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Research Article

## Two species of *Isopterygium* Mitt. - New to the Eastern Ghats in Peninsular India

P. M. Biju and A. E. D. Daniels\*

Bryology Laboratory, Department of Botany & Research Centre, Scott Christian College (Autonomous), Nagercoil - 629 003, Tamil Nadu, India

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Corresponding Author  
A. E. D. Daniels

✉ [dulipdaniels@rediffmail.com](mailto:dulipdaniels@rediffmail.com)

### Abstract

*Isopterygium lignicola* and *I. longithecata* are new to the bryoflora of the Eastern Ghats. Of these, *I. longithecata* is new to Peninsular India. The present discovery extends its distribution to the southern end of the country. Brief descriptions with illustrations and photo plates are provided here. A key is provided for those species in discussion.

### Keywords

Bryophyta; Eastern Ghats; *Isopterygium lignicola*; *I. longithecata*; mosses

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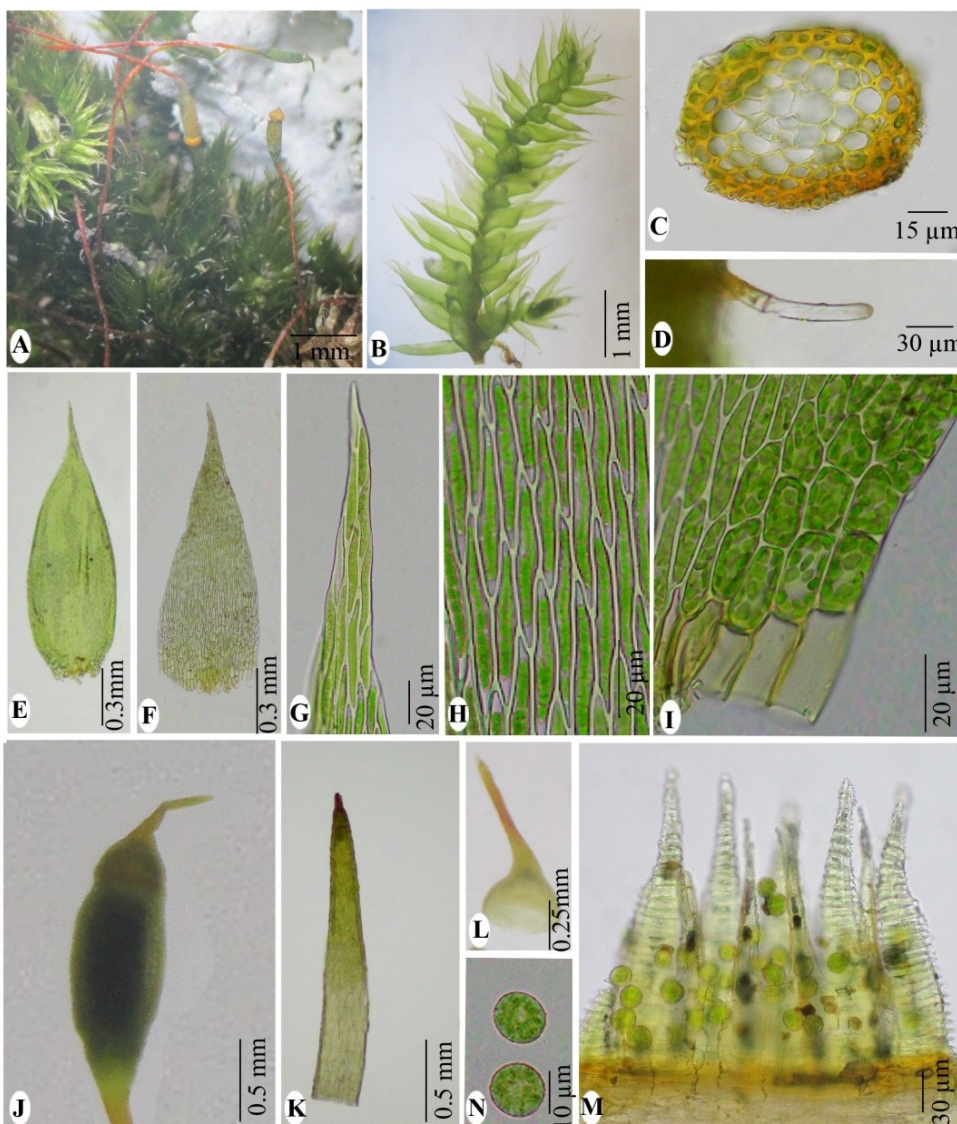
### Introduction

