RHYNCHOSTEGIUM

Lars Hedenäs¹

Rhynchostegium Bruch & Schimp., in P.Bruch, W.P.Schimper & W.T.Gümbel, Bryol. Europ. 5: 197 (fasc. 49–51, Mon. 1) (1852); from the Greek rhyncho- (beaked) and stegos (a lid), in reference to the rostrate operculum of the sporophyte.

Type: R. confertum (Dicks.) Schimp.

Autoicous. Plants small to medium-sized, irregularly to slightly bipinnately branched; branches ±straight when dry. Axillary hairs with 1–3 upper cells. Stem leaves erect to patent, straight or slightly homomallous, sometimes subimbricate, subcomplanate or complanate, the latter especially in branches, concave to plane, not plicate, varying around ovate to ovate-cordate, occasionally lanceolate, gradually or abruptly narrowed to a short- or long-acuminate apex, sometimes with a long acumen or apiculus differentiated; costa single, ending 35–75% up the leaf, smooth or occasionally ending in an abaxial spine, especially in branch leaves; margin above strongly to finely denticulate, plane or recurved below; median laminal cells linear, thin-walled or incrassate, eporose or slightly porose, smooth or rarely with some cells slightly distally and abaxially prorate; alar cells undifferentiated or quadrate to elongate-rectangular and somewhat widened, few or numerous, forming small indistinct isodiametric ovate or transversely triangular groups, decurrent or not.

Seta smooth or mammillose. Capsules horizontal or inclined; operculum rostrate or long-rostrate. Peristome: exostome perfect and red or orange-red, rarely the teeth narrow, pale yellow, cross-striolate only in the basal part and with reduced trabeculae; endostome segments with a low or high basal membrane; processes well developed and with broad perforations, or narrow and without or with narrow perforations; cilia well developed or short to vestigial.

About 140–150 species from most parts of the world have been referred to this highly artificial genus. The first three of the six Australian species listed below are probably closely related to each other, and species of a similar appearance occur in different climatological regions throughout most of the world (except the near-polar regions). *Rhynchostegium cylindritheca*, the Australian species usually referred to the genus *Eriodon*, differs from other members of *Rhynchostegium* in its less curved, inclined capsules with somewhat specialised peristomes and a poorly developed annulus. Similar specialisations have evolved in many other epiphytic species within different taxonomic groups. The similarities between *R. cylindritheca* and other *Rhynchostegium* species (in Australia especially *R. tenuifolium*) indicates that this species is more likely a specialised *Rhynchostegium* than a representative of a more independent evolutionary unit. Similar sporophytic specialisations as in *R. cylindritheca* are also seen in *R. nanopennatum*, and for the same reasons this species is also retained in *Rhynchostegium* in the present treatment.

References

Hedenäs, L. (1996), Taxonomic and nomenclatural notes on Australian Brachytheciaceae (Musci), *Nova Hedwigia* 62: 451–465.

Hedenäs, L. (2002), An overview of the family Brachytheciaceae (Bryophyta) in Australia, *J. Hattori Bot. Lab.* 92: 51–90.

Cite as: L.Hedenäs, Australian Mosses Online. 65. Brachytheciaceae: Rhynchostegium. http://www.anbg.gov.au/abrs/Mosses_online/Brachytheciaceae_Rhynchostegium.pdf (2012)

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- 3 Plants small; stem and branch leaves narrowly ovate to narrow-lanceolate, when dry with strongly inrolled margins; leaves appearing very narrow, needle-like; seta to 15 mm long ... 6. R. nanopennatum
- 3: Plants medium-sized; stem and branch leaves broadly ovate to lanceolate-ovate, when dry at most slightly undulate or twisted, never with strongly inrolled margins; seta usually more than 15 mm........4

1. Rhynchostegium tenuifolium (Hedw.) Reichardt, *Reise Novara, Pilze, Leber-Laubm.* 1(3): 191 (1870)

Hypnum tenuifolium Hedw., Sp. Musc. Frond. 283. 75, figs 1–3 (1801); Isothecium tenuifolium (Hedw.) Brid., Bryol. Univ. 2: 383 (1827); Amblystegiella tenuifolia (Hedw.) M.Fleisch., Hedwigia 61: 407 (1920); Helicodontium tenuifolium (Hedw.) Müll.Hal. ex M.Fleisch, Hedwigia 61: 407 (1920). T: Bullarook Forest, Vic., 1885, C.French 489; neo: H-BR, fide L.Hedenäs (1996).

