

## THUIDIOPSIS

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*Thuidiopsis* (Broth.) M.Fleisch., *Musci Fl. Buitenzorg* 4: 1515 (1923); from the genus name *Thuidium* and the Latin suffix *-opsis* (resembling or having the appearance of).

*Thuidium* subg. *Thuidiopsis* Broth., in H.G.A.Engler & K.A.E.Prantl, *Nat. Pflanzenfam.* I, 3(2): 1014 (1908).

Type: *T. furfurosa* (Hook.f. & Wilson) M.Fleisch.

Dioicous. Plants mostly medium-sized to tall, regularly or irregularly bipinnately branched, occasionally once-pinnate. Stems to 12 (–25) cm long. Axillary hairs 2–3-celled, consisting of 1 or 2 basal cells and 1 or 2 distal cells. Stem paraphyllia simple, crowded, to c. 12 (–15) cells long, simple. Branch paraphyllia shorter, largely restricted to the base of the main branches or lacking; branchlets naked or nearly so. Pseudoparaphyllia tall, mostly conspicuous. Stem leaves mostly strongly incurved from a broadly patent base, mostly cordate-ovate or cordate-triangular, plicate; apical part narrowly triangular to subulate, occasionally piliferous; margin mostly strongly recurved below, occasionally weakly appendiculate; costa naked at the base or bearing short appendages; abaxial distal epidermal cells smooth or ornamented; median leaf cells 5–12 µm wide; both leaf faces mammillose and papillose; adaxial ornamentation mostly weaker than the abaxial; cells of the acumen longer, less strongly ornamented or smooth. Leaves of ultimate branchlets mostly ovate or ovate-triangular, often strongly concave; costa reaching to 70% or more of the length of the leaf, ending below the leaf tip, abaxially flat or prominent but not cristate; distal epidermal cells elongate, pale, smooth or ornamented; median leaf cells 5–10 µm wide, ornamented like the stem leaves.

Inner perichaetial leaves smooth or weakly plicate; shoulders usually copiously ciliate; costa reaching into the acumen, occasionally excurrent; median leaf cells smooth or weakly papillose; walls incrassate. Seta to c. 3 cm long, smooth. Capsules to c. 2.5 mm long; stomata c. 5–40; operculum usually gradually and obliquely rostrate. Calyptra broadly cucullate, smooth, base mostly fringed by a few paraphysoid hairs.

*Thuidiopsis* occurs in South America, Australasia, island groups in the South Pacific Ocean and in southern Malesia. The genus probably consists of two very similar species, but little material from South America has been studied so far. Records from India and the Comoro Islands are doubtful. Also found in a former botanic garden in Madeira, but probably introduced from South America.

### References

- Touw, A. (2001a), A review of the Thuidiaceae (Musci) and a realignment of taxa traditionally accommodated in *Thuidium* sensu amplo (*Thuidium* Schimp., *Thuidiopsis* (Broth.) M.Fleisch., and *Pelekium* Mitt.), including *Aequatoriella* gen. nov. and *Indothuidium* gen. nov., *J. Hattori Bot. Lab.* 90: 167–209.
- Touw, A. (2001b), A taxonomic revision of the Thuidiaceae (Musci) of tropical Asia, the western Pacific, and Hawaii, *J. Hattori Bot. Lab.* 91: 1–136.
- Touw, A. & Falter-Van den Haak, L. (1989), A revision of the Australasian Thuidiaceae (Musci), with notes on species from adjacent regions, *J. Hattori Bot. Lab.* 67: 1–57.