*Isopterygium* Mitt. is a cosmopolitan genus with about 150 species world-wide ([www.tropicos.org](http://www.tropicos.org)), most of which occur in the tropical and subtropical belts of the globe (Gangulee, 1980). Of these, 20 species occur in India (Lal, 2005; Dandotiya *et al.*, 2011). From the Western Ghats, so far, 9 species have been reported.

Iwatsuki (1970) proposed a new genus *Isopterygiopsis* and transferred *Isopterygium muellerianum* (Schimp.) A. Jaeger under *Isopterygiopsis* Iwats. and made a new combination *Isopterygiopsis muelleriana* (Schimp.) Iwats. Iwatsuki (1970) also transferred *Isopterygium seligeri* (Brid.) Dixon *ex* Jensen under *Herzogiella* Broth. and made another combination *Herzogiella seligeri* (Brid.) Iwats. Iwatsuki (1987), transferred yet another species of *Isopterygium* viz., *I. pulchellum* (Hedw.) A. Jaeger under *Isopterygiopsis*

Iwats. and made another combination *Isopterygiopsis pulchella* (Hedw.) Iwats. Moreover, he (Iwatsuki, 1987) raised and validated *Pseudotaxiphyllum*, a section under *Isopterygium* to genus rank and transferred a host of species under it including three of *Isopterygium* occurring in India namely, *I. distichaceum* (Mitt.) A. Jaeger, *I. pohliaecarpum* (Sull. & Lesq.) A. Jaeger and *I. elegans* Brid. Considering all these changes, in India, currently there are only 14 species of *Isopterygium* Mitt. of which 6 have been reported from the Western Ghats and one from the Eastern Ghats. Further studies on this genus may alter the number of species so far reported from India.

Kumar and Krishnamurthy (2007) reported 59 species of mosses from Shervaroy Hills. However, not a single species of *Isopterygium* Mitt. has been enumerated. Sathish *et al.* (2014) in their checklist of mosses of Kalrayan Hills of the E. Ghats, included one species namely *I. albescens* (Hook.) A. Jaeger.



**Plate 1(A-N). *Isopterygium lignicola* (Mitt.) A. Jaeger**  
**A.** Habitat **B.** Portion of plant **C.** Cross section of stem **D.** Paraphyllia  
**E.** Leaf **F.** Perichaetial leaf **G.** Leaf apical cells **H.** Leaf median cells **I.** Leaf basal cells **J.** Capsule **K.** Calyptra **L.** Operculum **M.** Peristome teeth **N.** Spores

The present survey made on the Shervaroy Hills of the Eastern Ghats records the occurrence of two more species namely *Isopterygium lignicola* (Mitt.) A. Jaeger and *I. longithecra* (Mitt.) A. Jaeger that are new to the bryoflora of the Eastern Ghats. Of these, *I. longithecra* is new to Peninsular India. Until now, this species was known only from the Eastern Himalaya and was thought to be an Eastern Himalayan endemic. The present discovery extends its distribution to the southern end of the country. Brief descriptions with illustrations and photo plates are provided here. A key is provided for the species in discussion. The specimens are housed at SCCN.

