

# LEPTODONTACEAE

Johannes Enroth<sup>1</sup>

**Leptodontaceae** Schimp., *Coroll. Bryol. Eur.* 108 (1856).

Type: *Leptodon* D.Mohr

Dioicous, autoicous or polyicous. Plants gregarious, mainly epiphytic, small to rather robust, erect or strongly inrolled, (bi)pinnately to irregularly pinnately branched, frondose-stipitate, yellowish or various shades of green, dull or slightly glossy. Stolons creeping, bearing small leaves and tufts of rhizoids. Stems oval to nearly orbicular in cross section; epidermal and cortical cells small and thick-walled; medullary cells larger and thinner-walled; central strand absent. Leaves imbricate when dry, decurrent, ovate to ovate-lanceolate; apex obtuse to rounded or acute to acuminate; margins often partly recurved, entire throughout or crenulate above; costa single and vanishing at or above mid-leaf, occasionally shorter and/or double. Laminal cells smooth but often slightly bulging when wet; apical and median laminal cells  $\pm$ isodiametric and arranged in interrupted rows, or more elongate and irregularly arranged; alar cells relatively indistinct; supra-alar cells often isodiametric or transverse. Paraphyllia numerous and foliose, or absent; pseudoparaphyllia numerous, foliose.

Perichaetial leaves growing after fertilisation, sheathing. Seta from 1.5 mm to c. 4.5 mm long, often enclosed by perichaetial leaves. Capsules immersed or exserted, erect to slightly inclined, symmetrical, cylindrical to ovoid. Apophysal stomata few, phaneropore and round-pored, or absent. Annulus absent. Peristome diplolepidous, basically double but the endostome rudimentary or absent (infraspecific variation present); exostome teeth 16, lanceolate, smooth to spiculose-papillose or somewhat granulose. Operculum conical to obliquely rostrate. Calyptra cucullate, hairy. Spores c. 12–35  $\mu$ m diam., papillose.

In the past, the Leptodontaceae has often been treated as the subfamily Leptodontoideae of the Neckeraceae. However, while some later authors recognised the Leptodontaceae at the family level, its circumscription and generic components clearly required further scrutiny.

Olsson *et al.* (2009) confirmed that the Neckeraceae comprises three distinct clades based on morphology and geographical distribution. *Forsstroemia* and *Leptodon* belong to a 'Neckera-clade', together with *Neckera* Hedw. *sens. str.* and the recently described *Alleniella* S.Olsson, Enroth & D.Quandt, *Exsertotheca* S.Olsson, Enroth & D.Quandt and *Thamnmalia* S.Olsson, Enroth & D.Quandt ('clade A' in Olsson *et al.*, 2011).

Stark (1987) believed *Leptodon* to be the sister group of *Forsstroemia* within the Leptodontaceae subfam. Leptodontoideae, and while Olsson *et al.* (2009) confirmed the close relationship, they also showed that the Leptodontaceae is redundant, and its genera belong in the Neckeraceae.

[For pragmatic purposes alone, Leptodontaceae is retained in *Australian Mosses Online*, the primary function of which is to facilitate the identification of moss specimens to genus and species. — Ed.]

## References

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#### Key to Genera

Paraphyllia abundant along stems and branches; fronds usually strongly inrolled when dry..... **LEPTODON**  
Paraphyllia absent; fronds not inrolled when dry ..... **FORSSTROEMIA**

## LEPTODON

Johannes Enroth<sup>2</sup>

*Leptodon* D.Mohr, *Observ. Bot.* 27 (1803), *nom. cons.*; from the Greek *leptos* (slender, thin) and *odon* (a tooth), in reference to the distinctive exostome teeth.

Type: *L. smithii* (Hedw.) F.Weber & D.Mohr.

This genus of 1–3 species requires taxonomic revision. One species is known from Australia.

