

BRACHYTHECIUM

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Brachythecium Schimp., in P.Bruch, W.P.Schimper & W.T.Gümbel, *Bryol. Europ.* 6: 5 (1853); from the Greek *brachys* (short) and *theca* (an urn), in reference to the short capsules.

Type: *B. rivulare* Schimp.

Autoicous or dioicous. Plants small to large, almost unbranched or irregularly to pinnately branched; branches \pm straight when dry. Axillary hairs with 1 or 2 hyaline upper cells. Stem leaves almost erect to patent, sometimes imbricate, straight, homomallous, falcate-secund or almost circinate, concave, plicate or not, varying around ovate to broadly cordate, gradually or \pm abruptly narrowed to a short- to long-acuminate apex; costa single, ending 40–75% up the leaf, smooth or ending in an abaxial spine; margin above entire to denticulate, on one or both sides usually recurved near insertion or further up. Median laminal cells linear or short-linear, thin-walled or incrassate, eporose or porose; alar cells differentiated, quadrate to short-linear, small or large, forming distinctly or indistinctly delimited alar groups of various shapes, short- or long-decurrent.

Seta smooth or mammillose. Capsules horizontal; operculum conical. Peristome: exostome perfect, red, orange or orange-brown; endostome with a high basal membrane, well-developed, broadly perforate processes and cilia \pm as long as the processes.

This predominantly extra-tropical genus is estimated to include more than 200 species. Six of the eight Australian taxa are also widespread in the Northern Hemisphere. *Brachythecium*, in its current sense, is not homogeneous, and there are no unambiguous synapomorphies joining the species placed therein.

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Takaki, N. (1956), Researches on the Brachytheciaceae of Japan and its adjacent areas. III, *J. Hattori. Bot. Lab.* 16: 1–71.

- 1 Stem and branch leaves falcate-secund to almost circinate, plicate. **4. B. paradoxum**
- 1: Stem and branch leaves straight or at most slightly homomallous; if strongly homomallous then not plicate.....2
- 2 Stem leaves ±imbricate when wet and dry, plicate; alar cells in large distinct ovate or elongate-ovate groups that extend far up (10–15% of leaf length) along leaf margin **1. B. albicans**
- 2: Stem leaves erecto-patent to almost spreading, at least when wet, plicate or smooth; alar cells not extending far up along leaf margin3
- 3 Median laminal cells of stem leaves 5.0–8.5 µm wide; alar cells short- to elongate-rectangular; upper cells occasionally quadrate, incrassate or slightly so, in a large transversely triangular group, reaching from the margin almost to the costa; leaves not plicate. **5. B. plumosum**
- 3: Median laminal cells of stem leaves 7.5–14.5 µm wide; alar cells short- to elongate-rectangular, occasionally linear, thin-walled or slightly incrassate, in groups from c. 10 indistinctly differentiated cells to a large diffuse or well-delimited transversely triangular group, extending from leaf margin c. 15–80% to the leaf middle at insertion; leaves plicate or not.....4
- 4 Plants large; stem leaf costa 84.0–117.5 µm wide, usually single, forked in some leaves.....
..... **2. B. latinervium**
- 4: Plants medium-sized or large; stem leaf costa 48.5–88.0 µm wide, single.....5
- 5 Stem leaf margins entire or slightly sinuous, occasionally finely and obtusely denticulate (only near the apex) **3. B. mildeanum**
- 5: Stem leaf margins finely denticulate to denticulate, at least in the upper half of the leaf6
- 6 Stem leaves ovate, narrowly ovate or triangular-ovate, gradually narrowed to a long-acuminate apex, plicate; alar cells oblate, quadrate or rectangular, not inflated, regular, in distinct rounded-square, ovate or broadly ovate groups. **8. B. salebrosum**
- 6: Stem leaves ovate, broadly ovate, triangular, cordate or broadly cordate, gradually or abruptly narrowed to an acuminate apex, plicate or not; alar cells short-rectangular to linear, slightly or strongly inflated, in group varying from c. 10 indistinctly differentiated cells to a diffuse or well-delimited transversely triangular group.....7
- 7 Alar cells of stem leaves indistinctly differentiated, slightly inflated and often paler than the surrounding cells (occasionally almost hyaline); alar group varying from c. 10 indistinctly differentiated cells to a diffusely delimited ovate or transversely triangular group reaching 25–50% of the distance from the leaf margin to the leaf centre at insertion..... **7. B. rutabulum**
- 7: Alar cells of stem leaves strongly inflated and hyaline, forming a sharply delimited triangular group that reaches from the leaf margin 40–80% of the distance to the costa. **6. B. rivulare**