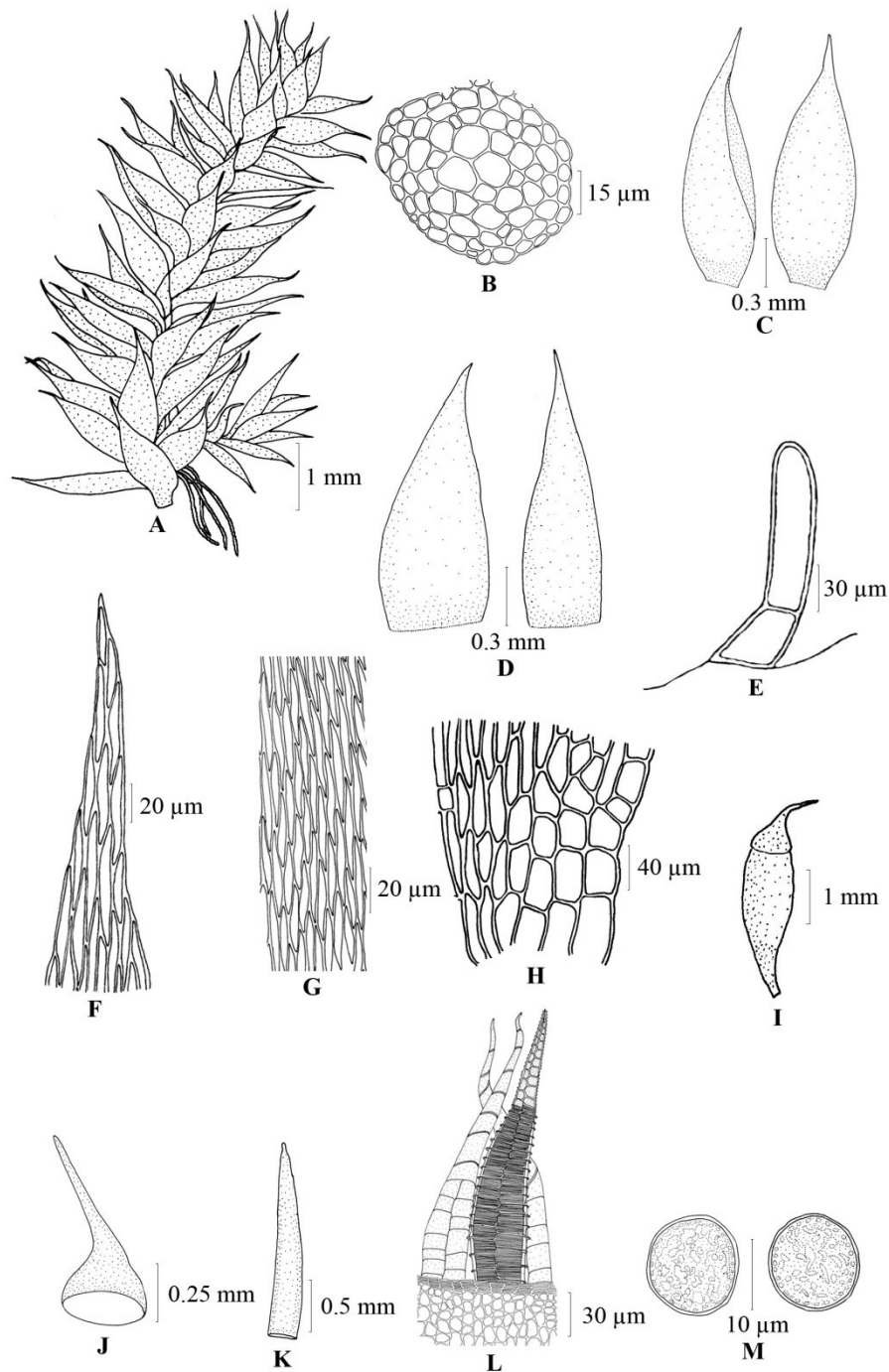
**Key to the species**

1a. Leaves erectopatent, with a row of rectangular cells along insertion line, faintly crenulate at margin; calyptrae not apiculate ..... *I. longithecra*

b. Leaves patent, without a row of rectangular cells along insertion line, entire at margin; calyptrae apiculate ..... *I. lignicola*

**Note:** *Isopterygium albescens* can be readily distinguished from both the species in discussion by its ovate leaves and acute to short-acuminate leaf apices.

