

OUT OF OBSCURITY: ON THE IDENTITY OF *ENTOSTHODON PERTENELLUS* (BROTH.) KIS (FUNARIACEAE)

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Abstract. The obscure African species *Entosthodon pertenellus* (Broth.) Kis is discussed and its concept clarified. The distribution of *E. pertenellus* is extended to include Grande Comore, Malawi and La Réunion. We include brief notes on morphological variation within the species, affinity with other members of the genus, habitat, and how to distinguish it from other *Entosthodon*s from the region. A description of the species is provided and it is illustrated for the first time.

Key words: Africa, islands, *Entosthodon*, Funariaceae, moss

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Entosthodon Schwägr., with ca 36 spp. in the region (Ah-Peng & Bardat 2005; O'Shea 2006; Wilding & Hedderson 2011), is the most diverse genus of Funariaceae in sub-Saharan Africa. The most poorly understood of these are the species described from East Africa and the neighbouring Western Indian Ocean islands.

Funaria (subg. *Entosthodon*) *pertenella* was described by Brotherus (1913) based on material collected in Tanzania by J. Brunthaler in 1909. The name was subsequently transferred by Kis (1985) to *Entosthodon* in line with Fife's (1985) concept of the genus. Until recently, the name had not been applied to any specimen other than the type (Kis 1985). However, our ongoing work on the genus in Africa shows that *E. pertenellus* (Broth.) Kis is fairly widespread in East Africa and the neighbouring islands, and is evidently common in most of the areas where it occurs. Much of the obscurity surrounding the species originates from ambiguities in Brotherus' description in combination with the unusual elevation at which the type was collected.

Brotherus described this species (as a *Funaria*) as having leaf margins erect and a limbidium comprising a single series of cells. Inspection of type material, which does not appear mixed with any other species, lends little credence to his description. The leaves of *E. pertenellus*, however, are at times fairly concave which may be equatable with Brotherus' '*marginibus erectis*', and the marginal cells between the shoulders of the leaf and the apex may form a \pm distinct border in some leaves but this never extends any further down the leaf, and is by no means characteristic of the species. A further peculiarity is the low elevation of the type locality, which according to the original description was somewhere between 1000 and 1100 m. To date, this is still the lowest recorded elevation for the species which is most commonly collected at elevations above 1800 m.

Entosthodon pertenellus is here newly recorded for La Réunion, Malawi, and Grande Comore (Ngazidja) (Figs 1–3). Over its distribution, *E. pertenellus* exhibits variation largely in the degree to which the marginal cells are differentiated between the apex and shoulder of the leaf. The Malawian material is probably the most extreme

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Fig. 1. Distribution of *Entosthodon pertenellus* (Broth.) Kis. Scale: 1:89M.



Fig. 2. *Entosthodon pertenellus* (Broth.) Kis habit. Photograph by J. Bardat.

in this sense and the leaves often have a distinct, sometimes toothed, border between the apex and shoulders of the leaf. Tanzanian and Island (Réunion and Grande Comore) plants are the most similar morphologically while the Malawian plants are in general slightly larger and in addition offer a more or less cohesive set of characters which could justify recognition at a sub-specific level.

Phylogenetic analyses (Wilding *et al.*, unpublished) are, however, unable to resolve the relationship among these major populations suggesting either recent dispersal or some degree of gene flow between populations.

