



## 16 BURMANNIACEAE <sup>1</sup>

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Annual or perennial, achlorophyllous, or rarely chlorophyllous (not in Tasmania) mycoheterotrophic herbs. Underground parts often rhizomatous or tuberous. Stems monopodial, unbranched or with few branches. Leaves present or absent, alternate, simple, sessile, often reduced to scales; margins entire; stipules absent. Inflorescence terminal, cymose or flowers solitary, monochasial cymes sometimes appearing racemose; each flower with a scale-like bract. Flowers actinomorphic or zygomorphic, variously coloured. Tepals 6, at least partially connate; tube persistent or caducous in fruit, variously shaped. Stamens 3 or 6, sessile or on short filaments, inserted opposite the tepals, sometimes connate by their anthers, forming a tube around the style. Ovary inferior, 1–3-locular, with parietal or axile placentation; nectaries apical on the ovary or internal and septal; ovules numerous; style branched apically, with 3 stigmas. Fruit a capsule, or fleshy and cup-shaped. Seeds numerous, dustlike.

A family of 17 genera and c. 166 species (Govaerts et al. 2007), widely distributed in the tropical regions of the world, but extends into subtropical and even temperate regions in North America and Australia (Jonker 1938). DNA-based phylogenetic analyses place Thismiaceae in Dioscoreales but outside Burmanniaceae. Nuclear and mitochondrial DNA data suggest that Thismiaceae are paraphyletic (Merckx et al. 2009).

The largest genera are *Burmannia*, with c. 60 species, and *Thismia*, with c. 50 spp. Each genus has 3 representatives in Australia; of these only *Thismia rodwayi* extends to Tasmania. Many species are known exclusively from the type collection, which in some cases was made more than a century ago. Most species in the family have a fully mycoheterotrophic mode of life; most are poorly known ecologically; mycorrhizal fungi of several species have been identified (Merckx et al. 2012). Most species occur in the leaf litter of dense forest and can only be detected during the flowering and fruiting period when above-ground organs appear.

Not surprisingly, due to the strong reduction of vegetative organs and the rarity of most species, the taxonomy of this family has been the subject of much debate. Most classifications treat the tribe Thismieae, in a broadly defined Burmanniaceae (Jonker 1938, Stevens 2001), while others favoured the recognition of a separate family of Thismiaceae closely related to the mycoheterotrophic Burmanniaceae (Dahlgren et al. 1985). Key references: Merckx et al. (2013); Curtis & Morris (1994).

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

### 1 THISMIA

*Thismia* Griff. *Proc. Linn. Soc. London* 1: 221 (1845).

*Bagnisia* Becc., *Malesia* 1: 249 (1878); *Geomitra* Becc., *Malesia* 1: 250 (1878);

Annual or perennial mycoheterotrophic herbs to 10 cm tall. Underground parts tuberous, or creeping cylindrical roots, or a cluster of short hyaline roots. Stems unbranched. Leaves scale-like. Inflorescence of

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single flowers or rarely a few-flowered cincinnus. Flowers actinomorphic or zygomorphic, variously coloured. Perianth of 6 tepals, often unequal in size, in 2 distinct whorls, the inner whorl sometimes connate forming a mitre; tube cylindrical to urceolate, soon falling off, throat circular, surrounded by an annulus. Stamens 6, inserted in the throat of the flower tube, pendent, occasionally alternating with inter-staminal lobes; connective often with appendages or hairs, connate into a tube with thecae separated, or connective free and thecae united. Ovary with 3 parietal placentas or with 3 free placental columns. Style 3-branched or capitate. Fruit fleshy, cup-shaped. Seeds ellipsoid to ovoid.

A genus of c. 50 species, the majority from Tropical America and Asia, but some extend into the subtropics (southern Japan, Australia) and temperate zones (Tasmania, New Zealand); 3 formally described species in Australia, 1 species present in Tasmania.

