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Fissidens enervis (Fissidentaceae; Bryophyta) new to Asia

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The African *Fissidens enervis* Sim is reported from the Western Ghats (India). This is the first Asian record.

The Western Ghats, a 1600 km long chain of hills along the western coast of Peninsular India with a major discontinuity, the Palghat Gap, is the most influential geomorphic feature in the region. The geological history of the Indian Peninsula as an original part of Gondwanaland, followed by tectonic movement northwards and collision with the Asian continent, have shaped its diverse of flora and fauna. Western Ghats is an abode of many unique elements such as the purple frog (*Nasikabatrachus sahyadrensis*) (Biju and Bossuyt 2003), which points to the African connection. Paleotropical *Fissidens* species are *F. crispulus* Brid. (Bruggeman-Nannenga 1997), *F. planifrons* Besch. (Blockeel et al. 2003) and *F. punctulatus* Sande Lac. (Bruggeman-Nannenga and Arts 2010). *Fissidens crispulus* and *F. punctulatus* are wide-spread species. The distribution of *F. planifrons* and *F. enervis* is more restricted. The first is known from Tanzania, Madagascar, the Comoro Islands, La Réunion and Sri Lanka. *Fissidens enervis* is known only from South Africa and the Western Ghats. The present find from the Western Ghats is the first Asian record of the African *F. enervis.*

Fissidens enervis Sim, Trans. R. Soc. South Africa 15: 187, 1926. Type: Natal, Pietermaritzburg, Town Bush Valley, *Sim 9899* (lectotype (designated by Magill 1981) PRE!)

Growing scattered; *rhizoids* basal, from lower stem cortex and some from the lamina, hyaline or brown, smooth; *stem* unbranched, with up to 13 µm wide cortical cells, 1.5–5.0 × 1.0–2.5 mm tall, pinnate; *leaves* pinnate, pale green, distant, 4–7 pairs, crispate when dry, elliptical with cuspidate tip, 0.30–1.30 × 0.12–0.25 mm, 3–5 times as long as wide, limbate; *limbidium* reaching the leaf apex, confluent or not, confluent at the apex of the vaginant laminae, reaching the insertion of the dorsal lamina, reaching the insertion of the vaginant lamina or not, in mid of dorsal lamina 11–16 µm wide, probably bistratose (no cross-sections seen), on vaginant laminae 11 µm wide, bistratose, marginal throughout; *vaginant lamina* ± 1/2 the leaf length, at the base narrower than the stem, slightly rounded at insertion, unistratose, subequal; *dorsal lamina* slightly rounded to ± straight towards the insertion, reaching the insertion, not decurrent, unistratose; *costa* lacking (vestigial in perichaetial leaves of type (surface view); *mid dorsal laminal cells* large, plane, 32–67 × 16–25 µm; *mid vaginant laminal cells* large, plane, 31.5–54.0 × 16.0–25.5 µm; *gemmae* not seen.

Fertile parts

Perigonia terminal on small, ca 1.5 mm long plants; *antheridia* 230 µm long; *perichaetia* terminal, perichaetial leaves 1.1–1.3 mm long with proximally widened vaginant laminae; *archegonia* 140–160 µm long; *Sporophyte*: *setae* ± 4 mm long, smooth; *capsule* symmetrical, 0.50 × 0.25 mm, ± 32 columns of quadratic-oblong exothecial cells. *Peristome* scariosus-type, teeth ± 33.5 µm wide at base. *Spores* not seen.