1. Brachythecium albicans (Hedw.) Schimp., in P.Bruch, W.P.Schimper & W.T.Gümbel, *Bryol. Europ.* 6: 23 (fasc. 52–54, Mon. 19) (1853)

Hypnum albicans Hedw., *Spec. Musc.* 251 (1801); *Chamberlainia albicans* (Hedw.) H.Robins., *Bryologist* 65: 112 (1962). T: Europe; lecto: G, *vide* L.Hedenäs (1996).

Illustrations: E.Nyholm, *Illustrated Moss Flora of Fennoscandia* 2(5): 544 (1965); A.J.E.Smith, *The Moss Flora of Britain and Ireland* 591 (1978); H.A.Crum & L.E.Anderson, *Mosses of Eastern North America* 2: 1042 (1981); L.Hedenäs, *op. cit.* 58, fig. 2D, E (2002); D.Meagher & B.Fuhrer, *A Field Guide to the Mosses and Allied Plants of Southern Australia* 51 (2003).

Dioicous. Plants medium-sized, sparingly and irregularly branched, green or pale green. Stem leaves erect-imbricate, straight or slightly homomallous, concave, plicate, ovate or triangular-ovate, gradually or abruptly narrowed to a narrow acumen; apex narrowly acuminate; costa 52.5–79.5 µm wide near the base, occasionally ending in short spine on the back; margin above entire or finely and often obtusely denticulate, in branch leaves finely denticulate, one or both sides recurved or partly recurved in the lower 65–75%. Median laminal cells 40–109 (–130) × 6.5–10.5 µm, smooth; alar cells oblate, quadrate or

rectangular, not inflated, regular, thin-walled or slightly incrassate, in elongate-oblong or elongate-ovate group, extending up along margin 10–15% of the leaf length. Proximal branch leaves lanceolate, ovate or rounded-triangular, gradually narrowed to an acuminate apex or acute to obtuse. Sporophytes not seen in Australian material.

Known from S.A., A.C.T., Vic. and Tas.; on the ground in habitats that are unstable or have sparse vegetation, or in anthropogenic habitats such as roadsides, both in tree-less habitats and more open forests, at altitudes up to c. 600 m. Also in New Zealand, and widespread in North America and western Eurasia.

S.A.: Tranmere, Southern Lofty Ra., 11 July 1983, *C.R.Alcock* (AD). A.C.T.: Higgins, *H.Streimann 49060* (*Musci Australas. Exsicc.* 33) (CANB, S). Vic.: Gembrook, *I.G.Stone 5999* (MELU). Tas.: Pikes Hill, *A.Moscal 26029* (HO); Ridgeway Reservoir, *A.V.Ratkowsky H618* (AD, CANB, HO).

Immediately diagnostic characters include the often sparingly branched, pale shoots and the imbricate, narrowly acuminate leaves with ovate alar groups consisting of small, regular cells that extend up along the basal leaf margin. *Brachythecium albicans* could only be confused with *B. salebrosum* among the Australian Brachytheciaceae; the differences between the two are listed under the latter. Many collections of this species were made in anthropogenic habitats, and it had been assumed that the species was originally introduced in Australia (J.H.Willis, *Victorian Naturalist* 72: 5–11, 1955). However, since it also occurs in natural environments its status as introduced requires further investigation. The haploid chromosome numbers 6, 7 and 9 are known from the Northern Hemisphere (R.Fritsch, *Bryophytorum Biblioth.* 40: 1–352, 1991).

2. *Brachythecium latinervium* Hedenäs, *Nova Hedwigia* 62: 453 (1996)

T: Mt Baw Baw, Vic., Oct. 1965, *D.McVean 26548*; holo: CANB.

Illustration: L.Hedenäs, *op. cit.* 66, fig. 5E, F (2002).