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## Key

- Median branch leaf cells unipapillose or mixed with a few pluripapillose cells; stems to 12 (–25) cm long; stem leaves to 1.4 (–2.0) mm long ..... **1. T. furfurosa**
- Median branch leaf cells pluripapillose or mixed with fewer unipapillose cells; stems to 6 cm long; stem leaves to 1.0 (–1.5) mm long ..... **2. T. sparsa**

### **1. Thuidiopsis furfurosa** (Hook. & Wilson) M.Fleisch., *Musci Fl. Buitenzorg* 4: 1497, 1725 (1923)

*Hypnum furfurosum* Hook.f. & Wilson, in J.D.Hooker, *Fl. Nov.-Zel.* 2: 107 (1854). T: Bay of Islands, New Zealand, Aug. 1841, *J.D.Hooker* 390; lecto: BM, *vide* A.Touw & L.Falter-Van den Haak, *op. cit.* 12.

[*Thuidium hastatum* auct. non (Mitt.) Reichardt: V.F. Brotherus & W.W.Watts, *Proc. Linn. Soc. New South Wales* 37: 376 (1912) p.p.]

[*Thuidium unguiculatum* auct. non (Hook.f. & Wilson) A.Jaeger & Sauerb.: V.F.Brotherus & W.W.Watts, *Proc. Linn. Soc. New South Wales* 37: 377 (1912)]

Illustrations: G.A.M.Scott & I.G.Stone, *The Mosses of Southern Australia* 403, pl. 76 (1976); A.Touw & L.Falter-Van den Haak, *op. cit.* 2, fig. 1(a), as *Thuidium furfurosum*; H.Streimann, *The Mosses of Norfolk Island* 153, fig. 68 (2002), as *Thuidium furfurosum*; D.Meagher & B.Fuhrer, *A Field Guide to the Mosses and Allied Plants of Southern Australia* 83 (2003); R.D.Seppelt, *The Moss Flora of Macquarie Island* 269, fig. 104 (2004).

Plants yellowish green to sordid green, bipinnate to indistinctly pinnate. Stems to 12 (–25) cm long. Pseudoparaphyllia tall and conspicuous. Ultimate branchlets to 8, loosely catenulate when dry. Stem leaves to 1.4 (–2.0) mm long, mostly triangular; acumen muticous, narrowly triangular or subulate. Leaves of ultimate branchlets to 0.25 (–0.50) mm long; apex narrowly acute; abaxial epidermal cells of the costa smooth or bearing 1 or several distal teeth; median leaf cells unipapillose, but occasionally some cells 2- or 3-papillose; papillae mostly tall, acute and curved.

Inner perichaetial leaves ciliate. Seta to c. 3 cm long.

Occurs in southern N.S.W., A.C.T., Vic. and Tas.; also in Norfolk Island, New Zealand, Macquarie Island, Society Islands, Juan Fernandez Islands, Tristan da Cunha, Gough Island, and perhaps in peninsular India. Grows from low elevations up to c. 1600 m (Vic.), and is mostly found terrestrial in moist, rather shaded situations, in swamps, subalpine grasslands, and on rocks or banks near forest streams; occasionally forming large patches in grassland and light bush.

N.S.W.: Wog Wog Property, 27 km SE of Bombala, *H.Streimann* 36368 (L). A.C.T.: Punchbowl Ck, Booroomba, *N.T.Burbidge* 6818 (CANB). Vic.: Antoninos Park, Ringwood, 23 km W of Melbourne, *H.Streimann* 35315 (L). Tas.: Maggs Mt, c. 2 km W of Lake Rowallan, *A.Moscal* 13351 (NSW).

Plants from very wet, shady places can be difficult to identify due to irregular branching and, occasionally, extreme reduction of the number and size of paraphyllia and pseudoparaphyllia.

### **2. Thuidiopsis sparsa** (Hook.f. & Wilson) Broth., in H.G.A.Engler & K.A.E.Prantl, *Nat. Pflanzenfam.*, 2nd edn, 11: 323 (1925)

*Hypnum sparsum* Hook.f. & Wilson, in J.D.Hooker, *Fl. Nov.-Zel.* 2: 109 (1854); *Thuidium furfurosum* (Hook.f. & Wilson) Reichardt var. *sparsum* (Hook.f. & Wilson) Sainsbury, *Rev. Bryol. Lichénol.* 21: 223 (1952); *Thuidiopsis furfurosa* (Hook.f. & Wilson) M.Fleisch. var. *sparsa* (Hook.f. & Wilson) Wijk & Margad., *Taxon* 10: 26 (1961). T: Whangarei, North Island, New Zealand, *Bolton s.n.*; holo: BM; iso: L, NY.