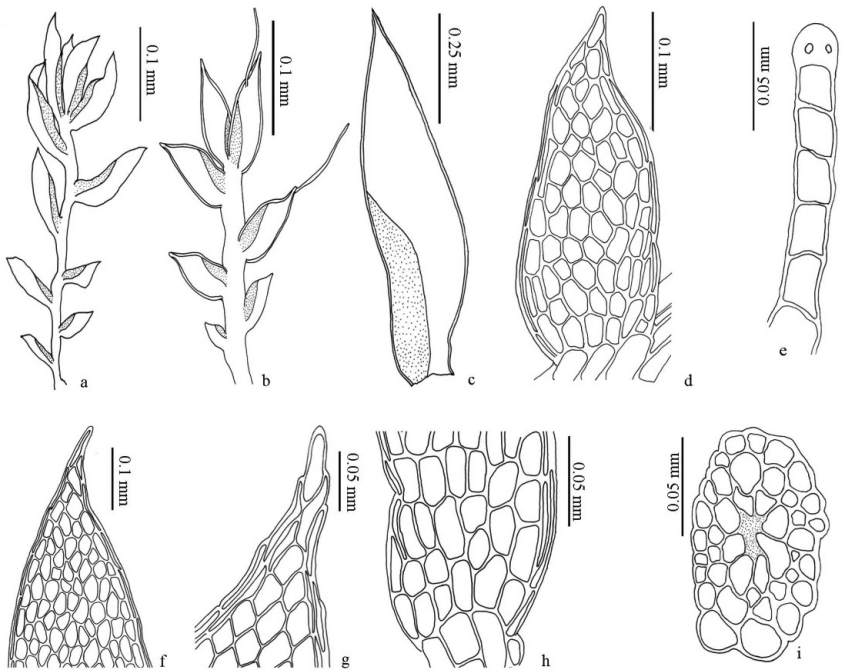

Figure 1. *Fissidens enervis* Sim (a) Perichaetial plant. (b) Small vegetative plant with rhizoids growing from the leaves. (c, d) Vegetative leaves. (e) Tran-section showing the libidium of the vaginant lamina. (f, g) Vegetative leave apices. (h) Leaf insertion, dorsal lamina on the right. (i) Tran-section of stem. ((b, d, h) from 1138b. (f) from type a, c, e, g, i from 1093c).

Diagnosis and comparison

Fissidens enervis is characterized by its cuspidate leaf apices, ecostate leaves and large laminal cells. Moreover, it frequently has rhizoids growing from the lamina. In India it may be confused with the also ecostate, limbate species *F. hyalinus* Wilson & Hook. (= *F. nymannii* Fleisch.) that is known from Mexico, USA, New Zealand, Australia, New Caledonia, Fiji, New Hebrides (Vanatu), the Philippines, Indonesia, India, China, Taiwan, Japan and Russia (Tan and Iwatsuki 1991, Iwatsuki and Suzuki 1995, 1996, Li and Iwatsuki 2001, Ignatov et al. 2007, Pursell 2007). It further resembles *F. dealbatus* Hook. f. & Wilson from New Zealand, Australia and New Caledonia (Beever et al. 2002). *Fissidens enervis* differs from both by its cuspidate leaf apex. *Fissidens hyalinus*. is distinct from both *F. enervis* and *F. dealbatus* by its unistratose limbidia (Iwatsuki and Suzuki 1995). *Fissidens dealbatus* Hook. f. & Wilson differs from the other two species in having 40 or more columns of exothecial cells.

Remarks

Fissidens enervis Sim*, F. dealbatus* and *F. hyalinus* belong to a remarkable group of *Fissidens* species that have subgenus *Aloma* sporophytes (hence they are classified in subgenus *Aloma* (Müll.Hal.) Kindb.), large laminal cells, ecostate to ± ecostate leaves and stems with lacking or weakly developed central strands (Pursell and Bruggeman-Nannenga 2004). Though occasionally ecostate species form dense mats they often grow sparsely scattered among other mosses. Unfortunately, all known collections of *F. enervis* are scanty.

Habitat and substrate: On land cuttings, exposed roots and soil in evergreen forest, associated with *F. crispus* Mont., *F. crispulus* and *Philonotis hastata* (Duby) Wijk & Margad. between 900 and 1200 m.
Distribution: South Africa, India, Western Ghats. Rare.
Examined specimens: India, Kerala, Palakkad District (Nelliyampathy, 900–1200 m), 10°53'54"N, 76°69'36"E, 12.07.2015, Manjula K M (ZGC 1093 c, 1098 b, 1138 b).
Illustration: Magill 1981, Fig. 8: 1–7