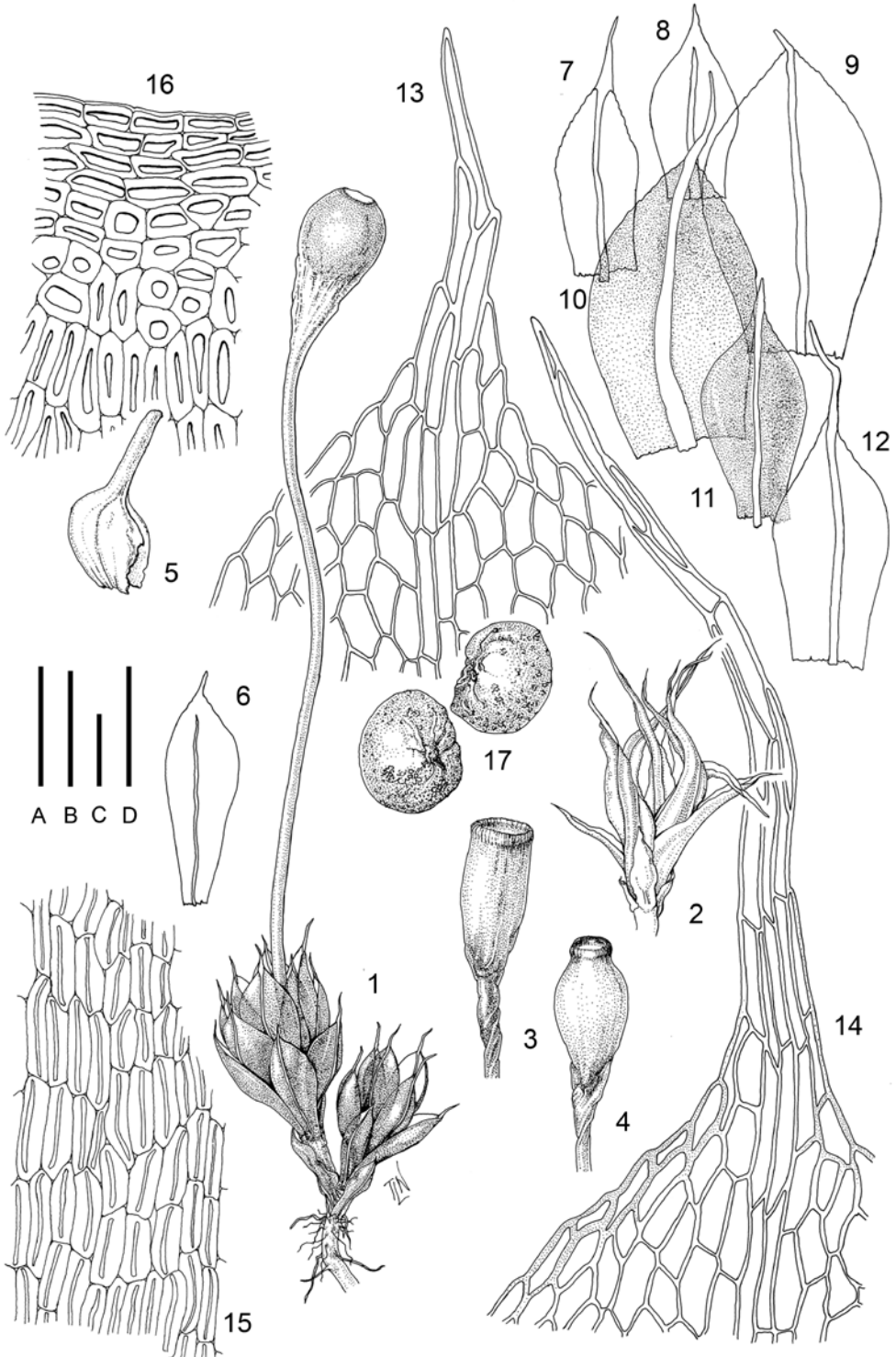
Preliminary phylogenetic analyses (Wilding *et al.*, unpublished) place *E. pertenellus* in the same clade as *E. attenuatus* (Dicks.) Bryhn, the type species of *Entosthodon* Schwägr. Morphologically the relationship is apparent as the two share several characteristic features such as oblong-obovate leaves, slightly asymmetric capsules, cerise rhizoids and finely verrucate spores.

In East Africa and the islands, *E. pertenellus* may be most easily confused with either *E. jamesonii* (Taylor) Mitt. or *E. mauritanus* Schimp. ex Besch. *Entosthodon jamesonii* is easily distinguished from *E. pertenellus* by virtue of its ovate-lanceolate to subulate leaves, with the costa ending below the apex. *Entosthodon mauritanus* is more similar macroscopically to *E. pertenellus*, but its conspicuously limbate leaves, with costa ending below the apex clearly place it apart. In La Réunion, the names *Funaria perlaxa* Thér. and *E. rottleri* (Schwägr.) Müll. Hal. have been incorrectly applied to material of *E. pertenellus*. The former two species are recorded for the island based on collections in BOL and REU, all of which have now been identified as *E. pertenellus*. *Funaria perlaxa* and *E. rottleri* should thus be excluded from the Réunion flora.

