PELEKIUM

Andries Touw[1]

Pelekium Mitt., *J. Linn. Soc. Bot.* 10: 176 (1868), *nom. cons.*; from the Greek *pelekos* (a helmet), in reference to the calyptra of *P. velatum*.

Type: *P. velatum* Mitt.

Lorentzia Hampe, *Flora* 50: 75 (1867). T: *L. longirostris* Hampe [= *P. velatum* Mitt.].

Hypnum subg. *Cyrto-hypnum* Hampe, *Flora* 50: 78 (1867); *Cyrto-hypnum* (Hampe) Hampe & Lorentz, *in* E.Hampe, *Bot. Zeit.* 27: 455 (1869). T: *Hypnum brachythecium* Hampe [= *Pelekium muricatulum* (Hampe) Touw]

Autoicous (synoicous in *P. synoicum*). Plants small or medium-sized, bipinnate (in Australia). Stems mostly up to 3–5 cm long. Axillary hairs 2 (–3)-celled, consisting of 1 (–2) basal cells and 1 distal cell. Stem paraphyllia to 5 (–9) cells long, simple (rarely with short lateral branches). Branch paraphyllia absent or restricted to the basal part of the branches. Ultimate branchlets of bipinnate species naked or nearly so. Pseudoparaphyllia inconspicuous. Stem leaves mostly triangular, ovate-triangular or subcordate, smooth or weakly plicate; apical part muticous or piliferous; margin mostly lacking appendages, at best weakly ornamented; costa mostly strong, occasionally appendiculate; abaxially prominent, tip often spinose; distal epidermal cells smooth or variously ornamented; median leaf cells 4–10 µm wide, abaxially mammillose and papillose, adaxial ornamentation similar or lacking. Leaves of ultimate branchlets mostly ovate or ovate-oblong, occasionally weakly acuminate; costa reaching to 50–90% of the length of the leaf, abaxially mostly more strongly ornamented than in stem leaves, often cristate distally; median leaf cells 4–10 µm wide, papillose as in stem leaves, often strongly mammillose on both faces.

Inner perichaetial leaves at most weakly plicate; acumen usually flexuose; shoulders (if differentiated) mostly bearing teeth, spines or pluricellular cilia; costa usually broad and ill-defined; median leaf cells abaxially smooth or nearly so. Seta c. 10–25 mm long, smooth, mammillose below the collum or entirely mammillose, occasionally spinulose. Capsules erect to subnutant, to 3 mm long, rarely exceeding 1.5 mm; stomata c. 5–15. Peristome reduced in many species, but complete in the Australian ones. Operculum long-rostrate (in Australia). Calyptra mostly cucullate and narrow (subcylindical), mammillose at the extreme apex at most, naked or occasionally fringed with some paraphysoid hairs, in *P. velatum* campanulate, lobed, plicate and hispid.

Pelekium comprises 20 comparatively well-known species and a number of American species in need of a taxonomic revision. Its distribution is pantropical, but it also occurs in extra-tropical parts of Europe, East Asia, the Americas, Macaronesia and southern Africa. Five species in Australia.

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.

[1] Naturalis Biodiversity Center, section Nationaal Herbarium Nederland, P.O. Box 9517, 2300 RA Leiden, The Netherlands.

Cite as: A.Touw, *Australian Mosses Online. 23. Thuidiaceae: Pelekium.*
http://www.anbg.gov.au/abrs/Mosses_online/Thuidiaceae_Pelekium.pdf (2012)

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.

Key

1 Seta distally mammillose or almost smooth; stem leaves muticous or the hair 2 (–3) cells long; median branch leaf cells 1–4-papillose, mostly weakly ornamented; stem paraphyllia mostly sparse or lacking, occasionally numerous in places; usually on weathered or soil-covered rocks.....**3. P. investe**

1: Seta entirely mammillose or spinulose; many stem leaves ending in a hair to 8 cells long; stem paraphyllia crowded; usually on rocks and wood.....2

2 Calyptra campanulate, hispid; seta spinulose; perichaetial leaves eciliate; median branch leaf cells unipapillose .....**5. P. velatum**

2: Calyptra cucullate or subcylindrical, smooth; seta mammillose; inner perichaetial leaves eciliate or bearing up to 5 short cilia; ornamentation of branch leaf cells various 3