Hypnum subclavatum Hampe, Syn. Musc. Frond. 2: 247. 176, fig. 5 (1851); Rhynchostegium subclavatum (Hampe) A.Jaeger, Ber. Thätigk. St. Gallischen Naturwiss. Ges. 1876–77: 370 (1878) [Ad. 2: 436]. T: "Nov. Holl." [Australia], F.Sieber; probable syn: BM.

Rhynchostegium tenuifolium var. howeanum Broth. & Watts, Proc. Linn. Soc. New South Wales 40: 383 (1915). T: below back of Gower Wilson's, [Lord Howe Island], on the ground, July 1911, W.W.Watts 49, 50; Robbin's Swamp, [Lord Howe Island], July 1911, W.W.Watts 305. syn: H-BR.

[Hypnum collatum Hook.f. & Wilson, Fl. Tasman. 2: 209 (1860), nom. illeg. incl. spec. prior.; Rhynchostegium collatum (Hook.f. & Wilson) Broth. & Watts., Proc. Linn. Soc. New South Wales 37: 381 (1912), nom. illeg. incl. spec. prior.]

Illustrations: J.Beever, K.W.Allison & J.Child, Mosses of New Zealand, 2nd edn 144 (1992); L.Hedenäs, op. cit. 80, fig. 11C, D (2002); D.Meagher & B.Fuhrer, A Field Guide to the Mosses and Allied Plants of Southern Australia 79 (2003).

Plants medium-sized, irregularly branched, the branches sometimes attenuate, green or yellow-green. Stem leaves subimbricate to subcomplanate, lanceolate-ovate, ovate, broadly ovate or ovate-cordate, gradually narrowed to an acuminate or short-acuminate apex, rarely with a short acumen (<10% of the leaf length), when dry with \pm plane margins; branch leaves often complanate; costa 33.5–63.0 μ m wide near the base, ending 35–75% up the leaf, long costae occasionally ending in a spine on the back; margin in upper part finely denticulate or occasionally denticulate. Median laminal cells (44.0–) 52.5–136.5 (–147.0) \times 5.0–8.5(–9.5) μ m.

Seta (10–)18–42 mm long, smooth. Capsules short-cylindrical, curved, horizontal. Peristome: exostome perfect, red or orange-red; endostome basal membrane constituting 40–44% of the endostome height; processes broadly perforate (< 12.5 μ m wide); longest cilia as long as the processes. Spores 8.5–14.5 μ m. n=22, fide R.Fritsch, Bryophytorum Biblioth. 40: 1–352 (1991).

Known from W.A., S.A., Qld, N.S.W., A.C.T., Vic. and Tas.; also in Lord Howe Island and Norfolk Island. Grows on the ground, on dead wood and tree bases, more rarely on rocks,

mostly in moist to wet or ±shaded habitats, but occasionally also on road edges and in lawns, from the sea level up to c. 1400 m. Outside Australia, it has been reported from New Zealand, the Pacific Islands and South America.

W.A.: Porongurup, 18 Nov. 1958, E.J.Riek (CANB). S.A.: Kangaroo Is., J.A.Elix & L.H.Elix KI/851 (CANB, NY). Qld: Mt Moltan, I.G.Stone 22866 (MELU). N.S.W.: 7 km E of Gundaroo, L.G.Adams 2280 (CANB). A.C.T.: Black Mtn, H.Streimann & J.A.Curnow 53350 (NY, S). Vic.: 2 km NE of Suggan Buggan, H.Streimann 6238 (CANB). Tas.: Dead Is., Port Arthur, W.A.Weymouth 758 (H-BR). Lord Howe Is.: below Northern Hill, W.W.Watts 79a (H-BR). Norfolk Is.: "old field", s. dat., coll. unknown (H-BR).

