

THE LIVERWORTS *MASTIGOPHORA DICLADOS* AND *PLAGIOCHILION OPPOSITUM* - NEW TO THE HEPATIC FLORA OF PENINSULAR INDIA

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ABSTRACT

Mastigophora diclados and *Plagiochilion oppositum*, earlier known to be distributed in Eastern Himalaya and Nicobar Islands, and Eastern Himalaya and Northeast India respectively, are added here to the hepatic flora of Peninsular India from the Agasthyamalai Biosphere Reserve in the southern Western Ghats. Incidentally, both the genera are new as well to Peninsular India.

Keywords: *Mastigophora diclados*, *Plagiochilion oppositum*, Agasthyamalai, Western Ghats.

INTRODUCTION

The knowledge of the bryoflora of Western Ghats, one of the 8 bryogeographical regions of the country and a biodiversity hotspot in the world, is far from adequate when compared to that of the flowering plants and the fern and fern allies. Investigations initiated about a decade and a half ago in the Agasthyamalai Biosphere Reserve in southern Western Ghats have resulted in the discovery of *Mastigophora diclados* (Brid. ex F. Weber) Nees ex Schiffn. and *Plagiochilion oppositum* (Reinw., Blume & Nees) S. Hatt. These liverworts were earlier known to be distributed in the Eastern Himalaya and Nicobar Islands and, Eastern Himalaya and the North-east respectively for the country (Bapna & Kachroo, 2000). According to Singh (1997), only 79 genera of liverworts were known to occur in the Western Ghats as a whole which is next to the Eastern Himalaya with 111 genera in terms of generic diversity. The present discovery, hereby raises the number to 81.

Mastigophora Nees is represented in India by two species viz., *M. diclados* (Brid. ex F. Weber) Nees ex Schiffn. and *M. woodsii* (Hook.) Nees, whereas *Plagiochilion* S. Hatt. is represented in the country by five species and one forma viz., *P. braunianum* (Nees) S. Hatt., *P. fimbriatum* (Mitt.) Inoue, *P. meyebarae* (S. Hatt.) Inoue, *P. oppositum* (Reinw. & al.) S. Hatt., *P. theriotanum* (Steph.) Inoue and *P. meyebarae* (S. Hatt.) Inoue f. *integerrimus* Grolle. Of these, *Mastigophora diclados* (Brid. ex F. Weber) Nees ex Schiffn. and *Plagiochilion oppositum* (Reinw. & al.) S. Hatt. are described here in detail and illustrated. This discovery extends the distribution of both the species and the respective genera to the southern end of the country. Specimens cited are housed at SCCN (Herbarium of Scott Christian College, Nagercoil).

Mastigophora diclados (Brid. ex F. Weber) Nees ex Schiffn., Consp. Hepat. Arch. Ind.: 202. 1898; Inoue in Bull. Natl. Sci. Mus., Tokyo, B. 14: 606. 1971; Bapna & Kachroo, Hepatic. India 1: 243. 2000. *Jungermannia diclados* Brid. ex F. Weber, Hist. Musc. Hepat. Prodr.: 56. 1815. - Type: Africa, Mauritius, *Bory de St. Vincent* s.n. (PC). *Lepidozia diclados* (Brid. ex F. Weber) Kachroo in Kashmir Sci. 7: 181. 1970. *Chandonanthus birmensis* auct. non Steph.: Horik. in J. Sci. Hiroshima Univ., Ser. B, Div. 2, Bot. 2: 205. 1934. (Fig. 1; Pl. 1)