Sexual condition unknown. Plants large, irregularly to irregularly pinnately and rather sparingly branched, turgid, green or yellow-green. Stem leaves erect and \pm imbricate, slightly shrunken and twisted when dry, \pm strongly concave, plicate or slightly so, broadly ovate or cordate-ovate, gradually to \pm abruptly narrowed to a short differentiated acumen, but not sharply piliferous, the acumen occupying 5–15% of the leaf length, occasionally twisted 90–180°; costa often forked or with one branch that is almost parallel to the main costa, 84.0–117.5 μ m wide near the base, occasionally weak distally, sometimes short and double, smooth; distal margin finely or very finely and often obtusely denticulate, often narrowly reflexed or recurved near leaf insertion. Median laminal cells 63–151 \times 8.5–14.5 (–17.0) μ m, smooth; alar cells short- to elongate-rectangular, slightly inflated, thin-walled or slightly incrassate, in some leaves scarcely differentiated from surrounding cells, when differentiated forming an indistinct triangular or transversely triangular group that is weakly delimited from surrounding cells, extending from the leaf margin 15–25% of the distance to the leaf centre at insertion. Proximal branch leaves almost orbicular to broadly ovate, with a rounded (often short-pointed) or obtuse apex. Sexual organs and sporophyte unknown.

Apparently endemic and very rare in alpine N.S.W. and Vic.; found on a wet rock and on wet peaty ground at altitudes of 1900 m and 1520 m, respectively. The N.S.W. locality in an open habitat with scattered shrubs.

N.S.W.: Blue Lake, Mount Kosciuszko Natl Park, *H.Streimann 9650* (CANB).

Brachythecium latinervium is clearly related to *B. rutabulum* and *B. rivulare*, and it is closer to *B. rutabulum* judging from the appearance of the alar groups. The differences between these three species are discussed in the notes under the last two.

Brachythecium subplicatum (Hampe) A.Jaeger and *B. fontanum* Fife are broadly similar Southern Hemisphere taxa. However, *B. latinervium* has more poorly differentiated alar cells, broader laminal cells, and its leaves narrow more gradually into a shorter and less apiculus-like acumen. In addition, *B. latifolium* has a broader stem leaf costa than *B. subplicatum*, and more distinctly finely denticulate leaf margins than in *B. fontanum*, the latter having entire margins except at the base of the leaf apiculus.

3. *Brachythecium mildeanum* (Schimp.) Schimp., in C.A.J.Milde, *Bot. Zeitung (Berlin)* 20: 452 (1862)

Hypnum mildeanum Schimp., *Syn. Musc. Eur.* 694 (1860). T: Europe; probable iso: S, *vide* L.Hedenäs (1996).

Illustrations: E.Nyholm, *Illustrated Moss Flora of Fennoscandia* 2(5): 549 (1965); A.J.E.Smith, *The Moss Flora of Britain and Ireland* 593 (1978); L.Hedenäs, *op. cit.* 66, fig. 5A, B (2002).

Autoicous. Plants medium-sized, with erect or creeping stems, irregularly branched and often with erect branches, green or pale green. Stem leaves patent to almost erect, slightly shrunken when dry, concave, plane or very weakly plicate, ovate to narrowly triangular-ovate, gradually narrowed towards the acuminate apex; costa 52.5–82.0 µm wide near the base, occasionally ending in small adaxial spine; margin entire or slightly sinuous, occasionally finely and obtusely denticulate (only near the apex), narrowly recurved near the insertion and often near the apex. Median laminal cells 56.5–115.5 × 8.5–12.5 µm, smooth; alar cells short- to elongate-rectangular, thin-walled or slightly incrassate, in an ovate or short-ovate group, extending from the margin a quarter of the distance to the leaf centre at insertion, indistinctly delimited towards other basal cells. Proximal branch leaves short-ovate to ovate; apex acute or obtuse-apiculate. Seta smooth.

Known from S.A., N.S.W., A.C.T. and Vic.; found in lawns, parks and gardens at altitudes up to c. 600 m. Also in North America and Eurasia.

S.A.: Leabrook Garden, Southern Lofty Ra., *D.G.Catcheside* 7959 (AD). N.S.W.: Merimbula, *H.Streimann* 46923 (NY). A.C.T.: Australian National University, Canberra, *H.Streimann* 44984 (NY); Emu Ridge, *H.Streimann* 50196 (CANB). Vic.: Parkville, *M.Regan* 7887B (MELU).

Among the Australian species, *B. mildeanum* is most similar to *B. rutabulum*, but it differs in the more numerous, regularly rectangular alar cells that form a larger and slightly better-delimited alar group, and in its entire or almost entire leaf margins (occasionally finely denticulate in the branch leaves).