Rhynchostegium tenuifolium is the most widespread species of Brachytheciaceae in Australia. It is very similar to both *R. cylindritheca* and *R. distratum*. However, *R. distratum* differs from in its broader median laminal cells [(7.5–) 8.0–13.0 µm wide], and it usually has more strongly denticulate stem and branch leaf margins. Rhynchostegium cylindritheca grows on rocks, a uncommon habitat for *R. tenuifolium*; otherwise, it can only be separated from *R. tenuifolium* with certainty when sporophytes are present. Thus, *R. cylindritheca* has inclined capsules with specialised peristomes, whereas *R. tenuifolium* has horizontal capsules with perfect peristomes.

Rhynchostegium tenuifolium can sometimes be confused with some expressions of Brachythecium rutabulum which, however, has broader median laminal cells (7.5–12.5 μ m wide) and a broader costa in the stem leaves (48.5–80.0 μ m wide near the base). The seta is rough and the operculum is conical in B. rutabulum; in contrast, the seta is smooth and the operculum is rostrate in R. tenuifolium.

2. Rhynchostegium cylindritheca Dixon, *Bull. Torr. Bot. Club* 42: 108, pl. 9, fig. 12 (1915)

Eriodon cylindritheca (Dixon) Dixon & Sainsbury, Trans. & Proc. Roy. Soc. New Zealand 75: 186 (1945). T: New Zealand; syn: H-BR.

Helicodontiadelphus australiensis Dixon, J. Bot. 74: 5. 6 (1936); Helicodontium collei Mitt. ex Dixon, J. Bot. 74: 5 (1936), nom. nud. in synon. T: Kangaroo Valley, N.S.W., R.Collie; holo: E.

Illustration: G.O.K.Sainsbury Handb. New Zealand Mosses 445, pl. 73, fig. 1 (1955).

Plants medium-sized, irregularly branched, yellow-green. Stem leaves \pm evenly arranged around the stem or complanate, the latter more common in branch leaves, ovate or broadly ovate, gradually narrowed to an acuminate apex, when dry with \pm plane margins; costa 27.5–42.0 μ m wide near the base, ending 50–65% up the leaf, smooth; margin in upper part denticulate or rather strongly denticulate. Median laminal cells 54.5–113.5 \times 4.5–8.0 μ m.

Seta 16–23 mm long, smooth. Capsules elongate-cylindrical, inclined, the basal half curved. Peristome: exostome specialised, teeth narrow, light yellow, outside cross-striolate only in lower c. 14% of teeth; endostome basal membrane 22–24% of endostome height, processes very narrow and not or narrowly perforate (< 2 μm wide); cilia short, up to 20% as long as processes. Spores (10.5–) 11.5–17.0 μm .

Known from rocks at a single locality in N.S.W. Also in New Zealand where it usually grows on the bark of *Fuchsia* or mahoe in damp sites.

The differences between this species and *R. tenuifolium* are discussed under the latter.

3. Rhynchostegium distratum (Hampe) A.Jaeger, Ber. Thätigk. St. Gallischen Naturwiss. Ges. 1876–77: 369 (1878)

Hypnum distratum Hampe, Linnaea 30: 642 (1860). T: Sealers Cove, Vic., 1854, F.Mueller 169; lecto: BM; isolecto: BM, fide L.Hedenäs (1996).

Plants medium-sized, irregularly or irregularly pinnately branched; stems and branches occasionally attenuate, green or yellow-green. Stem leaves evenly arranged around the stem or often subcomplanate to complanate, the latter more common in branch leaves, broadly ovate, ovate or triangular-ovate to lanceolate-ovate, gradually narrowed to an acuminate apex, when dry with \pm plane margins; costa 27.5–56.5 μ m wide near the base, ending (45–)

55–70% up the leaf, smooth; margin in upper part strongly or sometimes rather finely denticulate. Median laminal cells (65.0–) 73.5-153.5 (-172.0) × (7.5–) 8.0-13.0 µm.