3 Median branch leaf cells 2–8-papillose ..... **2. P. gratum**

3: Median branch leaf cells 1 (–3)-papillose 4

4 Autoicous; ultimate branches complanate; branch leaves broadly ovate, obtuse or rounded, weakly cristate .....**1. P. bonianum**

4: Synoicous; ultimate branches terete; branch leaves ovate, acute, strongly cristate.....**4. P. synoicum**

1. Pelekium bonianum (Besch.) Touw, *J. Hattori Bot. Lab.* 90: 203 (2001)

Thuidium bonianum Besch., *Bull. Soc. Bot. France* 34: 98 (1887); *Cyrto-hypnum bonianum* (Besch.) W.R.Buck & H.A.Crum, *Contrib. Univ. Michigan Herb.* 17: 65 (1990), as *Cyrtohypnum*. T: 'Nam-Cöng', Prov. Hanoi, Vietnam, 14 Jan. 1884, *H.Bon 2413*; holo BM? *n.v.*; iso: NY.

Thuidium trachypodioides Broth. & Watts, *Proc. Linn. Soc. New South Wales* 40: 379 (1915). T: gully behind 'The Pines', Lord Howe Island, July 1911, *W.W.Watts 287*; lecto H, *fide* A.Touw & L.Falter-Van den Haak, *op. cit.* 50; isolecto: NSW.

Illustrations: A.Touw & L.Falter-Van den Haak, *op. cit.* 51, fig. 17, as *Thuidium bonianum*; A.Touw, *op. cit.* 111, fig. 35b (2001b).

Autoicous. Plants very delicate, dark sordid green, irregularly bipinnate. Stems to 3 cm long; paraphyllia crowded or distant. Ultimate branchlets to 5 (–10), weakly complanate. Stem leaves to 0.3 (–0.4) mm long, appressed to erect when dry, ovate-triangular to deltoid; apex narrowly triangular, flexuose. Ultimate branchlet leaves to 0.3 mm long, mostly distant, ovate or ovate-elliptic, incurved from a patent base when dry; apex broadly acute, obtuse or rounded; costa weakly cristate; most crest cells longer than adjacent laminal cells, prorulate, distal 1 or 2 cells pluripapillose or spinose; median leaf cells unipapillose and mammillose on both leaf faces.

Inner perichaetial leaves flexuose or recurved at the apex, ciliate. Calyptra narrowly campanulate-cucullate, smooth, naked. Seta densely mammillose, to c. 12 mm long.

Widespread in continental SE Asia and Malesia, and extending north to southern Japan (Yakushima Island), east to New Caledonia and south to Lord Howe Island, but not known from the Australian mainland. All Lord Howe Island specimens were collected on coral rocks in a gully near sea level. Elsewhere also found on tree bases and logs, mostly below 1000 m alt., often near water.

Lord Howe Island: gully behind 'The Pines', July 1911, *W.W.Watts 97a, 290, 296, 529* (NSW); gully behind of Mrs. Nicholls' house, July 1911, *W.W.Watts 94*, NSW 11846 (NSW).

The plants from Lord Howe Island are unusually small and form compact, low wefts. Gametoecia and sporogones are usually present. Sterile plants resemble *Thuidiopsis sparsa* but have appressed pseudoparaphyllia, stem leaves lacking a patent base, and weakly complanate branch leaves with an abaxially strongly prominent costa and bulging, unipapillose branch leaf cells.

2. Pelekium gratum (P.Beauv.) Touw, *J. Hattori Bot. Lab.* 90: 203 (2001)

Hypnum gratum P.Beauv., *Prodr.* 64 (1805). T: Oware et Benin, *Palisot de Beauvois s.n.*; holo: G.

Hypnum kuripanum Dozy & Molk., *in* H.Zollinger, *Syst. Verzeichniss* 27, 32 (1854). T: Kuripan, Java, [Indonesia], *H.Zollinger 1810* ('1510'); lecto: L; isolecto: BM, FH; syn: montis Semiru, Java, [Indonesia], *H.Zollinger 2309*.

Thuidium erosulum Mitt., *J. Linn. Soc., Bot.* 10: 186 (1868). T: Tutuila, Samoa, *Powell 29*; lecto: NY, *fide* A.Touw & L.Falter-Van den Haak, *op. cit.* 43; isolecto: BM, H, L; Wakoya, Fiji, *Milne s.n.*, syn: NY.