All Australian specimens of *B. mildeanum* have been collected in strongly anthropogenic habitats, pointing to its introduction since European settlement in the late 18th century. It can be found in similar habitats in Europe, but it also occurs in somewhat nutrient-rich fens and swampy forests. The haploid chromosome numbers 13 and 14 are known from Europe (R.Fritsch, *op. cit.*).

4. *Brachythecium paradoxum* (Hook.f. & Wilson) A.Jaeger, *Ber. Thätigk. St. Gallischen Naturwiss. Ges.* 1876–77: 339 (1878) [Ad. 2: 405]

Hypnum paradoxum Hook.f. & Wilson, *London J. Bot.* 3: 554 (1844); *Brachytheciastrum paradoxum* (Hook.f. & Wilson) Ignatov & Huttunen, *Arctoa* 11: 260 (2002). T: South America; lecto: BM, *vide* L.Hedenäs (1996).

Illustrations: L.Hedenäs, *op. cit.* 58, fig. 2H, I (2002); D.Meagher & B.Fuhrer, *A Field Guide to the Mosses and Allied Plants of Southern Australia* 53 (2003).

Autoicous. Plants small to medium-sized, irregularly branched to irregularly pinnately branched, green or yellow-green. Stem and branch leaves falcate-secund or almost circinate, concave, plicate, ovate to cordate-ovate, gradually narrowed to an acuminate or long-acuminate apex; costa 29.5–59.0 µm wide near the base, abaxially often ending in a spine, or with prorate distal cell ends in the upper part; margin above denticulate or strongly denticulate (rarely finely denticulate), in branch leaves often coarsely denticulate, plane or one or both sides partly or completely reflexed or recurved. Median laminal cells 46.0–136.5 × 4.5–9.0 µm, smooth or with scattered distal cell ends abaxially prorate, more commonly so in branch leaves; alar cells quadrate, short-rectangular or rectangular, not inflated, regular or slightly irregular, slightly incrassate, in a distinct isodiametric oblong ovate or broadly ovate group. Proximal branch leaves ovate or broadly so, obtuse-apiculate to acuminate. Seta finely mammillose or mammillose ±throughout.

Known from N.S.W., A.C.T., Vic. and Tas.; common in the mountains, where it occurs up to at least 2000 m, rare below 800 m in mainland Australia (one specimen collected from 380 m in N.S.W.). Grows on the ground, on rocks, tree trunks or tree stumps, in forest or in more

exposed habitats, such as grassland or heathland, and in wet or dry places. Also known from New Zealand, southern South America and southern Africa.

N.S.W.: Barrington Tops, *H.Streimann* 399 (CANB); Dead Horse Gap, *H.Streimann* 1496 (CANB). A.C.T.: Brindabella Rd, *H.Streimann* 82 (CANB). Vic.: Howqua Gap, *H.Streimann* 50767 (CANB). Tas.: Dead Is., *W.A.Weymouth* 757 (H).

Brachythecium paradoxum is usually easy to recognise due to its small size and its strongly falcate to almost circinate plicate leaves. It is one of a group of species around *B. velutinum* (Hedw.) Schimp. from which it differs by its more strongly and more consistently falcate to circinate stem and branch leaves that have longer median laminal cells (rarely longer than 85 µm in *B. velutinum*). *Brachythecium salebrosum* is the Australian species most similar to *B. paradoxum*, but the former is much larger, and it has at most weakly curved leaves and smooth setae. The stem leaf costa of *B. salebrosum* is also slightly broader, and the median laminal cells are a little longer and wider than in *B. paradoxum*, but the overlap, especially in the laminal cell size, is considerable. The haploid chromosome number 22 is known from Chile (R.Fritsch, *op. cit.*).

5. *Brachythecium plumosum* (Hedw.) Schimp., in P.Bruch, W.P.Schimper & W.T.Gümbel, *Bryol. Europ.* 6: 8 (fasc. 52–54, Mon. 4) (1853)

Hypnum plumosum Hedw., *Spec. Musc.* 257 (1801); *Sciurohypnum plumosum* (Hedw.) Ignatov & Huttunen, *Arctoa* 11: 270 (2002). T: Europe; lecto: S, *vide* L.Hedenäs & P.Isoviita (1996)

Hypnum pseudoplumosum Brid., *Musc. Recent.* 2(2): 108 (1801), *nom. rej.* T: Europe; lecto: B, , *vide* L.Hedenäs & P.Isoviita (1996).