Seta 15–31 mm long, smooth. Capsules cylindrical, slightly curved, horizontal. Peristome: exostome perfect, red; endostome basal membrane 42–46% of endostome height; processes moderately broadly perforate (< 8.5 μ m wide); longest cilia as long as processes or almost so. Spores 10.5–16.0 μ m.

Known from Qld, N.S.W., A.C.T., N.S.W., Vic., Tas. and Lord Howe Island; usually on dead wood, but also common on tree bases, more rarely on rocks and soil, mostly in shaded, moist or wet habitats in forests at altitudes of c. 150–1400 m. Apparently endemic.

Qld: Yungaburra, W.W.Watts 601 (H-BR). N.S.W.: Bellenger R., Johnson 4820 (H-BR). A.C.T.: Smokers Gap, H.Streimann 4300 (CANB). Vic.: Stony Ck, H.Streimann 49392 (CANB). Tas.: Mt Wellington, A.J.Taylor 101 (H-BR). Lord Howe Island: Look Out Hill, W.A.Watts 270 (H-BR).

The differences between this species and R. tenuifolium are discussed under the latter.

4. Rhynchostegium laxatum (Mitt.) Paris, Index Bryol. 1131 (1898)

Hypnum laxatum Mitt., Hooker's J. Bot. Kew Gard. Misc. 8: 264 (1856); Hypnum luxatum Mitt. ex Paris, Index Bryol. 1131 (1898), nom. inval. err. pro H. laxatum Mitt.; Rhynchostegium taxatum Anonymous, Victorian Naturalist 89: 299 (1972), nom. inval. err. pro R. laxatum (Mitt.) Paris. T: Gippsland, Vic., F.Mueller 120; lecto: NY; isolecto: H-BR, NY, fide L.Hedenäs (1996).

Hypnum dentiferum Hampe, Linnaea 30: 642 (1860); Rhynchostegium dentiferum (Hampe) A.Jaeger, Ber. Thätigk. St. Gallischen Naturwiss. Ges. 1876–77: 371 (1878) (Ad. 2: 437). T: Gippsland, Vic., 1855, F.Mueller 120; lecto: BM; isolecto: BM, fide L.Hedenäs (1996).

Hypnum pseudomurale Hampe, Linnaea 30: 643 (1860); Rhynchostegium pseudomurale (Hampe) A.Jaeger, Ber. Thätigk. St. Gallischen Naturwiss. Ges. 1876–77: 376 (1878). T: Moe Swamp, Vic., No. 10; holo: BM.

Hypnum elusum Mitt., in J.D.Hooker, Handb. New Zealand Fl. 2: 478 (1867); Rhynchostegium elusum (Mitt.) A.Jaeger, Ber. Thätigk. St. Gallischen Naturwiss. Ges. 1876–77: 370 (1878). T: New Zealand, 1862, Hector; holo: NY; iso: BM, fide L.Hedenäs (1996).

Plants medium-sized, pinnately, irregularly pinnately or bipinnately branched, green or yellow-green. Stem leaves evenly arranged; leaves on branch leaves sometimes complanate, ovate, broadly ovate or broadly ovate-cordate, occasionally triangular-ovate, in attenuate shoots sometimes lanceolate-ovate, above abruptly narrowed to a long acumen or apiculus, occupying 20–40% of the leaf length; apex acuminate, with \pm plane margins when dry; costa 38–65 μ m wide near the base, extending 35–60% up the leaf, sometimes ending in a spine on the back; margin in upper part denticulate or finely denticulate. Median laminal cells 38.0–96.0 (-113.5) \times 6.5–11.5 (-12.5) μ m.

Seta 10–15 mm long, smooth. Capsules ovoid or elongate-ovoid, inclined. Peristome: exostome perfect, red; endostome basal membrane constituting 42–45% of the endostome height; processes broadly perforate (to 12.5 μ m wide); longest cilia as long as the processes. Spores 10.5–17.0 μ m diam. n = 20 + 2, 22, fide R.Fritsch, Bryophytorum Biblioth. 40: 1–352 (1991).