**Leptodon smithii** (Hedw.) F.Weber & D.Mohr, *Index Musc. Pl. Crypt.* [2] (1803)

*Hypnum smithii* Hedw., *Sp. Musc. Frond.* 264, pl. 68, figs 5–7 (1801); *Orthotrichum smithii* (Hedw.) Brid., *Musc. Recent.* 2(2): 33 (1801); *Pterogonium smithii* (Hedw.) Sm., *Fl. Brit.* 3: 1271 (1804); *Pilotrichum smithii* (Hedw.) P.Beauv., *Prodr.* 83 (1805); *Pterigynandrum smithii* (Hedw.) Lam. & DC., *Fl. Franç.*, 3rd edn, 2: 462 (1805); *Lasia smithii* (Hedw.) Brid., *Mant. Musc.* 133 (1819); *Neckera smithii* (Hedw.) Müll.Hal., *Syn. Musc. Frond.* 2: 118 (1850). T: “Crescit ad arborum truncos in silva Pisana, in Helvetia, Anglia prope Barham Downs; et teste Bridelio in Pyrenaeis orientalibus in silva de la Peine supra Vernex, in Galliae Departement de la Lozere, in Atlante, Promontorio bonae spei et in India orientali [...] Specimina hic picta Smithius misit”; *n.v.*

*Leptodon australis* Müll.Hal., *Hedwigia* 41: 132 (1902). T: Moss Vale, N.S.W., Nov. 1884, *T.Whitelegge*; iso: H-BR, LIV.

Illustrations: V.F.Brotherus, *op. cit.* 179, fig. 566; A.J.E.Smith, *The Moss Flora of Britain and Ireland* 505, fig. 244(1–3) (1978).

Dioicous. Plants medium-sized to rather robust, epilithic or epiphytic, pinnately to bipinnately branched; fronds usually strongly inrolled and branches circinate when dry, dark green, dull. Stem leaves erect and somewhat concave when dry, patent to spreading when wet, to c. 1.5 mm long and 1.0 mm wide, ovate; apex (broadly) obtuse to rounded; branch leaves similar but smaller; leaf margins narrowly recurved below, plane, somewhat incurved elsewhere, entire; costa single but often spurred or bifurcate above, c. 50–80 µm wide near the leaf base, tapering above, mostly vanishing at 50–75% of the leaf length. Laminal cells moderately thick-walled and somewhat collenchymatous, smooth but becoming bulging when wet. Upper and median laminal cells arranged in variously interrupted rows, ±isodiametric, rounded to oval or indistinctly hexagonal to rhomboid, c. 10–15 × 8–10 µm; basal juxtacostal and inner laminal cells longer; alar cells indistinct. Paraphyllia abundant on stems and branches, multiseriate and foliose to uniseriate and filiform, occasionally branched.

Gametoecia pseudolateral on stems and main branches. Post-fertilisation inner perichaetial leaves to c. 2.5 mm long, costate, sheathing, narrowed from a lanceolate or oblong base into a ligulate acumen at c. two-thirds of the leaf length; apex acute. Seta c. 1.5 mm long, almost enclosed by the perichaetial leaves. Capsules short-exserted, c. 1.5–2.0 mm long and 1.0 mm wide, erect, symmetrical, ovoid; apophysal stomata few, phaneropore, round-pored. Peristome: exostome teeth to c. 300 µm long, somewhat irregularly lanceolate, often cracked above along the median line, densely spiculose-papillose throughout, yellowish grey; endostome rudimentary, consisting of a low basal membrane; operculum conical-rostrate. Spores c. 20–30 µm diam., rather coarsely papillose. *n* = 11, *fide* H.Deguchi & K.Oginuma, *Lindbergia* 15: 88 (1990).

Occurs in south-eastern Qld, eastern N.S.W., A.C.T. and Vic.; mainly epilithic but also epiphytic on tree trunks, and frequently forming large colonies. Elsewhere with a broad but

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[http://www.anbg.gov.au/abrs/Mosses\\_Online/Leptodontaceae\\_Leptodon.pdf](http://www.anbg.gov.au/abrs/Mosses_Online/Leptodontaceae_Leptodon.pdf) (2012)

highly fragmented distribution, including North America, southern South America, western, central and Mediterranean Europe, eastern and southern Africa, E Asia and New Zealand.

