

ARCHIDIACEAE

Ilma G. Stone†

Archidiaceae Schimp., *Coroll. Bryol. Eur.* 5 (1856).

Type: *Archidium* Brid.

Autoicous, paroicous or synoicous. Plants annual or perennial, gregarious or scattered, terrestrial, 3–30 mm tall, yellowish or green, rarely pinkish. Stems erect or prostrate, frequently branched by sterile and fertile innovations, usually with a central strand, 2 layers of large thin-walled inner cortical cells and an outer cortex of 1 or 2 layers of similar or distinctly smaller cells. Rhizoids smooth, pale to deep brown, sometimes with propagules. Leaves erect to spreading, often clasping at the base, narrowly oblong, linear, lanceolate or ovate; apex obtuse, acute to acuminate or subulate; margin plane, incurved or recurved, entire to serrulate; laminal cells smooth, variously shaped (often in the same leaf); costa subpercurrent to excurrent, rarely absent or failing in mid-leaf; cells usually \pm uniform in cross-section.

Gametoecia axillary or terminal. Perichaetial leaves mostly larger than stem leaves, sheathing; basal part often pale. Calyptra minute. Sporogone immersed. Setae absent. Capsules globose, cleistocarpous, gymnostomous; columella absent; exothecial cells large, irregularly hexagonal, yellowish to blackish; stomata absent. Spores few per capsule, large, polyhedral, 50–300 μ m long; intine thick; exine smooth or papillose.

A monotypic family of approximately 30 species, widely distributed in tropical and temperate regions, but mostly native to Australia (16 species and three other distinct, but undescribed taxa) and Africa (14 species). Six of the named Australian taxa are endemic. The family was revised by J.A.Snyder (1975) who divided it into two subgenera. Subgenus *Archidium*, the only one occurring in Australia, is further subdivided into four sections, three of which, *Nanarchidium* Snider, *Protobium* Müll.Hal. and *Phascoidea* G.Roth, occur in Australia.

The family is characterised by the unique sporogone and large, distinctive spores, a delicate calyptra consisting mostly of archegonial neck, with remnants often attached to the vaginula, a bulbous foot embedded in a cup-shaped vaginula, a sessile capsule lacking an apiculus, with a single-layered wall at maturity and separated from the spore sac by a bell-shaped airspace.

Opinions regarding some features of sporogone morphogenesis vary and have been discussed by Snyder (1975a, b) and Stone (1973, 1987). In contrast, the vegetative plant throughout the family is extremely variable and can resemble, for example, *Bryum*, *Campylopus*, *Eccremidium*, *Ditrichum*, *Splachnobryum* or *Ephemerum*. When lacking sporogones, species of *Archidium* are usually recognisable by a costa that lacks stereids, and readily deciduous innovations and perichaetia that join the stem by a single, short, haustorial cell. Regeneration commonly occurs by new shoots from buried, moribund stems and rhizoidal tubers which are not uncommon in several species. Plants are often soil-encrusted and eroded and this, combined with variation in shape and areolation of leaves from stem, branches and innovations, makes delimitation of species difficult. Several species are efficient soil binders, having seasonal increments by repeated fertile and sterile innovations and copious rhizoids that become infiltrated and compacted with soil.

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ARCHIDIUM

Archidium Brid., *Bryol. Univ.* 1: 747 (1826); from the Greek *archi* (first), referring to its presumed primitive nature.

Type: *A. phascooides* Brid. [= *A. alternifolium* (Dicks. ex Hedw.) Schimp.]

Description as for the family.

Bistratose juxtacostal cells are included in the costal width which is measured in transverse section throughout.

- | | | |
|----|---|---------------------------|
| 1 | Costa absent or failing in mid-leaf; autoicous or paroicous; plants ephemeral..... | 2 |
| 1: | Costa subpercurrent, percurrent or excurrent; autoicous or, occasionally, with archegonia only; plants perennial..... | 3 |
| 2 | Plants stemless; protonema persistent, alga-like, green to red-brown; leaves ovate to lanceolate, minute, bract-like, ecostate; margin bluntly serrate; paroicous (1)..... | 9. A. minutissimum |
| 2: | Stems to c. 5 mm long; aerial and subterranean rhizoids with unicellular tubers; leaves mostly linear-lanceolate, lax, with the costa failing in mid-leaf; margin entire; autoicous | 16. A. watsii |
| 3 | Protonema persistent, compact, cushion-like (1:)..... | 15. A. thaliferum |
| 3: | Protonema usually lacking, or otherwise not persistent | 4 |
| 4 | Median cells of upper and perichaetial leaves variously quadrate, short-rectangular, trapezoidal or rhomboidal in the same leaf; if \pm uniform, then alar cells of stem leaves quadrate to short-rectangular, not sharply differentiated in length from median cells [sect. <i>Phascoidea</i>] (3:) | 5 |
| 4: | Median cells of upper and perichaetial leaves usually uniform, either rhomboidal-hexagonal, linear-rhomboidal, long-rectangular or prosenchymatous; if areolation irregular the alar cells of stem leaves \pm quadrate, much shorter than median cells, forming 2–8 rows of differentiated cells extending 4–16 or more cells along basal margin [sect. <i>Protobium</i>]..... | 9 |
| 5 | Innovation leaves julaceous or subjulaceous; stem and innovation leaves mostly less than twice as long as wide; margin plane to incurved (SE Australia) (4)..... | 6 |
| 5: | Innovation leaves not julaceous; stem and innovation leaves mostly more than twice as long as wide; margin plane to slightly recurved (mostly tropical) | 7 |
| 6 | Stem and innovation leaves with obtuse or truncate apices; margin cristate-denticulate; innovations julaceous (5)..... | 5. A. clavatum |
| 6: | Stem and innovation leaves with acute apices; margin \pm entire to weakly crenulate; innovations subjulaceous or julaceous..... | 13. A. stellatum |
| 7 | Innovation and stem leaves lanceolate to narrowly triangular, acuminate; upper leaves to 1.5 mm long; costa usually percurrent; capsules terminal (5:)..... | 11. A. rehmannii |
| 7: | Innovation and stem leaves ovate to lanceolate, acute or acuminate; upper leaves to 1 mm long; costa usually subpercurrent or excurrent; capsules lateral and terminal | 8 |