Plants 6-10cm long, pinnately or bipinnately branched, yellowish-green or yellowish-brown to dark brown; branches frequently flagelliform at apex. Stems procumbent, rigid, flexuous, oblong in cross section, 10 - 15 - celled across, 0.4 - 0.48 × 0.28 - 0.32mm; cortical cells 1 - or 2 - layered, 12 - 16 × 8 - 12µm, thick-walled; medullary ones 12 - 28 × 16 - 20µm, sometimes pitted on walls. Leaves imbricate, obliquely to transversely inserted, amplexicaul, rounded-quadrangle, concave, entire, dimorphic; stem leaves 0.8 - 0.96 × 1.04 - 1.12µm, 3 - lobed with small accessory lobes on either side at margin; lobes asymmetric; dorsal lobes large, erectopate, semicordate-ovate, acute; lateral ones, smaller, oblong-ovate; branch leaves, 2 - lobed with small appendages on either side at base, 0.6 - 0.65 × 0.5 - 0.06mm, cordate-ovate; dorsal lobes large, ovate, acute; lateral ones oblong;

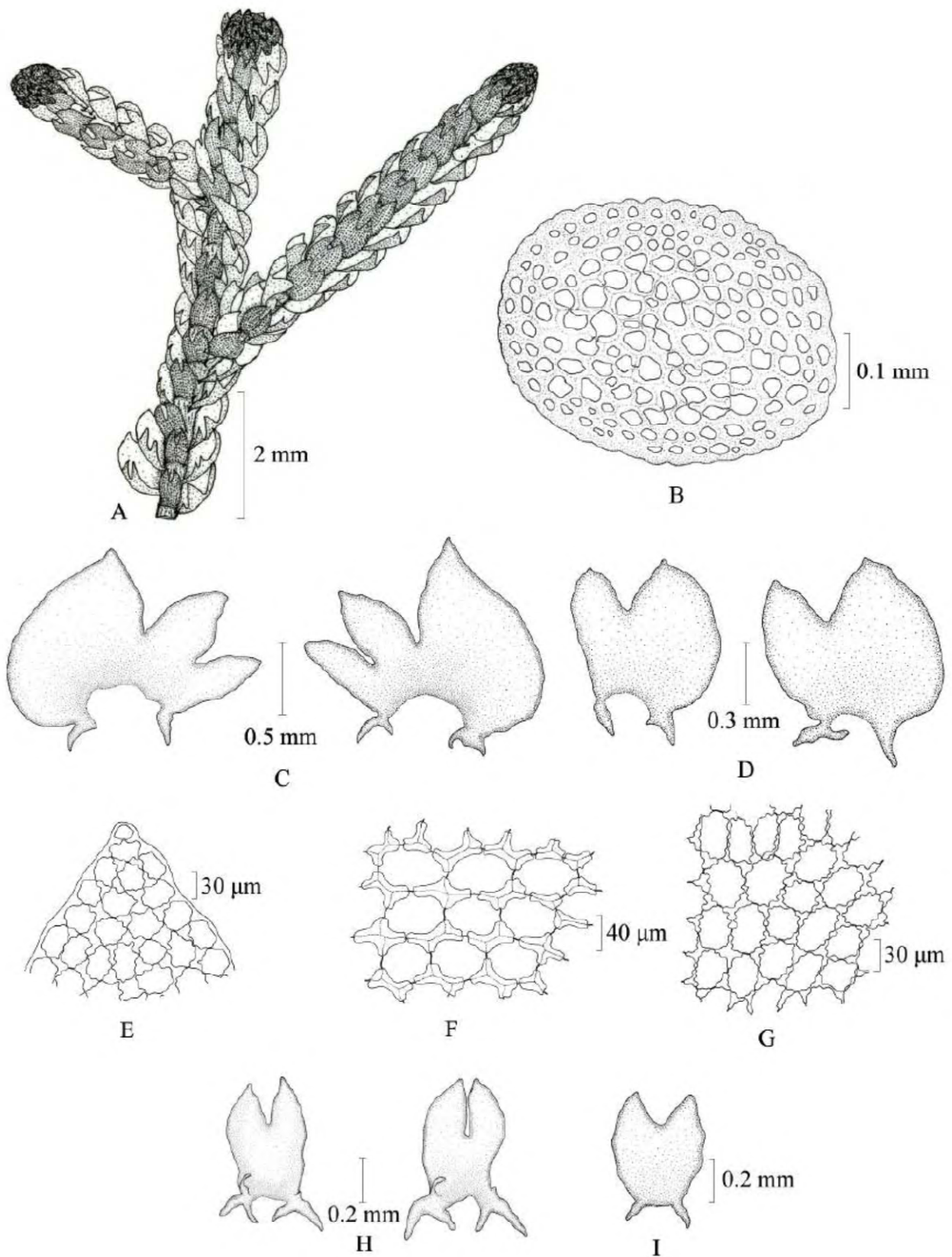


Fig. 1. *Mastigophora diclados* (Brid. ex F. Weber) Nees ex Schiffn. **A.** A portion of plant in ventral view; **B.** Cross section of stem; **C.** Stem leaves; **D.** Branch leaves; **E.** Apical cells of leaf; **F.** Median cells of leaf; **G.** Basal cells of leaf; **H.** Stem underleaves; **I.** Branch underleaf (drawn from Kariyappa 3650 p.p.)



Plate 1. *Mastigophora diclados* (Brid. ex F. Weber) Nees ex Schiffn. **A.** Habit; **B.** A portion of plant in ventral view; **C.** Cross section of stem; **D. & E.** Leaves; **F.** Apical cells of leaf; **G.** Median cells of leaf; **H.** Basal cells of leaf; **I. & J.** Underleaves.

