

A note on *Metzgeria conjugata* Lindb. (Hepaticae: Metzgeriaceae) from India

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Singh D & Singh DK, 2008. A note on *Metzgeria conjugata* Lindb. (Hepaticae: Metzgeriaceae) from India. *Geophytology*. 37 : 47-49.

Metzgeria conjugata Lindb., a taxon so far having doubtful record from India and Asia, has been described from Sikkim, India.

Key-words – *Metzgeria conjugata*, Sikkim, India.

INTRODUCTION

METZGERIA conjugata Lindb. was reported for the first time in Indian bryoflora by Gola (1914) from Kashmir. Later it was also reported by Kashyap (1932) from the same area. Chopra (1943) listed the species from South India as well without any specific location or taxonomic description. But Kuwahara (1965), considered the occurrence of this species in Himalaya (India) as uncertain. Srivastava and Udar (1975) and Srivastava and Srivastava (2004) also treated its presence in Indian territory as doubtful. Kuwahara (1984) reported this species from Japan, but the same does not find any mention in subsequent list of Hepaticae from that country (Yamada & Iwatsuki, 2006). According to Schuster (1992), however, only *M. conjugata* Lindb. subsp. *japonica* (S. Hatt.) Kuwah. [now treated under *M. lindbergii* Schiffn. (So, 2003)] occurs in Asia and not the typical variety. During a recent study on the liverworts of Sikkim Himalaya, authors came across an interesting population of the genus. A subsequent critical examination of the plants and literature revealed it to be *M. conjugata* Lindb. The most defining feature of this species is the presence of hairs on ventral surface of thallus, epidermal cells on the ventral surface of midrib in 2–4 rows, single and paired hairs at the margins of thallus and monoecious sexuality. As the species is very poorly known in Indian bryology, a detailed illustrated taxonomic account of the same has been provided to facilitate its easy identification.

SYSTEMATIC DESCRIPTION

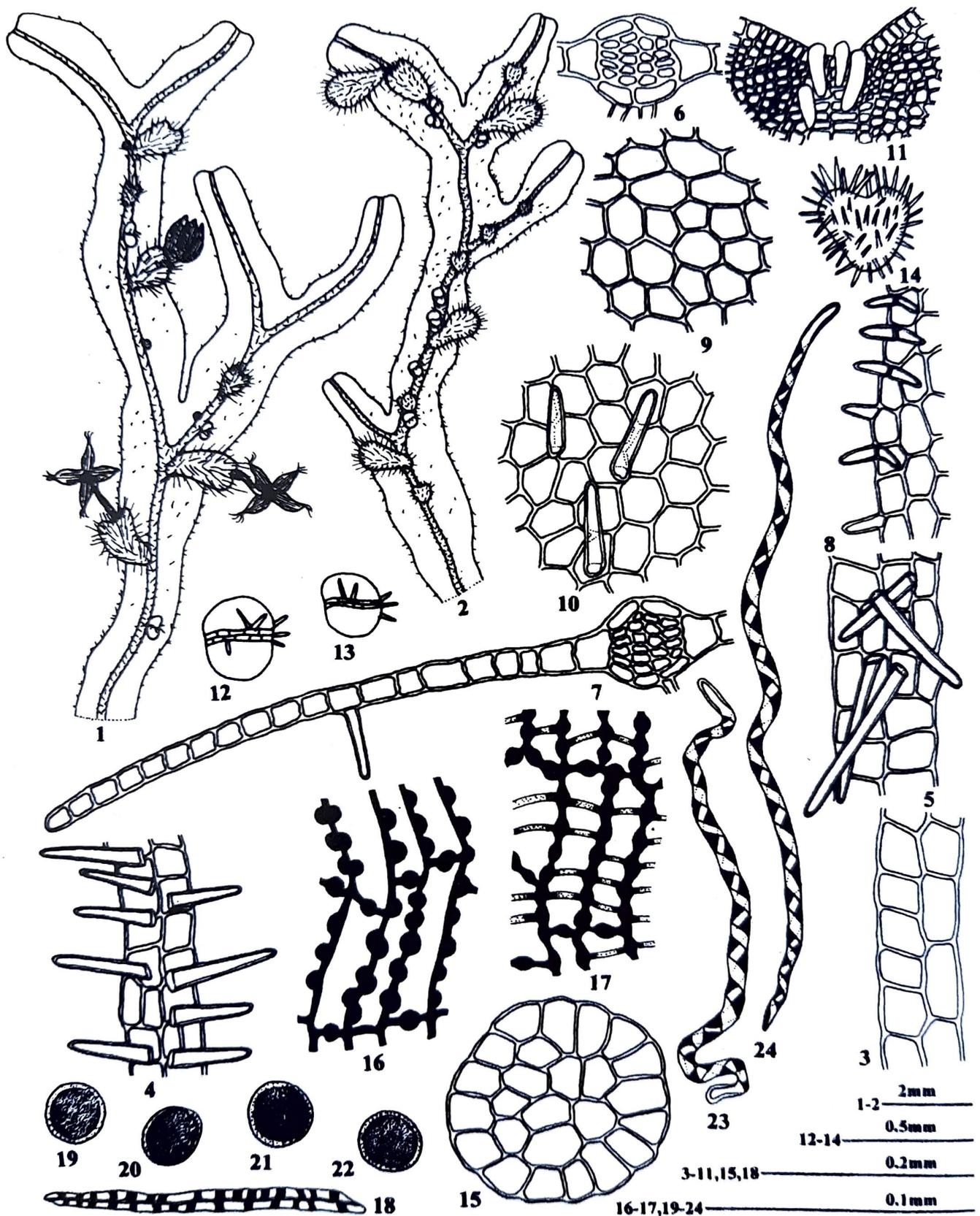
Metzgeria conjugata Lindb. in Acta Soc. Sci. Fenn. 10: 495 (1875)

