Swainsona 35: 153–157 (2021)

Hibbertia mathinnicola (Dilleniaceae), a new endemic species from northeastern Tasmania

Mark Wapstra

Environmental Consulting Options Tasmania (ECOtas), 28 Suncrest Avenue, Lenah Valley, Tasmania 7008, Australia
Email: mark@ecotas.com.au

Abstract: *Hibbertia mathinnicola* M.Wapstra is described and illustrated as an endemic taxon that is highly localised to northeastern Tasmania. Plants of this species have previously been identified as *Hibbertia calycina* (DC.) N.A.Wakef., a species now considered restricted to mainland Australia.

Keywords: *Hibbertia*, new species, *Hibbertia calycina*, endemic, taxonomy, northeast Tasmania, threatened species

Introduction

Hibbertia Andrews is a genus of more than 300 species, distributed mainly in Australia and extending to New Caledonia, New Guinea, Madagascar and some Pacific islands (APNI 2021). The number of species recognised in Tasmania has been somewhat fluid, especially in recent years as the taxonomy of some species-complexes of southeastern Australia has been resolved (e.g. Toelken 1998, 2000, 2013). Tasmania currently has eighteen species of *Hibbertia* (de Salas & Baker 2021), one of which is recognised as endemic, *Hibbertia basaltica* (Buchanan & Schahinger 2005).

One of the eighteen species recognised for Tasmania by de Salas & Baker (2021) is *Hibbertia calycina* (DC.) N.A.Wakef. The species is not listed as endemic, as it also occurs in Victoria (Willis 1972; Toelken 1996) and New South Wales (Harden & Everett 1990), including the Australian Capital Territory (Burbidge & Gray 1970). The recognition in other State floras that "*Hibbertia calycina*" also occurred in Tasmania is a relatively recent development. For example, Toelken (1996) in the *Flora of Victoria*'s treatment of *Hibbertia* did not attribute the species to Tasmania, although the current online version now does.

Hibbertia calycina was not included in any of the versions of *The Student's Flora of Tasmania*, Part 1 (Curtis & Morris 1975), since the Tasmanian Herbarium did not hold any specimens attributable to the species until the early 1980s. That such a distinctive species apparently went overlooked (or at least not collected) for close to two centuries of European occupation is somewhat surprising, especially given the early focus on the flora of the greater St Helens region in the late 1800s. In fact, it was in 1892 that Fitzgerald collected *Hibbertia rufa* from the area, which was to go unnoticed again until 2008, when the species was found to be localised but often abundant (Wapstra *et al.* 2011), highlighting how distinctive taxa can remain overlooked.

Prior to the recent submission of a batch of voucher specimens from surveys conducted in 2003/2004 by the author, the Tasmanian Herbarium (HO) only held eight sheets of *Hibbertia calycina*, the earliest from 9 Oct. 1980, three from 15 Jun. 1981, one from 8 Aug. 1981, and one each from 19 Oct. 1993, 6 Apr. 1995 and 20 Sep. 1999. The specimens from 1981 were originally labelled "*Hibbertia ?cistiflora*", presumably reflecting the use of a mainland flora treatment to identify the specimens (A. Buchanan, pers. comm.), but all subsequent specimens were labelled as "*Hibbertia calycina*". The Queen Victoria Museum & Art Gallery (QVMAG) also holds five collections of the taxon, two of which are apparent duplicates of one another (both labelled "Upper Scamander Pitts Hill", dated 9 Oct. 1980, and attributed to Mary Cameron), these being probably duplicates of the specimen held at the Tasmanian Herbarium with the same date and location. Of note is that these specimens are labelled "first recording for Tasmania". Other collections held at QVMAG include two from 20 Aug. 1981, attributed to "Forestry Officers" and one from 29 Sep. 1987 (also a Mary Cameron collection).