Occurs in N.S.W., Vic. and Tas.; grows on the stems of trees and shrubs, on dead wood or occasionally on the ground, almost invariably at elevations below 1000 m. Also in New Zealand and the Chatham Islands.

N.S.W.: Yarrangobilly Caves, *D.McVean 265115* (CANB). Vic.: Gippsland, *C.Franck 28* (NY). Tas.: Mt Arthur, *Sullivan 31* (H-BR); Johnnys Ck, *W.W.Watts 116* (NSW).

This species and the smaller R. muriculatum both have a long and well-defined acumen or apiculus on their stem leaves. The differences between the two species are discussed under R. muriculatum.

5. Rhynchostegium muriculatum (Hook.f. & Wilson) Reichardt, *Reise Novara, Pilze, Leber-Laubm.* 1(3): 191 (1870)

Hypnum muriculatum Hook.f. & Wilson, in J.D.Hooker, Fl. Nov.-Zel. 2: 108, 89, fig. 3 (1854); Eurhynchium muriculatum (Hook.f. & Wilson) A.Jaeger, Ber. Thätigk. St. Gallischen Naturwiss. Ges. 1876–77: 351 (1878) [Ad. 2: 417]; Rhynchostegiella muriculata (Hook.f. & Wilson) Broth., Nat. Pflanzenfam. 1(3): 1161 (1909). T: n.v. (not in BM).

Illustrations: L.Hedenäs, op. cit. 80, fig. 11E (2002; D.Meagher & B.Fuhrer, A Field Guide to the Mosses and Allied Plants of Southern Australia 58 (2003).

Plants small, irregularly pinnately, pinnately or slightly bipinnately branched, green or yellow-green. Stem leaves evenly arranged around the stem or slightly homomallous; branch leaves occasionally complanate, ovate, triangular-ovate or lanceolate-ovate, above \pm abruptly narrowed to a long acumen, constituting 25–40% of the leaf length, in depauperate specimens sometimes indistinct; apex acuminate or narrowly so, when dry with \pm plane margins; costa 27.5–61.0 μ m wide near the base, ending 40–65% way up the leaf, smooth or occasionally ending in a spine on the back; margin in upper part denticulate or finely denticulate. Median laminal cells 40.0–122.0 (–138.5) × (5.0–) 6.5–10.0 μ m.

Seta 6–13 mm long, mammillose throughout. Capsule short-cylindrical or obovoid, horizontal. Peristome: exostome perfect, red; endostome basal membrane constituting 42–48% of the endostome height; processes broadly perforate (< 13.5 μ m wide); cilia almost as long as the processes. Spores 10.5–19.0 μ m.

Known from N.S.W., A.C.T., Vic., Tas. and Norfolk Island; on dead wood, the stems of shrubs and trees, rocks and on soil, in shaded, moist or wet habitats, usually in forest, from the sea level up to c. 1000 m. Also in New Zealand.

N.S.W.: Katoomba, M.Fuller 74 (CANB). A.C.T.: Blue Range road, H.Streimann 10230 (NY). Vic.: Paradise, H.Streimann 42810 (CANB, NY). Tas.: Lake Dobson road, H.Streimann 39937 (HO, NY). Norfolk Island: Natl Park, H.Streimann 49628 (Musci Australas. Exsicc. 132) (S).

This species resembles a small *R. laxatum*. Besides the difference in size there are few gametophytic differences between the two species. *Rhynchostegium muriculatum* has slightly more narrowly ovate stem leaves than in normal shoots of *R. laxatum*, but in attenuate shoots of the latter the leaves are also narrow. When fertile, the seta is smooth in *R. laxatum* and strongly and densely mammillose throughout in *R. muriculatum*.

6. Rhynchostegium nanopennatum (Broth.) Kindb., Enum. Bryin. Exot. 103 (1891)

Hypnum nanopennatum Broth., Öfvers. Förh. Finska Vetensk.-Soc. 33: 109 (1890). T: Bellenden Ker Range, Qld, 1889, F.M.Bailey; holo: H; iso: S.

Illustration: L.Hedenäs, op. cit. 80, fig. 11F (2002).