(Text-Figs 1-24)

Plants light green – green, 10–22 mm long, 1.1–1.4 mm wide, dichotomously branched, apices obtuse – slightly retuse, ventral adventitious shoots present. Midrib distinct,

73.8–81.0 µm wide dorsally, 77.9–90.2 µm ventrally; dorsal epidermal cells in 2 rows, sub-quadrate – rectangulate, 41.0–90.2 x 41.0–45.1 µm; ventral epidermal cells in 2–4 rows, except near the main point of branching, sub-quadrate – rectangulate, 32.8–53.8 x 41.0–49.2 µm; inner cells 17–19 in number, 4 cells wide, 5–6 cells high; wing 15–22 cells wide on either side of midrib; marginal cells polygonal, 32.8–53.8 x 16.4–32.8 µm; middle cells polygonal, 28.7–53.8 x 17.5–41.0 µm, cells thin walled with minute trigones, intermediate thickenings absent; mucilage papillae present on apical ventral surface, cylindrical – club shaped, 41.0–65.6 µm long, 10.5–16.4 µm wide. Hairs short, straight, 41.0–82.0 µm long, 8.2–16.4 µm wide, disposed singly or in pairs along the margins of wing, more dense on ventral surface of midrib, 80.0–303 µm long, 12.5–17.5 µm wide; also distributed on ventral surface of lamina, 37.9–82.0 µm long, 8.2–12.3 µm wide. Gemmae absent. Monoecious. Antheridial branches globose, 214.5–330 µm in diameter, with short pointed hairs over the surface and midrib; hairs 49.2–90.2 µm long, 12.3–16.4 µm wide; midrib cells in two rows. Archegonial branches cordate, covered with hairs; calyptra pyriform, 1.0–1.3 mm long, covered with straight, pointed hairs; hairs 45.1–65.6 µm long, 10.5–14.5 µm wide; seta 1.5–1.8 mm long, 5–6 cells across; capsule sub-spherical, blackish brown, ca 57 x 44.7 µm, dehiscing into 4 valves; valves dark brown, 0.5–0.6 mm long, 0.2–0.3 mm wide, each bearing a tuft of fixed elaters at the apex; walls bistratose, cells of the outer layer 25–80 x 12.5–25.0 µm, with nodulose thickenings on the radial walls, thickening sometimes confined to one side of radial wall only; cells of the inner layer 25–75 x 12.5–30 µm, with sinuate – nodulose thickenings on the radial walls with prolongation on inner tangential walls, thus appearing semiannular. Spores yellowish brown, translucent, sub-globose – globose, 16.4–24.6 µm in diameter, with granular surface. Elaters 303–505 µm long, 4.1–7.17 µm broad, uni-spiral.