**1. *Isopterygium lignicola* (Mitt.) A. Jaeger, Ber. Thätigk. St. Gallischen Naturwiss. Ges.: 432. 1878; Bruehl, Rec. Bot. Surv. India 13(1): 112. 1931; R.S. Chopra, Taxon. Indian Moss.: 534. 1975; Gangulee, Moss. E. India 3(8): 1964, f. 1011. 1980; A.E.D. Daniels in R. Annamalai, Tamil Nadu Biodivers.: 54. 2004 & Arch. Bryol. 65: 66. 2010; J. Lal, Checklist Indian Moss.: 80. 2005; Manju & al., Trop. Bryol. Res. Rep. 7: 14. 2008 & Arch. Bryol. 42: 8.**



**Fig. 1 (A - M). *Isopterygium lignicola* (Mitt.) A. Jaeger**

**A.** Portion of plant **B.** Cross section of stem **C.** Leaves **D.** Perichaetial leaves **E.** Paraphyllia **F.** Leaf apical cells **G.** Leaf median cells **H.** Leaf basal cells **I.** Capsule **J.** Operculum **K.** Calyptra **L.** Peristome teeth **M.** Spores  
(Drawn from Daniels & Biju11420)

2009; A.E.D. Daniels & P. Daniel, Bryofl. S.-most W. Ghats, India: 146. 2013. *Hypnum lignicola* Mitt., Hooker's J. Bot. Kew Gard. Misc. 8: 355.1856. - Type: Burma (Myanmar), Moulmein, Parish 12 (NY). *Stereodon lignicola* (Mitt.) Mitt., J. Proc. Linn. Soc., Bot. 1 (Suppl.): 104. 1859. (**Fig. 1; Plate 1**)

Plants forming mats, slender, yellow-green above, brownish below, glossy. Stems creeping, 0.6 - 2 cm long, ca 0.13 × 0.10 mm in cross section, ovate, without a central strand; cortex 1- or 2-

layered; cells 8 - 12 × 7 - 10 μm, thick-walled; medullary ones 12 - 20 × 10 - 18 μm, thin-walled; branches pinnate. Paraphyllia not clustered, 2- or 3-celled, linear, ca 0.1 × 0.01 mm. Leaves patent, concave, 1.2 × 0.2 - 0.4 mm, ovate-lanceolate, entire at margin, long-acuminate with a long, narrow acuminate tip, ecostate; cells linear, smooth; apical cells 32 - 44 × 4 - 8 μm; median ones 44 - 52 × 4 - 8 μm; basal ones 16 - 32 × 8 - 20 μm, with a few swollen and hyaline at extreme angles. Perichaetial leaves ca 1 × 0.5 mm, oblong-ovate,

