**Fissidens taylorii** Müll.Hal, *Syn. Musc. Frond.* 1: 65 (1848)

*Fissidens pygmaeus* Taylor, *London J. Bot.* 5: 66 (1846), *nom. illeg. non F. pygmaeus* Hornsch. (1841). Type: Swan River, W.A., *J.Drummond s.n.*; holo: BM; iso: BM, FH.

**Plants** minute, yellow-green to green, terrestrial, in scattered clusters; shoots dimorphic, fertile shoots shorter, with a few bract-like leaves subtending perichaetial leaves; rhizoids at the base of main shoots and branch shoots. **Vegetative stems** 2–4 mm tall (or taller by repeated innovations); in section the central strand indistinct or absent. **Stem leaves** erecto-patent, little altered when dry, narrow, oblong to lanceolate, 0.30–0.85 mm long, 0.15–0.20 mm wide, asymmetrical; **apex** obtuse to acute, sometimes apiculate; **laminae** unistratose; **vaginant laminae** 2/3–4/5 leaf length, half open to almost fully closed, elimbate or limbate; **dorsal lamina** narrow, usually failing above the base, elimbate; **margins** entire to minutely serrulate; **marginal cells** of vaginant laminae ±distinct in 1–several rows of elongate cells, or undifferentiated; cells of apical and dorsal laminae irregularly quadrate to hexagonal, smooth, not bulging, the walls thin to firm. **Costa** of *bryoides*-type, reaching or ending shortly below the leaf apex.

**Autoicous** or ?**dioicous**. **Perigonia** gemmiform, lateral or basal in leaf axils of sterile or female shoots, occasionally rhizautoicous or apparently independent. **Female shoots** with 2–5 pairs of leaves, usually lateral or basal on sterile shoots; lower leaves bract-like. **Perichaetial leaves** 1.0–1.5 mm long, apical and dorsal laminae narrow, elimbate, dorsal lamina failing above the base, vaginant laminae inflated, usually limbate, occupying most of the leaf, ±open; margins entire to denticulate; costa subpercurrent to excurrent. **Setae** 2–6 mm long. **Capsules** erect to inclined; theca ovoid, ±symmetrical; **exothecial cells** thin-walled, not collenchymatous, in 65–70 columns of cells at mid-capsule. **Operculum** rostellate. **Peristome** of *bryoides*-type with spirally-thickened forks and highly hygroscopic, or of *sainsburia*-type, with teeth entire or rimose, not or weakly spirally-thickened and weakly hygroscopic.

*Fissidens taylorii* is characterised by the distinctly dimorphic sterile and fertile shoots. The fertile shoots, consisting of a few bract-like leaves subtending the perichaetials, are usually axillary, either basal or lateral, but never terminal on an otherwise vegetative leafy stem. Plants can occasionally be dioicous, as male, female and sterile shoots are often independent, although possibly derived by detachment from leaf axils or buried moribund plants.

Detailed descriptions and illustrations are provided in the comprehensive revision by Stone & Beever (1996).

Occurs in all Australian States and Territories. Usually on compacted soil, from semi-desert to more moist, coastal areas but not in the wet tropics. Also in North and South America and New Zealand.

Four varieties are known from Australia.

**1** Leaves of sterile shoots broadest above mid-leaf, 2–2.5 times longer than wide; vaginant laminae c. 90% or more of leaf length; limbidium generally absent; peristome teeth split, with 2 spirally thickened arms ..... var. **gillianus**

**1:** Leaves of sterile shoots usually broadest at or below mid-leaf, 3–4.5 times longer than wide; vaginant laminae c. 75% of the leaf length; limbidium present or absent; peristome teeth entire or split ..... 2

**2** Peristome teeth entire, rimose or occasionally weakly split, papillose, ±erect whether dry or moist; leaves of sterile shoots subobtuse-apiculate to acute; costa usually percurrent ..... var. **sainsburyanus**

**2:** Peristome teeth forked, the arms spirally ornamented, recurved when dry, strongly incurved when moist; leaves of sterile shoots obtuse, subobtuse or acute; costa subpercurrent to short-excurrent .... 3

