# ECHINODIACEAE

*Scott R. Gilmore*[1]

**Echinodiaceae** Broth., *Nat. Pflanzenfam.* I, 3: 1216 (1909).

Type: *Echinodium* Jur.

Dioicous. Plants tufted, on rock, less commonly on wood or soil. Primary stems short and usually leafless; secondary stems long, sparingly branched; rhizoids sparse on primary stems. Leaves markedly imbricate, erecto-patent when dry, spreading when moist from a broadly ovate to lanceolate base to a subulate apex; margin often bistratose; costa short- to long-excurrent. Lamina unistratose; laminal cells isodiametric.

Perigonia lateral on secondary stems and branches. Perichaetia lateral on secondary stems. Calyptra cucullate. Seta elongate. Capsule ovoid to subglobose; operculum rostrate. Peristome double. Spores small, globose, papillose.

A monogeneric family.

## ECHINODIUM

*Echinodium* Jur., *Bot. Zeitung (Berlin)* 24: 20 (1866); from the Greek *echinos* (spiny), in reference to the habit of these mosses.

Type: *E. spinosum* (Mitt.) Jur.

Description as for the family.

This genus of six species is known from Australasia, the south-western Pacific Ocean, and from Madeira in the subtropical North Atlantic Ocean. In terms of their Australian distributions, *E. hispidum* occurs on the mainland and in Lord Howe Island, while *E. umbrosum* (Mitt.) A.Jaeger var. *umbrosum* is known only from Lord Howe Island.

Stech *et al.* (2008) noted that the two Australasian species were molecularly unrelated to the Macaronesian entity, and they transferred them to *Thamnobryum* in the Neckeraceae. However, following Goffinet *et al.* (2012), the Australian taxa are retained here in *Echinodium*.

### References

Churchill, S.P. (1986), A revision of *Echinodium* Jur. (Echinodiaeae: Hypnobryales), *J. Bryol.* 14: 117–133.

Goffinet, B., Buck, W.R. & Shaw, A.J. (2012), *Classification of the Bryophyta*. [http://www.eeb.uconn.edu/people/goffinet/Classificationmosses.html]

Stech, M., Sim-Sim, M., Glória Esquível, M., Fontinha, S., Tangney, R., Lobo, C., Gabriel, R. & Quandt, D. (2008), Explaining the 'anomalous' distribution of *Echinodium* (Bryopsida: Echinodiaceae): Independent evolution in Macaronesia and Australasia, *Organisms Diversity & Evolution* 8: 282–292.

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http://www.anbg.gov.au/abrs/Mosses_Online/Echinodiaceae.pdf (2012)

**Key**

Leaves c. 2.0–3.5 mm long and 0.45–0.70 mm wide; costa long-excurrent; lamina ending well below the leaf apex.....**1. E. hispidum**

Leaves c. 0.85–1.70 mm long and 0.12–0.42 mm wide; costa percurrent to short-excurrent; lamina reaching the leaf apex..... **2. E. umbrosum**

**1. Echinodium hispidum** (Hook.f. & Wilson) Reichardt, *Reise Novara, Pilze, Leber-Laubm.* 1: 127 (1870)

*Hypnum hispidum* Hook.f. & Wilson, *London J. Bot.* 3: 552 (1844); *Leskea hispida* (Hook.f. & Wilson) Mitt., *J. Linn. Soc., Bot.* 4: 91 (1860); *Sciaromium hispidum* (Hook.f. & Wilson) Paris, *Index Bryol.* 1155 (1898). T: New Zealand (Antarctic Expedition, 1839–43), *J.D.Hooker 398*; lecto: BM *n.v.*; isolecto: BM *n.v.*

*Echinodium arboreum* Broth., *Öfvers. Förh. Finska Vetensk.-Soc.* 35: 55 (1893); *Sciaromium arboreum* (Broth.) Paris, *Index Bryol.* 1154 (1898). T: Cambewarra, N.S.W., Dec. 1885, *T.Whitelegge 354*; holo: H-BR *n.v.*, iso: NSW (3 specimens).

Illustrations: G.A.M.Scott & I.G.Stone, *Mosses of Southern Australia* 381, pl. 73 (1976); J.Beever, K.W.Allison & J.Child, *Mosses of New Zealand*, 2nd edn 123, fig. 63a–d (1992); D.Meagher & B.Fuhrer, *A Field Guide to the Mosses and Allied Plants of Southern Australia* 149 (2003).

