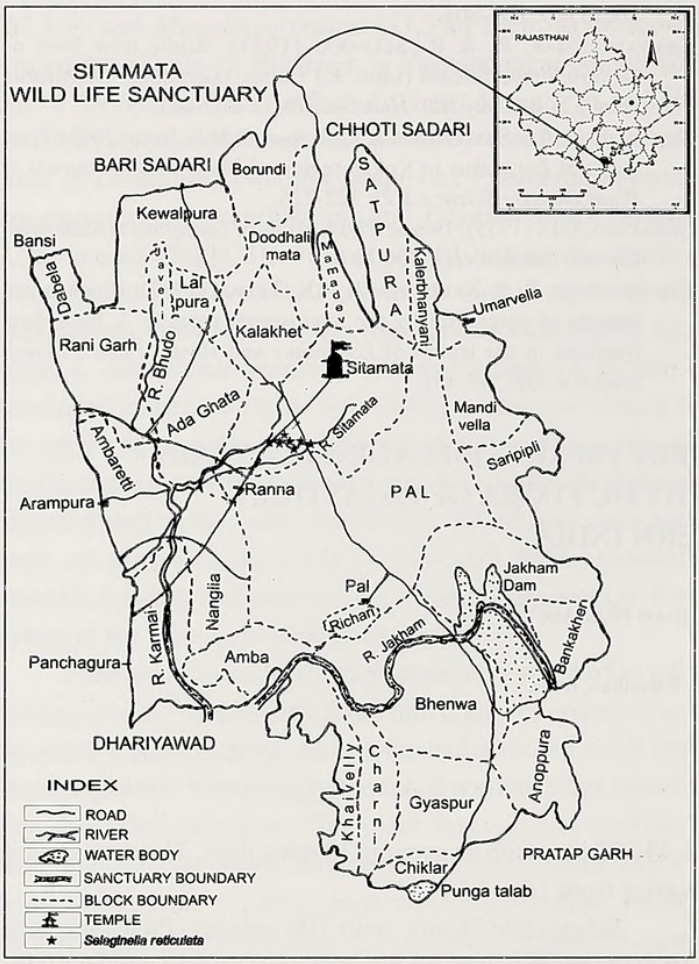


Fig. 1: Map of Sitamata Wildlife Sanctuary, Rajasthan, India

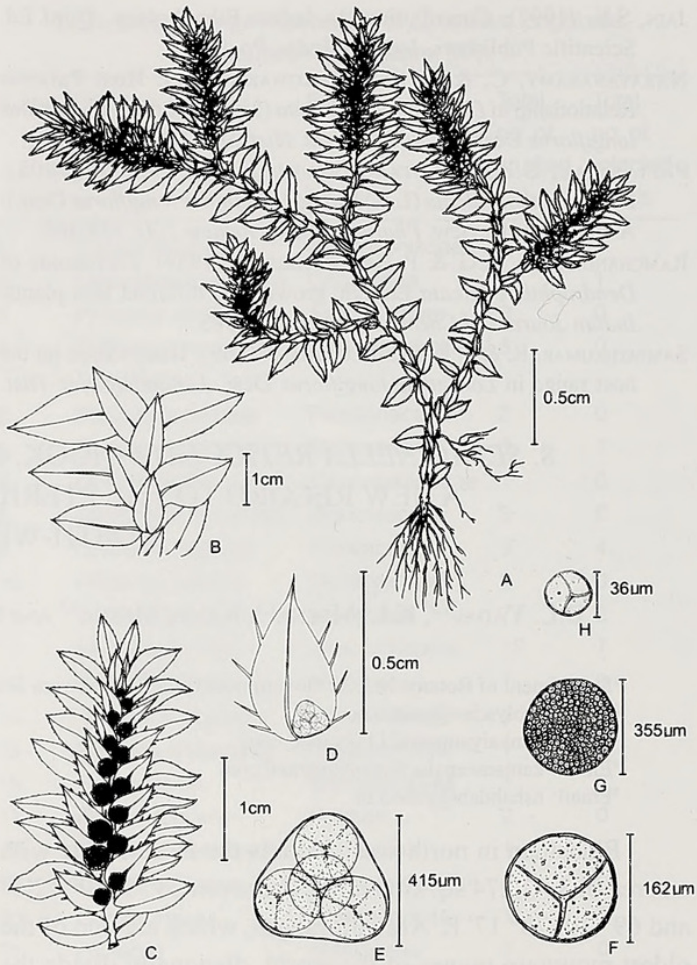


Fig. 2: A-H *Selaginella reticulata*, A. Habit, B. Lateral and Median leaves, C. Strobilus, D. Megasporophyll, E. Megasporangium, F. Megaspore, G. Microsporangium, H. Microspore

lucida drawings were made under a microscope. Voucher specimens were deposited in the Herbarium, Department of Botany, M.L.V. Government College, Bhilwara.

During search for pteridophytes in Sitamata Wildlife Sanctuary, the authors collected some plant specimens of *Selaginella* from a river valley on way to Sitamata temple (Fig. 1) of the Sanctuary. After a thorough survey of literature, critical examination and expert opinion, the specimens were determined as *Selaginella reticulata* (Fig. 2) of Selaginellaceae, a taxon not recorded by earlier workers from Rajasthan.