- 8 Costa of innovation leaves usually excurrent; perichaetial leaves narrowly acuminate or long-subulate; costa strongly excurrent or occasionally percurrent; epidermal cells of stem c. 10 μm wide (7:) **3. A. capense**
- 8: Costa of innovation leaves usually subpercurrent; perichaetial leaves with a short-ligulate flattened subula, often retrorse, occasionally gradually acuminate; costa usually subpercurrent; epidermal cells of stem 12–15 μm wide..... **17. Archidium** sp. **A**
- 9 Costa in middle of stem leaves 20–65 μm wide (4:)..... 10
- 9: Costa in middle of stem leaves 65–150 μm wide 18
- 10 Mid-leaf cells lax, rectangular, rhomboidal or fusiform, 50–130 \times 12–30 μm ; quadrate alar cells lacking; costa subpercurrent to percurrent (9) 11
- 10: Plants lacking this combination of characters..... 13
- 11 Perichaetial leaves with margins narrowly recurved above (10) **14. A. subulatum**
- 11: Perichaetial leaves with margins plane or incurved 12
- 12 Mid-leaf cells rectangular to linear-rhomboidal, 4–8 times longer than wide; perichaetial leaves linear-lanceolate, narrowly acuminate to setaceous (11:)..... **7. A. indicum**
- 12: Mid-leaf cells mostly ellipsoidal-fusiform, to 4 times longer than wide; perichaetial leaves lanceolate to ovate or oblong-lanceolate, acute, sometimes short-acuminate **4. A. clarksonianum**
- 13 Costa of upper stem leaves subpercurrent to percurrent, occasionally short-excurrent (10:) 14
- 13: Costa of upper stem leaves usually distinctly excurrent, sometimes hyaline at apex and forming a hairpoint 16
- 14 Stem leaves erect-appressed, ovate-lanceolate, acute, mostly to 3 times as long as wide; costa usually subpercurrent, occasionally percurrent (13) **2. A. brevinerve**
- 14: Stem leaves erecto-patent, ovate-lanceolate to triangular, often acuminate, 4 or more times as long as wide; costa subpercurrent to excurrent..... 15
- 15 Median cells of stem leaves mostly 30–50 μm long; costa with (2 or) 3 rows of adaxial cells, usually subpercurrent, rarely excurrent; costa of perichaetial leaves usually percurrent (14:)... **1. A. birmanicum**
- 15: Median cells of stem leaves mostly 50–90 μm long; costa with 2 rows of adaxial cells, percurrent to short-excurrent; costa of perichaetial leaves excurrent **10. A. ohioense**
- 16 Stem leaves ovate to ovate-lanceolate; costa usually long-excurrent, frequently hyaline; perichaetial leaves usually less than 1 mm long, less than 3 times longer than wide; costa weak, not excurrent or short-excurrent from an acumen (13:)..... **12. A. rothii**
- 16: Stem leaves usually lanceolate; costa percurrent to short-excurrent; perichaetial leaves usually more than 1 mm long, c. 4 times longer than wide; costa usually excurrent, frequently hyaline 17
- 17 Plants 1.5–5.0 mm tall; median cells of perichaetial leaves 7–11 μm wide, narrowly prosenchymatous, usually very thick-walled (16:) **8. A. microthecium**
- 17: Plants 2–15 mm tall; median cells of perichaetial leaves 9–14 μm wide, rhomboidal to prosenchymatous, not thick-walled **10. A. ohioense**
- 18 Stem leaves lacking alar cells; median cells mostly \pm rectangular, lax; costa usually less than 70 μm wide, with 2–5 rows of adaxial cells (9:) **7. A. indicum**
- 18: Stem leaves with alar and basal cells quadrate to short-rectangular; median cells mostly rectangular or rhomboidal; costa 70–150 μm wide, with 4–8 or more rows of adaxial cells 19
- 19 Costa of upper stem leaves usually excurrent or long-excurrent in a slender point (18:)..... **18. Archidium** sp. **B**
- 19: Costa of upper stem leaves subpercurrent or percurrent, occasionally short-excurrent..... 20
- 20 Stem leaves linear-lanceolate, loosely spreading, often \pm squarrose, flexuose, deeply channelled, usually 5–7 times longer than wide; apex attenuated; margin usually plane; lamina at base of stem leaves 3–6 cells wide between margin and costa (19:)..... **19. Archidium** sp. **C**
- 20: Stem leaves lanceolate, erect to spreading, not flexuose, concave, mostly 3–5 times longer than wide; apex acute to acuminate; margin usually narrowly recurved; lamina at base of stem leaves more than 6 cells wide between margin and costa **6. A. elatum**

1. *Archidium birmanicum* Mitt. ex Dixon, *J. Indian Bot.* 2: 175 (1921)

T: Karwar, India, 1919, *Sedgwick (H.N.Dixon 6383)*; holo: BM, *fide* J.A.Snider, *J. Hattori Bot. Lab.* 39: 143 (1975); iso: G, H-BR, L.

Illustrations: H.C.Gangulee, *Mosses of Eastern India and Adjacent Regions* 2: 173, fig. 79 (1971); J.A.Snider, *J. Hattori Bot. Lab.* 39: 179, pl. 18; 196, pl. 35 (344) (1975); A.Eddy, *Handb. Malesian Mosses* 1: 27, fig. 17 (1988).

Autoicous. Plants loosely tufted, lax, 5–25 mm tall. Stem in T.S. similar to that of *A. ohioense* (see below). Leaves suberect to laxly patent, lanceolate, 0.8–1.2 mm long, 3–5 times longer than wide; apex acute to acuminate; margin \pm entire; costa usually subpercurrent, 35–50 μ m wide, in T.S. \pm hemispherical, with 2 or 3 large adaxial cells, otherwise similar to *A. ohioense*; laminal cells mostly in regular rows, rectangular to rhomboidal, in mid-leaf 20–40 \times 8–12 μ m, usually shorter towards margin and longer and broader towards costa, at base 30–80 \times 10–15 μ m; alar cells usually in 1 or 2 rows, mostly short-oblong to quadrate.

Perigonia mostly terminal (not seen). Perichaetia lateral near apex. Perichaetial leaves somewhat broader than upper vegetative leaves; costa percurrent to slightly excurrent; laminal cells lax, mostly larger than in vegetative leaves. Sporogone not seen.

Occurs in northern N.T. and north-eastern Qld; also in India, Burma and New Guinea.

N.T.: Hemple Bay, Groote Eylandt, *R.L.Specht M2 & M3* (AD); c. 25 km NW of Jabiru, Kakadu Natl Park, *L.A.Craven & G.Whitbread 6791* (AD, CANB); Manton R., between Katherine and Darwin, *A.C.Beauglehole 13784* (MEL). Qld: 2 km S of Wilderness Lodge, Cape York, *I.G.Stone 25597* (MEL); Lakefield Natl Park, Cape York, *I.G.Stone 25582* (MEL).

Distinguished from *A. indicum* by the abaxially more prominent costa and the denser areolation, and from *A. ohioense* by fewer, less well-defined, quadrate alar cells, denser areolation, and the costa of perichaetial leaves which is not long-excurrent.

The Hemple Bay specimen was originally reported as *Pseudephemerum nitidum* (Hedw.) Reim. (D.G.Catcheside, in R.L.Specht & C.P.Mountford, *Records of the American-Australian Scientific Expedition to Arnhem Land* 3(8): 169, 1958) and later as *A. indicum* (D.G.Catcheside & I.G.Stone, *J. Adelaide Bot. Gard.* 11: 2, 1988).

2. *Archidium brevinerve* P. de la Varde, *Rev. Bryol. Lichénol.* 6: 133 (1934)

T: Rochers de Coum près Nzamalèu, Gabon, *coll. unknown*; lecto: PC, *fide* J.A.Snider, *J. Hattori Bot. Lab.* 39: 140 (1975).