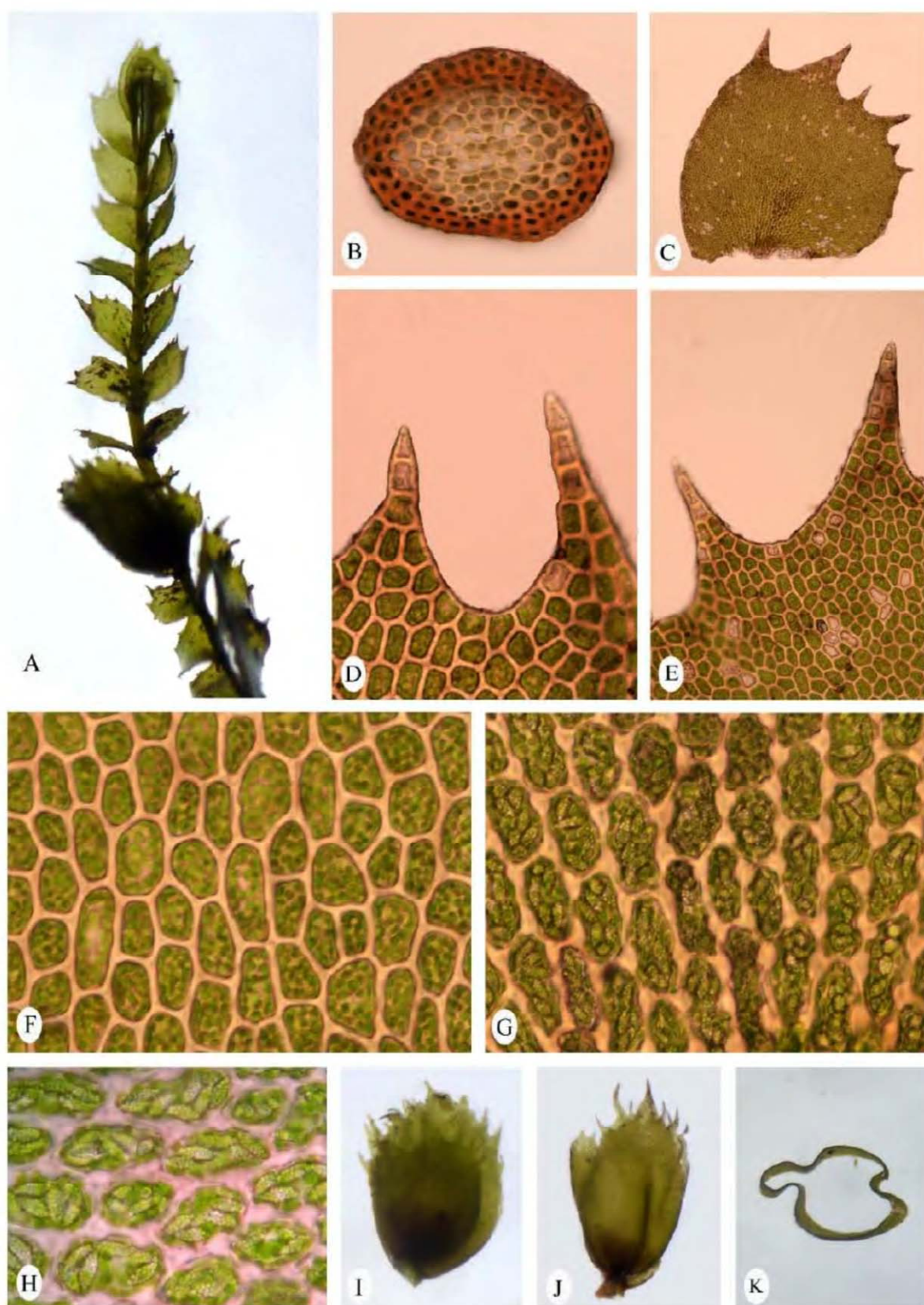


Plate 2. *Plagiochilion oppositum* (Reinw., Blume & Nees) S. Hatt. **A.** A portion of plant in ventral view; **B.** Cross section of stem; **C.** Leaf; **D & E.** Apical cells of leaf; **F.** Median cells of leaf; **G.** Basal cells of leaf showing oil bodies; **H.** Oil bodies; **I.** A female bract; **J.** Perianth; **K.** Cross section of perianth.

