



A new *Riccardia* (Aneuraceae, Marchantiophyta) from Tasmania

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Abstract: A new *Riccardia* Gray species is described from a single rainforest locality at Growling Swallet, Mount Field National Park in Tasmania, Australia. It is similar to the Australasian *R. eriocaula* (Hook.) Besch. & C.Massal., *R. bipinnatifida* (Colenso) Hewson, *R. australis* (Hook.f. & Lév.) E.A.Br. and *R. pseudodendroceros* Schust. of Aotearoa/New Zealand and the South American *R. spegazziniana* C.Massal. The new species is distinct in the field due to its large size of up to 85 mm and its regularly and densely pinnate form. Microscopically, it has a primary shoot 5.5–6 times wider than deep, epidermal cells smaller than internal cells, mycorrhizae present in epidermal and internal cells, and sessile male branches.

Keywords: Aneuraceae, *Riccardia*, Tasmania, new species, endemic, liverwort, Australia

Introduction

The simple thalloid liverwort genus *Riccardia* Gray has a cosmopolitan distribution with its centre of diversity in the Southern Hemisphere (Rabeau *et al.* 2017). It was revised for Australia by Hewson (1970) who reported 17 species. The checklist of hornworts and liverworts of Australia (Renner *et al.* 2024) listed 24 species, with 14 recorded from Tasmania. Ten are shared with other states and islands in Australia and eight are shared with Aotearoa/New Zealand (Tab. 1).

No new species of *Riccardia* have been published for Australia since Hewson (1970). However, there have been several new records, primarily of species shared with Aotearoa/New Zealand, including *R. alba* (Colenso) E.A.Br., *R. browniae* A.Hagborg & L.Söderstr., *R. lobulata* (Colenso) E.A.Hodgs. and *R. nitida* (Colenso) E.A.Hodgs. (McCarthy 2006; Renner *et al.* 2024). This contrasts with Aotearoa/New Zealand, where five new species have been described since 2024 (Glenny 2024, 2025a, 2025b, 2025c, 2026).

The *Riccardia* described here was found while collecting bryophytes at the hyper-humid Growling Swallet in Mount Field National Park (N.P.). Two patches of mixed male and female plants were located five metres from the stream beside the trail.

Materials and Methods and Terminology

Plant structures were studied without staining and after applying the “bleach and blue” method of Rico (2011). Plants were soaked in pure domestic bleach

until cell contents were cleared, then stained with dilute methylene blue, and mounted in water. Sections were cut by hand with a single-edged razor blade. To observe the oil-bodies, specimens were collected and transported in a sealed plastic box and kept in the fridge until they were examined. Thalli were not stained before being mounted in water. To observe the mycorrhizal fungi, specimens were bleached and stained with lactophenol cotton blue.

Additional specimens of this species were searched for in the *Aneura* and *Riccardia* indet. collections at the Tasmanian Herbarium. No further collections were found.

Terminology follows Brown & Braggins (1989) and Glenny (2025b).

Taxonomy

Riccardia plumisecta S.Fish, *sp. nov.*

Holotypus: Australia, Tasmania: Growling Swallet, Mount Field N.P., 605 m, growing loosely over bryophyte-clad ESE-facing soil bank five metres from stream, in a hyper-humid environment, under *Blechnum wattsii* in *Nothofagus cunninghamii*, *Atherosperma moschatum* and *Dicksonia antarctica* forest, associated with *Ptychomnion aciculare*, *Hymenophyton flabellatum*, *Schistochila lehmanniana* and *Balantiopsis* sp., 8 Feb. 2026, S. Fish 256 (HO627353). **Isotypus:** CHR.

Plants plagiotropic, green but with older parts brown, uniformly dark brown when dried. Plants

Table 1. Affinities of the Tasmania *Riccardia* flora. Distributions taken from Hewson (1970), Hässel (1972), Brown & Braggins (1989), Glenny (2024, 2025a, 2025b, 2025c, 2026) and Renner *et al.* (2024).