Illustrations: J.A.Snider, *J. Hattori Bot. Lab.* 39: 174, pl. 14; 197, pl. 36 (1975).

Autoicous. Plants 5–9 mm tall, green to yellowish green, gregarious. Stems erect, not flexuose, simple or 1- or 2-branched; epidermal cells much narrower than cortical cells, the latter with dense contents. Leaves erect-appressed when dry, erect to erecto-patent when moist, \pm uniform except a few bract-like leaves below, channelled or concave, ovate to ovate-lanceolate, 0.6–0.9 mm long, 0.25–0.30 mm wide; apex acute to acuminate; margin entire, serrulate above, often partly recurved; costa usually subpercurrent, in mid-leaf 30–45 μ m wide, in T.S. with cells \pm undifferentiated, 2 or 3 adaxial, 1 or 2 central and 5–7 slightly smaller abaxial. Laminal cells firm-walled, fusiform to hexagonal or rhomboidal above, in mid-leaf rectangular or rhomboidal, 20–40 \times 10–12 μ m, at base 20–30 \times 10–14 μ m, in alar region quadrate to short-rectangular, 11–18 \times 13–18 μ m, in 3 or 4 rows, extending 5–10 cells up margin.

Perichaetia axillary, \pm sessile or on a very short branch. Perichaetial leaves as long as or slightly longer than vegetative leaves, more acuminate; costa percurrent to short-excurrent; laminal cells mostly broader, lax, rhomboidal, fusiform or rectangular, 15–40 \times 10–15 μ m, longer and rectangular below, 50–80 \times 10–18 μ m. Only immature capsules seen.

Very rare and known from only one locality in north-eastern Qld; also collected once in equatorial Africa.

Qld: Murray Falls, N of Cardwell, *I.G.Stone 24920* (MEL).

Archidium brevinerve is reported for the first time from Australia, with the Australian specimen closely resembling the lectotype. It differs from *A. ohioense* and *A. rothii* in the subpercurrent costa and from *A. birmanicum* in the straight stem and the longer and less spreading perichaetial and stem leaves.

3. *Archidium capense* Hornsch., *Linnaea* 15: 135 (1841)

T: Cape of Good Hope, South Africa, 1827, *Ecklon*; lecto: H-BR; iso: S-PA, *vide* J.A.Snider, *J. Hattori Bot. Lab.* 39: 148 (1975).

Illustrations: G.Roth, *Aussereur. Laubm.* 1: pl. 10 (12) (1911); J.A.Snider, *J. Hattori Bot. Lab.* 39: 185; pl. 24; 198, pl. 37 (354) (1975); R.E.Magill, *Fl. Southern Africa: Bryophyta* 1(1): fig. 20 (1–10) (1981).

Autoicous. Stems 1–10 mm tall, sometimes branching by innovations from axils of outer perichaetial leaves or lower down, in T.S. with 1 or 2 rows of smaller c. 10 µm wide cells outside the large cortical cells. Leaves erect when dry, erecto-patent when moist, ovate or triangular to lanceolate 0.5–1.2 mm long; margin usually minutely serrulate; costa usually excurrent, filling subula, broad, channelled, 80–100 µm or more wide, in T.S. crescent-shaped, mostly 3 or 4 cells thick, with up to 8 large adaxial cells, abaxial side ±rough, with smaller often prorate cells; laminal cells not uniform in shape, narrower above, 30–50 × 5–10 µm, median cells 20–40 × 8–10 µm, alar cells 10–25 × 10–15 µm.

Perichaetia terminal, often on almost leafless shoots, and terminal on short lateral branches, sometimes axillary, sessile. Perichaetial leaves with a concave sheathing base, subulate, sometimes secund; margin slightly recurved in upper part of concave sheathing base; costa wide, filling subula, usually excurrent, in T.S. as in stem leaves; laminal cells in mid-leaf ±rectangular to rhomboidal, 25–40 × c. 10 µm, narrower for a few marginal rows. Capsules immature.

Occurs in northern W.A., southern S.A. and north-eastern Qld; forms cushions on sandstone shelves. Also in South Africa.

W.A.: summit of arm of Bungle Bungle Massif, SE Kimberley, *S.J.Forbes 2632* (MEL). S.A.: between Mitcham and Belair, *G.H.Bell 1503* (AD). Qld: near Frangipanni Bay, tip of Cape York Penin., *I.G.Stone 25591* (MEL); Porter Ck, Cardwell, *I.G.Stone 23150B, 23152* (MEL); Davies Creek Rd, Mareeba, *I.G.Stone 12293D* (MEL).

Plants of two kinds occur in Australia: those from W.A. are smaller with stem and innovation leaves not much longer than wide, as in the type of *A. campylodium* Müll.Hal., a synonym of *A. capense* (Snider, 1975). Specimens from S.A. and Qld have longer, ovate to lanceolate leaves more like the type of *A. capense*, but sometimes with numerous axillary perichaetia near the base of longer stems, the terminal perichaetia on shorter shoots arising from old, buried stems.

4. *Archidium clarksonianum* I.G.Stone, *J. Hattori Bot. Lab.* 82: 271 (1997)

T: Wallaman Falls road, west of Ingham, Qld, *I.G.Stone 21207B*; holotype: MEL.

Illustrations: I.G.Stone, *op. cit.* 271, fig. 1; 274, fig. 2; 275, fig. 3.

Plants perennial, 2–9 mm tall, yellow-brown, scattered or gregarious. Stems very lax, arising from buried stems of the previous year, from rhizoidal gemmae or from robust stoloniferous rhizoids, sometimes with lateral innovations from below the perichaetium. Rhizoids sometimes very coarse, with swollen brown moniliform thick-walled propagating cells. Leaves small and distant below, larger and comose above, ovate-lanceolate, oblong or lanceolate, 1.0–1.6 mm long, 0.3–0.5 mm wide; apex acute to short-acuminate; margin plane or incurved, entire to weakly crenulate, bordered (except at the apex and base) by a single row of narrow prosenchymatous cells 5–10 µm wide, with firm yellow walls; costa subpercurrent to percurrent, in mid-leaf 20–30 µm wide, in T.S. mostly with 2 large adaxial cells, 3 or 4 smaller abaxial and 1 or 2 central cells; laminal cells very lax, thin-walled, mostly prosenchymatous above, elliptic-fusiform in mid-leaf and rectangular at the base, 10–12 µm wide above, 70–130 × 15–30 µm in mid-leaf and base.

Perichaetia terminal. Perichaetial leaves 1.4–2.4 mm long, similar to comal stem leaves; costa 30–50 µm wide, sometimes with a trace below mid-leaf.

Endemic to northern N.T. and north-eastern Qld; grows on damp, silty earth, often under *Melaleuca* trees, occasionally on roadside or creek banks in partial shade, usually mixed with other mosses but sometimes forming discrete colonies.