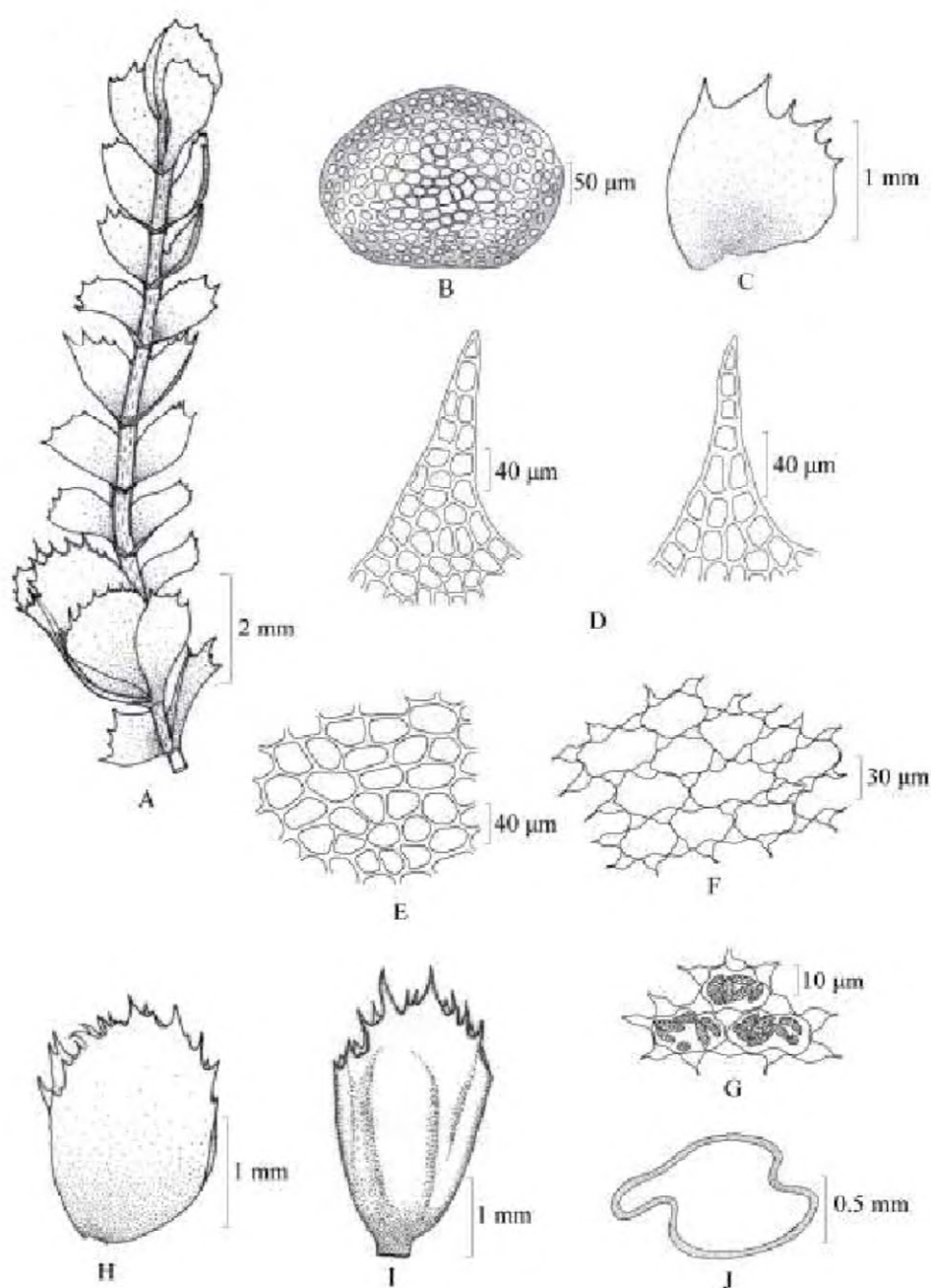


Fig. 2. *Plagiochilium oppositum* (Reinw., Blume & Nees) S. Hatt. **A.** A portion of plant in ventral view; **B.** Cross section of stem; **C.** Leaf; **D.** Apical teeth of leaf; **E.** Median cells of leaf; **F.** Basal cells of leaf; **G.** Oil bodies; **H.** A female bract; **I.** Perianth; **J.** Cross section of perianth (drawn from Kariyappa 3697 p.p.)

cells with large, bulging trigones; apical leaf cells $20 - 30 \times 20 - 24 \mu\text{m}$; median leaf cells $30 - 40 \times 20 - 30 \mu\text{m}$; basal leaf cells $25 - 40 \times 16 - 30 \mu\text{m}$; oil - bodies not seen. Underleaves imbricate, $0.48 - 0.7 \times 0.4 - 0.5 \text{ mm}$, oblong-ovate, 2-lobed, with small basal appendages on either side. Sporogonium not seen.

Habitat: Rupicolous in moist evergreen forests, ca 1500m.

Distribution.: Tropics and subtropics of Southeast Asia, Africa, Pacific Islands and India [Nicobar Islands, Eastern Himalaya (Sikkim) and Western Ghats (Tamil Nadu-Tirunelveli)].

Specimens examined: Western Ghats, Tamil Nadu, Tirunelveli District, Agasthyamalai Biosphere Reserve, Pongalapparai, ca 1500m, 19.4.2010, K.C. Kariyappa 3650 p.p., 3651 p.p.

Plagiochilion oppositum (Reinw., Blume & Nees) S. Hatt. in Biosphaera 1: 7. 1947; Inoue in J. Hattori Bot. Lab. 27: 61. 1964 (as *oppositus*); Bapna & Kachroo, Hepatic. India 2: 81. 2000. *Jungermannia opposita* Reinw., Blume & Nees in Nova Acta Phys.-Med. Acad. Caes. Leop.-Carol. Nat. Cur. 12: 236. 1824.