Species	Endemic to Tasmania	Shared with mainland Australia	Shared with Aotearoa / New Zealand	Shared with South America	Shared with Asia
<i>Riccardia aequicellularis</i> (Steph.) Hewson		✓	✓		
<i>Riccardia alcornis</i> (Hook.f. & Taylor) Trevis.			✓	✓	
<i>Riccardia bipinnatifida</i> (Colenso) Hewson		✓	✓		
<i>Riccardia cochleata</i> (Hook.f. & Taylor) Kuntze		✓	✓		
<i>Riccardia colensoi</i> (Steph.) W.Martin		✓	✓		
<i>Riccardia crassa</i> (Schwägr.) C.Massal.		✓	✓		✓
<i>Riccardia eriocaula</i> (Hook.) Besch. & C.Massal.		✓			
<i>Riccardia gracilis</i> (Steph.) R.M.Schust.	✓				
<i>Riccardia lobulata</i> (Colenso) E.A.Hodgs.		✓	✓		
<i>Riccardia longiflora</i> (Steph.) Hewson	✓				
<i>Riccardia nitida</i> (Colenso) E.A.Hodgs.		✓	✓		
<i>Riccardia prehensilis</i> (Hook.f. & Taylor) C.Massal.*				✓	
<i>Riccardia rupicola</i> (Steph.) Hewson		✓			
<i>Riccardia wattsiiana</i> (Steph.) Hewson		✓			✓
Totals	2	10	8	2	2

* "Tasmanian records of this South American species should be verified." (Renner *et al.* 2024: 86).

not sexually dimorphic, 45–85 mm long, 10–22 mm wide including branches, monopodial, densely and regularly 2–4-pinnate, with a second primary shoot often forming, even without damage to the apex of the main axis (Fig. 1A, D). Secondary shoots in 6–15 pairs. Tertiary shoots in 6–13 pairs on largest secondary shoots (Fig. 1). Latent branch tips absent. Stolons absent. Rhizoids absent. Fresh plants smell strongly like seaweed.

Primary shoot 1.6–2.6 mm wide, 10–12 cells deep, 432–520 µm deep, 3.6–5.5 times wider than deep, biconvex-to plano-convex (Fig. 2A). Marginal wing absent. Shoot apices retuse at a depth of 80–96 µm. In transverse section ventral and dorsal epidermal cells 0.4–0.6 times the depth of internal cells with an abrupt transition; at all levels of division epidermal cells 10–44 (–60) µm diameter, walls 4 µm thick, internal cells circular to irregular, at all levels of division (16–) 36–128 µm in diameter, walls 4 µm thick (Fig. 2D). Epidermal cells in surface view round to rectangular, 40–88 µm long, 32–44 µm wide. Internal cylinder of pigmented and thick-walled cells absent. Mucilage papillae 3–4 per apical notch, hemispherical on the apical margin, when slightly displaced ventrally becoming clavate, thin-walled and smooth, 17–35 × 9–15 µm, rarely persistent and then much larger, 60–104 µm long, 24–40 µm

wide. Rhizoids not seen. Endomycorrhizae present in epidermal and internal cells (Fig. 2F).

Secondary shoots 12 to 30 per plant, alternate to subopposite, determinate in length, the largest 7–9.5 mm long, 784–1800 µm wide at their base, 6–9 cells deep, 240–560 µm deep, width to depth ratio 2.6–6.1, plano-convex, apices shallowly retuse (Fig. 2B), marginal wing absent. Ventral and dorsal epidermal cells smaller than internal cells with an abrupt transition, in surface view round to rectangular, 48–80 µm long, 40–56 µm wide.

Tertiary shoots 672–1288 µm wide at their base, 5–6 cells deep, 160–588 µm deep, 1.6–4.3 times wider than deep, 3 to 6 per secondary shoots, alternate to subopposite, apex shallowly retuse, on well-developed tertiary shoots some quaternary shoots are present. Marginal wing absent. Ventral and dorsal epidermal cells smaller than internal cells with abrupt transition, in surface view round to rectangular, 24–88 µm diameter, in transverse view circular to square. Internal cells isodiametric, 36–100 (–128) µm in diameter, walls 4 µm thick.

Oil-bodies absent from epidermis, 1–2 per cell in subepidermis, spherical, botryoidal, 19–30 µm diameter, colourless (Fig. 2E).