N.T.: Jim Jim Falls, Kakadu Natl Park, *I.G.Stone* 23435, 23438 (MEL). Qld: c. 3 km S of Wilderness Lodge, Cape York Penin., *I.G.Stone* 25598 (MEL); “Heathlands”, Cape York Penin., 14 June 1984, *M.Godwin* [*I.G.Stone* 23019] (MEL); Kellahers, Cooktown, *I.G.Stone* 25436 & *R.Robertson* (MEL).

Archidium clarksonianum differs from *A. indicum* in having perichaetial leaves that are lanceolate to ovate-lanceolate and less than 5 times as long as wide, fusiform-elliptical mid-leaf cells and consistently narrow marginal cells. The leaves are similar to those of the African *A. laxirete* P. de la Varde which was described by Snider (1975) as a synoicous, ephemeral moss.

5. *Archidium clavatum* I.G.Stone, *Muelleria* 2: 199 (1973)

T: Mt Tarrengower, near Maldon, Vic., 17 Oct. 1971, *I.G.Stone* 7033; holo: MEL; iso: DUKE, MEL.

Illustrations: *I.G.Stone*, *op. cit.* 200, fig. 58; 205, fig. 59; 207, fig. 60; pl. 25; *J.A.Snider*, *J. Hattori Bot. Lab.* 39: 191, pl. 30; 200; pl. 39 (361) (1975).

Autoicous. Plants 2–5 mm tall; branching, julaceous; sterile innovations 1 or 2, clavate, from the axils of lower perichaetial leaves. Leaves erect, appressed, broadly ovate, concave, c. 0.4–0.6 mm long; apex obtuse, often truncate; margin entire below, cristate-denticulate above; costa subpercurrent, broad, shallow, 60–100 µm wide; laminal cells 8–10 µm wide, short-rhomboidal to hexagonal above, short-rectangular below.

Perigonia terminal on short branches. Perichaetia terminal. Perichaetial leaves 7–9; upper ones c. 1.3–1.5 mm long; costa and margin as in vegetative leaves; laminal cells irregularly 3–5-sided, in mid-leaf mostly rhomboidal or trapezoidal, c. 11–16 µm wide and 3–4 times longer than wide, incassate, mostly smaller in marginal and apical regions; at base with a marginal strip of pale thin-walled ±rectangular cells.

Known from only one locality in central Vic.; grows embedded in gravelly detritus with gelatinous algae, lichens and bryophytes in a depression in granite rock; also reported from Brazil (*D.M.Vital*, pers. comm.).

Vic.: Mt Tarrengower, near Maldon, *I.G.Stone* 7088 (MEL).

This species is characterised by the cristate-denticulate margins of the vegetative and perichaetial leaves, the denticulations usually composed of finger-like projections from distal and proximal ends of adjoining cells.

6. *Archidium elatum* Dixon & Sainsbury, in G.O.K.Sainsbury, *Trans. Roy. Soc. New Zealand* 75: 169 (1945)

T: Ahipara, Northland, New Zealand, *H.B.Matthews* 335 [*Sainsbury* 961]; holo: WELT; iso: BM, NY, S-PA.

Illustrations: *G.O.K.Sainsbury*, *Bull. Roy. Soc. New Zealand* 5: 71, pl. 9, fig. 1 (1955); *J.A.Snider*, *J.Hattori Bot. Lab.* 39: 181, pl. 20 (200–205); 196, pl. 35 (347) (1975).

Australian plants sterile. Stems 0.7–20 mm tall, simple or branched, in T.S. with outer cortex of 2 layers of small cells. Leaves erecto-patent, crowded above, spreading below, clasping, concave, narrowly lanceolate, 0.6–1.5 mm long, 0.15–0.30 mm wide; apex acute or acuminate; margin often narrowly recurved in mid-leaf, entire or weakly serrulate above; costa subpercurrent to percurrent, in mid-leaf 80–120 µm wide, in T.S. crescent-shaped, 2 or 3 cells thick, with up to 8 adaxial cells; laminal cells near leaf apex c. 5–10 µm wide, prosenchymatous, in mid-leaf rectangular to oblong-rhomboidal, 20–40 × 9–12 µm, in alar region subquadrate to short-rectangular, c. 10–12 µm wide, often extending to a quarter of the leaf length, at base usually with more than 6 cells between costa and margin.

Perichaetia axillary or terminal. Inner perichaetial leaves oblong, sheathing, contracted to a subula; margin often narrowly recurved above mid-leaf; costa similar but narrower than in

stem leaves; cells of limb narrowly hexagonal, rectangular to rhomboidal, c. 35–55 × 10–15 µm, in sheath very thin-walled, loosely hexagonal, c. 50–70 × c. 15 µm, gradually shorter upwards, with marginal cells narrower and shorter.

Gregarious and binding sandy soil on creek banks or in rock crevices in north-eastern Qld and near Sydney, N.S.W.; also in New Zealand.

Qld: Blencoe Ck, Herberton, *I.G.Stone* 22422, 22423, 23238 (MEL); Attie Ck, Cardwell, *I.G.Stone* 22361, 23178 (MEL). N.S.W.: Ku-ring-ai Chase Wildflower Reserve, near Sydney, *I.G.Stone* 17653 (MEL).

7. *Archidium indicum* Müll.Hal., *Flora* 71: 8 (1888)

T: Northern Pegu Yomah, Burma, *S.Kurz* 2889; lecto: S-PA; *vide* J.A.Snider, *J. Hattori Bot. Lab.* 39: 145 (1975); isolecto: FH, L, NY, S-PA.

Illustrations: G.Roth, *Aussereur. Laubm.* 1: t. 11 (9a–c) (1911); J.A.Snider, *J. Hattori Bot. Lab.* 39: 181, pl. 20 (193–199); 196, pl. 35 (345) (1975).

Sterile. Plants scattered or tufted, 3–20 mm tall, yellow to yellow-brown. Stems simple or branched, lax; tubers moniliform. Leaves lax, usually distant, erecto-patent, linear-lanceolate to elliptic, 0.7–1.5 mm long, c. 4–8 times longer than wide; apex acuminate or acute; margin entire; costa subpercurrent to percurrent, 30–70 µm wide, in T.S. 3 cells thick with mostly 3–5 thin-walled adaxial cells, abaxial cells usually similar, central cells few, similar or substereid; laminal cells thin-walled, loosely rectangular, in mid-leaf 50–100 × 12–20 µm (some shoots with median cells only 7–10 µm wide), narrower above and sometimes at margins, at base mostly 12–25 µm wide.

Perigonia not seen. Perichaetia terminal on short suberect branches or lateral. Perichaetial leaves lanceolate-subulate or linear-lanceolate, gradually acuminate or setaceous, 1.8–2.4 mm long, 5–8 times longer than wide; costa subpercurrent or percurrent; laminal cells thin-walled, rectangular to rhomboidal, at apex 40–60 µm long and c. 10 µm wide, in mid-leaf 60–150 × 12–20 µm wide, at margin sometimes narrower, at base shorter and wider. Sporophyte not seen.

Occurs in monsoonal forests in northern W.A. and N.T.; also in India, Sri Lanka and Burma.