Brachythecium kayseri Geh., *Rev. Bryol.* 3: 4 (1876). T: Sydney, N.S.W., coll. *unknown*; iso: M.

Illustrations: E.Nyholm, *Illustrated Moss Flora of Fennoscandia* 2(5): 541 (1965); A.J.E.Smith, *The Moss Flora of Britain and Ireland* 597 (1978); H.A.Crum & L.E.Anderson, *Mosses of Eastern North America* 2: 1037 (1981); L.Hedenäs, *op. cit.* 58, fig. 2J, K (2002).

Autoicous. Plants medium-sized, shoots often long-tapering, irregularly branched and often with tapering branches, green, olive-green, yellow-green or brownish. Stem leaves erecto-patent to patent, more erect when dry, straight or homomalous, concave or strongly concave, not plicate, broadly ovate, triangular-ovate or oblong-ovate, gradually or abruptly narrowed to an acuminate or short-acuminate apex; costa 53.0–94.5 µm wide near the base, occasionally short and forked, smooth or sometimes ending in an abaxial spine, more commonly so in branch leaves; margin finely denticulate or denticulate diatally, in branch leaves denticulate to strongly denticulate, plane or (near the insertion) narrowly recurved. Median laminal cells 38.0–94.5 × 5.0–8.5 µm, smooth; alar cells short- to elongate-rectangular; upper cells sometimes quadrate, incrassate or slightly so, in a large transversely triangular group reaching from the margin almost to the costa. Proximal branch leaves suborbicular to broadly ovate, with a rounded or obtuse apex. Seta mammillose or slightly so, often smooth in the basal part.

Known from N.S.W., A.C.T., Vic. and Tas.; usually on rocks and boulders or tree stems in or on the banks of creeks and rivers, occasionally also on the ground in wet habitats, or on wet or moist rocks, from close to sea level to at least 1400 m above. Widely distributed in New Zealand, North America, northern South America, Eurasia and North Africa.

N.S.W.: Cambewarra, *W.W.Watts* 6730 (H); head of Genoa R., *H.Streimann* 2021 (CANB); Gloucester R., *H.Streimann* 1594 (CANB). A.C.T.: Cotter R., *H.Streimann* 39148 (CANB). Tas.: King R., W coast, *W.A.Weymouth* (*Tasmanian Mosses* 2514) (H).

Usually characterised by rather strongly concave, non-plicate stem leaves with narrow median laminal cells, and by the large alar groups that consist mainly of short- to elongate-rectangular cells, and which extend from the leaf margin almost to the costa. The haploid chromosome numbers 9 + *m*, 10, 10 + *m*, 11 and 11 + *m* are known from North America and Eurasia (R.Fritsch, *op. cit.*).

6. *Brachythecium rivulare* Schimp., in P.Bruch, W.P.Schimper & W.T.Gümbel, *Bryol. Europ.* 6: 17. 546 (fasc. 52–54, Mon. 13. 12) (1853)

T: Europe; lecto: BM, *vide* L.Hedenäs (1996).

Illustrations: E.Nyholm, *The Moss Flora of Britain and Ireland* 550. (1965); A.J.E.Smith, *The Moss Flora of Britain and Ireland* 593 (1978); H.A.Crum & L.E.Anderson, *Mosses of Eastern North America* 2: 1054 (1981); L.Hedenäs, *op. cit.* 66, fig. 5G, H (2002).

Dioicous. Plants medium-sized or occasionally robust, irregularly to pinnately branched, green or yellow-green. Stem leaves erecto-patent to patent, slightly more erect when dry, usually straight, occasionally slightly homomallous, concave, faintly to strongly plicate, rarely smooth, ovate, triangular, cordate or broadly cordate, gradually narrowed to an acuminate apex; costa 48.5–63.0 μm wide near the base, smooth, in branch leaves occasionally ending in a short abaxial spine; margin denticulate or finely denticulate, plane, occasionally recurved near the base. Median laminal cells 69.5–168.0 \times 8.5–11.5 μm , smooth; alar cells short-rectangular to short-linear, \pm strongly inflated, narrower near the margin, thin-walled, forming a large well-defined transversely triangular group, extending from the margin 40–80% of the distance to the leaf centre at insertion. Proximal branch leaves orbicular or broadly ovate, with a rounded and sometimes apiculate apex. Seta mammillose throughout.