**3** Sterile shoots 2–4 mm tall; leaves 0.30–0.85 mm long; apex obtuse, subobtuse-apiculate to acute; perigonia occasionally separate, often single and axillary at the base of sterile or perichaetial shoots, or numerous and axillary, the leaves then short, obtuse or obtuse-apiculate ..... var. **taylorii**

**3:** Sterile shoots 5–10 mm tall; leaves 0.5–1.0 mm long; apex acute; perigonia numerous in leaf axils; female shoots 1 or more, axillary near the base ..... var. **epiphytus**

**Fissidens taylorii** Müll.Hal. var. **taylorii**

*Fissidens basilaris* Müll.Hal. & Hampe, *Linnaea* 26: 501 (1855). Type: Barossa Range, S.A., *F.Mueller s.n.*; holo: BM; iso: MEL [The Mueller collection is a mixture of *F. taylorii* var. *taylorii* and *F. pungens* Müll.Hal & Hampe].

*Fissidens sarcophyllus* Burchard & Broth., *Pap. & Proc. Roy. Soc. Tasmania* 1895: 112 (1896), *nom. nud.*; *F. weymouthii* Paris, *Index Bryol.*, Suppl. 164 (1900), *nom. nud.* Based on: Mt Wellington, Tas., *W.A.Weymouth 772* (HO), *fide* I.G.Stone, *J. Bryol.* 16: 263 (1990c).

*Fissidens sullivanii* Müll.Hal., *Gen. Musc. Frond.* 56 (1901), *nom. nud.* Based on: Mount Ararat, Vic., Oct.1882, *D.Sullivan* (MEL 29185), *fide* I.G.Stone & J.E.Beever, *J.Bryol.* 19: 51 (1996).

*Fissidens nanopyxis* Müll.Hal., *Gen. Musc. Frond.* 59 (1901), *nom. nud.* Based on: Port Phillip, Vic., *C.French 14* (MEL 29187), *fide* I.G.Stone & J.E.Beever, *loc. cit.*.

*Fissidens sublimbatus* Broth., *Proc. Linn. Soc. New South Wales*, Suppl. 27: 28 (1902), *nom. nud.* Based on: Lochiel,Vic., on submerged decaying log, 29 July 1900, *F.M.Reader 140* (NSW) [Immature material, the correct variety remains in doubt, *fide* I.G.Stone & J.E.Beever, *op. cit.* 63].

Illustrations: I.G.Stone & J.E.Beever, *J. Bryol.* 19: 52, fig. 1; 53, fig. 2a, c, f; 55, fig. 4 (1996); J.E.Beever, B.Malcolm & N.Malcolm, *The Moss Genus* Fissidens *in New Zealand: an illustrated key* 68 (2002).

**Vegetative shoots** 2–4 mm long, or longer by repeated innovations. **Leaves** oblong, oblong-linear to narrowly linear, 0.30–0.85 mm long, 0.10–0.20 mm wide, 3.0–4.5 times longer than wide; **apex** obtuse to acute, occasionally apiculate; **vaginant laminae** elimbate or weakly limbate; **dorsal lamina** narrow, usually failing above the base, elimbate. **Lamina cells** thin- or firm-walled, 8–20 µm long, 8–12 µm wide; **costa** subpercurrent to short-excurrent.

**Gametoecia** mostly axillary on vegetative stems, basal or lateral, occasionally independent; **perichaetial leaves** with cells of vaginant laminae to 30 µm long; limbidium cells to 80 µm long. **Setae** erect or flexuose, 2–6 mm long. **Peristome** of *bryoides*-type; teeth 39–60 µm wide at the base, recurved when dry, strongly incurved when moist, divided to c. half way, the arms spirally thickened, adaxial trabeculae below the bifurcation shallow, scarcely ornamented. **Calyptra** smooth, cucullate. **Spores** 15–32 (–35) µm diam.