Taxonomic Account

Selaginella species of lycopod, *Selaginella reticulata* (Hook. & Grev.) Spring in Bull. Ac. Brux. X, p.233 (sep.p.33), no. 155 (1843). *Lycopodium reticulatum* Hook. & Grev. *In* Hook. Bot. Misc. II p. 402, no. 185 (1831). *L. tetragonstachyum* Wall. Cat. No. 124 (1829) p.p. nomen.

Plant erect, 1.0–1.5 cm high, rooting at base only, Stem cylindrical, glabrous, branched from the base, branches alternate; rhizophore wiry, restricted to basal one third. Leaves dimorphic throughout, membranous, bright green; lateral leaves oblong or elliptic, acute, 1.2 x 0.59 mm, denticulate; median leaves ovate, cordate, acute, 0.72 x 0.39 mm denticulate. Spike 3.0-5.0 mm, Sporophylls dimorphic; smaller sporophylls fertile with long cilia, ovate, acuminate; larger sporophylls sterile oblong-elliptic, acute, dentate. Megasporangia 10-12, 380-543 µm; megaspores trilete circular 153-180 µm in diameter with reticulations on exine. Microsporangia 1-3 restricted to the basal part of the strobilus, 344-380 µm; microspores trilete, circular brick red in colour, 36-40 µm, exine sparsely studded with tubercles.

Fertile: September-October.

Earlier records: Eastern Himalaya, Myanmar.

Specimens Examined: River valley on way to Sitamata Wildlife Sanctuary, Rajasthan, Yadav & Meena 06.ix.2009, MLVGCB Herb., 3007.

Field notes: Rare, plant growing amidst moss and *Selaginella repanda* on the moist slope of a river valley. The small size made it difficult to spot among moss in nature.

S. rajasthanensis has been reported by Gena *et al.* (1979) as a new species of *Selaginella* from Rajasthan, India. However, Fraser-Jenkins (2008) has treated this species as the synonym of *S. reticulata*. *Selaginella reticulata* resembles

S. rajasthanensis Gena, Bhardwaja & Yadav in general appearance, but is very different from the latter in habitat (erect *vs* prostrate), branching (repeated *vs* uncommon), rhizophores (basal *vs* throughout), lateral leaf (acute *vs* obtuse), sporophylls (ciliated *vs* serrate).

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9. REDISCOVERY OF ENDEMIC *USNEA* SPECIES FROM WESTERN GHATS, INDIA

Gargee Pandit[1,2] and Bharati Sharma[1,3]

[1]Agharkar Research Institute, G.G. Agarkar Road, Pune 411 004, Maharashtra, India.
[2]Email: gargee.pandit@gmail.com
[3]Email: bharatimsharma@gmail.com

Introduction

India is known to have eight lichenogeographical regions (Singh and Sinha 1997) (Fig. 1). The diverse climatic and habitat conditions of these regions provide favourable conditions for speciation that leads to endemism.

India has 2,303 lichen species in 305 genera with about 22.5% endemism (Singh and Sinha 2010) and particularly in regions like the Western Ghats endemism is high compared to the other parts of the country. The region enjoys tropical climate and is one of the richest lichen sites of India. 800 species have been reported from this region, of which 219 species, i.e. 27.27% of total lichen flora at regional level and 10.68% at national level, are endemic (Singh *et al.* 2004).

The statistic of endemism, as well as distributional records, of many species is subject to change as some of these are known only from a single collection, and type locality, (Singh *et al.* 2004). Endemic species are most vulnerable to extinction, as they occupy a narrow geographical area or region.

During our several collection efforts in different regions of the Western Ghats, we came across some interesting findings on the lichen genus *Usnea* Dill. ex. Adans. It is

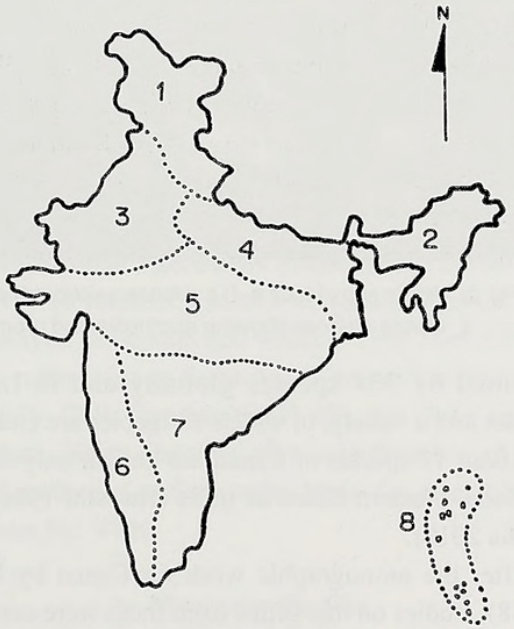


Fig. 1: Map showing Lichenogeographic regions of India (Singh & Sinha 1997)

1. Western Himalaya Region; 2. Eastern Himalaya Region; 3. Western Dry Region; 4. Gangetic plains; 5. Central India; 6. Western Ghats; 7. Eastern Ghats & Deccan plateau; 8. Andaman & Nicobar Islands



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