

**Fissidens flabellulus** Thwaites & Mitt., *J. Linn. Soc. Bot.* 13: 324 (1873)

Type: Ceylon [Sri Lanka], *Thwaites 142*; iso: ?NY *fide* Z.Iwatsuki & T.Suzuki, *J. Hattori Bot. Lab.* 51: 397 (1982).

**Plants** small to very small, usually flabelliform; 0.5–1.3 mm long, 0.6–1.2 mm wide with leaves. **Stems** simple; in section lacking a central strand; axillary nodules hyaline,  $\pm$ distinct. **Leaves** in 2–6 pairs; upper leaves lanceolate, 0.6–1.2 mm long, 0.1–0.3 mm wide; **apex** acute to narrowly acute; **vaginant laminae** reaching 1/2–2/3 leaf length, half open or joining nearer to the margin, proximal part with or without a unistratose intramarginal border of narrow rectangular to prosenchymatous cells c. 40–80  $\mu$ m long; **dorsal lamina** tapered or rounded at the base, reaching the insertion; **margins** serrate by projecting cell ends; **laminal cells** smooth, weakly convex, hexagonal and isodiametric, 10–15  $\mu$ m diam., becoming slightly larger proximally; **costa** of *scariosus*-type, green, percurrent to short-excurrent, often dividing the lamina unequally, the dorsal side wider in mid-leaf.

**Rhizautoicous** or **autoicous**. Male plants with 2–5 pairs of leaves; **perigonia** often terminal on stems. **Perichaetia** terminal on stems; **perichaetial leaves** to 1.5 mm long and 0.35 mm wide, shouldered below a long and often deep indentation at the apex of the vaginant laminae, with cells oblong and margin intermittently serrate proximally. **Setae** terminal, 2–3 mm long. **Capsules** ovate to short-cylindrical; theca 0.3–1.0 mm long, 0.25–0.60 mm wide; **exothecial cells** with slightly thickened longitudinal walls, weakly collenchymatous. **Operculum** long-conical to rostrate, 0.3–0.4 mm long. **Peristome** of *scariosus*-type. **Calyptra** campanulate, c. 0.4 mm long, smooth. **Spores** 7–14  $\mu$ m diam.,  $\pm$ smooth.

Occurs in rainforest in north-eastern Qld.

Also in the eastern Palaeotropics from Sri Lanka to Malesia, New Caledonia and Japan.

Two varieties are known from Australia.

Vaginant laminae with an intramarginal border of elongate cells; capsules c. 0.45–1.00 mm long .....

..... var. **eachamensis**

Vaginant laminae lacking an intramarginal border of elongate cells; capsules 0.30–0.35 mm long.....

..... var. **flabellulus**

**Fissidens flabellulus** Thwaites & Mitt. var. **flabellulus**

Illustration: I.G.Stone, *J. Bryol.* 18: 177, fig. 4 (1994).

**Stems** c. 0.5–1.3 mm long. **Leaves** in 2–6 pairs, 0.6–1.0 mm long, 0.10–0.25 mm wide; **apex** acute to acuminate; **vaginant laminae** reaching to c. 1/2 leaf length, the proximal part lacking a unistratose marginal border of narrow rectangular to prosenchymatous cells; **margins** serrate; **costa** percurrent to excurrent.

**Rhizautoicous** or **autoicous**, apparently also **dioicous**. **Perichaetial leaves** in 2–5 pairs. **Capsules** 0.30–0.35 mm long.

*Images*

Occurs in rainforest in north-eastern Qld, between Cooktown and Cardwell. Grows on soil.

Also in Sri Lanka, China, Japan, Malesia and New Caledonia.

*Selected specimens examined:* Qld: Helenvale, S of Cooktown, *I.G.Stone 19232 p.p.* (MEL); Lake Eacham Natl Park, Atherton Tableland, *I.G.Stone 25525* (MEL).

The var. *flabellulus* has been collected from soil, but it seems to be rare and is always mixed with other small *Fissidens* species.

**Fissidens flabellulus** Thwaites & Mitt. var. **eachamensis** I.G.Stone, *J. Bryol.* 18: 177 (1994)

Type: Lake Eacham Natl Park, Atherton Tableland, Qld, *I.G.Stone 25528*; holo: MEL.

Illustration: I.G.Stone, *op. cit.* 178, fig. 5.

**Stems** to c. 0.5 mm long; axillary nodules collapsing readily. **Leaves** in 3–5 pairs, 0.9–1.2 mm long, 0.2–0.3 mm wide; **apex** acute; **margins** serrate above, vaginant laminae with large, occasionally distant teeth, or entire; **vaginant laminae** reaching to 1/2 leaf length or slightly more, the proximal part with a unistratose intramarginal border of 2–4 rows of narrow rectangular to prosenchymatous cells 40–80  $\mu\text{m}$  long; **costa** percurrent to usually slightly excurrent.

**Perichaetial leaves** in 2 pairs. **Capsules** c. 0.45–1.00 mm long. **Peristome** teeth 32–35  $\mu\text{m}$  wide at the base. **Spores** 7–10  $\mu\text{m}$  diam.

#### *Images*

Occurs in north-eastern Qld, from the Atherton Tableland south to the Kirrama Range near Cardwell; also near Nambour in south-eastern Qld. Grows on soil in rainforest.

*Selected specimens examined:* Qld: Kirrama Ra., near Cardwell, I.G.Stone 16993 (MEL); Paynter Ck, near Nambour, I.G.Stone 13276 p.p. (MEL).

Distinguished from var. *flabellulus* by the intramarginal border of elongate cells in the vaginant laminae and by the larger capsules.

Although growing in similar habitats, *F. flabellulus* var. *eachamensis* is more widespread in Australia and appears to be more common than var. *flabellulus*. It is easily overlooked because of its small size and while apparently endemic, it is likely to be discovered on islands to the north and east of Australia.

*Fissidens subacutissimus* Thér., from New Caledonia, closely resembles *F. flabellulus*, but the mid-lamina cells are larger [10–15 (–20)  $\mu\text{m}$  wide] than those of Australian *F. flabellulus* (10–15  $\mu\text{m}$ ).

Iwatsuki & Suzuki (1989) placed *F. subacutissimus* in synonymy with *F. bogoriensis* M.Fleisch., but that species has much larger and more elongate mid-lamina cells (30–45  $\times$  20–25  $\mu\text{m}$ ), and the limbidium is often present on all laminae. Further evaluation of their relationship is required.

#### *Bibliography*