[*Thuidium sparsum auct. non* (J.D.Hook. & Wilson) Reichdt: V.F.Brotherus & W.W.Watts, *Proc. Linn. Soc. New South Wales* 43: 563 (1918)]

Illustrations: A.Touw & L.Falter-Van den Haak, *op. cit.* 44, fig. 14, as *Thuidium kuripanum*; A.Touw, *op. cit.* 111, fig. 35g (2001b).

Autoicous. Plants yellowish green, sordid green or brownish, bipinnate. Stem to 3 (–5) cm long; paraphyllia crowded. Ultimate branchlets to 8 (–10), loosely catenulate when dry. Stem leaves to 0.5 mm long, appressed to erect when dry, triangular; acumen narrow, flexuose. Ultimate branchlet leaves to 0.2 mm long, incurved both wet and dry; apex broadly acute or obtuse, margins abruptly converging distally of the tip of the costa; costa cristate; crest cells similar to adjacent laminal cells, pluripapillose; median leaf cells bearing 2–8 small papillae, strongly mammillose on both leaf faces, especially on the abaxial one.

Inner perichaetial leaves flexuose or twisted, crenulate, mostly mixed with stronger teeth or short cilia in some leaves. Calyptra mostly narrowly cucullate but often failing to split, smooth, naked. Seta mammillose, to 20 mm long.

A tropical rainforest species found at altitudes up to 350 m in north-eastern Qld and northern N.T. (Arnhem Land). Widespread in tropical Africa, SE Asia, Malesia, and adjacent parts of Oceania (east to Samoa). In Australia usually found on rock (limestone caves and sandstone gorges), but also on wood.

N.T.: 15 km S of Ramingining, *J.Russell-Smith 4000* (L). Qld: Royal Arch Cave, Chillagoe, *I.G.Stone 21835* (MELU).

Very similar in general appearance to *P. synoicum* and small forms of *Thuidiopsis sparsa* and *Thuidium cymbifolium*, but recognisable by the ornamentation of the costa and leaf cells, and by stem leaves that are appressed at the base when dry.

3. Pelekium investe (Mitt.) Touw, *J. Hattori Bot. Lab.* 90: 203 (2001)

Hypnum investe Mitt., *Hooker's J. Bot. Kew Gard. Misc.* 8: 355 (1856); *Leskea investis* (Mitt.) Mitt., *J. Linn. Soc., Bot.*, Suppl. 1: 135 (1859); *Thuidium investe* (Mitt.) A.Jaeger, *in* A.Jaeger & F.Sauerbeck, *Ber. Thätigk. St. Gallischen Naturwiss. Ges.* 1876–77: 252 (1878). T: Moulmein, Burma, *D.Parish 15*; holo: NY; iso BM.

Illustration: A.Touw, *op. cit.* 100, fig. 31.

Autoicous. Plants yellowish green, brownish green, sordid green or blackish green, bipinnately to irregularly branches. Stems to 5 cm long; paraphyllia mostly sparse or lacking, occasionally numerous in places. Branches mostly ascending; ultimate branchlets c. 3–7, mostly weakly complanate. Stem leaves to 0.45 mm long, erecto-patent to patent both wet and dry, triangular-ovate to narrowly triangular-ovate; acumen narrow, flexuose, mostly muticous; hair 2–3 cells long. Leaves of ultimate branchlets to 0.2 mm long, incurved both wet and dry, ovate to ovate-oblong; apex mostly rounded or blunt; costa not prominent to cristate; crest cells smooth or less strongly ornamented than the adjacent laminal cells; median laminal cells equally ornamented on both leaf faces, strongly mammillose and with 1–3 low indistinct knob-like papillae, or low-mammillose with to 4 small papillae.

Inner perichaetial leaves flexuose, subentire, denticulate, or sparingly ciliate. Calyptra cucullate, smooth, naked. Seta distinctly mammillose below the collum or almost smooth, to c. 15 mm long.

Found in several localities between sea level and 240 m in northern N.T. (Arnhem Land) and north-eastern Qld. A tropical lowland species growing in evergreen forest, on humid, weathered or soil-covered rocks (limestone and sandstone), less often on mineral soil; widely distributed in Africa, Asia and the Pacific, but uncommon throughout its range.

N.T.: Green Ant Ck, *J.Russell-Smith & D.Lucas 7976* (CANB). Qld: Lake Eacham, *H.Streimann* 16880 (L).