Qld: Bunya Mountains Natl Park, SW of Kingaroy, *D.H.Norris* 35330 (H). N.S.W.: Dorrigo, 1947, *A.Burges* (LIV); Mt Tomah, Nov. 1898, *J.H.Maiden* (H-BR). A.C.T.: Booroomba Rocks 30 km SSW of Canberra, *H.Streimann* 9088 (H). Vic.: Mt Alexander, near Elphinstone, 9 Mar. 1969, *I.G.Stone* (MELU).

This species is readily distinguished by its strongly inrolled fronds (when dry), regularly pinnate to bipinnate branching, and abundant paraphyllia.

## FORSSTROEMIA

Johannes Enroth<sup>3</sup>

*Forsstroemia* Lindb., *Öfvers. Förh. Finska Vetensk.-Akad.* 19: 605 (1863); named in honour of the Swedish clergyman and botanist J.E.Forsström (1775–1824).

Type: *F. trichomitria* (Hedw.) Lindb.

Autoicous or polyicous. Plants gregarious, mainly epiphytic, occasionally epilithic, stipitate and frondose, medium-sized, yellowish green or brownish yellow, dull or slightly glossy. Rhizoids brownish orange, smooth. Stems irregularly pinnately branched or unbranched; central strand absent. Stem leaves imbricate, concave, plicate or smooth, decurrent, (ovate-) lanceolate to ovate-acuminate; apices acute to acuminate or filiform, occasionally spreading and twisted; branch leaves similar but smaller; margins recurved from base mid-way along the leaf or above, entire throughout or faintly serrulate above; costa mostly single, reaching c. 25–75% of the leaf length, occasionally double and very short. Laminal cells smooth, thick-walled; alar cells indistinct; supra-alar cells (sub)quadrate to transverse in triangular groups extending upwards along the margins to c. one-third of the leaf length. Paraphyllia absent; pseudoparaphyllia foliose, lanceolate.

Post-fertilisation inner perichaetial leaves to c. 4 mm long, mostly oblong-lanceolate to oblong-acuminate and with a single costa of variable length, occasionally ecostate. Seta to 4.5 mm long, smooth, twisted when dry, reddish. Capsules ±exserted, erect, cylindrical; apophysal stomata absent. Peristome double; endostome very rudimentary to absent; exostome teeth c. 300 µm long, hygrocastique, narrowly lanceolate, solid or perforate to cracked above, often smooth below but papillose to somewhat granulose above, yellowish grey; operculum conico-rostrate. Calyptra cucullate, hairy. Spores globose, papillose, isomorphic.

*Forsstroemia* was segregated from *Leptodon* by Lindberg (1863) to accommodate *F. trichomitria*. Manuel (1974) placed the genus in the Leucodontaceae, but it was transferred to the Leptodontaceae by Buck (1980), a move accepted by Stark (1987) and Goffinet & Buck (2004). In his monograph of *Forsstroemia*, Stark (1987) suggested that *Leptodon* was the sister group of *Forsstroemia* within the Leptodontaceae subfam. Leptodontoideae. However, while Olsson *et al.* (2009) did confirm a close relationship between *Leptodon* and *Forsstroemia*, they also demonstrated the correct placement of both genera within the Neckeraceae.

*Forsstroemia* is a genus of 13 species, most of which are restricted to southern or eastern Asia. Two species occur in eastern and south-eastern Australia. The genus was revised by Stark (1987) on morphological grounds and, recently, by Olsson *et al.* (2012) using sequence data from two plastid regions and nuclear ribosomal DNA.

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Median laminal cells of stem leaves ±isodiametric to short-rhomboid or short-oblong; costa extending beyond mid-leaf ..... **F. producta**

Median laminal cells of stem leaves (sub)linear, clearly elongate; costa usually vanishing below mid-leaf, occasionally extending slightly above ..... **F. trichomitria** subsp. **australis**

### **Forsstroemia** sect. **Microforsstroemia** Nog.

Median laminal cells up to 3 times longer than wide; costa single, relatively strong, extending above mid-leaf.