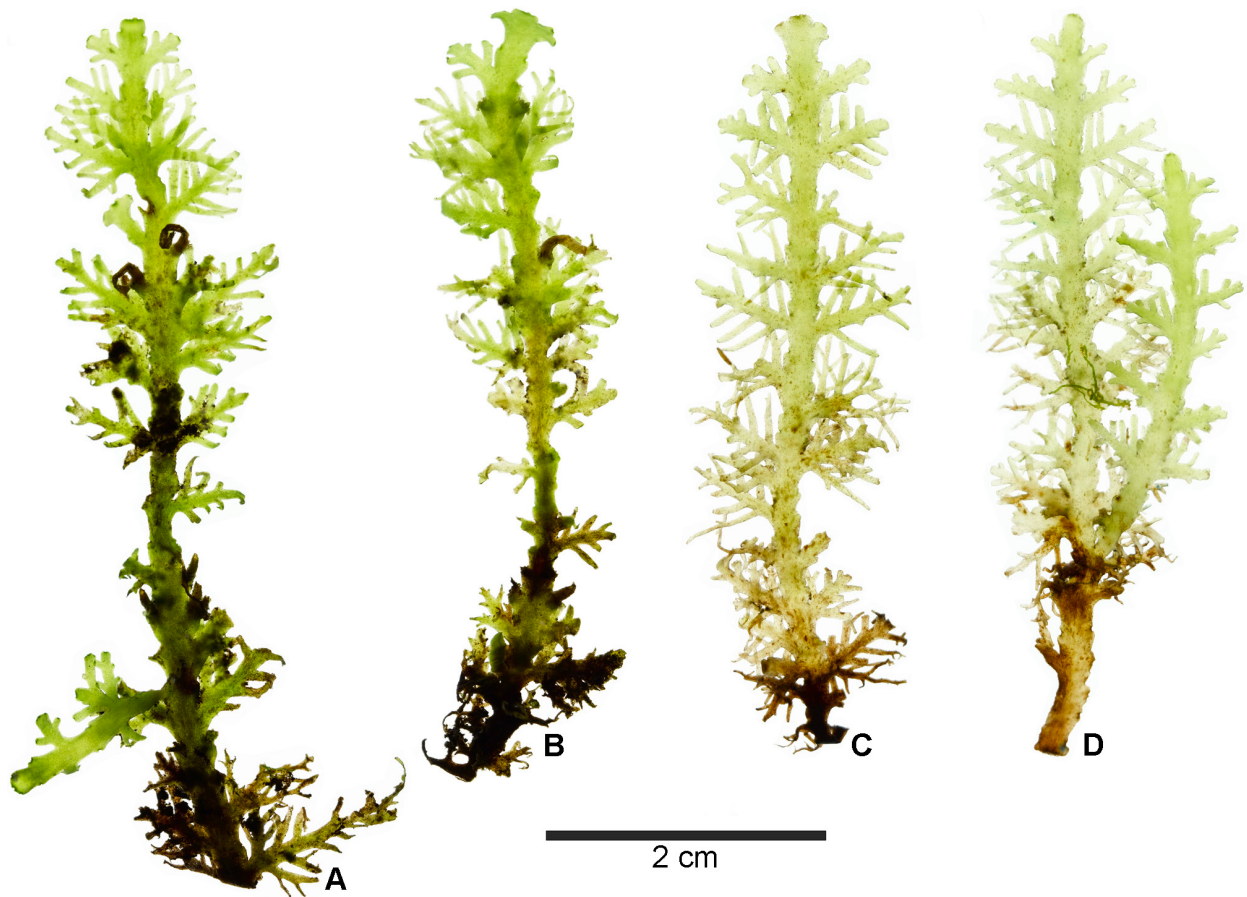


Fig. 1. Whole plants of *Riccardia plumisecta*: **A–B** Female; **C–D** male. — *S. Fish 256* (HO).