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Text-Figs 1-24. *Metzgeria conjugata* Lindb. 1. Thallus in ventral view showing mature sporophyte. 2. Thallus in ventral view showing young sporophyte. 3. Dorsal epidermal cells of midrib. 4, 5. Ventral epidermal cells of midrib. 6, 7. T. S. of thallus. 8. Marginal cells of thallus. 9. Middle cells of thallus in dorsal view. 10. Middle cells of thallus in ventral view. 11. Apex of thallus showing mucilage papillae, ventral view. 12, 13. Antheridial branches. 14. Young archegonial branch. 15. T.S. of seta. 16. Capsule wall in outer view. 17. Capsule wall in inner view. 18. T. S. of capsule wall. 19 - 22. Spores. 23, 24. Elaters (Text-Figs 1, 15-24 drawn from 36497B; Text-Figs 2-14 drawn from 36500).

Habitat and Ecology—Foliicolous and lignicolous, growing in moist and shady places along the fringe of broad leaved temperate forests between 1900–2000 m altitude.

Distribution—India: Sikkim (nov.); Europe (Paton, 1999), Africa, North America, and South America (Schuster, 1992).

Specimens examined—Pangthang (ca 1900 m), 05.03.2005, D. Singh, 36497B, 36500 (CAL); 25.10.2005, D. Singh, 36638 (CAL); Nimachen (ca 2000 m), 02.11.2005, D. Singh, 36768 (CAL).

DISCUSSION

The Indian plants of *Metzgeria conjugata* exhibit frequent fertility (Text-Figs 1, 2) as observed by Schuster (1992) for American plants. Interestingly both male and female branches could be seen at different stages of development on the same thallus. The mature plants have straight, pointed hairs, which are both single and geminate (Text-Fig. 8). In addition the hairs are also present on the ventral surface of the wings (Text-Figs 1, 2, 7, 10) and female and male branches (Text-Figs 12–14). The midrib shows 2 rows of epidermal cells on the dorsal surface and 2–4 rows on ventral surface (Text-Figs 4–7). The capsule wall shows '*Metzgeria furcata*' type of thickenings with localized, nodulose thickenings on the radial walls of the cells of outer layer and sinuate – nodulose radial wall thickenings in the cells of inner layer often extending across the tangential wall, thus appearing semiannular in surface view (Text-Figs 16, 17).

In having monoecious plants which lack gemmae, *M. conjugata* resembles *M. lindbergii*, *M. himalayensis* and *M. sikkimensis* amongst the Asian species. But it differs from all of them in the presence of hairs on the ventral surface of wing and the male branches, besides having 2/2-4 composition of epidermal cells of the midrib. *M. conjugata* further differs from *M. himalayensis* as latter has '*Metzgeria commata*' type of

thickenings in the cells of the capsule wall in contrast to '*Metzgeria furcata*' type in the former.

ACKNOWLEDGEMENTS

The authors are grateful to the Director, Botanical Survey of India for facilities and encouragement, to the Chief Wildlife Warden, Sikkim Forest Department for facilitating the exploration in East Sikkim, to Prof. S. C. Srivastava, Head, Department of Botany, University of Lucknow, for critically going through the manuscript and useful suggestions, and to the Ministry of Environment and Forests, New Delhi for financial support under the All India Co-ordinated Project on Taxonomy (AICOPTAX).

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