W.A.: Maragui Promontory, Prince Regent River Reserve, West Kimberley, *K.F.Kenneally* 2124 (MEL, PERTH); King Edward R., *D.J.Edinger* 581 (AD). N.T.: Malabanbandju, Kakadu Natl Park, *I.G.Stone* 23364, 23365 (MEL); Katherine Gorge, *L.A.Craven* 6740 (AD, CANB); Tallaputta Spring, *J.H.Willis s.n.* (AD, MEL).

The Australian plants appear to be closest to *A. indicum*, with similar costal structure but mostly with shorter leaves. However, as in the holotype, plants, even individuals of the same colony, are often very variable in areolation.

8. *Archidium microthecium* Dixon & P. de la Varde, *in* P. de la Varde, *Ann. Cryptog. Exot.* 1: 37 (1928)

T: Kodaikanal, India, *Foreau* 211; holo: BM; iso: PC *n.v.*

Illustrations: J.A.Snider, *J. Hattori Bot. Lab.* 39: 176, pl. 15 (125–134); 198, pl. 37 (355) (1975); R.E.Magill, *Fl. Southern Africa: Bryophyta* 1(1): fig. 18 (17–22) (1981).

Autoicous. Plants 1.2–5.0 mm tall; innovations subperichaetial, usually with rhizoids at base. Leaves bract-like below, lanceolate above, 0.4–0.9 mm long, 0.17–0.20 mm wide; apex acute or acuminate; costa rounded, 25–35 µm wide, percurrent or excurrent in a brittle arista to 250 µm long; median laminal cells rhomboidal to prosenchymatous, 25–50 µm long, usually incrassate; alar cells thinner-walled, often quadrate to short-rectangular, 8–11 µm wide. Perigonia usually terminal; perigonal leaves 3 or 4, the outermost lanceolate, to 0.7 mm long, with an excurrent costa; inner 2 short, ovate-apiculate, 0.3–0.4 mm long.

Perichaetia subterminal, sessile or sometimes terminal. Perichaetial leaves oblong-lanceolate, acuminate, 0.7–1.2 mm long; margin entire to weakly serrulate, sometimes narrowly recurved above; costa narrow, 30–40 µm wide, usually long-excurrent; cells in mid-leaf prosenchymatous, 60–100 × 10–12 µm, thick-walled with narrow lumina, rectangular below, hyaline in the alar region. Sporophyte not seen.

Rare in N.T. and north-eastern Qld; also in South Africa and India.

N.T.: Katherine Gorge, *I.G.Stone 23309 p.p.* (MEL). Qld: Porter Ck, Cardwell, *I.G.Stone 23150.01* (MEL).

The stems are often almost leafless, with a terminal perigonium and subtending perichaetia in the N.T. collections, whereas in the Qld material the perichaetia are terminal on the main stem and lateral branches.

9. *Archidium minutissimum* I.G.Stone, *J. Bryol.* 13: 353 (1985)

T: S of Cooktown, Qld, 5 June 1984, *I.G.Stone 22050*; holo: MEL; iso: MEL.

Illustrations: I.G.Stone, *op. cit.* 354, fig. 1; 355, fig. 2.

Paroicous. Plants *Ephemerum*-like, almost acaulescent, 0.3–0.8 mm tall; protonema persistent, alga-like, pale green, reddening with age. Leaves, including perichaetial leaves, few, scale-like, erecto-patent or secund, green to red-brown, ovate or lanceolate, 0.2–0.7 mm long, ecostate; apex acute to finely acuminate, twisted or truncate; margin bluntly serrate; laminal cells elongate-rectangular to rhomboidal, 30–70 × 10–15 µm.

Antheridia solitary in leaf axils. Capsules minute, 200–250 µm diam. Spores 16 (–36), 70–100 µm long.

Endemic to north-eastern Qld, at bases of *Melaleuca* trees bordering freshwater lagoons and mangrove swamps subject to inundation at extreme high tides; very rare, known only from a few localities near Cooktown.

Qld: near mouth of Alligator Ck, Finch Bay, Cooktown, *I.G.Stone 22016, 22020* (MEL); Cooktown Botanic Gardens, *I.G.Stone 22033* (MEL).

Not found since the original collections were made in 1984.

10. *Archidium ohioense* Schimp. ex Müll.Hal., *Syn. Musc. Frond.* 2: 517 (1851)

T: Ohio, U.S.A., *Sullivant Musci Allegh.* 213; lecto: FH-SULL *n.v.*, *fide* J.A.Snider, *J. Hattori Bot. Lab.* 39: 135 (1975); isolecto: BR, CU, FH, G, L, LD, MICH, MIN, NY, US, W; all *n.v.*

Illustrations: J.A.Snider, *op. cit.* 172, pl. 11; 173, pl. 12; 195, pl. 34 (1975); H.A.Crum & L.E.Anderson, *Mosses of Eastern North America* 1: 76, fig. 28; 77, fig. 29 (1981).

Autoicous. Stems 2–15 mm long, in T.S. with epidermal cells not much narrower than cortical cells. Leaves closely set, erect to erecto-patent, concave, amplexicaul, linear-lanceolate, 0.5–1.2 mm long, 3–6 times longer than wide; apex acuminate; margin ±entire; costa usually percurrent, sometimes excurrent, 25–40 µm wide, in T.S. round to semicircular, mostly 4 or 5 cells thick, with 2 large adaxial cells and central cells substereid; alar cells quadrate to short-rectangular, 12–15 µm wide, reaching to c. 12 cells up margin; median cells ±rhomboidal to elongate-hexagonal, 50–80 (–110) × 10–40 µm.

Gametoecia usually axillary. Perigonial leaves with costa usually excurrent. Perichaetial leaves ovate-lanceolate, 1.2–2.0 mm long, c. 4 times longer than wide, acuminate; costa excurrent, 35–50 µm wide. Capsules c. 400 µm diam. Spores c. 165 µm.

Occurs in north-eastern Qld; also in North America, West Indies, Africa, Mascarene Is., Sri Lanka, India, China, Japan and New Caledonia.

Qld: Millstream Falls, *I.G.Stone 19776* (MEL).

Capsules, so far only found axillary in Australian material, can be either terminal or lateral in American and African specimens. *Archidium ohioense* can be distinguished from *A. birmanicum* by the more tapered leaves, more regular median cells, more distinct alar cells and a usually long-excurrent costa of perichaetial leaves; from *A. rothii* by the longer and narrower stem leaves with percurrent (or short-excurrent) costa, longer laminal cells, quadrate alar cells that do not reach as far up the margin, and by the much larger perichaetial leaves with long-excurrent costae.

11. *Archidium rehmannii* Mitt., *J. Linn. Soc., Bot.* 22: 300 (1886)

T: Cape Town, South Africa, *Rehmann*; holo: NY; iso: S-PA.

Illustrations: G.Roth, *Aussereur. Laubm.* 1: pl. 11 (8) (1911); J.A.Snider, *J. Hattori Bot. Lab.* 39: 184, pl. 23; 201, pl. 40 (365) (1975).

