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Solmsiella biseriata (Austin) Steere (Bryophyta: Erpodiaceae) – an addition to Bryoflora of Central India

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Abstract

Solmsiella biseriata (Austin) Steere is recorded for the first time in Central India earlier known from Eastern and Western Ghats of India.

Keywords

Solmsiella biseriata, Mosses, New record, Jharkhand

Introduction

The genus *Solmsiella* Müll. Hal. is a monotypic genus of the family Erpodiaceae. The family Erpodiaceae is represented by 16 species under 4 genera (1, 2) worldwide and 5 species under 3 genera in India (3). Of which all 5 species are occurring in Western Ghats (3) 2 species viz. *Aulacopilum glaucum* Wilson and *Solmsiella biseriata* (Austin) Steere from Eastern Ghats (4) and *Erpodium mangiferae* Müll. Hal. is the only species which is widely occurring in both Eastern and Western Himalaya, Eastern and Western Ghats, Central India (3, 5). Among all members of the Erpodiaceae *Solmsiella biseriata* (Austin) Steere is the most liverwort-looking species and in a sterile condition, it would generally recognized as a moss.

During a recent study of Bryoflora of Jharkhand, an interesting specimens of the monotypic genus *Solmsiella* without central strand in transverse section of stem, dimorphic, 4-rowed leaves with pluripapillose leaf cells were collected from Parasnath Wildlife Sanctuary of Jharkhand and a subsequent study of the specimens and relevant literatures (3-11) revealed it as *Solmsiella biseriata*, a species earlier known from Eastern and Western Ghats of India (3, 4, 11). A detailed description and photomicrographic plate of the same have been provided.

Materials and Methods

The specimens were collected and preserved in herbarium packets (size 15 × 10 cm) with complete field data and have been deposited in the Cryptogamic section of the Central National Herbarium, Botanical Survey of India, Howrah (CAL). For microscopic study, the dried specimens were first soaked in normal water to allow them to stretch and regain their original shape. The external morphology were studied under Stereozoom Dissecting Microscope model Leica S8APO, anatomical details and microstructures were studied with the help of Biological Research Microscope model Nikon Eclipse Ni. The measurements were taken with the help of eyepiece occulometer and stage micrometer (make Erma, Japan).

Taxonomic description

Solmsiella biseriata (Austin) Steere, Bryologist 37: 100. 1935; A.E.D Daniels, J.L. Mabel, P. Daniel, Taiwania 57 (2): 176. 2012; Peng-cheng & M.R. Crosby in Moss Fl. China 5: 7. 2011; A.K. Asthana & P. Srivast., Cryptogam Biodiversity and Assessment (1): 64. 2016. A.E.D Daniels, R. Sreebha & K.C. Kariyappa in Bryfl. Indira Gandhi National Park, Anamalai Hills, India 171. 2018; *Lejeunea biseriata* Austin, Proc. Acad. Nat. Sci. Philadelphia 21: 225. 1870. *Erpodium biseriatum* (Austin) Austin, Bot. Gaz. 2: 142. 1877. *Solmsiella ceylonica* (Thwaites & Mitt.) Mull. Hal., Bot. Centralbl. 19: 149. 1884. *Erpodium ceylonicum* Thwaites & Mitt., J. Linn. Soc., Bot. 13: 306. 1873. (Figs. 1: A-O; 2: A-G; 3: A-G)

Plants yellowish green when fresh, yellowish brown in herbarium; shoots, 5-9 mm long, 1.9-2.4 mm wide including leaves; irregularly branched, branches horizontal to ascending. Stems oval in outline in transverse section, 112.5-125.0 × 87.5-112.5 µm, 5-6 cells across the diameter; cortical cells single layered, usually smaller, 7.5-20.0 × 7.5-15.0 µm, thin to slightly thick-walled, yellowish brown; medullary cells usually larger, 25-40.0 × 20.0-35.0 µm, thin-walled, hyaline. Rhizoids at ventral surface of stem, clustered, reddish brown. Leaves in two dorsal and two ventral rows, dimorphic, dorsal leaves oblong-ovate, 0.45-0.60 mm long, 0.25-0.38 mm wide, apex obtuse, margin entire or sometimes incurved at base, ecostate; apical dorsal leaf cells polygonal to subquadrate, 8.7-16.4 × 7.5-12.5 µm, thin-walled; median dorsal leaf cells oblong-hexagonal, 12.5-32.5 × 10.0-12.5 µm, thin-walled; basal dorsal leaf cells,