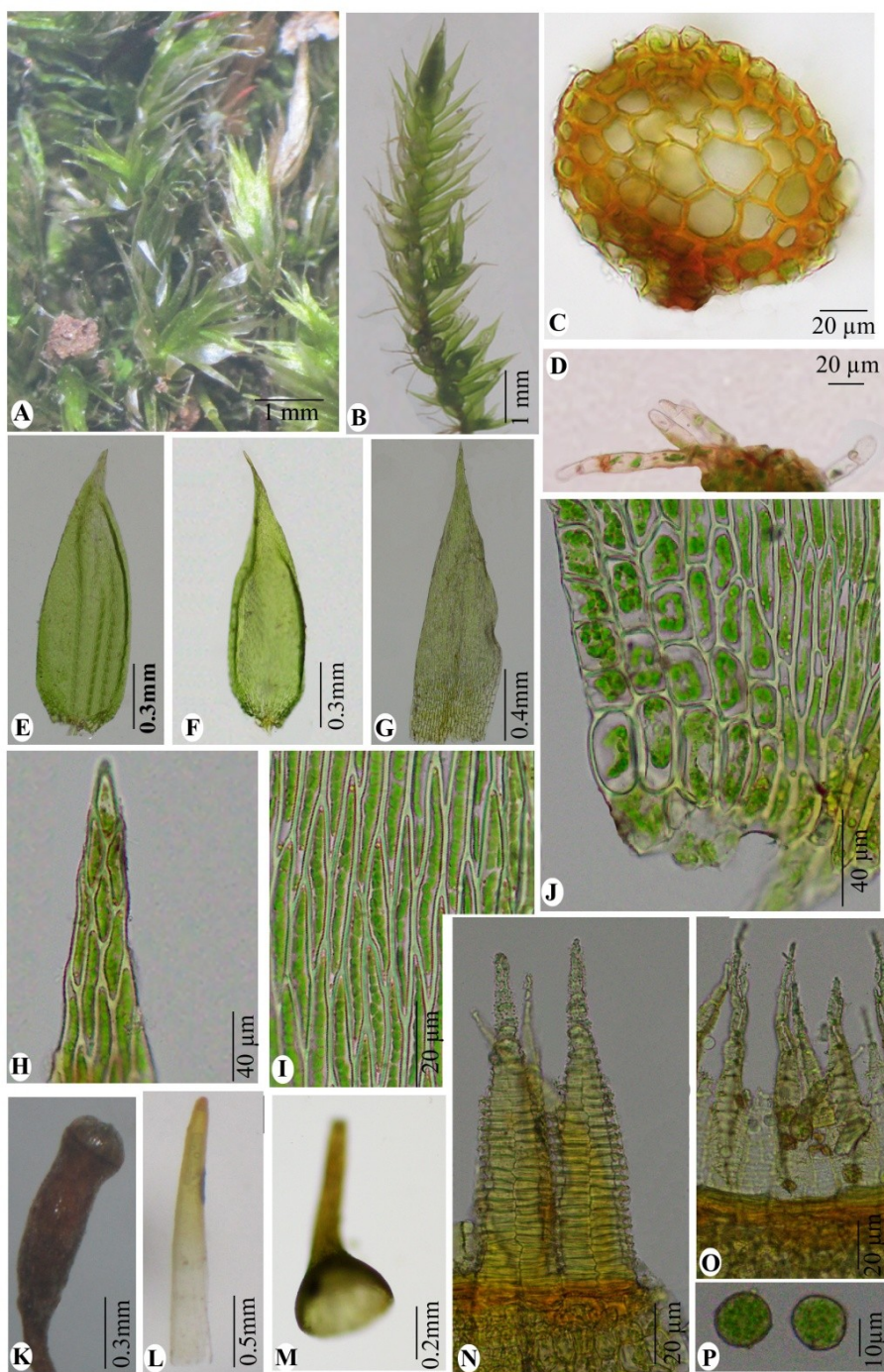


Plate 2(A-P). *Isopterygium longithecum* (Mitt.) A. Jaeger

A. Habitat B. Portion of plant C. Cross section of stem D. Paraphyllia  
 E&F. Leaves G. Perichaetial leaf H. Leaf apical cells I. Leaf median cells  
 J. Leaf basal cells K. Capsule L. Calyptra M. Operculum N. Peristome teeth  
 outer surface O. Inner surface P. Spores