Pelekium investe resembles *P. gratum*, but is usually readily identified by its habitat and the combination of setae that are distally rough at most, almost naked stems, and ascending parallel branch systems forming small separate fronds that hide the creeping stem from view. Plants of *P. gratum* mostly have flattened fronds consisting of branches that spread out horizontally.

4. Pelekium synoicum (Touw) Touw, *J. Hattori Bot. Lab.* 90: 205 (2001)

Thuidium synoicum Touw, *in* A.Touw & L.Falter-Van den Haak, *J. Hattori Bot. Lab.* 67: 46 (1989). T: Hakau Plantation, Tinputz District, Bougainville, Solomon Islands, 2 Jan. 1983, *W.Korea 1*; holo: L; iso: (*n.v.*): CANB, LAE, NICH, NY.

[*Thuidium meyenianum auct. non* (Hampe) Dozy & Molk.: E.B.Bartram, *Farlowia* 4: 243 (1952)]

Illustrations: A.Touw & L.Falter-Van den Haak, *op. cit.* 47, fig. 15, as *Thuidium synoicum*; A.Touw, *op. cit.* 110, fig. 35s.

Synoicous. Plants yellowish green to sordid green, bipinnately branched. Stem to 4 (–7) cm long; paraphyllia crowded. Ultimate branchlets to 13, loosely catenulate when dry. Stem leaves to 0.6 mm long, appressed to erect when dry, erecto-patent when moist, triangular to deltoid, narrowly acuminate, mostly piliferous; hair to 7 cells long. Leaves of ultimate branchlets to 0.25 mm long, ovate; apex acute; costa cristate; crest cells similar to the adjacent laminal cells, distal ones pluripapillose; median leaf cells strongly 1 (–3)-mammillose and papillose on both faces.

Inner perigamial leaves flexuose or twisted, entire or crenulate, mostly with a few stronger teeth or short cilia in some leaves. Calyptra narrowly cucullate, smooth, naked or sparingly pilose. Seta mammillose, to c. 20 mm long.

Occurs in rainforest of north-eastern Qld. (Tozer Ra. to Seaview Ra.). Also found throughout Malesia and Melanesia. Grows on rocks, logs and the lower part of tree trunks, at low altitudes (to c. 170 m).

Qld: Mossman River Gorge, *L.J.Brass 18169* (FH); Upper Conn Ck, Cardwell, *I.G.Stone 16368* (MELU).

Unique by virtue of its synoicous perichaetia (all other Thuidiaceae being autoicous or dioicous), but antheridia are often absent in perigamia with sporogones.

5. Pelekium velatum Mitt., *J. Linn. Soc., Bot.* 10: 176 (1868)

Thuidium velatum (Mitt.) Paris, *Index Bryol.* 1294 (1898). T: Tutuila, Samoa, *Powell 14*; holo: NY.

Illustrations: A.Touw & L.Falter-Van den Haak, *op. cit.* 49, fig. 16; A.Touw, *op. cit.* 111, fig. 35v (2001b).

Autoicous. Plants yellowish green or sordid green, bipinnately branched. Stems to 4 cm long; paraphyllia mostly simple, crowded. Ultimate branchlets to 10, catenulate when dry, complanate when moist. Stem leaves to 0.7 mm long, triangular, obliquely patent both wet and dry; acumen often piliferous, narrowly triangular to filiform; hair to 8 cells long. Leaves of ultimate branchlets to 0.4 mm long, ovate, asymmetrical, patent when moist; apex broadly acute; costa strongly cristate; crest cells similar to adjacent laminal cells, but partly pluripapillose; median leaf cells almost equally ornamented on both faces, unipapillose; papillae small.

Inner perichaetial leaves mostly erect, almost entire, irregularly dentate, or spinose. Calyptra campanulate, large, white, hispid, plicate and laciniate at base. Seta spinulose, to 15 mm long.

Known from a single 19th century collection from eastern Qld. Widespread and common in Malesia and adjacent parts of other regions; also found in tropical East Africa (Tanzania). A moss from the undergrowth of lowland tropical rainforest, growing on wood and rocks (mostly limestone).

Qld: Rockhampton, 1866, *A.Dietrich s.n.* (H).

Differs from all other species by the peculiar ornamentation of the seta and calyptra.