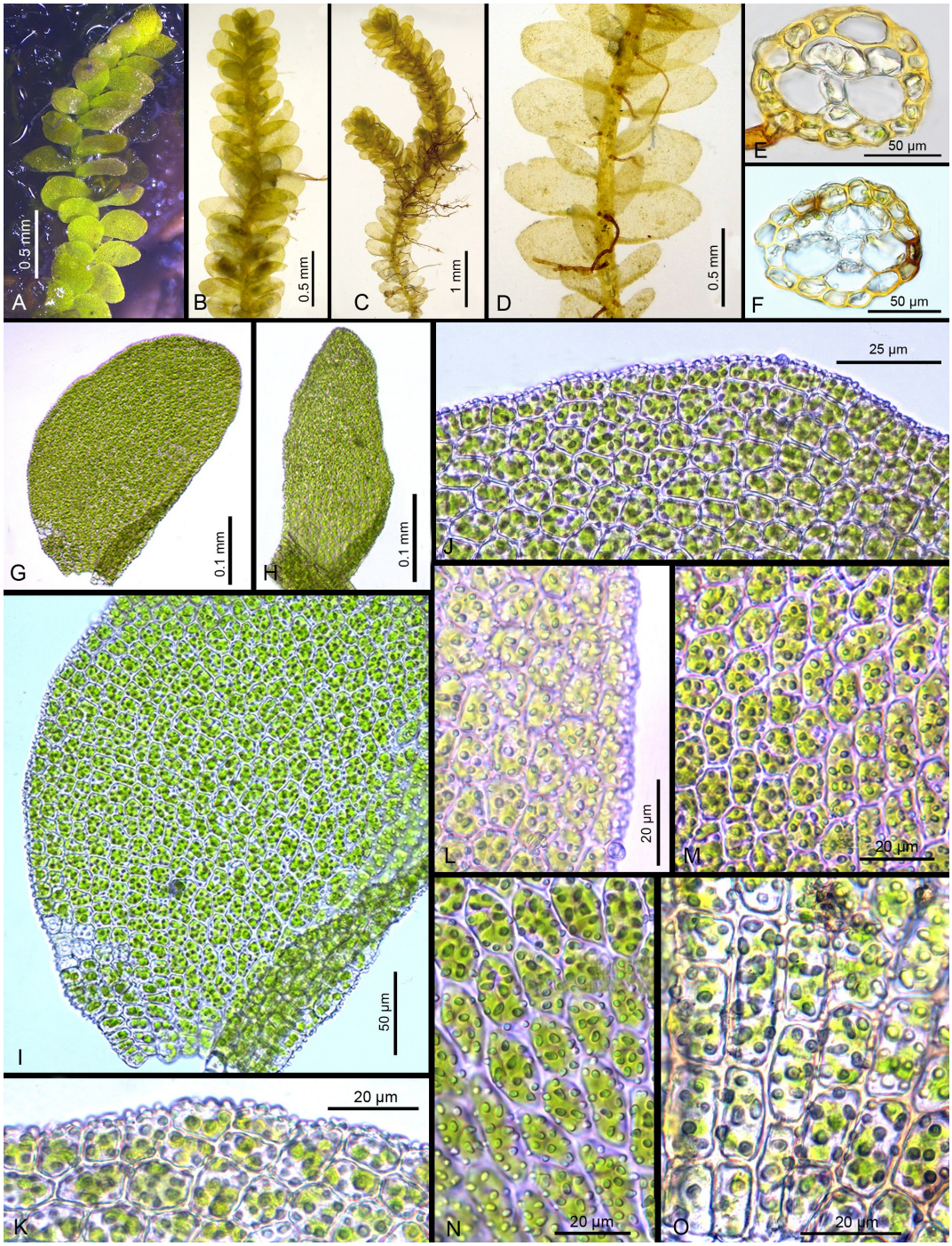

Fig. 1. A. *Solmsiella biseriata* (Austin) Steere , **B**. A portion of plant in dorsal view; **C**. A portion of plant in ventral view; **D**. A portion of the same enlarged; **E**, **F**. Transverse section of stem; **G**. A dorsal leaf; **H**. A ventral leaf; **I**. Basal portion of dorsal leaf; **J**, **K**. Apical cells of dorsal leaf; **L**. Marginal cells of dorsal leaf; **M**. Median cells of dorsal leaf; **N**. Sub basal cells of dorsal leaf; **O**. Basal cells of dorsal leaf (All photomicrographs from D. Singh 71059A).