***Image***

The most variable and widespread variety in Australia, it extends from comparatively moist coastal regions into arid Central Australia. Known from all States and Territories.

Also in North and South America and New Zealand.

*Selected specimens examined*: W.A.: Murchison Gorge, *I.G.Stone 6176* (MEL). N.T.: Standley Chasm, *I.G.Stone 5173* (MEL). S.A.: Morialta Falls, *D.G.Catcheside 52.56* (AD). Qld: Carnarvon Gorge, *I.G.Stone 20240 p.p.* (MEL). Tas.: Proctors Rd, Hobart, *W.A.Weymouth 2840* (HO).

Gametoecia frequently grow from old buried stems, often developing rhizoids at their bases and becoming independent plants. The *taylorii* 'expression', which is more common in arid regions, is not difficult to distinguish from the *basilaris* 'expression', its leaves being shorter and broader, the apex more obtuse, the costa shorter, with laminal cells slightly smaller and spores larger. However, intermediates do occur. The *basilaris* 'expression' is not known from Western Australia.

Several packets in the Farlow Herbarium (FH) are annotated as *Fissidens (Semilimbidium) perlaxifolius* Bartram sp. nov., collected by R.D.Royce (numbers 64 & 65) on October 21, 1948, from Darradup, 16 miles (25 km) W of Nannup, Western Australia. Collection no. 64 was annotated by Zen. Iwatsuki in February 1998 as "*Fissidens perlaxifolius* Bartr. msc." It appears that the name has never been formally published. Despite a search by the Collections Manager and Botany Librarian at FH, no manuscript notes or description of *perlaxifolius* have been located. However, the plants are referable to *F. taylorii* var. *taylorii* (see figure), and the packets have been annotated accordingly.

***Image***

**Fissidens taylorii** Müll.Hal. var. **gillianus** (Catches. & I.G.Stone) I.G.Stone, *J. Bryol.* 19: 51, 54 (1996)

*Fissidens gillianus* Catches. & I.G.Stone, *J. Adelaide Bot. Gard.* 1: 5 (1988). Type: George Gill Range, N.T., *J.H.Willis s.n.*; holo: MEL 1022414.

Illustrations: D.G.Catcheside & I.G.Stone, *op. cit.* 6, fig. 3; 7, fig. 4, as *F. gillianus*; I.G.Stone & J.E.Beever, *op. cit.* 54, fig. 3 c; 56, fig. 5a–d; H.Streimann, *The Mosses of Norfolk Island* 88, fig.39 (2002).

**Leaves** to c. 0.5 mm long and 0.2 mm wide, 2–2.5 times longer than wide, often broadest above; **apex** obtuse, apiculate; **vaginant laminae** c. 9/10 the leaf length, almost closed, elimbate; **dorsal lamina** bowed outwards above, tapering to 1 row of cells basally, ending above the insertion; **lamina cells** ±hexagonal, 8–15 (–20) µm long, (5–) 8–10 µm wide; **costa** subpercurrent. **Axillary hairs** 2-celled**,** basal cell rectangular, 1/3–1/2 the length of the broader apical cell. **Rhizoidal gemmae** rare, 2–4-celled.

**Perigonia** axillary or basal on female shoots which are usually lateral or basal on vegetative shoots. **Perichaetial leaves** elimbate, or the limbidium ill-defined. **Setae** 1.5–3.5 mm long, thick. **Capsules** with theca short, ovoid to cylindrical, to c. 0.6 mm long, 0.20–0.35 mm wide. **Peristome** with inner trabeculae deeper than in var. *taylorii*, 65–70 µm wide at base, 220–260 µm long. **Spores** 18–29 µm diam., pale, very finely and faintly papillose.

***Images***

Occurs in W.A., N.T., N.S.W. and A.C.T.; also on Phillip Island in the Norfolk Island group. Usually on rather moist red soil in arid regions.