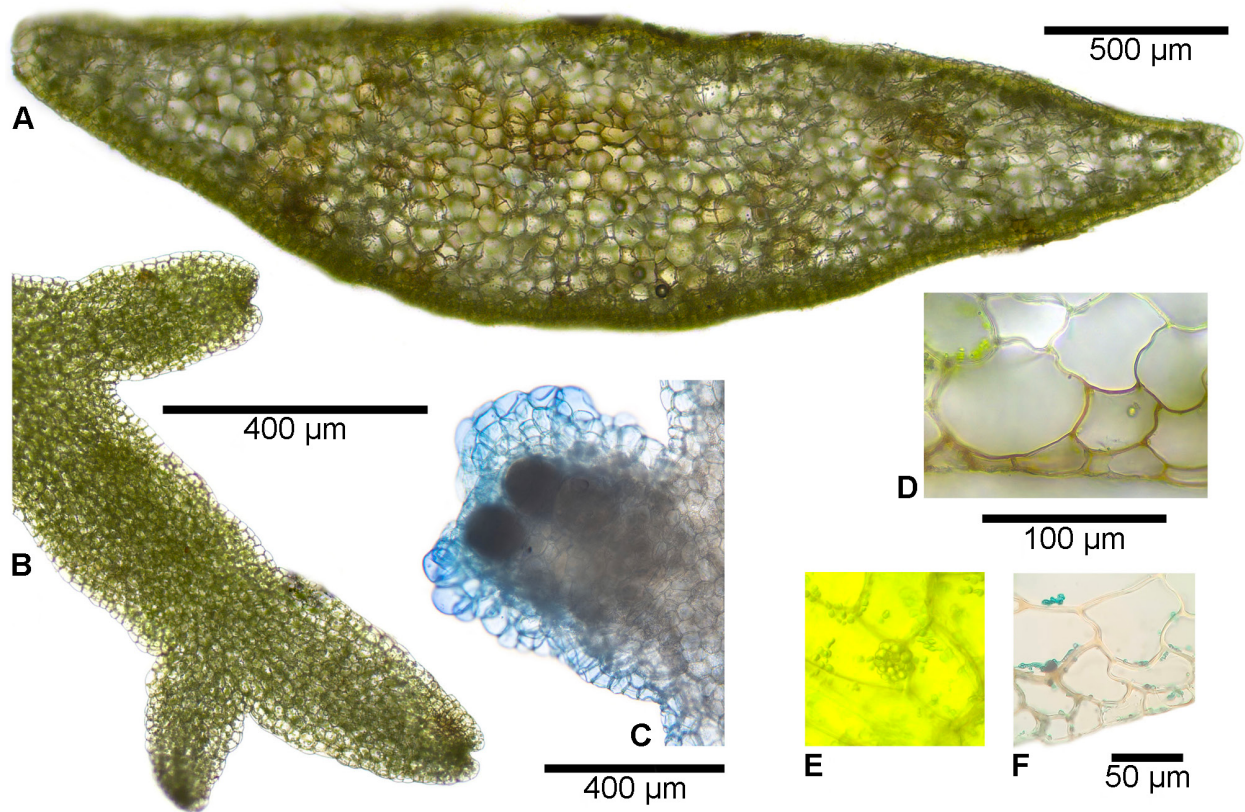


Fig. 2. Transverse section of primary shoot and dorsal view of *Riccardia plumisecta*: **A** Full section with dorsal surface uppermost; **B** dorsal view of tertiary shoot and quaternary shoot showing retuse apex; **C** ventral view of male branch; **D** ventral epidermal and internal cells; **E** botryoidal oil-body; **F** ventral epidermal and internal cells with mycorrhizae. — *S. Fish 253* (HO).

Gemmae absent.

Dioicous. *Male branches* found throughout male plant, 2–6 per secondary shoots, replacing tertiary and quaternary shoots, spread throughout secondary shoots, unbranched and sessile, 240–720 µm long, 432–640 µm wide, angled upwards from the plane of the secondary shoots at 30–40° and slightly recurved in distal half with pitted surface facing outwards from secondary shoots or tertiary shoots or facing slightly ventrally (Fig. 2C). Antheridia in 2–6 pairs of pits, the pits separated by bridges 2–3 cells wide, each pit bound by c. 8 cells. Marginal wing unistratose, 2–3 wide, marginal row enlarged and mamillate. Male branch not reverting to normal tissues beyond the male section. *Female branches* on short lateral branch on primary shoot throughout plant, solitary or paired. Gynoeceal scales branched.