Plants mostly pale green or yellowish green, bipinnately to irregularly branched, mostly open. Stems to 6 cm long. Pseudoparaphyllia mostly tall and conspicuous. Ultimate branchlets to 7 (–12), terete or loosely catenulate when dry. Stem leaves to 1.0 (–1.5) mm long, ovate to triangular, strongly incurved from a patent base; acumen usually muticous, occasionally piliferous, narrowly triangular, flexuose; hair to 5 cells long. Leaves of ultimate branchlets to 0.3 mm long; apex generally acute; abaxial epidermal cells of the costa mostly

smooth, rarely prorulate or papillose; median leaf cells pluripapillose; but sometimes unipapillose in the distal part of the leaf.

Inner perichaetial leaves mostly ciliate. Seta to 2.5 cm long.

Widespread in Australasia and southern Malesia, New Caledonia, Fiji, the Cook Islands, Juan Fernandez Islands, South America and Tristan da Cunha. A record from the Comoro Islands is doubtful and Madeiran plants were almost certainly introduced from South America.

Unipapillose cells present in most or all leaves of ultimate branchlets ..... **2b. var. hastata**  
Unipapillose cells lacking, or present in only a few leaves of ultimate branchlets ..... **2a. var. sparsa**

## **2a. Thuidiopsis sparsa (Hook.f. & Wilson) Broth. var. sparsa**

*Hypnum unguiculatum* Hook.f. & Wilson, in J.D.Hooker, *Fl. Tasman.* 2: 208 (1859); *Thuidium unguiculatum* (Hook.f. & Wilson) A.Jaeger & Sauerb. ex Müll.Hal. & Broth., *Abh. Naturwiss. Vereine Bremen* 16(3): 509 (1900); *Thuidiopsis unguiculata* (Hook.f. & Wilson) M.Fleisch., *Musci Fl. Buitenzorg* 4: 1497, 1725 (1923). T: Yorktown, Tas., *R.C.Gunn 1598a*; lecto: BM, *fide* A.Touw & L.Falter-Van den Haak, *op. cit.* 19; isolecto: L; Tas., *R.C.Gunn 37*; syn: BM; Tas., *Lawrence 53*, syn: BM, NY; NW Bay, Tas., *Oldfield 313b*; syn: BM; Bay of Islands, New Zealand, *A.Sinclair s.n.*; syn: BM.

*Hypnum suberectum* Hampe, *Linnaea* 30: 638 (1860); *Thuidium suberectum* (Hampe) A.Jaeger, *Ber. Thätigk. St. Gallischen Naturwiss. Ges.* 1876–77: 246 (1878); *Thuidiopsis suberecta* (Hampe) Broth., in H.G.A.Engler & K.A.E.Prantl, *Nat. Pflanzenfam.*, 2nd edn, 11: 323 (1925). T: Tarwin R., Vic., 1854, *F.Mueller 20*; holo: BM; iso: H, L.

*Thuidium liliputanum* Broth., *Öfvers. Förh. Finska Vetensk.-Soc.* 42: 121 (1900); *Thuidiopsis liliputana* (Broth.) Broth., in H.G.A.Engler & K.A.E.Prantl, *Nat. Pflanzenfam.*, 2nd edn, 11: 323 (1925). T: Richmond R., N.S.W., *W.W.Watts 2012*; lecto: H, *fide* A.Touw & L.Falter-Van den Haak, *op. cit.* 19; isolecto: BM, L, NSW; Alstonville, N.S.W., *W.W.Watts 497*; syn: H, NSW; *loc. id.*, *W.W.Watts 499*; syn: H, NSW; Marshalls Falls, N.S.W., 22 June 1896, *W.W.Watts 615*, syn: H, NSW; Richmond R., N.S.W., *W.W.Watts 902*; syn: H, NSW; Myocum, Shearers Farm, N.S.W., Sept. 1897, *W.W.Watts 1528*; syn: H; Pierces Ck, Alstonville, *W.W.Watts 1704* (erroneously cited as '1204' in Brotherus, 1900); syn: H, NSW; Fernleigh, N.S.W., *W.W.Watts 1901*; syn: H, NSW; Blackall Ra., Qld, *F.Whitterton 31*; syn: CHR, H, L.