Autoicous. Plants 5–15 mm tall; innovations numerous, subapical or from within perichaetia, as long as fruiting plant. Stems in T.S. with outer 1 or 2 rows of cells much narrower than cortical cells. Leaves erecto-patent when dry, patent when moist, ovate-lanceolate below, lanceolate above, to 1.5 mm long; apex acute to acuminate; margin entire to weakly serrulate; costa 50–70 μm wide, percurrent or slightly excurrent, in T.S. crescent-shaped, 2–4 cells thick; mid-leaf cells irregularly 4-sided, 10–30 \times 8–10 μm , narrower towards margin, longer above.

Perichaetia terminal. Perichaetial leaves broadly ovate-lanceolate, often falcate, abruptly subulate; costa crescent-shaped, percurrent to excurrent; laminal cells in mid-leaf mostly rhomboidal, 30–60 \times 10–11 μm , narrower towards margin. Capsules terminal. Spores c. 160 μm .

Occurs in W.A. in swampy areas on bare sand, mixed with *Leptocarpus aristatus* and *Eccremidium pulchellum*. Also in South Africa.

W.A.: Yule Brook Reserve (Cannington Swamp), 20 km SE of Perth, *R.Wyatt & A.Stoneburner 4118* (PERTH); Coomalloo, *I.G.Stone 6005* (MEL).

This species is characterised by the innovations with stiffly erect, narrowly lanceolate leaves with broad costae. Capsules are rare in Australia.

12. *Archidium rothii* Watts ex G.Roth, *Hedwigia* 54: 267 (1914)

T: Alice Springs, "Qld", [N.T.], *coll. unknown*; holo: S-PA; iso: NSW.

Illustrations: G.Roth, *Aussereur. Laubm.* pl. 10, fig. 6 (1914); J.A.Snider, *J. Hattori Bot. Lab.* 39: 178, pl. 17; 197, pl. 36 (350) (1975); D.G.Catcheside, *Mosses of South Australia* 60, fig. 8 (1980).

Autoicous. Stems 5–10 mm long, in T.S. similar to *A. ohioense* (see above). Leaves usually crowded, erect to erecto-patent, ovate to ovate-lanceolate, acuminate, 0.60–0.95 mm long, 0.3–0.5 mm wide; costa 35–42 μm wide, excurrent in a long and often spinulose arista, in T.S. similar to *A. ohioense*; laminal cells in mid-leaf rhomboidal-hexagonal, 23–70 \times 11–14 μm , in alar region quadrate, 12.5–23.0 μm wide, extending half to two-thirds up the margin. Moniliform rhizoidal gemmae sometimes present.

Perigonia axillary; bracts ovate, apiculate, 0.20–0.45 mm long, the costa weak or absent. Perichaetia usually axillary, sessile. Perichaetial leaves broadly sheathing, sometimes convolute, usually 0.5–1.0 mm long, 0.25–0.35 mm wide; apex narrowly acuminate; margin usually entire, often incurled; costa usually c. 26 μm wide, percurrent to short-excurrent; laminal cells thin-walled, lax, rhomboidal or prosenchymatous, 45–80 \times 13–18 μm . Sporogone not seen.

Endemic, common and widespread in inland to coastal areas of northern W.A., central and northern N.T., and in eastern Qld from Cape York south to Maryborough. An efficient earth-binder that forms dense turfs with numerous branches arising from old buried stems; often on earth paths with a compacted surface.

W.A.: Halls Creek, *I.G.Stone 23498* (MEL). N.T.: Mount Olga Gorge, *D.G.Catcheside 76.312* (AD, MEL). Qld: Christmas Ck, *M.Godwin [I.G.Stone 23021]* (MEL); Frangipanni Beach, Cape York, *I.G.Stone 25591* (MEL); Ferry St, Maryborough, *I.G.Stone 25815* (MEL).

Archidium rothii is distinguished from *A. ohioense* by the broader stem leaves, often with hoary points, alar cells extending further up the leaf margin, perigonial leaves with the costa weak or absent and shorter perichaetial leaves with the costa not or only slightly excurrent. The attenuated, twisted acumen can sometimes be mistaken for an excurrent costa.

13. *Archidium stellatum* I.G.Stone, *Muelleria* 2: 192 (1973)

T: near Neilborough, Vic., 14 Nov. 1968, *I.G.Stone* 30; holo: MEL; iso: MEL, NSW.

Illustrations: *I.G.Stone*, *op. cit.* 193, fig. 55; 195, pl. 23; 197, fig. 56; 198, fig. 57; J.A.Snider, *J. Hattori Bot. Lab.* 39: 189, pl. 28; 201, pl. 40 (364) (1975); D.G.Catcheside, *Mosses of South Australia* 58, fig. 6; 59, fig. 7 (1980).

Autoicous. Plants perennial, c. 3–5 mm tall. Stems erect, with a terminal perichaetium, branching within the perichaetium by 1–7 julaceous or subjulaceous innovations, bearing capsules at their apices. Leaves broadly ovate, apiculate, 0.1–0.5 mm long; margin entire to weakly crenulate; costa subpercurrent to percurrent; laminal cells quadrate to short-rectangular, in mid-leaf $10\text{--}20 \times 8\text{--}10 \mu\text{m}$.

Perigonia bud-like, terminal on lateral branches. Perichaetial leaves 1.0–1.9 mm long, ovate, abruptly narrowed to a short subula; margin \pm entire, sometimes slightly incurved; costa usually percurrent, in mid-leaf 90–100 μm wide; laminal cells in mid-leaf irregularly rectangular to rhomboidal, mostly $25\text{--}80 \times 8\text{--}12 \mu\text{m}$, shorter at margins, hyaline in alar region. Capsules 340–450 μm diam. Spores 140–150 μm , smooth to faintly ornamented.

Endemic to Vic. and south-eastern S.A.; common as dense turfs on road verges in lightly forested country and grassland.

S.A.: Bellevue Heights, above Sturt Valley, Adelaide, *D.G.Catcheside* 71.941 (AD). Vic.: Moyston, *I.G.Stone* 210 (MEL); Wannan Falls, *I.G.Stone* 9279 (MEL); Yarra Glen, *I.G.Stone* 14428 p.p. (MEL).

Habit variability is usually a response to levels of illumination; plants tend to be short and compact in full light, very elongated in very shaded habitats.

14. *Archidium subulatum* Müll.Hal., *Flora* 71: 7 (1888)

T: Cape of Good Hope, South Africa, 1876, *Rehmann*; lecto: S-PA, *fide* J.A.Snider, *J. Hattori Bot. Lab.* 39: 144 (1975).

Illustrations: G.Roth, *Aussereur. Laubm.* 1: Taf. 12 (10) (1911); J.A.Snider, *op. cit.* 180, pl. 19; 196, pl. 35 (346) (1975).