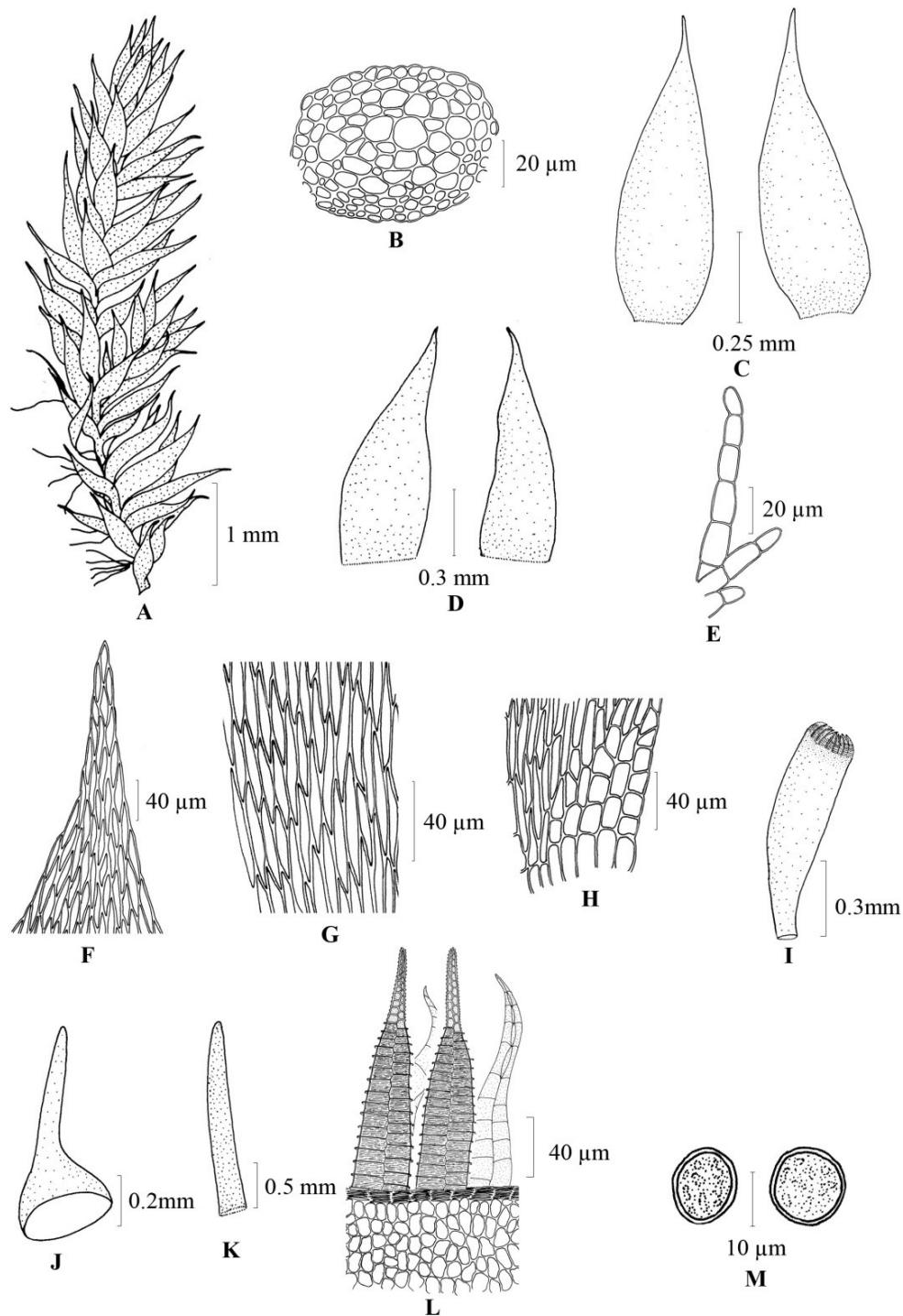
acuminate. Sporophytes on main stems. Setae erect, ca 6 mm high. Calyptrae ca  $2 \times 0.5$  mm, cucullate, narrow, apiculate. Capsules inclined to horizontal, ca  $1.2 \times 0.4$  mm, ovoid-cylindric. Operculum conic, long-rostrate. Peristome teeth 2-rowed; outer row ca  $0.24 \times 0.04$  mm, segmented, lamellate, papillose; inner row ca  $0.18 \times 0.03$  mm, papillose. Spores ca  $12 \mu\text{m}$ , globose, papillose.