Plants small, irregularly branched, green or brownish green. Stem leaves $\pm evenly$ arranged around the stem, but often turned upwards from the substratum; branch leaves complanate, narrowly ovate to narrowly lanceolate, from far below gradually narrowed to an acuminate apex, when dry with strongly inrolled margins and appearing narrow and needle-like; costa 25–35 μm wide near the base, ending 35–55% way up the leaf, sometimes ending in a spine on the back; margin finely denticulate or denticulate. Median laminal cells 65.0–149.0 \times 8.5–11.5 μm .

Seta 6–9 mm long, smooth. Capsules cylindrical, slightly curved in transition to the seta, horizontal. Peristome: exostome perfect, orange-red; endostome basal membrane constituting 28–32% of the endostome height; processes narrow, narrowly perforate (< 4 μ m wide); cilia absent or vestigial. Spores (11.5–) 14.5–21.0 μ m.

Known only from Qld; found on the base of shrubs, its habitat is otherwise imperfectly known. Apparently endemic.

Qld: Mt Bartle Frere, W.W.Watts 296, 297 (H-BR); Frenchmans Ck, W.W.Watts 416 (H-BR); Kuranda, W.W.Watts 433 (H-BR).

When dry, the seemingly extremely narrow leaves, due to their inrolled margins, make this species somewhat similar to *Scorpiurium cucullatum* rather than any other Australian Brachytheciaceae. For the differences between *Rhynchostegium nanopennatum* and *Scorpiurium cucullatum*, see the discussion under the latter.

Uncertain Taxa

The identity or occurrence in Australia of the following taxa is uncertain. Type material was not available for study.

Rhynchostegium aristatum A.Jaeger, Ber. Thätigk. St. Gallischen Naturwiss. Ges. 1876–77: 370 (1878) [Ad. 2: 436]

Hypnum aristatum Hook.f. & Wilson, Fl. Tasman. 2: 210 (1860), hom. illeg., non H. aristatum Sull. (1854); Brachythecium aristatum (A.Jaeger) Mitt., Trans. & Proc. Roy. Soc. Victoria 19: 89 (1882).

Rhynchostegium inaequale Dixon, Proc. Roy. Soc. Queensland 53(2): 36 (1941).

Rhynchostegium patulum A.Jaeger, Ber. Thätigk. St. Gallischen Naturwiss. Ges. 1876–77: 370 (1878) [Ad. 2: 436]

Hypnum patulum Hampe, Linnaea 37: 162 (1872), hom. illeg., non Hypnum patulum Hedw. (1801) [= Meteoriopsis patula (Hedw.) Broth.]

Rhynchostegium plagiotheciella Müll.Hal., Hedwigia 36: 132 (1897).

Rhynchostegium raphidorrhynchum (Müll.Hal.) A.Jaeger, Ber. Thätigk. St. Gallischen Naturwiss. Ges. 1876–77: 366 (1878).

Nomina Nuda

Rhynchostegium antipodum Mitt., Trans. & Proc. Roy. Soc. Victoria 19: 88 (1882).

Rhynchostegium austromontanum Mitt., Trans. & Proc. Roy. Soc. Victoria 19: 89 (1882).

Rhynchostegium incurvum Mitt., Trans. & Proc. Roy. Soc. Victoria 19: 88 (1882).

Rhynchostegium latifolium Geh., Rev. Bryol. 4: 4 (1876).

Rhynchostegium obtusissimum Geh., Rev. Bryol. 4: 4 (1876).

Rhynchostegium obtusum Mitt., Trans. & Proc. Roy. Soc. Victoria 19: 88 (1882).

Rhynchostegium parramattense Mitt., Trans. & Proc. Roy. Soc. Victoria 19: 88 (1882).

Rhynchostegium strictifolium Broth. ex Paris, Index Bryol. 1126, 1137 (1898).

Rhynchostegium strictiusculum Broth., Bot. Bull. Dept. Agric. Queensland 4: 21 (1891).

Rhynchostegium strumiferum Mitt., Trans. & Proc. Roy. Soc. Victoria 19: 89 (1882).