Occurs in N.S.W., A.C.T., Vic. and Tas.; on the ground, on rocks, logs and tree trunks, in wet or moist habitats, sometimes periodically flooded, often in or beside creeks and rivers, in forested or more open environments; reported from altitudes of 350–1600 m in mainland Australia, down to the sea level in Tas. Widespread in North America and Eurasia, also reported from Chile and Kerguelen Island.

N.S.W.: head of Genoa R., *H.Streimann* 2012 (CANB). A.C.T.: Dingo Dell area, *N.T.Burbidge* 6884 (S). Vic.: Alpine Rd, *H.Streimann* 49431 (CANB). Tas.: Ridgeway Reservoir, *A.V.Ratkowsky* H671 (CANB); Seaview Farm, *J.A.Curnow* 2434 (CANB, S).

This species differs from *B. latinervium* in its well-differentiated, transversely triangular alar groups consisting of strongly inflated cells, the narrower costa, and narrower laminal cells in the stem leaves. Only dioicous specimens have been seen from Australia, but autoicous specimens rarely occur in Europe and Macaronesia. While large, sharply delimited alar groups of \pm strongly inflated cells are usually diagnostic for *B. rivulare*, some phenotypes of *B. rutabulum* have slightly wider alar cells than normal, and these specimens can be difficult to assign to either species. The haploid chromosome numbers 5, 6, 11, 12, 13 and 16 have been reported from North America and Eurasia (R.Fritsch, *op. cit.*).

7. *Brachythecium rutabulum* (Hedw.) Schimp., in P.Bruch, W.P.Schimper & W.T.Gümbel, *Bryol. Europ.* 6: 15 (fasc. 52–54, Mon. 11) (1853)

Hypnum rutabulum Hedw., *Spec. Musc.* 276 (1801). T: Europe; lecto: G, *vide* L.Hedenäs (1996).

Brachythecium novae-valesiae Geh., *Rev. Bryol.* 3: 4 (1876). T: Sydney, N.S.W., *coll. unknown*; iso: BM, M.

Illustrations: G.A.M.Scott & I.G.Stone, *The Mosses of Southern Australia* 423, pl. 83 (1976); D.G.Catcheside, *Mosses of South Australia* 321, fig. 198 (1980); L.Hedenäs, *op. cit.* 66, fig. 5C, D (2002); D.Meagher & B.Fuhrer, *A Field Guide to the Mosses and Allied Plants of Southern Australia* 51 (2003); R.D.Seppelt, *The Moss Flora of Macquarie Island* 83, fig. 32 (2004).

Autoicous. Plants medium-sized to large, sparingly and irregularly or pinnately branched, green, yellow-green or dull green. Stem leaves erect and subimbricate to erecto-patent, straight or slightly homomallous, slightly shrunken when dry, concave, not or slightly plicate, ovate to broadly ovate or rounded-cordate, gradually or abruptly narrowed to an acuminate apex; costa 48.5–80.0 μm wide near the base, smooth; branch leaves with a costa rarely ending in a short and obtuse abaxial spine; margin denticulate or finely denticulate above, more strongly denticulate in branch leaves, often slightly recurved near insertion. Median laminal cells 61.0–153.5 (–172.0) \times 7.5–12.5 μm , smooth; alar cells short- to elongate-rectangular (occasionally quadrate), slightly broader than surrounding cells, thin-walled or slightly incrassate, in a group ranging from c. 10 indistinctly differentiated cells to a diffusely delimited ovate or transversely triangular group reaching 25–50% of the distance

from the leaf margin to the centre of the leaf at insertion. Proximal branch leaves ovate to almost orbicular, acute or with a rounded apex, often with a short apiculus. Seta mammillose throughout.

Occurs in S.A., Qld, N.S.W., A.C.T., Vic., Tas. and Macquarie Island; on the ground, on logs, on tree trunks and shrub stems, or on rocks, in moist or shaded habitats, in forest, on the banks of creeks and rivers and on swampy ground; in mainland Australia at intermediate elevations (mainly c. 400–1700 m), in Tasmania down to sea level. Also in New Zealand, Tierra del Fuego, North and Central America and Eurasia.

