



1 HYDATELLACEAE ¹

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Small, tufted, glabrous, annual or perennial herbs, subaquatic or aquatic, sometimes wholly submerged. Stem reduced; roots fibrous. Leaves alternate, linear to filiform, flattened to terete, 1-veined, slightly widened at the base; sheath and ligule absent. Inflorescence a bisexual (heterogamous) or unisexual (homogamous) terminal capitulum-like structure (head), sessile or scapose, with an involucre of 1–4 pairs of equal, membranous, 1-veined bracts. Flowers numerous, unisexual, without a perianth or bracteoles. Staminate flowers a solitary stamen; filament relatively stout; anther basifixed, bilocular, dehiscing longitudinally. Pistillate flowers a solitary carpel; ovary unilocular, with or without 3 prominent ribs; ovule 1, pendulous; stigmas sessile, 2–6, filamentous, each a single row of large cells. Fruit membranous, dehiscent or indehiscent. Seeds solitary, ovoid; endosperm replaced by starchy perisperm.

A monogeneric, aquatic or subaquatic family (see generic account for species and distributional details). Hydatellaceae have highly reduced flowers and inflorescences and were, until recently, included in the Poales (eg. APG II 2003) though they have also been placed in Centrolepidaceae and in their own order Hydatellales (for discussion see Hamann 1998; Saarela et al. 2007; Sokoloff et al. 2008a). Recent studies based on molecular data have indicated that Hydatellaceae should not be placed in Poales or indeed with the remainder of the Monocotyledons but at the 'base' of the Angiosperm phylogenetic tree (Saarela et al. 2007; APG III 2009). This discovery has led to a flurry of high profile research on this small and once overlooked family (eg. Rudell et al. 2007, 2008, 2009a, 2009b; Tillich et al. 2007; Friedman 2008; Remizowa et al. 2008; Sokoloff et al. 2008a, 2008b, 2010). Hydatellaceae are now placed in the Nymphaeales with the aquatic families Nymphaeaceae (Waterlilies: worldwide) and Cabombaceae (worldwide) (see Saarela et al. 2007; Sokoloff et al. 2008a; Stevens 2008; APG III 2009).

Key references: Cooke (1987); Hamann (1998); Sokoloff et al. (2008a).

External resources: accepted names with synonymy & distribution in Australia (APC); author & publication abbreviations (IPNI); mapping (ALA, AVH, NVA); nomenclature (APC, APNI, IPNI).

1 TRITHURIA

Trithuria Hook.f., *Bot. Antarct. Voy. III.* (Fl. Tasman.) 2(6): 78 (1858).

Synonymy: *Juncella* F.Muell. ex Hieron., *Nat. Pflanzenfam.* [Engler & Prantl.] T. II 4(11): 15 (1888). *Hydatella* Diels, *Bot. Jahrb. Syst.* 35: 93 (1904).

Description details as per family.

An aquatic or subaquatic genus of 12 species found in Australia (10 spp.), New Zealand (1 sp.) and India (1 sp.). Sokoloff (2008a) monographed the family and determined that the distinction between *Trithuria* and *Hydatella* could not be maintained and so combined them. *Trithuria* is the older name and so has priority even though the family name was based on *Hydatella*. Five species (4 endemic) are found in south-western Western Australia, four are confined to northern Australia, one is found across southern Australia, and one is endemic to Tasmania.

1 This work can be cited as: Duretto MF (2011). Hydatellaceae, **version 2019:1**. In MF de Salas (Ed.) *Flora of Tasmania Online*. 5 pp. (Tasmanian Herbarium, Tasmanian Museum and Art Gallery: Hobart). <https://flora.tmag.tas.gov.au/treatments/hydatellaceae/>

2 Tasmanian Herbarium, Tasmanian Museum & Art Gallery, PO Box 5058, UTAS LPO, Sandy Bay, TAS 7005, Australia.

1. Inflorescence bisexual; ovaries triquetrous; fruits ribbed, opening by 3 valves; seeds honeycombed 1 *T. submersa*
 1: Inflorescence usually unisexual; ovaries globular; fruits smooth, indehiscent; seeds smooth 2 *T. filamentosa*

1 *Trithuria submersa* Hook.f., *Bot. Antarct. Voy. III.* (Fl. Tasman.) 2(6): 79, t. 138A (1858)

Juncella submersa (Hook.f.) Hieron., *Nat. Pflanzenfam.* [Engler & Prantl.] T. II 4(11): 14 (1888).