*Selected specimens examined*: W.A.: Three Mile Rocks, 37 km NNE of Bullfinch, *R.Wyatt & A.Stoneburner 4199* (PERTH). N.T.: Carmichael Crag, George Gill Ra., *A.C.Beauglehole 26400A* (MEL 1038782); Mt Connor, *J.H.Willis s.n.* (MEL 1022409, 1514426); Mt Olga, 23 Aug. 1960 *M.Allender s.n.* (MEL 1022409); Ayers Rock summit [Uluru], 11 Sept 1965, *J.H.Willis s.n.* (MEL 1022412). N.S.W.: Leichardt, Sydney, *W.W.Watts 6766, 6767* (BM); Caloola Ck, 62 km NNE of Broken Hill, *H.Streimann 6334* (CANB 7903946). A.C.T.: Acton, *D.G.Catcheside 68.*117 (AD).

Distinguished from var. *taylorii* by the shorter and broader leaves with longer vaginant laminae. However, some specimens can be difficult to separate unless peristomes are present.

**Fissidens taylorii** Müll.Hal. var. **epiphytus** (Allison) I.G.Stone & J.E.Beever, *J. Bryol.* 19: 57 (1996)

*Fissidens epiphytus* Allison, *Trans. Roy. Soc. New Zealand* 88: 10 (1960). Type: near Roxburgh, Otago, New Zealand, *K.W.Allison 5860*; holo: CHR; iso: MEL.

Illustrations: I.G.Stone & J.E.Beever, *J. Bryol.* 19: 56, fig. 5j–m; 58, fig. 6 (1996); J.E.Beever, B.Malcolm & N.Malcolm, *The Moss Genus* Fissidens *in New Zealand: an illustrated key* 64 (2002).

**Sterile shoots** to 10 mm long. **Leaves** in 15–25 pairs, patent, oblong-lanceolate, 0.5–1.0 mm long; **apex** acute; **vaginant laminae** usually limbate.

**Gametoecia** axillary on barren stems, the male numerous, 0.2–0.3 mm long, the female sparse, usually in lower leaf axils, 0.5–1.5 mm long. **Peristome** as in var. *taylorii*. **Spores** c. 36 µm diam.

***Images***

Rare in Vic. and Tas.

Also in south-eastern New Zealand.

*Selected specimens examined*: Vic.: Mt Eccles, *A.C.Beauglehole 3060* (MEL); Avon R., *F.Mueller 86* (MEL 29158). Tas.: Pittwater Bluff, *A.Moscal 12990* (HO).

This variety is characterised by having much larger plants, with longer leaves and more numerous axillary perigonia.

**Note:** The relationship between *F. taylorii* var. *epiphytus* and *F. taylorii* var. *floribundus* (Wilson) Wijk & Margad. requires investigation.

*Fissidens taylorii* Müll.Hal. var. *floribundus* (Wilson) Wijk & Margad., *Taxon* 8: 106 (1959); *F. brevifolius* Hook.f. & Wilson var. *floribundus* Wilson, *in* J.D.Hooker, *Fl. Tasman*. 2: 167 (1859). Type: New Norfolk, Tas., *Oldfield 218*; holo: BM (not located).

It is likely that the type of *F. taylorii* var. *floribundus* represents the same taxon as does the type of *F. taylorii* var. *epiphytus*. If this can be confirmed, the correct name of the moss would be *F. taylorii* var. *floribundus*.

**Fissidens taylorii** Müll.Hal. var. **sainsburyanus** J.E.Beever, *Fl. New Zealand Mosses* 8: 1, 41 (2014)

*non Fissidens taylorii* var. *sainsburiana* Allison, *Trans. Roy. Soc. New Zealand* 88: 9 (1960), *nom. nud.*

*Sainsburia novae-zelandiae* Dixon, *Bryologist* 44: 40 (1941). Type: Whakaki Lagoon, near Wairoa, Hawkes Bay, New Zealand, *G.O.K.Sainsbury 960*; holo: BM; iso: WELT M016916.

*Fissidens brevifolius* Hook.f. & Wilson, *Fl. Nov.-Zel.* 2: 61 (1854). Type: North Island, New Zealand, 1850, *W.Colenso*; holo: BM.