(Fig.2 ; Plate-2)

Type: (Indonesia), Java (STR). *Noguchia opposita* (Reinw., Blume & Nees) Inoue, J. Hattori Bot. Lab. 20: 102. 1958.

Plants 1.0 - 3.5cm long, pale olive green. Stems stoloniferous, ca 0.24 × 0.14mm in cross section, ovate, brown; cortical cells 2- or 3-layered, 6 - 8 × 4 - 6µm, irregularly quadrate-hexagonal, thick-walled; medullary ones 8 - 16 × 8 - 14µm, irregularly quadrate-hexagonal, thin-walled. Leaves distant, obliquely spreading, 0.8 - 1.2 × 0.7 - 1.2mm, ovate to ovate-oblong, concave, arcuate, slightly decurrent at dorsal margin, not decurrent at ventral margin, subtruncate to rounded, with 5 - 10, 2 to 6 cells long teeth at apex; apical leaf cells 16 - 20 × 10 - 16µm; median leaf cells 20 - 40 × 12 - 20µm, thick-walled; basal leaf cells 30 - 50 × 16 - 20µm, thin-walled, with large, nodulose trigones; oil - bodies 3 - 8 per cell, 4 - 8 × 4 - 5µm, globose to spindle-shaped, segmented. Female inflorescences terminal, with subfloral innovations; bracts similar to vegetative leaves, 1.3 - 2.0 × 0.96 - 2.2mm, inflated at base, with 8 - 10, triangular, broad-based teeth at margin. Perianth 1.5 - 3.1 × 0.8 - 1.5mm, oblong to ovate-oblong, irregularly toothed at margin, rounded to truncate at mouth. Sporogonium not seen.

Habitat: Corticolous on *Litsea* sp., ca 1800m.

Distribution: Indonesia, New Guinea, New Hebrides, Samoa, Sri Lanka, Sulawesi, Taiwan, the Philippines, Vietnam and India [Eastern Himalaya and Western Ghats (Tamil Nadu-Tirunelveli)].

Specimens examined: Western Ghats, Tamil Nadu, Tirunelveli District, Agasthyamalai, Pongalappara, ca 1800m, 19.4.2010, K.C. Kariyappa 3697 p.p.

ACKNOWLEDGEMENTS

We thank the Tamil Nadu State Forest Department for permission to explore the study area and the Ministry of Environment and Forests, Govt. of India, New Delhi, for financial support through a project under the AICOPTAX. AEDD also thanks Dr. D.G. Long (E), for confirming the identity of *Mastigophora diclados*, gift specimens and help with literature, Mr. M.J. Wigginton, Peterborough, England, for help with literature and Dr. G. Winter, Senckenberg Natural History Museum, Germany, for help with literature and translation of the type details in the protologue into English. He is also thankful to Dr. M. Sanjappa, former Director, Botanical Survey of India, Kolkata, for his keen interest in the work and the Principal, Scott Christian College, for facilities.

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प्रायद्वीपीय भारत के हेपेटिक वनस्पतिजात के लिए नये मेस्टिगोफोरा डाइक्लेडोस एवं

प्लेजिओचिलियन ओपोसिटम प्रहरिता

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अभी तक पूर्वी हिमालय, निकोबार द्वीप एवं पूर्वोत्तर भारत में ज्ञात व्याप्ति वाले मेस्टिगोफोरा डाइक्लेडोस एवं प्लेजिओचिलियन की अब दक्षिणी-पश्चिमी घाट में अगस्त्यमलै जीव मंडल रिजर्व से प्रायद्वीपीय भारत के हेपेटिक वनस्पतिजात की व्याप्ति जुड़ गई है। प्रायद्वीपीय भारत के लिए दोनों वंश नये हैं।