[*Hypnum hastatum* auct. non Mitt.: E.Hampe, *Linnaea* 28: 213 (1856)]

[*Leskea hastata* auct. non Mitt.: W.Mitten, *J. Linn. Soc., Bot.* 4: 93 (1860)]

[*Thuidium hastatum* auct. non (Mitt.) Reichardt: V.F.Brotherus & W.W.Watts, *Proc. Linn. Soc. New South Wales* 37: 376 (1912) p.p.]

[*Thuidium furfurosum* auct. non (Hook.f. & Wilson) Reichardt: E.B.Bartram, *Farlowia* 4: 243 (1952)]

[*Thuidiopsis furfurosa* auct. non (Hook.f. & Wilson) M.Fleisch.: H.P.Ramsay, *Austral. J. Bot.* 22: 328 (1974) p.p.]

[*Thuidium laeviusculum* auct. non (Mitt.) A.Jaeger: G.A.M.Scott & I.G.Stone, *The Mosses of Southern Australia* 404 (1976)]

Illustrations: G.A.M.Scott & I.G.Stone, *The Mosses of Southern Australia* 405, pl. 77 (1976), misidentified as *T. laeviusculum*; A.Touw & L.Falter-Van den Haak, *op. cit.* 19, fig. 4a–g, k, m–p (1989), as *Thuidium sparsum*; A.Touw, *op. cit.* 55, fig. 15a–g (2001b); H.Streimann, *The Mosses of Norfolk Island* 157, fig. 70 (2002), as *Thuidium sparsum* var. *sparsum*.

Fronds mostly open. Stem leaves ovate, deltoid or broadly triangular. Papillae on median leaf cells of branch leaves (2–) 3–5, rounded, occasionally indistinct or single in a few cells near the leaf apex. *n* = 11, 22, *fide* H.P.Ramsay, in A.Löve, *Taxon* 16: 552–561 (1967) and H.P.Ramsay, *Austral. J. Bot.* 22: 328 (1974), in both publications as *Thuidium furfurosum*; cf. A.Touw & L.Falter-Van den Haak, *op. cit.* 5.

Very common in eastern Qld, N.S.W., A.C.T., Vic. and Tas.; found twice in S.A. This is by far the most common representative of the genus in Australasia; it also occurs in Lord Howe Island, Norfolk Island, adjacent parts of Indonesia, Oceania, as well as Central and South America. Grows from sea level up to 1670 m (in N.S.W.), and is most abundant near water courses, on solid substrata and, less often, terrestrial in the undergrowth of forest and scrub, ranging from subtropical rainforest to dry and open communities, and tree plantations of various kinds; less often found in more open situations.

Qld: Mt Greville, 20 km SW of Boonah, *H.Streimann* 248 (L, MO). N.S.W.: Bolo Ck Natl Park, *H.P.Ramsay* 4/64 (NSW). A.C.T.: Warks Rd SW of Cotter, near Lees Ck, Brindabella Ra., *A.Touw* 18766 (L). Vic.: Phantom Falls, 7 km ENE of Marysville, *H.Streimann* 35271 (L). Tas.: Lake St Clair, *D.A. & A.V.Ratkowsky* B 195 (CHR, L, MO).

This variety is extremely variable in size and general appearance. Robust plants can be inseparable macroscopically from *T. furfurosa*. Many Queensland plants are very small and resemble the small, monoicous *Pelekium* species occurring there. From these, *T. sparsa* can be distinguished in the field by stem leaves being patent at the base and branch leaves having a non-cristate, often glossy costa.