Illustrations: Morley & Toelken (Eds), *Flowering Plants in Australia* 374, fig. 220e (1983); Cooke, *Fl. Australia* 45: 5, fig. 21a-c (1987); Conn, *Fl. New South Wales* 4: 266 (1993); Conn, *Fl. Victoria* 2: 629, fig. 126a, b (1994).

Small annual herb; growing ± submerged in fresh water; roots fibrous; leaves and inflorescences often bright red when growing in open situations, green when shaded. Leaves 1–3(–6) cm long, lax, filiform, elliptical in transverse section, apex tapering, base widened slightly and with narrow hyaline margins. Inflorescence bisexual (heterogamous), scapose or sessile; scapes several, to 10 cm long, filiform, erect, elongating in the fruiting stage and usually becoming longer than the leaves, each with a terminal head; the head 2–3 mm in diam., made of closely packed, minute, unisexual flowers, surrounded by an involucre of 4–6 bracts; bracts lanceolate to ovate, 2–4 mm long, longer than flowers. Staminate flowers few, usually 2–4 near the centre of the head; filament to 2 mm long, red; anther purple. Pistillate flowers usually 10–20(–35) per head; ovary obovoid-triquetrous with rounded angles; stigmas 3, filamentous, septate, sometimes bifid, red, often unequal in length. Fruit obovoid with 3 prominent angles, 0.5–0.8 mm long, opening from the base in 3 valves. Seed honeycombed. Flowering &/or fruiting Sep.-Jan.

Tas. (FUR, TCH, TNM, TSE); also WA, SA, NSW, Vic. Localized but sometimes abundant in marshes, roadside soaks or on the margins of lakes and lagoons especially in the midlands and north of the state. The capitulum (head) can be on a scape longer than the leaves or sessile. This variation is seen across Australia and requires further investigation.

2 *Trithuria filamentosa* Rodway, *Pap. & Proc. Roy. Soc. Tasmania* 1897: 48 (1898)

Hydatella filamentosa (Rodway) W.M.Curtis, *Records of the Queen Victoria Museum* 50: 5 (1974).

Illustrations [often as *H. filamentosa*]: Rodway, *Fl. Tasman.*, facing p. 232 (1903); Stones & Curtis, *The Endemic Flora of Tasmania* 6: t. 203 (1978); Cooke, *Fl. Australia* 45: 5, fig. 21e (1987); Kirkpatrick, *Alpine Tasmania* 146, fig. 66a (1997).

Small annual or perennial herb, dioecious or sometimes monoecious; often growing submerged and forming clumps several cm in diameter; rootstock in perennial plants erect, c. 1.5 mm in diam., bearing fibrous roots and leaves crowded for a length of c. 1 cm below the apex, the old leaves long persistent. Leaves erect, filiform-terete, 0.5–2.5(–5) cm long, apex narrowed, rounded and forming a hydathode, proximal ½ of the blade colorless with the base slightly flattened and widened. Inflorescence usually unisexual (homogamous), rarely bisexual (heterogamous), scapose; male heads fewer than female; scapes usually much shorter than the leaves though sometimes longer, to 2 cm long, each with a terminal head; heads to 2 mm diam., made of closely packed, minute, unisexual flowers, surrounded by an involucre of 2–4 bracts; bracts lanceolate, c. 4–5 mm long, longer than flowers. Staminate flowers 3–6 per head; filaments c. 6 mm long, sometimes reddish; anthers red-purple. Pistillate flowers to 20 per head; ovary globular; stigmas 5–6, filamentous, septate, red, usually unequal in length. Fruit elliptical-ovoid, apiculate, indehiscent. Flowering &/or fruiting Dec.-Apr.

Tas. (TCH, TSR, TWE); endemic. Localized and uncommon on the Central Plateau and Mount Field, where usually found submerged in lakes and tarns. In the south-west it is also often found on stream margins and in swamps.

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- NOTE:** Web addresses can and do change: a list of current web addresses is maintained in the web version of this treatment on the *Flora of Tasmania Online* website at <https://flora.tmag.tas.gov.au/>

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