Calyptra 4–6 mm long, c. 776 µm diameter, walls 4–5 cells thick at 2/3 of length, pachydermal cells smooth and not peeling from the calyptra surface. Umbo absent, projecting cells sparse near and at the apex.

Sporophyte not seen.

Diagnosis. Dioicous. Male and female plants similar. Plants plagiotropic, up to 85 mm long, monopodial, densely and regularly 2–4 pinnate. Shoot apices retuse. Primary shoots 3.6–5.5 times wider than deep, biconvex- to plano-convex, marginal wing absent. Internal cells larger than epidermal cells, epidermal cells smooth. Oil-bodies 1–2 in subepidermis, absent from epidermis. Endomycorrhizae present in both dorsal and ventral epidermal and internal cells. Male branches 2–6 per secondary shoot, replacing tertiary and quaternary shoots, sessile, unbranched, 2–6 pairs of antheridia,

pitted surface facing outwards or slightly ventrally. Stolons absent. Stele absent. *Gemmae* absent.

Distribution & ecology. *Riccardia plumisecta* is currently known by a single gathering from 600 m elevation in the cool temperate rainforest of Mount Field N.P. It was found growing loosely over bryophytes and soil on a steep, ESE-aspect bank in a hyper-humid stream gully underneath *Blechnum wattsii* Tindale and *Polystichum proliferum* (R.Br.) C.Presl. in *Atherosperma moschatum* Labill., *Nothofagus cunninghamii* (Hook.) Oerst. and *Dicksonia antarctica* Labill. forest with *Ptychomnion aciculare* (Brid.) Mitt., *Hymenophyton flabellatum* (Labill.) Trevis., *Schistochila lehmanniana* (Lehm. & Lindenb.) Carrington & Pearson, *Tylimanthus* sp. and *Balantiopsis* sp. (Fig. 3A).

Recognition. *Riccardia plumisecta* is distinctive in the field due to its large size and regularly and densely pinnate form (Fig. 3B). It is similar in size, dendroid form and sexuality to *R. eriocaula*. It differs in having larger primary shoot dimensions, a shallower primary shoot, the lack of an internal pigmented and thick-walled stele, planar secondary and tertiary shoots, a lack of projecting cells on the thallus surface, the presence of internal mycorrhizae, and the lack of a marginal wing in the secondary and tertiary shoots. With *R. bipinnatifida* it shares the same transverse section shape of the main axis, internal cells that are larger than epidermal cells, smooth epidermal cell texture, dioicy and absence of stele and marginal wing. *Riccardia plumisecta* differs from *R. bipinnatifida* in being densely and regularly 2–4 pinnate, its secondary shoots smaller than the tertiary shoots, having larger primary shoot dimensions and number of cells deep, the presence of mycorrhizae and the absence of gemmae (Tab. 2).



Fig. 3. **A** *Riccardia plumisecta* type locality, showing the steep soil bank and *Blechnum wattsii*. **B** Female *R. plumisecta* plants *in situ*. — S. Fish 256 (HO).

Table 2. Comparison of *Riccardia plumisecta* with *R. bipinnatifida*, *R. eriocaula*, *R. australis*, *R. pseudodendroceros* and *R. spegazziniana*. Data from Brown & Braggins (1989), Hässel (1972), Glenny (2025b), HO626175, HO66904, CHR638628.