## 2b. *Thuidiopsis sparsa* var. *hastata* (Mitt.) Touw, *comb. nov.*\*

Basionym: *Leskea hastata* Mitt., *J. Linn. Soc., Bot.* 4: 93 (1860); *Hypnum hastatum* Müll.Hal., *Syn. Musc. Frond.* 2: 485 (1851), *hom. illeg. non* Duby (1846); *Thuidium hastatum* (Mitt.) Reichardt, in E.Fenzl, *Novara Exp., Bot.* 1: 187 (1870); *Thuidiopsis hastata* (Mitt.) Broth., in H.G.A.Engler & K.A.E.Prantl, *Nat. Pflanzenfam.*, 2nd edn, 11: 323 (1925); *Thuidium sparsum* var. *hastatum* (Mitt.) Touw & Falter, *J. Hattori Bot. Lab.* 67: 24 (1989). T: Insula Rottennest (Rottnest I), W.A., Aug. 1839, *L.Preiss* 2461 p.p.; holo: B, n.v. (destroyed); lecto: BM, *fide* A.Touw & L.Falter-Van den Haak, *op. cit.* 24; isolecto: L, MO.

? *Hypnum stuartii* Müll.Hal., *Bot. Zeit.* 14: 459 (1856); *Thuidium stuartii* (Müll.Hal.) A.Jaeger, in A.Jaeger & F.Sauerbeck, *Ber. Thätigk. St. Gallischen Naturwiss. Ges.* 1876–77: 266 (1878); *Thuidiopsis stuartii* (Müll.Hal.) Broth., in H.G.A.Engler & K.A.E.Prantl, *Nat. Pflanzenfam.*, 2nd edn, 11: 323 (1925). T: S. Tas., *C.Stuart s.n.*; holo: B, n.v. (destroyed); iso: BM?

[*Hypnum recognitum* auct. non Hedw.: E.Hampe, in J.G.C.Lehmann, *Pl. Preiss.* 2: 119 (1846)]

[*Thuidium furfurosum* auct. non (Hook.f. & Wilson) Reichardt: E.B.Bartram, *Trans. Brit. Bryol. Soc.* 1: 470 (1951)]

Illustration: A.Touw & L.Falter-Van den Haak, *op. cit.* 21, fig. 4h, i, l, as *Thuidium sparsum* var. *hastatum*.

Fronds mostly compact. Stem leaves deltoid. Papillae on median leaf cells of branch leaves 1–3 (–4), rounded or acute and curved, occasionally indistinct.

Occurs near the coast, from southern W.A. to Vic. and Tas. Grows from sea level to an altitude of c. 200 m, terrestrial and on wood, in lawns and in dune, heath, scrub, and open woodland communities; most vigorous in moist places or near water courses.

W.A.: Nornalup, *A.D.Banwell* 61 (FH, NSW). S.A.: Stamford Hill, c. 10 km SE of Port Lincoln, *P.G.Wilson* 2671 (B, L). Vic.: Bears Gully, Walkerville, 18 Jan. 1971, *G.A.M.Scott* (MUCV 298). Tas.: Dead Is., Port Arthur, *W.A.Weymouth* 589 (CHR, H, NSW).

Plants of this variety can resemble either *T. furfurosa* or *T. sparsa* var. *sparsa* in general appearance.

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\* Cite as: *Thuidiopsis sparsa* var. *hastata* (Mitt.) Touw, *Australian Mosses Online* 23. *Thuidiaceae: Thuidiopsis* 4 (2012) [[http://www.anbg.gov.au/abrs/Mosses\\_online/Thuidiaceae/Thuidiaceae\\_Thuidiopsis.pdf](http://www.anbg.gov.au/abrs/Mosses_online/Thuidiaceae/Thuidiaceae_Thuidiopsis.pdf)]. Published 18 May 2012.