

## TRISMEGISTIA

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*Trismegistia* (Müll.Hal.) Müll.Hal., *Flora* 82: 474 (1896); from the Greek *tris* (thrice) and *megistos* (largest), in reference to the robustness of the plants, suggesting they are three times larger than other mosses.

*Hypnum* sect. *Trismegistia* Müll.Hal., *J. Mus. Godeffroy* 3(6): 39 (1874); *Sematophyllum* subg. *Trismegistia* (Müll.Hal.) Renaud, *Prodr. Fl. Bryol. Madagascar, des Mascareignes et des Comores* 234 (1898).

Lecto: *T. lancifolia* (Harv.) Broth.

Dioicous. Plants small, medium to robust, dull green to yellowish green, glossy, forming dense prostrate wefts or turfs. Primary stems very long, creeping, arched or ascending, densely rhizoidal; secondary stems short, thick, erect, usually richly branched above; branches erect, densely foliate, subdendroid. Stem leaves concave from an oval, ovate or ovate-elongate base, lanceolate-ligulate or lanceolate-subulate-pointed; margins plane, smooth below, serrate to spinose above, bordered by longer cells. Upper laminal cells oval, short-rhomboid or linear, pitted, smooth, becoming longer towards the base; alar region often multitiered, with a row of longer, coloured, swollen basal cells; supra-alar cells several, small, thin-walled. Branch leaves erect-spreading, narrower and smaller than stem leaves, lanceolate from an ovate base, broadly acuminate, usually broadly bordered above and with a margin that is sharply serrate in the upper half. Costa absent or short and double in stem and branch leaves. Laminal cells of branch leaves oval or oval-rhomboidal, smooth; basal alar cells inflated and coloured at the angles, thick-walled, porose, curved towards the stem; supra-alar cells rectangular.

Perichaetia on primary stems and at base of secondary stems; inner perichaetial leaves erect, weakly long-plicate, lanceolate, acuminate, sharply toothed above, ecostate. Seta long, c. 40 mm or longer, thick, twisted, purple to red, smooth. Capsules ovoid to short-cylindrical, horizontal; operculum short- to long-rostrate from a conical base; annulus absent. Peristome diplolepidous, double, alternate; exostome teeth 16, lanceolate, incurved, dorsally finely cross-striate; ventral lamellae radially developed; endostome segments 16, broad, sharply keeled, similar in length to teeth; cilia 3 or 4; basal membrane high. Spores small to medium-sized, papillose. Chromosome number not known.

Following a recent revision (Akiyama, 2010), *Trismegistia* is now regarded as a mainly Indo-Malesian and western Pacific genus of nine species, while former American, African and East Asian taxa have been assigned to other genera. Although they share some attributes, such as long setae and toothed margins, research using rbcL sequences has demonstrated that *Trismegistia* is only remotely related to *Mastopoma* and *Wijkia* which have a single row of alar cells, compared with the alar region with  $\pm$ inflated cells in a scalariform pattern in *Trismegistia*, according to Tsubota *et al.* (2001) and Tan & Chang (2004).

Bordered, serrate leaves distinguish *Trismegistia* from all other Australian Pylaisiadelphaceae and Sematophyllaceae, and the presence of primary and erect secondary stems (stipes) with branches and branchlets gives it a subdendroid appearance. Other distinguishing features include the rounded to almost straight leaf insertion and an alar region that is partly or completely multitiered (Akiyama, 2010: 2, figs 1, 2).

Tan (1991: 204) treated *T. calderensis* (Sull.) Broth. and *T. rigida* (Mitt.) Broth. as distinct species and included *T. lancifolia* (Harv.) Broth. as a synonym of the latter. Akiyama (2010:

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11, 14, 25) noted that from the description given in Ramsay *et al.* (2002), the latter regarded *T. rigida* as encompassing what are, in fact, two taxa, viz. *T. lancifolia* and *T. calderensis* var. *rigida* (Akiyama, 2010: 25, Note 1).

Ramsay *et al.* (2002) followed Tan's (1991) opinion and re-determined the sole Australian species, from Qld, and originally recorded as *T. lancifolia* by Stone (1982), as *T. rigida*. Akiyama (2010: 19) observed that *T. lancifolia* and *T. rigida* had been misidentified in a number of local floras, and he clarified the characters that can separate them. Thus, the leaves of *T. lancifolia* are narrower than the ovate leaves of *T. rigida*, and while while the alar region is invariably multitiered in *T. rigida*, cells are arranged in a single row in *T. lancifolia* except for the outermost 1–3 columns. Akiyama (2010) recognised five varieties of *T. lancifolia* based on morphological attributes, geographical distribution and ecological parameters, calling the endemic Australian entity *T. lancifolia* var. *australiana*.

### References

Akiyama, H. (2010), Taxonomic revision of the genus *Trismegistia* (Pylaisiadelphaceae, Musci), *Humans & Nature* 21: 1–77.

Ramsay, H.P., Schofield, W.B. & Tan, B.C. (2002b), The family Sematophyllaceae (Bryopsida) in Australia. Part 1. Introduction, family data, key to genera and the genera *Wijkia*, *Acanthorrhynchium*, *Trismegistia* and *Sematophyllum*, *J. Hattori Bot. Lab.* 90: 1–50.

Stone, I.G. (1992), New and noteworthy records of mosses mostly from Queensland, Australia, *J. Bryol.* 14: 691–699.