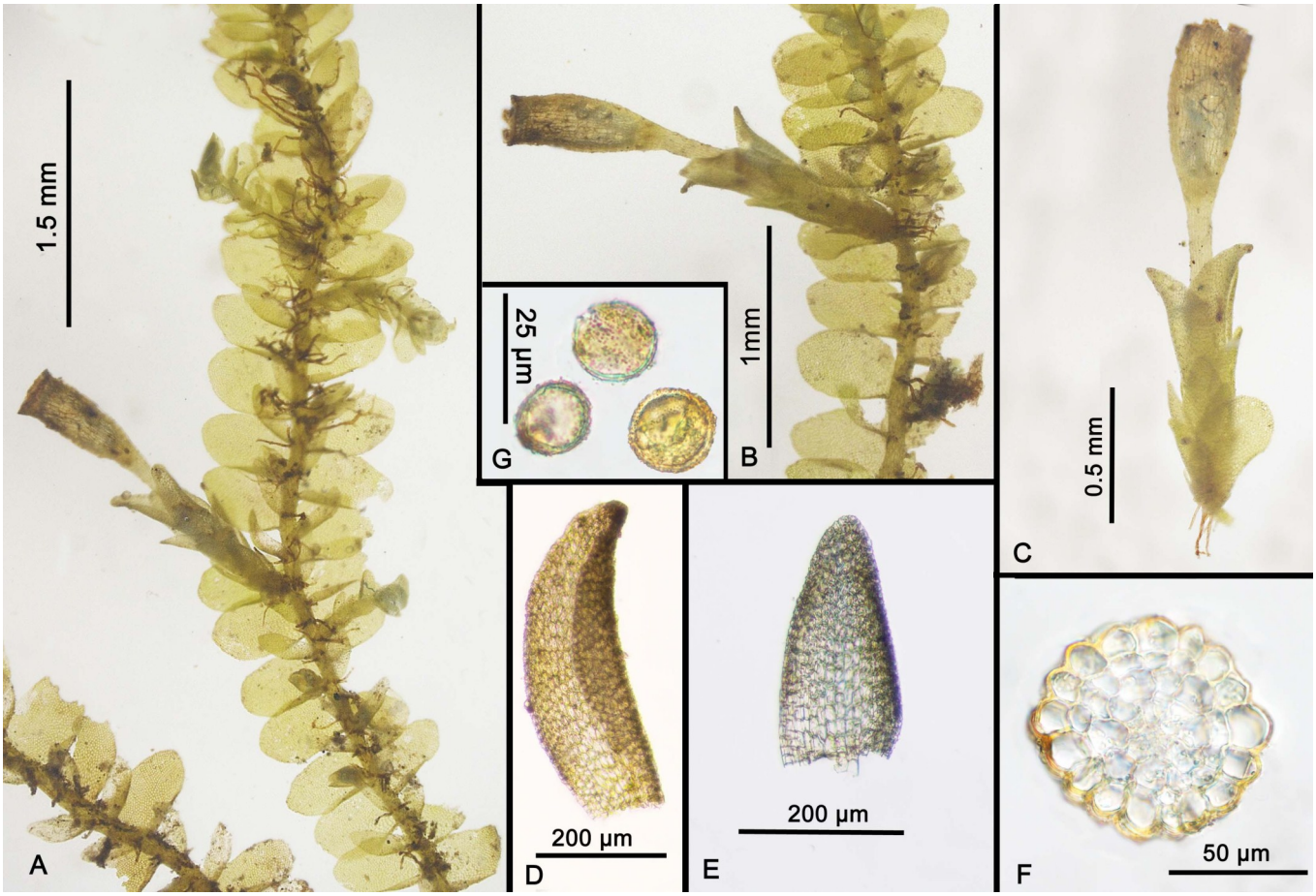

Fig. 2. A. *Solmsiella biseriata* (Austin) Steere , **B**. A portion of plant in ventral view bearing gynoecial branches; **C**. A female inflorence; **D**, **E**. Perichaetial leaves; **F**. Transverse section of seta; **G**. Spores (All photomicrographs from D. Singh 71066).