Autoicous. Plants densely tufted, 4–14 mm tall, pale green to yellowish. Fertile stems simple or fasciculately branched with both female and sterile subperichaetial innovations. Leaves distant, \pm uniform, 0.5–1.0 mm long, less than 4 times as long as wide, erecto-patent, ovate-lanceolate or narrowly lanceolate, acuminate; margin plane, sometimes recurved in uppermost part, entire to serrulate above; costa narrow, 20–40 μm wide, subpercurrent, filling leaf apex or slightly excurrent; laminal cells rhomboidal to prosenchymatous above, $30\text{--}70 \times 7.5\text{--}10 \mu\text{m}$, gradually wider, 10–20 μm wide, and more rectangular in mid-leaf and below, at base 17–25 μm wide, often quadrate near insertion.

Perichaetial leaves whitish, 1.5–1.8 mm long, c. 5 times as long as wide, concave from an ovate to broadly ovate sheathing basal part, gradually lanceolate-subulate; margin narrowly recurved above, entire or serrulate; costa 40–90 μm wide, filling the subula; laminal cells laxly rectangular or rhomboidal, in mid-sheath $80\text{--}130 \times 15\text{--}20 \mu\text{m}$, at base lax, shorter-rectangular to 6-sided, $40\text{--}60 \times 20\text{--}30 \mu\text{m}$. Sporogone not seen.

Very rare in northern N.T.; also in South Africa.

N.T.: 25 km NW of Jabiru, Kakadu Natl Park, *L.A.Craven & G.Whitbread* 6792 (AD, CANB).

Archidium subulatum is readily distinguished from the other Australian species with large, lax rectangular cells (*A. indicum* and *A. clarksonianum*) by the narrowly recurved margin of the large, pale perichaetial leaves. The costa in mid-perichaetial leaf is sometimes duplicated with one or two cells between the two strands.

15. *Archidium thaliferum* I.G.Stone, *J. Bryol.* 13: 345 (1985)

T: top of Island Stack, Lawn Hill Gorge Natl Park, Qld, 29 June 1984, *I.G.Stone* 22190, *A.G.Stone & R.Langford*; holo: MEL; iso: BM, BRI, MEL.

Illustrations: *I.G.Stone*, *op. cit.* 348, fig. 1; 350, fig. 2; 351, fig. 3.

Autoicous. Plants 1.0–1.5 mm tall. Stems 0.1–0.5 mm long, soft, often subterranean; branches few, short, clustered; protonema highly specialised, persistent, cushion-shaped, thalloid, c. 1.0 mm across and 0.6 mm deep, the upper surface greyish white, the centre chlorophyllose; rhizoid system extensive; propagules tuber-like. Leaves erect to suberect, ovate, oval or lanceolate, 0.2–0.8 mm long, 0.2–0.4 mm wide, acute to acuminate; costa percurrent to excurrent, c. 50 µm wide; margin entire to weakly serrulate; cells in mid-leaf rhomboidal to prosenchymatous, 50–70 × 12–15 µm; marginal cells smaller, ±rectangular.

Perigonia sessile below perichaetia; leaves often ecostate. Perichaetial leaves 0.9–1.2 mm long, 0.30–0.45 mm wide; costa excurrent. Capsules 320–350 µm diam. Spores (50–) 70–110 µm long, smooth to granulose.

Known only from the type locality in semi-arid, north-western Qld on thin, exposed soil on sandstone, associated with *Riccia* spp., lichens and blue-green algae. Possibly also in the Kimberley region of W.A.

Qld: Island Stack, Lawn Hill Gorge, *I.G.Stone* 22189 (MEL); Painted Pool, Lawn Hill Gorge, *I.G.Stone* 22175 (MEL).

Archidium thalliferum is unique among mosses in having a perennial, pseudoparenchymatous, thalloid protonema differentiated into three zones with protective, photosynthetic and storage functions. The specimen from Painted Pool is atypical with longer stems. It has rhizoidal tubers, and barren plants grow from pieces of moribund, protonematal tissue.

A specimen from W.A. (Kimberley, *G.A.M.Scott*, MEL 662) has leaf shape, cells and rhizoidal gemmae that match the type. However, no protonematal cushions were seen.

16. *Archidium watsii* (Broth.) I.G.Stone, *J. Bryol.* 13: 153 (1984)

Splachnobryum watsii Broth., *Oefvers. Förh. Finska Vetensk.-Soc.* 42: 99 (1900). T: Parsley Bay, N.S.W., Feb. 1899, *W.W.Watts* 2479; lecto: H-BR, *vide* I.G.Stone, *loc. cit.*; isolecto: NSW; Watsons Bay, N.S.W., 27 Feb. 1899, *W.W.Watts* 2450; syn: H-BR, NSW.

Illustrations: I.G.Stone, *op. cit.* 154, fig. 1; 155, fig. 2.

Autoicous. Plants ephemeral. Stems c. 0.2–2.0 mm long, lax, usually with a terminal perigonium and a few subterminal fertile innovations; rhizoids at base of stems, innovations and basal leaf cells; vegetative propagules golden, globose, single-celled, 120–150 µm diam., on rhizoids above and below ground. Leaves glossy, iridescent, erecto-patent to patulous, linear to lanceolate, 0.4–2.3 mm long; apex acute; costa ending about mid-leaf, to 100 µm wide, in T.S. with thin-walled cells, homogeneous, or adaxial ones smaller; margin entire, plane; laminal cells lax, thin-walled, rectangular to irregularly hexagonal, mostly 75–150 × c. 25–40 µm.

Capsules c. 250–400 µm diam. Spores c. 150 µm long, densely and finely papillose, brown.

Endemic and very rare in eastern N.S.W. and Qld; transitory on sandy or gravelly soil or decaying rock in damp places under cliffs, but also in drier areas in light shade of trees (after sufficient rain).

Qld: Cania Gorge Natl Park, near Monto, *I.G.Stone* 21066 (BRI, MEL); Emerald to Fairbairn Dam, *I.G.Stone* 21185 (MEL). N.S.W.: Abbotsford, near Sydney, *W.W.Watts* 6749 (NSW).

Archidium watsii is closest to *A. minus* (Renauld & Cardot) Snider from the U.S.A. and *A. laxirete* P. de la Varde from Africa, both of which are also ephemeral with lax, thin-walled cells. They differ in being synoicous and having much longer costae and an apparent lack of vegetative propagules.

17. *Archidium* sp. A

Autoicous. Plants 5–10 mm tall. Stems in T.S. with epidermal cells 12–15 µm wide; innovations few, short, arising between or below lower perichaetial leaves. Leaves sparse, erecto-patent when dry, patent when moist, concave, amplexicaul, ovate or lanceolate, 0.5–0.9 mm long; apex acute to acuminate; margin serrulate, mostly recurved in mid-leaf;

costa 60–80 µm wide in mid-leaf, subpercurrent to percurrent, in T.S. crescent-shaped, 2 or 3 cells thick with up to 6 large adaxial cells, abaxial cells numerous, smaller; laminal cells near apex short and narrow, 20–35 × 5–7 µm; in mid-leaf irregularly rectangular to rhomboidal, 20–60 × 10–15 µm; in alar region quadrate to short-rectangular, 10–15 µm wide.

