

Fissidens crispulus Brid., *Muscol. Recent. Suppl.* 4: 187 ('1818') [1819]

Type: "Germ: *Krauselichter Spaltzahn*. Gall: *Fendule frisée*"; not designated.

Fissidens zippelianus Dozy & Molk., *Syst. Verz.* 29 (1854), *vide* M.A.Bruggeman-Nannenga, *J. Hattori Bot. Lab.* 81: 157 (1997). Type: Java, Indonesia, *Zippelius 3750*; lecto: L, *vide* Z.Iwatsuki & T.Suzuki, *J. Hattori Bot. Lab.* 43: 400 (1977).

Fissidens kerianus Müll.Hal. ex Broth., *Öfvers. Förh. Finska Vetensk.-Soc.* 36: 155 (1895), *vide* I.G.Stone, *J. Bryol.* 16: 248 (1990). Type: Mulgrave Range, Qld, *F.M.Bailey*; holo: H-BR.

Fissidens terrae-reginae E.B.Bartram, *Farlowia* 4: 235 (1952), *syn. nov.* Type: Mossman River Gorge, Qld, on granite rock in rain forest, alt. 150 m, 16 Mar. 1948, *L.J.Brass 18183*; lecto: FH 0060865 (selected here); Upper Parrot Creek, Annan River, Qld, moist rocks on bank of a stream in rain forest, alt. 350 m, 5 Sept. 1948, *L.J.Brass 20037*; *syn:* FH 00545434. [Note: Bartram (1952) cited two collections from north-eastern Queensland, *L.J.Brass 18183* and *20037*, without designating either as Type. Both specimens are fruiting and constitute syntypes. As the Mossman River Gorge material fully represents the concept of the protologue, as well as bearing a label "*Fissidens terrae-reginae* E.B.Bartram sp. nov.", this specimen is chosen as the lectotype.]

Illustrations: Z.Iwatsuki & T.Suzuki, *loc. cit.* fig. 12; Z.Iwatsuki & T.Suzuki, *J. Hattori Bot. Lab.* 51: 477, pl. 31 (1982); I.G.Stone, *op. cit.* 249, fig. 2F-k (1990); all as *F. zippelianus*.

Plants small to medium-sized, green or yellowish, simple or branched. **Stems** 3–10 mm tall, longer when branched; in section lacking a defined central strand; axillary hyaline nodules prominent. **Leaves** in 5–20 or more pairs, narrowly lanceolate, 1.5–2.0 mm long, 0.2–0.4 mm wide; **apex** acute to obtuse-mucronate; **margins** crenulate to serrulate throughout by projecting lamina cells; **vaginant laminae** reaching to mid-leaf or just beyond, subequal at the apex, partly open; **dorsal lamina** ending abruptly in a wedge-shaped or rounded base, extending to the insertion or failing shortly above; **lamina cells** of apical lamina rounded to rounded-hexagonal, 6–8 μm , \pm thick-walled, distinctly mammillose except at the extreme apex; cells of vaginant laminae similar but less mammillose; **costa** of *bryoides*-type, strong, subpercurrent to scarcely excurrent.

Dioicous. **Perigonia** terminal; upper end of vaginant laminae of perigonial leaves \pm broadly rounded, open. **Perichaetia** terminal; **perichaetial leaves** narrowly lanceolate, the upper cells of the vaginant laminae \pm elongate, forming an indistinct limbidium-like band. **Setae** terminal, 1.5–4.0 mm long. **Capsules** symmetrical, slightly inclined, 0.4–0.8 mm long; **exothecial cells** short-rectangular, thin-walled, not collenchymatous. **Operculum** rostrate, 0.4–0.8 mm long, with a slightly curved beak. **Peristome** of *zippelianus*-type; teeth strongly inflexed, basal part of the outer lamellae appearing as minutely papillose horizontal ridges, the filaments stiff, not twisted. **Calyptra** campanulate, c. 0.9 mm long, smooth. **Spores** 13–17 (–19) μm diam., finely papillose.