Tan, B.C. (1991), Miscellaneous notes on Asiatic mosses, especially Malesian Sematophyllaceae (Musci) and others, *J. Hattori Bot. Lab.* 70: 91–106.

Tsubota, H., Akiyama, H., Yamaguchi, T. & Deguchi, H. (2001b), Molecular phylogeny of the genus *Trismegistia* and related genera (Sematophyllaceae, Musci) based on chloroplast *rbcL* sequences, *Hikobia* 13: 529–549.

**Trismegistia lancifolia** (Harv.) Broth., in H.G.A.Engler & K.A.E.Prantl, *Nat. Pflanzenfam.* I, 3: 1078 (1908)

*Neckera lancifolia* Harv., in W.J.Hooker, *Icon. Pl.* 2(4): tab. XXI, fig. 5 (1836). T: "Nepal" [but probably Singapore], *Wallich.s.n.*; holotype: TCD-Harvey; isotype: BM-Hooker, E, NY-Mitten.

Illustrations: E.B.Bartram, *Philipp. J. Sci.* 68: pl. 24, figs 406 (as *T. rigida*), 407 (as *T. lancifolia*) (1939); H.C.Gangulee, *Mosses of Eastern India and Adjacent Regions* 1869, fig. 951 (1980); H.Akiyama, *op. cit.* 41–66, pl. 14–25.

Plants variable in size and branching pattern, mostly glossy, ±complanately foliate in fronds of ascending stems (stipes). Primary stems long, often stoloniferous, prostrate, pinnately branched; secondary stems 10–40 mm long, richly branched above, blunt at the tips. Stem leaves ovate-lanceolate to ligulate, patent to spreading, usually 2.0–2.5 mm long, c. 1 mm wide, rarely longer [up to 3.8 mm in var. *australiana*], appressed when dry, concave, larger and acutely pointed on the main stem; branch leaves similar to stem leaves [longer and narrower in var. *australiana*] c. 3 mm long and 0.5 mm wide, patent to spreading, narrowly lanceolate, concave, slightly narrowed to a ligulate tip with a short acuminate apex; margin sharply spinose, serrate to dentate above and distinctly bordered by 1–3 rows of narrow thick-walled porose cells in the upper half; stem and branch leaves ecostate. Laminar cells linear-rhomboidal, more variable near the apex; alar region strongly differentiated, the basal cells c. 134 µm × 30 µm, inflated, thick-walled, outermost 2 or 3 porose and transversely divided giving a multitiered appearance.

Perichaetia on the main stem; perichaetial leaves narrow, erect, with a serrate and acuminate apex. Seta smooth, 6.0–7.5 cm long. Capsules long-exserted, horizontal, arcuate, cylindrical, to 3.8 mm long and 1.2 mm wide; operculum long-rostrate. Peristome teeth subulate, papillose, 700–800 µm long; dorsal trabeculae short; endostome papillose. Spores less than 20 µm diam.

Occurs in Thailand, Indonesia, Malaysia, Singapore, the Philippines, Papua New Guinea, Australia, the Solomon Islands, Vanuatu and Fiji.

**Trismegistia lancifolia** (Harv.) Broth. var. **australiana** H.Akiy., *Humans & Nature* 21: 24 (2010)

T: Noahs Creek, Cape Tribulation, Qld, *I.G.Stone18054*; holo: MEL.

[*Trismegistia rigida* auct. non (Mitt.) Broth.: H.P.Ramsay, W.B.Schofield & B.C.Tan, *op. cit.* 20 (2002)]

Illustrations: H.P.Ramsay, W.B.Schofield & B.C.Tan, *op. cit.* 23, fig. 11, as *T. rigida* [fig. 12 (capsules and spores) is referable to a different taxon (from Papua New Guinea), possibly *T. lancifolia* var. *lancifolia*]; H.Akiyama, *op. cit.* 62, pl. 21.

Plants large, forming a dense turf. Primary stems long, prostrate, pinnately branched; secondary stems  $\pm$ ascending, sparingly branched, not forming fronds. Stem leaves ovate-lanceolate, to 3.8 mm long,  $\pm$ gradually narrowed, acute; margins entire below, serrate to spinose above, scarcely bordered. Laminal cells below apex elliptic to linear,  $> 60 \mu\text{m}$  long, smooth; upper median laminal cells fusiform to linear, 30–40  $\mu\text{m}$ , smooth, longer below; alar region with large cells, outer 2 or 3 columns multitiered. Branch leaves linear-lanceolate to ligulate, often concave near insertion, slightly curved or almost straight at the base.

Perigonia, perichaetia and sporogones and spores not known. Chromosome number not known.

A very rare endemic in rainforest in north-eastern and south-eastern Qld; grows on tree bases and trunks and rotten logs. The specimens listed below are the only known collections.

Qld: Mount Mistake Natl Park, *I.G.Stone 20919* (MEL); Noahs Ck, Cape Tribulation, *I.G.Stone 18055, 18056* with *P.W.Richards* (MEL).

Characterised and distinguished from other varieties of *T. lancifolia* by its larger size; weak differentiation of the stem and branch leaves; leaves that are smaller distally; leaf margins with weak, spinose or serrate borders; longer subapical laminal cells; the alar region of branch leaves arranged in a single row, except for the outer 1–3 multitiered columns.