

PLAGIOTHECIACEAE

Niels Klazenga¹

Plagiotheciaceae M.Fleisch., *Nova Guinea, Bot.*, n.s., 8: 748 (1912).

Type: *Plagiothecium* Schimp.

Dioicous or autoicous. Pleurocarpous. Stems irregularly branched in a single plane, mostly complanate-foliate; in cross section with a 1-layered hyalodermis. Paraphyllia and pseudoparaphyllia lacking. Stem and branch leaves similar, often asymmetrical, decurrent; alar patches decurrent, consisting of \pm inflated hyaline cells; costa short and double. Peristome hypnoid.

Plagiotheciaceae is a small, but almost cosmopolitan family, occurring in all continents except Antarctica. The present treatment follows the circumscription of Goffinet & Buck (2004) who added the satellite genera *Struckia* Müll.Hal. and *Buckiella* Ireland [the latter subsequently transferred to the Hypnaceae (Goffinet *et al.*, 2012)], thus modifying only slightly the treatment of Buck & Ireland (1985) who considered the family to be monotypic. According to Goffinet & Buck (2004), the Plagiotheciaceae is characterised by mostly complanate-foliate plants, stems with a hyalodermis, often asymmetrical, decurrent leaves with a short double costa, linear leaf cells, and differentiated alar cells that are restricted to the basal angles of the leaves. Pedersen & Hedenäs (2002) proposed a much broader family circumscription, including *Acrocladium* Mitt., *Bardunovia* Ignatov & Ochyra, *Catagonium* Broth., *Herzogiella* Broth., *Isopterygiopsis* (Schimp.) Z.Iwats., *Myurella* Bruch & Schimp., *Orthothecium* Bruch & Schimp., *Plagiothecium*, *Platydictya* Berk., *Pseudotaxiphyllum* Z.Iwats., *Rhizofabronia* (Broth.) M.Fleisch. and *Struckia*. Putative morphological synapomorphies for this group included the absence of pseudoparaphyllia, the absence of rhizoids on the stem and lowermost abaxial costa, purplish, granular-papillose axillary rhizoids and exostomes with whitish yellow basal parts. However, none of these character states are present in all included taxa. Of the additional genera included in Plagiotheciaceae by Pedersen & Hedenäs, those that occur in Australia, *viz.* *Acrocladium* and *Catagonium*, are here treated in separate families.

References

- Buck, W.R. & Ireland, R.R. (1985), A reclassification of the Plagiotheciaceae, *Nova Hedwigia* 41: 89–125.
- Goffinet, B. & Buck, W.R. (2004), Systematics of the Bryophyta (mosses): from molecules to a revised classification, *Monogr. Syst. Bot. Missouri Bot. Gard.* 98: 205–239 (2004).
- Goffinet, B., Buck, W.R. & Shaw, A.J. (2012), *Classification of the Bryophyta*. [<http://www.eeb.uconn.edu/people/goffinet/Classificationmosses.html>].
- Pedersen, N. & Hedenäs, L. (2001), Phylogenetic relationships within the Plagiotheciaceae, *Lindbergia* 26: 62–76.
- Pedersen, N. & Hedenäs, L. (2002), Phylogeny of the Plagiotheciaceae based on molecular and morphological evidence, *Bryologist* 105: 310–324.

¹ Royal Botanic Gardens Melbourne, Birdwood Avenue, South Yarra, Vic. 3141.

PLAGIOTHECIUM

Plagiothecium Schimp., in P.Bruch & W.P.Schimper, *Bryol. Europ.* 5: 179 (1851); from the Greek *plagios* (placed sideways, sloped, oblique) and *theke* (a vessel or container), alluding to the inclined to horizontal capsules.

Lecto: *P. denticulatum* (Hedw.) Schimp.

Autoicous or dioicous. Plants small to medium-sized, forming dense mats. Stems creeping, irregularly branched in a single plane, mostly complanate-foliate; in cross section with a single-layered hyalodermis, followed by a single layer of small firm-walled cells, internally with larger thin-walled cells; central strand often indistinct; paraphyllia and pseudoparaphyllia absent; branch primordia *Bryum* type, subtype AA; asexual propagules often present. Stem and branch leaves similar, erect to erecto-patent, imbricate, ovate, plane to concave, acute to acuminate, decurrent; margin entire throughout to serrulate near the apex, plane throughout or revolute below; costa short and double; Laminal cells linear, firm-walled, not pitted, often becoming shorter towards the leaf apex and insertion; alar cells oval to rectangular, often inflated, forming decurrent triangular or oval, often auriculate patches.