Qld: Killarney, 1897, *F.Whitteron* (NSW). N.S.W.: Bradneys Ck, *H.Streimann 7401* (CANB). A.C.T.: DeSalis Ck, *H.Streimann 4038* (CANB). Vic.: Razor Ck, *H.Streimann 50774* (CANB). Tas.: Maggs Mtn, *A.Moscal 13344* (CANB).

Brachythecium rutabulum is a rather nondescript and highly variable species that can be confused with *B. latinervium*, *B. rivulare*, *B. mildeanum* or *Rhynchostegium tenuifolium*. *Brachythecium rivulare* differs from *B. rutabulum* in having large transversely triangular, sharply delimited alar groups consisting of strongly inflated cells. *Brachythecium latinervium* differs in its broader and frequently forked costa and in its somewhat broader laminal cells in the stem leaves.

The haploid chromosome numbers 5, 6, 10, 10 + *m*, 11, 12, 13, 20, 22 and 24 have been reported from Eurasia (R.Fritsch, *op. cit.*).

8. *Brachythecium salebrosum* (Hoffm. ex F.Weber & D.Mohr) Schimp., in P.Bruch, W.P.Schimper & W.T.Gümbel, *Bryol. Europ.* 6: 20 (fasc. 52–54, Mon. 16) (1853)

Hypnum salebrosum Hoffm. ex F.Weber & D.Mohr, *Index Musc. Pl. Crypt.* 2[b] (1807); *Chamberlainia salebrosa* (Hoffm. ex F.Weber & D.Mohr) H.Robins., *Bryologist* 65: 105 (1962). T: Europe; lecto: G, *vide* L.Hedenäs & P.Isoviita (1996).

Illustrations: A.J.E.Smith, *The Moss Flora of Britain and Ireland* 591 (1978); H.A.Crum & L.E.Anderson, *Mosses of Eastern North America* 2: 1043 (1981); L.Hedenäs, *op. cit.* 58, fig. 2F, G (2002); R.D.Seppelt, *The Moss Flora of Macquarie Island* 85, fig. 33 (2004).

Autoicous. Plants medium-sized to rather large, almost unbranched or, usually, irregularly pinnately branched, yellowish green. Stem leaves erect to erecto-patent, subimbricate, more spreading when dry, straight or homomalous, concave, plicate, ovate, narrowly ovate or triangular-ovate, gradually narrowed to an elongate-acuminate apex; costa 42–88 μm wide near the base, smooth or ending in a spine on the abaxial surface, especially in branch leaves; margin finely denticulate or denticulate (rarely almost entire) above, more strongly denticulate in branch leaves, one or both sides partly or entirely recurved from the leaf base to the lower acumen. Median laminal cells 54–149 \times 8.0–10.5 μm , smooth; alar cells oblate, quadrate or rectangular, not inflated, regular, thin-walled or slightly incrassate, in distinct rounded-squarish ovate or broadly ovate groups. Proximal branch leaves suborbicular to ovate, with a square, rounded-apiculate or short-acuminate apex. Seta smooth.

Occurs in Qld, N.S.W., A.C.T., Vic. and Tas.; on grassy or open ground, on soil-covered rocks and on tree trunks, in open and forested habitats, occasionally on river banks, at c. 350–1650 m. Also in the Kerguelen Islands (Indian Ocean), New Zealand and Macquarie Island, and widespread in North America and Eurasia.

Qld: Brisbane, *M.Fleischer B2758* (AD). N.S.W.: Abercrombie Caves, *H.Streimann 45017* (CANB, S). A.C.T.: Smokers Gap, *H.Streimann 2559* (CANB). Vic.: Buckland R., *H.Streimann 50702* (CANB). Tas.: Maria Is., *W.A.Weymouth 899* (H).

Brachythecium salebrosum is most similar to *B. albicans* among the Australian species, but the leaves are not so distinctly imbricate as in the latter, are somewhat more rigidly plicate, the alar groups do not extend up along the basal leaf margins, the leaf margins are more strongly denticulate, and the costa, especially in the branch leaves, more often ends in an abaxial spine that is usually stronger than in *B. albicans*. For the differences between *B. salebrosum* and *B. paradoxum*, see the notes under the latter. The haploid chromosome numbers 10 + *m*, 12 + *m*, 13 and 13 + *m* are known from Eurasia (R.Fritsch, *op. cit.*).