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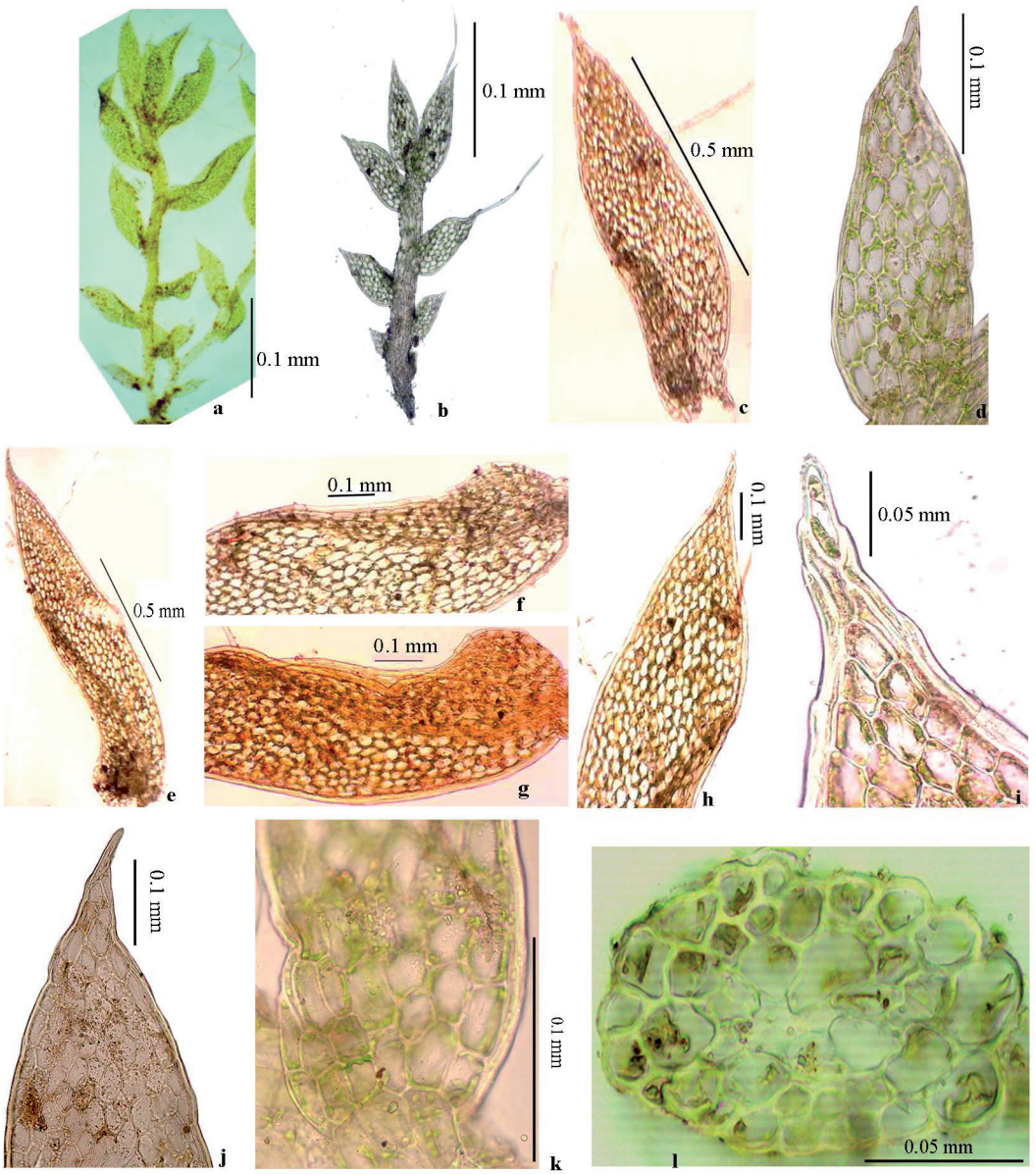

Figure 2. Figure 1. *Fissidens enervis* Sim (a) Perichaetial plant. (b) Small vegetative plant with rhizoids growing from the leaves. (c, d) Vegetative leaves. (e) Perichaetal leaf. (f, g) Details perichaetal leaves. (h, i, j) Leaf apices. (k) leaf insertion. (l) Tran-section of stem. (b, d, k from 1138b; j from type specimen; a, c, e–j, l from 1093c).

References

Beever, J. E., Malcolm, B. and Malcolm, N. 2002. The moss genus *Fissidens* in New Zealand an illustrated key. – Micro-Optics Press, Nelson, N. Z.

Biju, S. D. and Bossuyt, F. 2003. New frog family from India reveals an ancient biogeographical link with the Seychelles. – Nature 425: 711–714.

Blockeel, T. L. et al. 2003. New national and regional bryophyte records 6. – J. Bryol. 24: 329–332.

Bruggeman-Nannenga, M. A. 1997. Notes on *Fissidens* VI. New synonyms, new combinations and validation of some names. – J. Hatt. Bot. Lab. 81: 155–173.

Bruggeman-Nannenga, M. A. and Arts, T. 2010. A revision of the Fissidentaceae (Musci) of La Réunion (including all species known from Mauritius and Rodriguez). – J. Bryol. 32: 170–207.

Ignatov, M. S., Suzuki, T. and Cherdantseva, M. C. 2007. *Fissidens hyalinus* (Fissidentaceae, Bryophyta), a new species for Russia. – Arctoa 16: 123–126.

Iwatsuki, Z. and Suzuki, T. 1995. *Fissidens* (Musci, Fissidentaceae) in Vanuatu (New Hebrides) collected by Dr. M. Higuchi. – Fragmenta Floristica Geobot. 40: 153–158.
Iwatsuki, Z. and Suzuki, T. 1996. *Fissidens* in the Fiji Islands. – J. Hatt. Bot. Lab. 78: 139–162.
Li, Zhi-Hua and Iwatsuki, Z. 2001. Fissidentaceae. 2: 3–67. Moss flora of China. – Science Press and Miss. Bot. Gard. Beijing.
Magill, R. E. 1981. Bryophyta. Part 1. Mosses. Fascicle I. Sphagnaceae – Grimmiaceae. – In: Winter, B. de, Killick, D. J. B. and Leistner, O. A. et al. (eds), Flora of Southern Africa. Bot. Res. Inst., Dept of Agriculture and Fisheries, Republic of South Africa.
Pursell, R. A. 2007. *Fissidentaceae*. Flora Neotropical Monograph 101. 1–279. – The New York Botanical Garden Press.
Pursell, R. and Bruggeman-Nannenga, M. A. 2004. A revision of the infrageneric taxa of *Fissidens*. – Bryologist 107: 1–20.
Tan, B. C. and Iwatsuki Z. 1991. A new annotated Philippine moss checklist. – Harvard Papers Bot. 3: 1–64.