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Occurs in north-eastern Qld; usually on moist rock or soil, occasionally aquatic, rarely on bark.

Also known from sub-Saharan Africa, islands in the Indian Ocean, India, Malesia, southern China, New Caledonia and Fiji.

Selected specimens examined: Qld: Mt Bartle Frere, *I.G.Stone 18901* (MEL); Kauri Ck, Lamb Ra., NE of Atherton, *H.Streimann 29865* (AD, CANB); Sullivans Track, Cardwell, *I.G.Stone 24523* (MEL); Mena Ck, Paronella Park, *I.G.Stone 25084* (MEL); Massey Ck, Iron Ra., *F.R.Clarkson 2603* (MEL); The Boulders, Babinda, *I.G.Stone 24452* (MEL); Massey Ck, Iron Ra., Cape York Penin., *J.R.Clarkson 2603* (MELU).

Stone (1990b) proposed *F. kerianus* as a new synonym of *F. zippelianus* (= *F. crispulus*). Plants of the former closely resembled those of the lectotype of *F. zippelianus* illustrated by Iwatsuki & Suzuki (1977), but the leaves were longer (6–10 times as long as wide) and slightly more pointed. Stone examined a large number of Australian specimens, many from rocks in streams, which she referred to *F. zippelianus* and concluded that the species was very variable in size and leaf morphology. Australian specimens attributed to *F. zippelianus*

varied in the ratio of leaf length to width (5–10:1), leaf apex from broadly acute to acuminate, the costa subpercurrent to short-excurrent (*I.G.Stone 24552*), and in the dorsal lamina narrowing to the base or being broader and abruptly rounded, or sometimes even decurrent. Such variation complicates identification at the varietal level, and further study, particularly of Queensland collections, is warranted (Stone, 1990b). Iwatsuki & Suzuki (1982) noted that, being dioicous, male plants were difficult to find and sporophytes were not common. Fertile plants can occasionally have weakly differentiated and \pm elongate marginal cells on the vaginant laminae of perichaetial leaves, but they do not make a complete limbidium.

This species is extremely variable in size and leaf morphology, sometimes even within the same plant (Stone, 1990b). It was first reported from Australia, from Babinda, Queensland, by Brothrus & Watts (1918). Examination of a large number of Australian specimens, many from rocks in streams, indicates that *F. crispulus* is highly polymorphic, varying in the following leaf characters: ratio of length to width (5–10:1), the apex broadly acute to acuminate, the costa percurrent to short-excurrent, and in the variability of the base of the dorsal lamina.

In her account of *Fissidens* in New Zealand (http://www.nzflora.info/factsheet/Taxon/Fissidens_crispulus_var_robinsonii.html), Beever (2014), stated: “*Fissidens crispulus* var. *robinsonii* is said to differ from the type variety in its narrowly acute leaf apices, with short excurrent costae (Iwatsuki & Suzuki 1989, as varieties of *F. zippelianus*), and in the presence of a differentiated central strand in the stem (Li & Iwatsuki 2001). N.Z. material matches well the lectotype of *F. robinsonii* Broth., and, although scanty, is placed with confidence into *F. crispulus* var. *robinsonii*”.

The holotype of *F. terrae-reginae* has a costa that is at best percurrent, and the stem has a weakly differentiated central strand, thus showing features that could lead to an identification as either var. *crispulus* or var. *robinsonii*. Iwatsuki (March, 1998) annotated the packet as *F. zippelianus* var. *robinsonii*, and while its morphology is closer to var. *robinsonii* than var. *crispulus*, given the inherent variability in the anatomy of the Australian material examined, particularly the presence or absence of a weakly differentiated central strand in the stem and the leaf costa being only weakly excurrent, I have chosen not to recognise var. *robinsonii* in Australia.

[Bibliography](#)