*Fissidens elamellosus* Müll.Hal. & Hampe, *Linnaea* 28: 214 (1856). Type: by the Yarra River, Vic., *F.Mueller*; holo: BM; iso: MEL.

*Fissidens macrodus* Hampe, *Linnaea* 30: 645 (1858). Type: by the Yarra River, Vic., *F.Mueller*; holo: BM; iso: MEL.

Illustrations: D.G.Catcheside, *Mosses of South Australia* 74, fig. 15d–f (1980), as *F. taylorii*; I.G.Stone & J.E.Beever, *J. Bryol.* 19: 53, fig. 2b, d, e, g; 54, fig. 3b, d, f; 60, fig. 7; 61, fig. 8; 62, fig. 9 (1996); J.E.Beever, B.Malcolm & N.Malcolm, *The Moss Genus* Fissidens *in New Zealand: an illustrated key* 66 (2002).

**Leaves** 0.4–0.7 mm long, 0.15–0.20 mm wide, in 8–12 pairs; **cells** of apical and dorsal laminae (6.0–) 7.5–12.0 (–18.0) µm long, (7.0–) 7.5–10.0 (–12.0) µm wide; **costa** strong, subpercurrent to percurrent, often excurrent in a cusp. **Perigonia** bud-like, at the base of sterile or perichaetial shoots. **Perichaetia** terminal on short shoots, axillary at the base of sterile shoots or apparently independent; **perichaetial leaves** with vaginant laminae with entire or dentate margins, often elimbate in the upper part, thick-bordered and entire below, the distal lamina narrowly subulate. **Peristome** inserted well below the capsule rim, of *sainsburia*-type; **teeth** stiff, erect, undivided or rimose, perforated or entire or weakly forked at the apex, 51–68 µm wide at the base; lamellae finely papillose abaxially at the base, larger above the papillae, often in vertical or oblique rows, adaxially above with longitudinal ridges; tips occasionally faintly spirally thickened. **Calyptra** smooth, cucullate. **Spores** 12–25 µm diam.

***Images***

Occurs in S.A., N.S.W., Vic. and Tas.

Also in New Zealand.

*Selected specimens examined*: S.A.: Mount Crawford, *D.G.Catcheside 77.270* (AD). N.S.W.: off Tubbal Rd, 13 miles [c. 21 km] from Young, *W.W.Watts 7188* (NSW). Vic.: Yarra, 1854, *F.Mueller 100* (MEL); McKillops Bridge, Snowy R., East Gippsland, *I.G.Stone 14200* (MEL). Tas.: Western Junction, Perth Road, 6 Sept. 1888, *W.A.Weymouth* (HO).

This variety is similar to var. *taylorii*, but the apical and dorsal laminae of vegetative leaves are often more reduced and the lamina cells slightly smaller. The peristome structure is unique**.**

This was originally described as the monotypic genus *Sainsburia* because of its unique peristome (Dixon, 1941), but it closely resembled *F. taylorii* gametophytically. The peristome was regarded as taxonomically unimportant by Sainsbury (1955) who reduced *Sainsburia novae-zealandiae* to a synonym of *F. taylorii*, noting it was “a form marked by the teeth being cracked and erect instead of divided and incurved”. Varietal status was proposed by Allison (1960). The spelling of the epithet has usually been given as *sainsburianus.*

The peristome teeth are ±erect (when moist and dry), entire, rimose or fenestrate, their distal regions ±straight (moist and dry), and with ornamentation finely papillose or irregular and obscure (*sainsburia*-type). The peristome is unique in the genus *Fissidens* (Bruggeman-Nannenga & Berendsen, 1990), although a similar morphology is found in some members of the Grimmiaceae (Edwards, 1984: figs 4d, 7n).

Much emphasis has been placed on peristome structure in the classification of mosses (Philibert, 1884; Edwards, 1984; Goffinet *et al*., 2009). As this remarkable peristome is unique in the genus, the relationships and status of *F. taylorii* var. *sainsburyanus* require further investigation.

***Bibliography***