Perichaetia frequent at the bases of stems and branches; perichaetial leaves slightly enlarged, sheathing, not decurrent, narrowly acute to short-acuminate; costa variable. Calyptra cucullate, smooth; basal margin entire. Seta elongate, smooth, straight to curved, rarely circinate and twisted. Capsules erect to horizontal, straight to arcuate, cylindrical or sometimes ellipsoidal, smooth to sulcate; stomata present; operculum conical to rostrate. Exostome teeth triangular, shouldered, with a zig-zag commissural line, horizontally striate below, papillose above, trabeculate inside; endostome papillose, with a low to high basal membrane, processes keeled, fenestrate; cilia 1–3, nodulose. Spores usually spherical, rarely ellipsoidal, smooth or minutely papillose.

A genus of 25–30 species with an almost cosmopolitan distribution, occurring on all continents except Antarctica. Most species occur in temperate latitudes of the Northern Hemisphere. One species in Australia.

References

Ireland, R.R. (1992), Studies of the genus *Plagiothecium* in Australasia, *Bryologist* 95: 221–224.

Ochyra, R. (2002), *Plagiothecium lamprostachys* (Hampe) A.Jaeger (Plagiotheciaceae), a forgotten name for an Australian moss, *J. Bryol.* 24: 85–86.

Sainsbury, G.O.K. (1955), *Bull. Roy. Soc. New Zealand* 5: 456–457 (1955).

Scott, G.A.M. & Stone, I.G. (1976), *The Mosses of Southern Australia* 436–437 (1976).

***Plagiothecium lamprostachys* (Hampe) A.Jaeger, *Ber. Thätigk. St. Gallischen Naturwiss. Ges.* 1876–77: 449 (1878)**

Hypnum lamprostachys Hampe, *Linnaea* 30: 639 (1860). T: Tarwin River, Vic., *F.Mueller*; holo: BM; iso: MEL 32353

Plagiothecium novae-seelandiae Broth., *Proc. Linn. Soc. New South Wales* 41: 594 (1916). T: top of Otira Gorge, Kellys Creek, Kellys Range, New Zealand, *T.W.N.Beckett*; holo: H-BR.

[*Plagiothecium denticulatum* auct. non (Hedw.) Bruch & Schimp.: G.A.M.Scott & I.G.Stone, *Mosses of Southern Australia* 436 (1973)]

Illustrations: R.R.Ireland, *op. cit.* 222, figs 1–8, as *P. novae-seelandiae*; D.Meagher & B.Fuhrer, *A Field Guide to the Mosses and Allied Plants of Southern Australia* 45 (2003); R.D.Seppelt, *The Moss Flora of Macquarie Island* 217, fig. 86 (2004).

Autoicous. Plants yellowish green to green, forming smooth mats. Stems 2–6 cm long, irregularly branched, complanate-foliate to terete-foliate, often with flagelliform tips; central strand poorly developed. Leaves ovate, asymmetrical to almost symmetrical, 1.2–2.0 mm long, 0.5–1.2 mm wide, \pm concave, smooth, acute to broadly acuminate, decurrent; margin

entire or with a few minute teeth at the apex, plane or narrowly revolute below its widest part. Mid-laminal cells linear, $90\text{--}175 \times 9\text{--}15 \mu\text{m}$, thin- to firm-walled, not pitted; alar cells oval to rectangular, inflated, forming long decurrencies 3–5 rows wide, often somewhat auriculate. Capsule inclined to horizontal, slightly sulcate when dry. Spores spherical, $8\text{--}14 \mu\text{m}$ diam., minutely papillose.

Occurs in N.S.W. as far north as the New England Tableland, in Vic. east to the Grampians, and in Tas.; found in wet forests or montane and subalpine vegetation, at elevations of 100–1760 m, mostly on rock, more rarely on the bases of trees or tree ferns or terrestrial. Also in New Zealand, Campbell Island (as *P. laetum* Bruch, Schimp. & W.Gümbel) and Macquarie Island.