**Habitat:** Rupicolous in moist deciduous forests, ca 1020 m.

**Distribution:** Myanmar, Sri Lanka and India: Eastern Himalaya (Sikkim), NE. India (Meghalaya), Western Ghats of Karnataka, Kerala, Tamil Nadu and Eastern Ghats of Tamil Nadu (Salem).

**Specimens examined:** Eastern Ghats: Tamil Nadu, Salem Dist., Shervaroy Hills, ca 1020 m, 12.8.2015, A.E.D. Daniels & P.M. Biju11420.

**2. *Isopterygium longithecum* (Mitt.) A. Jaeger, Ber. Thätigk. St. Gallischen Naturwiss. Ges.: 432. 1878; Gangulee, Moss. E. India 3(8): 1955, f. 1011. 1980.**



**Fig. 2(A-J).** *Isopterygium longitheca* (Mitt.) A. Jaeger

**A.** Portion of plant **B.** Cross section of stem **C.** Leaves **D.** Perichaetial leaves

**E.** Paraphyllia **F.** Leaf apical cells **G.** Leaf median cells **H.** Leaf basal cells

**I.** Capsule **J.** Operculum **K.** Calyptra **L.** Peristome teeth **M.** Spores

(Drawn from Daniels & Biju 11388 p.p.)

*Stereodon longitheca* Mitt., J. Proc. Linn. Soc., Bot. 1 (Suppl.): 104. 1859. -Type: India, Himalaya, Darjeeling, Tonglo, *J. D. Hooker* 1152 (BM). (**Fig. 2; Plate 2**).

Plants forming mats, slender, yellow-green above, brownish below, glossy. Stems creeping, irregularly pinnately branched, complanate, 0.5-1.5 cm long, ca. 0.12 × 0.08 mm in cross section, ovate, without a central strand; cortex 1- or 2-

layered; cells 8 - 12 × 4 - 8 mm, thick-walled; medullary ones 20 - 28 × 16 - 20 mm, thin-walled. Paraphyllia clustered, 2 - 6-celled, linear, ca. 0.14 × 0.02 mm. Leaves erectopatent, concave, 1 - 1.7 × 0.4 - 0.6 mm, ovate-lanceolate, entire, sometimes revolute on one side at base, long-acuminate and faintly crenulate at apex, ecostate; cells linear, smooth; apical cells 32 - 48 × 4 - 8 μm; median ones 48 - 60 × 4 - 8 μm; basal ones 28 - 38 × 8 - 20 μm,

with one row of rectangular cells along the insertion line. Perichaetial leaves ca.  $1.2 \times 0.4$  mm, oblong-ovate, acuminate. Sporophytes on main stems. Setae erect, ca. 9 mm high. Calyptrae ca.  $1.8 \times 0.2$  mm, cucullate, narrow, not apiculate. Capsules inclined, ca.  $1 \times 0.3$  mm, cylindrical. Operculum conic, long-rostrate. Peristome teeth 2-rowed; outer row ca.  $0.23 \times 0.06$  mm, segmented, lamellate, papillose; inner row ca.  $0.17 \times 0.04$  mm, papillose. Spores ca.  $16 \times 16$   $\mu\text{m}$  in diameter, globose, papillose.

**Habitat:** Lignicolous, and corticolous on *Albizia* sp. (Mimosaceae), ca. 1020 m.

**Distribution:** India: Eastern Himalaya and Eastern Ghats of Tamil Nadu (Salem).

**Specimens examined:** Eastern Ghats: Tamil Nadu, Salem Dist., Shervaroy Hills, ca. 1020 m, 11.8.2015, A.E.D. Daniels & P.M. Biju 11388 p.p., 11393 p.p.

### Discussion

The Eastern Ghats is more or less an unexplored region in terms of bryophyte diversity. However, like the Western Ghats, this region is also rich in bryophyte diversity which is evident by the number of new reports made by Kumar and Krishnamurthy (2007) and Sathish *et al.* (2014). The present study also strengthens this fact, as *Isopterygium lignicola* and *I. longitheca* are being reported new to the bryoflora of the Eastern Ghats and Peninsular India respectively.

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