Perigonia few, axillary. Perichaetia terminal, clustered at the stem apex and on lower lateral branches, or sessile in leaf axils, sometimes numerous. Perichaetial leaves often secund, concave, to 1.5 mm long, the inner leaves oblong, sheathing, abruptly or gradually narrowed to a flat serrulate often retrorse ligulate subula, at least one-quarter of the leaf length; apex acute or obtuse; margin partly recurved, serrulate above; costa subpercurrent, widest (to 90 µm) in mid-leaf; laminal cells irregularly rectangular to rhomboidal, large, lax and pale in alar regions. Only immature capsules seen.

Occurs in north-eastern Qld at the bases of cliffs in gallery forest; also in central Qld on earth banks in brigalow forest.

Qld: Dawson Hwy, Moura, *I.G.Stone 21152* (MEL); c. 15 km past Moura, Dawson Ra., *I.G.Stone 21164* (MEL); Finch Bay, Cooktown, *I.G.Stone 25472* (MEL); Dalrymple Ck, Cardwell, *I.G.Stone 21398* (MEL).

This unnamed moss is characterised by the subpercurrent, crescent-shaped costa, partly narrowly recurved margin and the flat, serrulate subula of perichaetial leaves. Innovations are short, eventually fertile at the apex; the upper leaves are lanceolate, and basal leaves are often more ovate.

18. *Archidium* sp. B

Autoicous. Plants yellowish green, lax, to 20 mm tall, rarely branched. Stems in T.S. with epidermal cells 12–15 µm or more wide. Rhizoids of lower stem fine, forming a sparse whitish tomentum, those from base and in lower leaf axils pale brown, coarse, c. 20 µm wide. Leaves erect to erecto-patent, crowded and often falcate above, becoming shorter and more distant and spreading downwards, bract-like at base, amplexicaul, narrowly linear-lanceolate, finely acuminate, 1–2 mm long, 5–7 times longer than wide; margin scarcely or not recurved; costa usually excurrent in a long slender tapering flexuose sometimes spinulose arista in upper leaves, subpercurrent to percurrent in lower and innovation leaves, 50–120 µm wide, in T.S. crescent-shaped, 2 or 3 cells thick with 4–8 large adaxial cells; laminal cells narrowly prosenchymatous above, 50–80 × 5–6 µm, in mid-leaf thin-walled, in regular rows, rectangular to rhomboidal 50–100 × 9–12 µm, in alar region short-oblong, 12–20 µm wide in 3–5 rows, extending c. 7 cells up basal margin.

Perichaetial and perigonial buds rare, lateral. Sporophyte not seen.

Known from raised mounds in coastal, swampy woodland in far north-eastern Qld.

Qld: Eubenangee Swamp Natl Park, near Babinda, *I.G.Stone 24571* (MEL); Weipa, SE of Airport, June 1985, *M.Godwin* (MEL).

The long, finely tapering leaf apex with the costa excurrent in a slender arista separates this unnamed species from other Australian *Archidium* species. It resembles *A. longifolium* Lesq. & James [a growth form of *A. alternifolium* (Dicks. & Hedw.) Schimp. according to Snider (1975)], but differs in the wider costa and autoicous, not paroicous, sexual condition.

19. *Archidium* sp. C

Plants to 1.5 mm tall, yellowish green with a silky sheen. Stems in T.S. with 1 or 2 rows of large inner cortical cells and 1 or 2 outer rows of narrower firmer cells; innovations few, lateral, sometimes subperichaetial. Leaves comose in upper part of stems and innovations, loosely spreading to squarrose below, linear-lanceolate, 0.6–1.4 mm long, 0.16–0.18 mm wide, tapering to a deeply channelled flexuose subula; margin distantly serrulate, erect to incurved, rarely weakly recurved near insertion; costa usually percurrent, above almost filling the subula, in mid-leaf to 90 µm wide, at base more than half leaf width, in T.S. concave, 2 or 3 cells thick, with up to 12 large adaxial cells, abaxial cells numerous, much smaller, sometimes prorate; mid-leaf cells rectangular to prosenchymatous, often sinuose, 40–100 ×

5–10 µm, often prorate, gradually shorter downwards; alar cells 12–30 × 10–12 µm; lamina 3–6 cells wide between costa and margin at base.

Perigonia not seen. Perichaetia axillary, sessile or subsessile, sometimes clustered, rarely terminal on short branches. Perichaetial leaves concave, often secund, flexuose, sheathing, oblong-lanceolate, subulate, 0.65–1.30 mm long; margin incurved; costa usually percurrent, c. 55 µm wide in subula; laminal cells prosenchymatous to rhomboidal, in shoulder region 40–80 × 10–20 µm; marginal and subula cells narrower, prorate. Capsules not seen.

Locally common in coastal areas of north-eastern Qld between Cooktown and Cardwell; often found in dense mats on sandy banks near watercourses, in partial shade of mangroves or *Melaleuca*, binding soil by yearly increments.

Qld: Massey Ck, Silver Plains, N of Cooktown, *J.R.Clarkson 2602* (BRI, MEL); Rowland property, Cooktown, *I.G.Stone 25467* (MEL); Dead Horse Ck, Cardwell, *I.G.Stone 22120* (MEL); Edmund Kennedy Natl Park, Cardwell, *I.G.Stone 25430* (MEL).

Archidium sp. C is characterised by a costa that occupies almost the entire leaf width throughout and an almost tubular subula. Plants superficially resemble *A. indicum* in the long, fine spreading leaves that are 5–7 times as long as wide, and the presence of brown rhizoidal gemmae, but the can be separated by the narrower laminal cells and broad costa. *Archidium* sp. C also differs from “sp. B” in the narrower laminal cells, and the costa that is never long-excurrent.

Excluded Names

Archidium brisbanicum Broth., *Oefvers. Förh. Finska Vetensk.-Soc.* 35: 35 (1893)

T: Ipswich Rd, Brisbane, Qld, 1890, *H.Tryon*; holo: H-BR.

This is *Eccremidium brisbanicum* (Broth.) I.G.Stone & G.A.M.Scott (*J. Bryol.* 7: 603, 1973; Ditrichaceae).

Archidium stolonaceum Müll.Hal., *Flora* 71: 8 (1888)

T: Paddington, Sydney, N.S.W., 1884, *T.Whitelegge*; lecto: MEL, *fide* J.A.Snider, *J. Hattori Bot. Lab.* 39: 154 (1975); isolecto: NSW.

This is *Eccremidium pulchellum* (Hook.f. & Wilson) Müll.Hal. (Ditrichaceae), *fide* I.G.Stone (*Muelleria* 2: 211, 1973).

Archidium ecklonii Hampe ex Müll.Hal., *Hedwigia* 38: 53 (1899)

T: Cape of Good Hope, South Africa, 1874, *F.C.Naumann*; lecto: BM, *fide* J.A.Snider, *J. Hattori Bot. Lab.* 39: 155 (1975); isolecto: FL.

Renamed *Pleuridium ecklonii* (Hampe ex Müll.Hal.) Snider (J.A.Snider, *loc. cit.*). While I agree with Magill (1981) that this placement is probably inappropriate, this is clearly not an *Archidium* as the type of branching is quite different.