	<i>Riccardia plumisecta</i>	<i>Riccardia bipinnatifida</i>	<i>Riccardia eriocaula</i>	<i>Riccardia australis</i>	<i>Riccardia pseudo-dendroceros</i>	<i>Riccardia spegazziniana</i>
Plant length (mm)	45–85	25–35 (–75)	30–70	10–35 (–70)	c. 30	to 80
Pinnation	2–4	2–3	3 (4)	2–3	2–3	2–3
Thallus transverse sectional shape	bi- to plano-convex	bi- to plano-convex	bi-convex	bi-convex	plano-convex	plano-convex
Primary shoot width (µm)	1600–2600	570–1068	252–1005	(257–) 488–548 (–775) in erect form	not mentioned	1000–3000
Primary shoot depth (µm)	432–520	153–253	140–430	215–400 (–514)	265–315	410–580
Primary shoot depth (cells)	10–12	6–9	15–17	(8–) 12–20 (–24) in erect form	9–10	10–13
Marginal wing	absent	absent	present	absent	present	absent
Epidermal cell size relative to internal cells	smaller	smaller	similar	smaller	smaller	smaller
Dorsal epidermis with chloroplasts	yes	yes	yes	yes	no	no
Stele	absent	absent	present	absent	absent	absent
Apices retuse	retuse	retuse	rounded, retuse	retuse	retuse	retuse
Stolons	absent	absent	present	present	absent	absent
Rhizoids	not seen	present	present on prostrate stems	present on prostrate stems	no	not seen
Mucilage papillae	sparse	sparse	dense	sparse	sparse	not mentioned
Mucilage papillae length (µm)	60–104	56	(16–) 15–87 (–190)	39–51	58–122	21–45
Mucilage papillae width (µm)	24–40	40	24–32	16–19	10–22	15
Mycorrhizae	present	absent	absent	present	absent	absent
Gemmae	absent	infrequent	present	present	absent	absent
Epidermal ornamentation	smooth	smooth	smooth	smooth	smooth	smooth
Sexuality	dioicous	dioicous	dioicous	dioicous	sterile	dioicous
Pairs of antheridia	2–6	(2–) 4–5 (–12)	3–12	(2–) 4–6 (–10)	not known	6–10

Etymology. From the Latin, *pluma*, meaning a soft feather, and *secare*, meaning to cut, referring to the finely and regularly bipinnate appearance.

Other specimen examined

TASMANIA. Growling Swallet, Mount Field N.P., 600 m, on soil under *Polystichum proliferum* and *Blechnum wattsii* in *Nothofagus cunninghamii*, *Atherosperma moschatum* and *Dicksonia antarctica* forest growing five metres from stream, hyper-humid, 25 Jan. 2026, *S. Fish* 253 (HO627352).

Discussion

Riccardia plumisecta is a conspicuous addition to the Aneuraceae flora of Tasmania, which now totals 15 species. It is most similar to the dendroid Australasian species *R. eriocaula* but lacks a stele and projecting cells on the surfaces. It is somewhat similar to *R. bipinnatifida* of Australasia and *R. australis* of Aotearoa/New

Zealand, but the primary shoot is more robust than in either of those two species and it possesses a densely and regularly bipinnate form; it also lacks stolons which are present in *R. australis*. It is also superficially similar to *R. pseudodendroceros* of Aotearoa/New Zealand but differs in having a deeper primary shoot and absence of a unistratose marginal wing (Tab. 2).

It is similar to *Riccardia spegazziniana* of South America in many respects (Tab. 2): overall size, degree of pinnation, dimensions of the primary shoot, a smooth epidermis, epidermal cells smaller than internal cells, dioecy and the absence of a stele, stolons, rhizoids and gemmae. The most obvious difference is that *R. spegazziniana* has a hyaline dorsal epidermis that lacks both chloroplasts and oil-bodies.

Other species examined

***Riccardia australis*.** New Zealand: WESTLAND. Te Kuha Ridge, 571 m, forest 10 m high of *Weinmannia racemosa*,

Nothofagus fusca, *Podocarpus laetus*, and *Nothofagus menziesii* in shallow gully, largest tree trunk of red beech 1 m diameter, 6 Nov. 2015, D. Glenny 13210 (CHR638628).

Riccardia bipinnatifida. TASMANIA. Mount Wellington, Pipeline Track, 10 Aug. 1977, A.V. Ratkovsky 77/196 (HO66904).

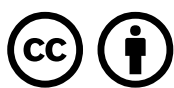
Riccardia eriocaula. TASMANIA. East Coast District, Mill Creek, 20 m, rare on rotting log within shaded riparian situation under *Eucalyptus regnans*, with *Thuidium laeviusculum*, *Hypnum cupressiforme*, *Bartramia papillata*, *Eucamptodon muelleri*, *Bryum billardierei*, 15 Sep. 1985, A. Moscal 11136 (HO101937); Mount Field N.P., Growling Swallet, 593 m, on wet fallen log 30 cm above stream in canopy gap, in *Atherosperma moschatum*, *Nothofagus cunninghamii* and *Dicksonia antarctica* forest, very humid, 8 Feb. 2026, S. Fish 258 (HO626175).

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