#### **1. Forsstroemia producta** (Hornsch.) Paris, *Index Bryol.* 498 (1896)

*Pterogonium productum* Hornsch., *Linnaea* 15: 138 (1841); *Neckera producta* (Hornsch.) Müll.Hal., *Syn. Musc. Frond.* 2: 94 (1850); *Lasia producta* (Hornsch.) A.Jaeger, *Ber. Thatigk. St. Gallischen Naturwiss. Ges.* 1875–1876: 204 (1877) [Ad. 2: 108]; *Dusenien producta* (Hornsch.) Müll.Hal. ex M.Fleisch., *Hedwigia* 59: 213 (1917), *nom. inval.*, in synonym. T: Cape Province, South Africa, *M.R.Crosby & C.A.Crosby* 7974; neo: MO n.v.; isoneo: L n.v., *fide* L.Stark, *op. cit.* 163.

*Dusenien subproducta* Müll.Hal., *Hedwigia* 41: 132 (1902); *Forsstroemia subproducta* (Müll.Hal.) Broth., in H.G.A.Engler & K.A.E.Prantl, *Nat. Pflanzenfam.* 1(3): 759 (1905). T: s. loc., Qld, *F.M.Bailey* 827; lecto: H-BR, *fide* L.R.Stark, *op. cit.* 163.

Illustrations: L.R.Stark, *op. cit.* 165–167, figs 18–20.

Autoicous. Stems subpinnately branched. Stem leaves c. 1.5 mm long and 0.8 mm wide, ovate to ovate-acuminate; apices acute to acuminate or filiform and twisted; costa reaching beyond mid-leaf, mostly spurred. Median laminal cells c. 15–25 µm long, oval or short-rhomboid to short-oblong.

Seta c. 1.5–2.5 mm long. Capsules short-exserted.

Occurs in eastern Qld, N.S.W. and Tas.; prefers shaded habitats, mostly epiphytic on trees, less commonly epilithic. Also in North, Central and South America, eastern and southern Africa, China and Korea.

Qld: Cardwell Ra., 24 km WNW of Cardwell, *H.Streimann* 28564 (CANB). N.S.W.: Flat Rock, Scone, *W.W.Watts* 8423 (NSW). Tas.: Western region, 1846, *J.Milligan* (NY n.v., cited by L.R.Stark, *op. cit.* 170).

### **Forsstroemia** sect. **Forsstroemia**

Median laminal cells at least 4 times longer than wide; costa single or double, relatively weak, often ceasing below mid-leaf.

#### **2. Forsstroemia trichomitria** (Hedw.) Lindb. subsp. **australis** (Müll.Hal.) L.R.Stark, *J. Hattori Bot. Lab.* 63: 198 (1987)

*Lasia australis* Müll.Hal., *Linnaea* 35: 620 (1868); *Forsstroemia australis* (Müll.Hal.) Paris, *Index Bryol.* 498 (1896); *Dusenien australis* (Müll.Hal.) Müll.Hal., *Hedwigia* 41: 132 (1902). T: Hunter R., N.S.W., *H.Scott*; lecto: NY, isolecto: BM n.v., *fide* L.R.Stark, *loc. cit.*

*Lasia australis* var. *stricta* Müll.Hal., *Linnaea* 35: 621 (1868); *Forsstroemia australis* var. *stricta* (Müll.Hal.) Paris, *Index Bryol.* 498 (1896). T: Brisbane R., Qld, *A.Dietrich*; not located, *fide* L.R.Stark, *loc. cit.*

Illustrations: L.R.Stark, *op. cit.* 193, 194, fig. 32D–G, M, P–R.

Polyoicous. Stems unbranched or sparingly and irregularly branched. Stem leaves c. 2–3 mm long, ovate-lanceolate to lanceolate; apices acuminate; costa mostly single, usually ending below mid-leaf, occasionally double and very short. Median laminal cells mostly 40–60  $\mu\text{m}$  long, (sub)linear and slightly vermicular.

Seta c. 2–4 mm long. Capsules exserted.

Endemic to eastern Qld and N.S.W.; usually epiphytic, occasionally epilithic and most abundant in shaded habitats.

Qld: Brisbane, 1887, *F.M.Bailey* (H-BR). N.S.W.: Lismore, Mar. 1899, *W.W.Watts* (H-BR).

This subspecies is distinguishable from the extra-Australian subsp. *trichomitria* by having more infrequent branching and the polyoicous rather than consistently autoicous sexual condition.