HABITAT. *Entosthodon pertenellus* usually occurs on open or exposed soil such as along paths and earthen embankments, and in other areas of moderate disturbance. It is common at elevations between 2300 m and 2900 m in Tanzania and 1900 m and 2600 m in La Réunion. In Grande Comore and Malawi it is known from elevations around 2000 m.

SELECTED SPECIMENS EXAMINED: MALAWI: MT. MULANJE, T.A. Hedderson 17420, 17441, 17478, 17491 (BOL). GRANDE COMORE (NGAZIDJA):

Fig. 3. *Entosthodon pertenellus* (Broth.) Kis: 1 – habit wet; 2 – habit dry; 3 & 4 – capsules dry; 5 – calyptra; 6–12 – leaves; 13 & 14 – leaf apices; 15 – exothecial cells; 16 – cells at capsule mouth. Scale bars: A (1–5) = 1 mm, B (6–12) = 0.5 mm, C (13–16) = 50 µm, D (17) = 28 µm.



MT. KARTALA, *T. Pócs* 9159/AL (BOL, EGR). LA RÉUNION: MAFATE, *N. Wilding* 151 (BOL); MAIDO, *N. Wilding* 20, 22b, 22c, 23, 32, 33, 35, 40 (BOL); Ah-Peng & Hedderson R584-9 (REU); PITON DE LA FOURNAISE, *N. Wilding* 30, 31, 64, 67, 71, 75, 156, 164 (BOL); PITON DES NEIGES, *T. A. Hedderson* 16634b, 16636, 16637; *N. Wilding* 166, 167, 185, 237 (BOL); ROCHE ECRITE, *N. Wilding* 55, 56, 59, 61; *T. A. Hedderson* 16580 (BOL); TANZANIA: MT. KILIMANJARO, *T. Pócs*, *R. Ochyra* & *H. Bednarek-Ochyra* 88118/V, 88124/M, 88125/W, 88125/S, T (BOL, EGR).

***Entosthodon pertenellus* (Broth.) Kis**

Figs 2 & 3

Funaria pertenella Broth., Denkschr. Kaiserl. Akad. Wiss., Wien. Math.-Naturwiss. Kl. 88: 737. 1913. LECTOTYPE (designated here): TANZANIA. West Usambara, Kalange, 1000–1100 m. *J. Brunthaler s.n.* (WU!). ISOLECTOTYPE: H!

Plants small, light-green, scattered to gregarious. *Stems* reddish-brown, 1–3 mm high, branching by sub-perigonal innovation, in cross-section with 1–2 layers of thick-walled reddish-brown cortical cells, a hyalodermis and a central strand, with cerise rhizoids below. *Leaves* erect-spreading, oblong-obovate, 1.1–1.8 × 0.4–0.9 mm (including awn), concave, entire to weakly and bluntly toothed above, short acuminate or rarely apiculate. *Cells of upper lamina* rectangular to oblong-hexagonal, (22–)30–55(–63) × 12–25(–30) μm, thinner walled, longer, and more oblong below; *marginal cells* usually undifferentiated, sometimes forming a ± conspicuous border between shoulders and apex; *costae* reddish brown, usually excurrent, in cross-section with two adaxial and one abaxial layer of large cells surrounding a central stereid group. *Axillary hairs* present.

Polyoicous. *Setae* 5–7(–15) mm long, pale yellow to reddish-brown, twisted anti-clockwise. *Capsules* erect or weakly inclined, slightly asymmetric (from a more or less distinct bend in the neck), narrowly oblong-pyriform, weakly constricted below the mouth when dry, 1.1–1.9 × 0.4–0.6 mm, with a well differentiated neck ca 1/3–1/2 the total length of the capsule, yellowish-

to reddish-brown at maturity; mouth transverse, ca 3/4 the diameter of the capsule; *exothecial cells* with obscure lumina, ca 40–65 × 8–18 μm, in cross-section with thick, strongly cuneate anticlinal walls, ca 4–6 rows of oblate cells at mouth. *Opercula* planoconvex. *Peristome* usually absent, if present consisting of a highly reduced and fragmented hyaline membrane. *Spores* finely verrucate or smooth, 25–33 μm, trilete scars rarely obvious. *Calyptrae* cucullate-rostrate.

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