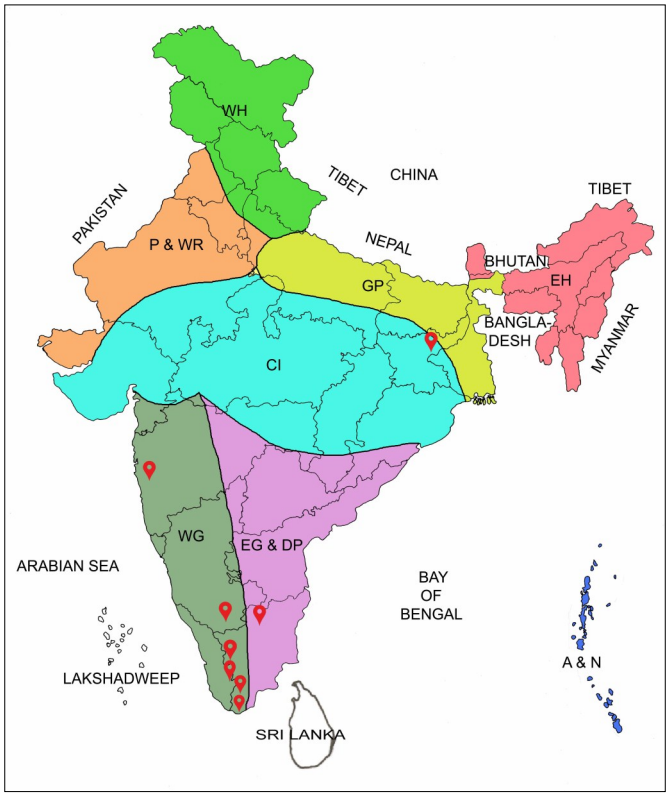

Fig. 3. Distribution of the *Solmsiella biseriata* (Austin) Steere in India.

rectangular, 25.0-50.0 × 8.7-15.0 µm, thin-walled; ventral leaves elliptical or oblong-ligulate, 0.30-0.35 mm long, 0.11 -0.16 mm wide, apex obtuse, margin entire or sometimes incurved at base, ecostate; cuticle densely pluripapillose (5-10) both dorsal and ventral surface of leaves.

Dioicous (?). Sporophytes on short lateral branches on main shoots. Perichaetial leaves narrower than vegetative ones, ovate, 0.4-0.6 mm long, 0.18-0.2 mm wide, obtuse to subacute. Seta 0.5-1.1 mm long, circular in outline in transverse section, 65-87 µm in diameter. Capsules emergent, cylindrical, 0.70-0.90 mm long, 0.20-0.24 mm wide, pale brown; annulus poorly differentiated. Calyptrae fall off due to over mature sporophyte. Spores pale brown, globose–subglobose, 12.5-18.0 × 10-15.0 µm, papillose.

Habitat

Corticolous, growing closely appressed to substratum in loose or compact patches on the bark of *Shorea robusta* Gaertn. under close canopy in association with *Lopholejeunea* spp.

Distribution

India [Karnataka, Kerala, Maharashtra, Tamil Nadu (3, 4, 10, 11)], China, Indonesia, Sri Lanka, Taiwan, Thailand, Vietnam, Australia, Africa, North, Central and South America (2, 12, 13).

Solmsiella biseriata is characterized by the absence of central strand in transverse section of stem, dimorphic, ecostate leaves in 2 dorsal and 2 ventral rows with pleuripapillose leaf surface, perichaetial leaves narrower than vegetative ones, emergent cylindrical capsules, globose–subglobose spores with papillose surface. *Solmsiella biseriata* easily distuingishable among the family Erpodiaceae in having dimorphic leaves (Fig. 1. D, G, H).

Specimens examined

India, Central India, Jharkhand, Parasnath Wildlife Sanctuary, near Jal Mandir, 23°57′40.54″N, 86°08′11.90″E, c. 1322 m, 24.10.2018, D. Singh 71059A, 71062, 71066 (CAL); near Kathpulawa, 23°58′ 36.73″N, 86°07′46.37″E, c. 759 m, 26.10.2018, D. Sing 71085 (CAL).

Results and Discussion

Its present discovery in Central India extends its range of distribution and increases its area of occurrence. The populations of *S. biseriata* are luxuriant in India and in Jharkhand also and do not face any immediate anthropogenic threat due to its occurrence inside the Wildlife Sanctuary (Parasnath Wildlife Sanctuary) in Jharkhand. The population of Jharkhand are more or less similar in all respect with the population of other area in the country except the minor variations of the size of plants which is may be the plants from different geographical locations.

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Authors contributions

RDB and TS carried out the micromorphological studies, DS conceived with the study, prepared the manuscript and plate. All authors read and approved the final manuscript.

Compliance with ethical standards

Conflict of interest: Authors do not have any conflict of interests to declare.

Ethical issues: None.

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