N.S.W.: Gloucester Tops, *H. Streimann 6439* (CANB). Vic.: head of Delatite R., Mt Stirling, *J.H. Willis 229W* (MEL); Dinner Gorge, N of Licola, *A. Thies 1569* (MEL). Tas.: Dixons Kingdom Hut, Walls of Jerusalem Natl Park, *N. Klazenga* (MEL).

This species was recognised as *P. denticulatum* (Hedw.) Bruch & Schimp. by Sainsbury (1955) and Scott & Stone (1976). Ireland (1992) established that Australian and New Zealand material belonged to a distinct species, *P. novae-seelandiae*, for which a prior name, *P. lamprostachys*, was found by Ochyra (2002). Australasian material differs from *P. denticulatum* by the often terete-foliate and flagelliform branches; concave to broadly acute leaves with the margins plane or recurved at the base only; entire or scarcely serrulate leaf apices; and straight, inclined capsules that are wrinkled in the neck only when dry. In contrast, in *P. denticulatum* the branches are almost invariably complanate-foliate, never flagelliform; leaves are flat with the margins revolute almost to the apex and with distinctly serrulate apices; and the capsules are arcuate with a wrinkled urn when dry. Moreover, while asexual propagules have never been found in *P. lamprostachys*, they are common in *P. denticulatum*.

Australian material appears much more variable than indicated in Ireland's treatment. While entirely terete-foliate plants have been found, most specimens have companate-foliate as well as terete-foliate parts. Indeed, some collections are entirely complanate-foliate and lack flagelliform branches, as it is the terete-foliate branches that become flagellate at the tips. Moreover, leaves in most Australian collections are more gradually acuminate than in the type of *P. novae-seelandiae*, which was illustrated by Ireland (1992). While acute to broadly acuminate leaves are restricted to terete-foliate branches, and the most narrowly acute leaves occur on complanate branches, rather narrowly acute leaves can also be found on terete-foliate and flagelliform branches. Laminal cell width tends to be at the lower end of the range of $9\text{--}18 \mu\text{m}$ reported by Ireland (1992). The *P. novae-seelandiae* form appears to be a high altitude and high latitude variant of *P. lamprostachys*.

Excluded Name

Plagiothecium lucidum (Hook.f. & Wilson) Paris, *Index Bryol.* 962 (1897)

Hypnum lucidum Hook.f. & Wilson, *London J. Bot.* 3: 554 (1844). T: Hermite Is., Cape Horn, Chile, *J.D. Hooker* (BM).

Illustrations: W.R. Buck & R.R. Ireland, *Fl. Neotropica Monogr.* 50: 11, fig. 5 (1989); W.R. Buck, *Pleurocarpus Mosses of the West Indies* 297, pl. 116, figs 9–16 (1998).

Autoicous. Plants dirty pale green, forming smooth mats. Stems to c. 4 cm long, simple to sparingly irregularly branched, complanate-foliate, without flagelliform tips; central strand very narrow. Leaves narrowly ovate, often arched with downward pointing tips, asymmetrical, $(0.70\text{--}) 0.85\text{--}1.50$ mm long, \pm concave, smooth, gradually long-acuminate, decurrent; margin entire or, rarely, with a few minute apical teeth, plane or more typically erect almost to the apex. Mid-laminal cells linear, $85\text{--}140 \times 5\text{--}6$ (-9) μm , thin- to firm-walled, not pitted; alar cells few in the extreme basal angles, rectangular, often inflated; decurrencies narrow, 1–3 cells wide. Capsules erect to horizontal, smooth. Spores spherical, $9\text{--}14 \mu\text{m}$ diam., papillose.

Ireland (1992) recognised a second species for Australia, *P. lucidum*, which he distinguished from *P. novae-seelandiae* by always having complanate stems and branches, more gradually acuminate leaves, much narrower mid-laminal cells and short and narrow decurrencies. Only a single Australian collection was cited, but the implication was that *P. lucidum* was more common in Australia. All Australian material of *Plagiothecium* studied here belongs to a single species. Although in many collections all stems are complanate and the leaves are acuminate, the decurrencies are invariably long and wide with inflated cells, and the mid-laminal cells are always much broader than reported from *P. lucidum*. It is not out of the question that *P. lamprostachys* is conspecific with *P. lucidum*, which occurs scattered in the Dominican Republic, the northern part of the South American *cordillera* between Venezuela and Bolivia, SE Brazil and Tierra del Fuego, but I have not seen enough of the latter to come to a firm conclusion.