Plants dark green to black. Secondary stems 3–9 cm long, sparingly branched. Leaves from an ovate or lanceolate base to a long-subulate apex, slightly plicate at the base, (2.22–) 2.36–3.40 mm long, 0.46–0.73 mm wide; margin usually entire below to serrate above, occasionally entire above; costa strong, filling the subula, 80–135 µm wide at the base. Median laminal cells smooth, c. 4–8 µm wide; basal cells near the costa similar to mid-leaf cells, rarely short-rectangular.

Perigonial leaves ovate, with an acute apex; larger leaves with an acuminate apex; margin smooth to serrulate above; laminal cells rectangular, 25–36 × 5–7 µm. Perichaetial leaves subulate from an ovoid or oblong base; costa weak or absent except in the subula; margin entire to denticulate; median laminal cells rectangular, 30–68 × 4–10 µm. Seta c. 15 mm long, twisted. Capsules inclined, ovoid to subglobose, slightly wider at the mouth. Exostome teeth long and thin; endostome basal membrane c. one-third the height of the exostome; cilia slightly shorter than the exostome teeth. Spores c. 8–10 µm diam. *n* = 10, *fide* H.P.Ramsay, *New Manual of Bryology* 1: 195 (1983).

Occurs in Qld, N.S.W., Vic. and Tas.; most common on wet rocks, but also on wood and soil. Also in Lord Howe Island, New Zealand, Campbell Island, the Auckland Islands and New Caledonia.

Qld: S of Binna-Burra, Lamington Natl Park, *D.H.Norris 34524* (CANB). N.S.W.: Weeping Rocks, New England Natl Park, 72 km E of Armidale, *H.Streimann 47669* (CANB). Vic.: Tarra Valley Natl Park, 26 km S of Traralgon, *H.Streimann 65262* (CANB). Tas.: Hobart Rivulet, *W.A.Weymouth* (CANB).

This moss initially appears very similar to *Bescherellia elegantissima* Duby (Cyrtopodaceae). However, the latter is distinctly paler, it has significantly longer cells at the leaf base near the costa, a thinner costa (c. 30–35 µm wide at the base) with guide cells, and the cylindrical capsules lack an endostome.

**2. Echinodium umbrosum** (Mitt.) A.Jaeger, *Ber. Tatigk. St. Gallischen* 1876–77: 314 (1878) var. **umbrosum**

Leskea umbrosa Mitt., *J. Linn. Soc., Bot.* 4: 92 (1859). T: New Zealand, *Kerr*, holo: NY *n.v.*, iso: NY *n.v.*

*Echinodium parvulum* Broth. & Watts, *Proc. Linn. Soc. New South Wales* 40: 376 (1915). T: Mt Lidgbird, Lord Howe Is., *W.W.Watts 517* holo: H-BR *n.v.*

Illustrations: G.O.K.Sainsbury, *Handb. New Zealand Mosses* 375, pl. 60 (1955); J.E.Beever, K.A.Allison, & J.Child, *Mosses of New Zealand* 123, fig. 63e (1992).

Plants dark green to black. Secondary stems c. 1.5 cm long, sparingly branched. Leaves with an ovate base, slowly tapering to a broad subula, or linear-lanceolate with a gradually tapering apex, slightly plicate or somewhat concave at the base, 0.86–1.71 mm long, 0.12–0.42 mm wide; apex thin, rounded, acute or acuminate; costa strong, percurrent to short-

excurrent, c. 40–55 μm wide at the base, not filling the subula but with laminal cells on either side; margin bistratose, entire thoughout or slightly denticulate above; median laminal cells isodiametric, c. 7–8 μm wide, smooth or with the upper cells minutely papillose; basal cells near the costa similar to those above, or short-rectangular, smooth.

Perigonia, perichaetia and sporogone not seen.

Known from Lord Howe Island; also in New Zealand.

Lord Howe Island: Run [Dinner Run], *W.W.Watts s.n.* (NSW), as *E. parvulum.*

*Echinodium umbrosum* is readily distinguished from *E. hispidum* by its smaller leaves and its percurrent to short-excurrent costa rather than a long-excurrent projection. As this description is based on a single specimen, it does not include the variability seen throughout its range.

*Echinodium umbrosum* var. *glaucoviride* (Mitt.) S.P.Churchill is known from Norfolk Island, Fiji, the Kermadec Islands, New Zealand, the Chatham Islands and Campbell Island (H.Streimann, *The Mosses of Norfolk Island* 62–64, 2002).