### 1 *Thismia rodwayi* F.Muell., *Vict. Naturalist* 7: 115 (1890)

*Fairy lanterns*

*Rodwaya thismiacea* F.Muell., *Vict. Naturalist* 7: 116 (1890), *nom. inval., pro. syn.*; *Bagnisia rodwayi* F.Muell. *Vict. Naturalist* 7: 155 (1890) *nom. inval. [nom. alt.]*; *Bagnisia hillii* Cheeseman, *Kew Bull.* 420: (1908); *Sarcosiphon rodwayi* (F.Muell.) Schltr., *Notizbl. Bot. Gart. Berlin-Dahlem* 57: 38,39 (1921).

*Illustrations*: Curtis & Morris, *The Student's Flora of Tasmania* 4b:424, fig. 149 (1994); Wapstra et al., *The Tasmanian Naturalist* 127: 3-4, fig. 1, fig. 2 (2005); Conn, *Fl. Victoria* 2: 739, fig. 144 (1994); Wapstra et al., *Tasmanian Plant Names Unravelling* 302 (2010); Wood (2010).

Fleshy herbs of uncertain longevity, all parts virtually subterranean except for flowers that emerge just at the soil surface, often hidden almost dense leaf litter and soil. Underground parts creeping horizontally, vermiform, white, 1.0–1.5 mm in diameter, sparingly or much-branched, spreading ± horizontally for 10s of centimetres but breaking readily. Flowering stems erect, 0.5–3.0 cm long, arising in the axil of a minute scale leaf and bearing c. 6 colourless bracts, the 3 uppermost the largest (c. 5–10 mm long); bracts lobed or shortly toothed and forming an involucre around the base of the solitary terminal flower. Perianth fleshy (but brittle), campanulate-mitiform, 12–18 mm long, 7–10 mm wide; amber to red (also recorded as rosy pink), paler towards the base; tube obovate-oblong, with 6 strong and 6 faint longitudinal stripes, 6–8 mm long, 4–6 mm wide, abruptly narrowed basally; lobes 4–6 mm long; outer lobes triangular-ovate, spreading to recurved (depending on age); inner lobes well separated, linear-spathulate, each with the basal linear portion 4–6 mm long and erect, the wider upper portion arching inward and the 3 lobes cohering at the top of the flower, each lobe slightly keeled and prolonged into a free subulate point that is either erect, or spreading forward and the points then interlacing (the precise arrangement depending on age). Stamens included, hanging from a 6-lobed ring at the top of the tube; filaments short, red, connectives fleshy, flattened and enlarged, ± overarching and concealing the minute the anthers and extending below them; anthers with 2 separate lobes, each bilocular. Style c. 1 mm long, stout, persistent; stigmas 3, fleshy, bilobed. Ovary inferior, obovate, unilocular with 3 free basal placentae; ovules minute, very numerous. Fruit ivory-white, becoming thin and transparent distally, and then disintegrating to expose the seeds, c. 1 cm across, capsule sunk into the hypanthium. Seeds ellipsoid, 0.5 mm long, 0.25 mm wide, seed coat reticulate, sandy brown. Flowering (Aug.-) Sep.-Dec; fruiting possibly throughout Aug.-Dec. (rarely seen).

Tas. (BEL°, TNS, TSE, TSR); also Qld (far south), NSW, Vic., New Zealand (although this may be a separate species, Merckx & Smets, 2014). Widespread in wet sclerophyll forest with broad-leaf understorey and occasionally mixed forest or “damp” sclerophyll forest, with key understorey species apparently *Olearia argophylla*, *Bedfordia salicina*, *Pomaderris apetala* and *Coprosma quadrifida*, to approximately 600 m a.s.l.. Absent from the west, southwest, northwest and islands but whether this reflects paucity of survey or a genuine absence is not known. The distribution, habitat characteristics and conservation management of the species has been relatively well studied in Tasmania (Roberts et al. 2003; Wapstra et al. 2005; Merckx & Wapstra 2013; Wapstra & Chuter 2013). The mycoheterotrophic life history and phylogenetic affinities are currently under study (Merckx unpubl. data). Currently listed as rare under the Tasmanian *Threatened Species Protection Act 1995*.

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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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