The impetus for the present paper was a long-term project examining the conservation status of "*Hibbertia calycina*" in Tasmania, started in 1995, and reported in Hopkins (1996), because of the taxon's restriction to wood production forests and uncertainty regarding its distribution, habitat and management requirements. That ecological project was continued and is reported in Turner *et al.* (2020), which describes the

ISSN 2206-1649 (Print) • ISSN 2206-1657 (Online)

distribution, habitat, population structure, management requirements and conservation status of the taxon (as *Hibbertia calycina*). It has been long-speculated that the Tasmanian "*Hibbertia calycina*" was a distinctive endemic taxon, principally supported by the restricted distribution and unique habitat, and morphological differences. Examination of *Hibbertia* material in HO showed it to be distinct from any named species. The formal recognition of this taxon is now made.

Materials and methods

The description of the new species is based on wild-collected material by the author and on specimens held at HO. Examination of root material was made on small plants, 3–15 cm tall with measurements taken at a depth of 1–2 cm below ground level. Seed was examined from material stored in the collections of the Tasmanian Seed Conservation Centre.

Taxonomy

Hibbertia mathinnicola Wapstra, ***sp. nov.***

Holotypus: Skyline Tier, Scamander Forest Reserve, 19 Oct. 1983, *F. Duncan s.n.* (HO322826). **Isotypi:** AD, HO322827.

Hibbertia calycina auct. non (DC.) N.A.Wakef.: M.Wapstra *et al.*, *Little Book Common Names Tasman. Pl.* 23 (2005); A.M.Gray, *Fl. Tasmania Online Dilleniac.* 25 (2009); de Salas & Matthew.L.Baker, *Cens. Vasc. Pl. Tasmania* 40 (2020); Turner *et al.*, *Pap. Proc. Roy. Soc. Tasmania* 154: 61 (2020).

Erect *shrub* to 0.3–0.6 (–1.3) m high, multi-stemmed, sometimes from the base, generally dense and compact with well-developed taproot, c. 2–4 mm diam. and several finer lateral roots (c. 0.4–0.6 mm diam.). *Branches* with many short lateral shoots, sparsely strigose, glabrescent; stem hairs tubercle-based, short, simple, very rarely bifurcate or multi-branched. *Leaves* alternate but closely clustered (almost fasciculate), erect, dark green when fresh, rarely yellowing in highly exposed situations, drying grey-green; stomata highly visible in dried material; petiole very short; lamina (3.5–) 10–15 (–18) mm long (leaves in close groups tend to be shorter, while older leaves at the end of flowering branchlets tend to be in the 14–16 mm length range), 0.75–1.2 mm wide, linear; margins revolute, raised above and touching a broad central ridge that extends to the apex; adaxial surfaces with scattered tubercle-based, forward-directed, simple, acicular hairs; abaxial surfaces obscured by the in-rolled margins; true abaxial leaf surface with abundant short multi-cellular white hairs (visible by dissection). *Flowers* 5-merous, solitary, sessile, terminal on short lateral branches. *Bracts* in pairs, narrowly triangular, fawn-brown, sparsely strigose, c. 3 mm long, c. 0.8 mm wide at the base, gently to deeply curved with long-tapered apex. *Sepals* imbricate, persistent, light green, occasionally with purple-brown flecks and patches, 4.5–6.5 mm long, unequal; outer sepals narrow-ovate, inner sepals broadly-ovate; sepal adaxial surfaces sparsely to moderately strigose on exposed surfaces; abaxial surfaces glabrous to sparsely strigose in upper quarter to third; margins of inner sepals membranous and virtually glabrous except for short scattered hairs; sepal apex shortly apiculate (apiculum 0.8–1 mm long). *Petals* bright yellow, often all present on most flowers at full anthesis but rapidly caducous, spreading, oblong-obovate, 7–8.5 mm long with a 1 mm long notch at the apex. *Stamens* 8–10, without staminodes, in a single cluster to one side of the carpels, erect, c. 3 mm long; filaments slightly connate at the base; anther and filament ± equal; anthers dehiscing by vertical slits. *Carpels* 2, fused at base; ovaries tomentose to villous, styles attached at the dorsal apex of each ovary, erect, c. 4–4.3 mm long. *Seeds* reniform, slightly flattened, 1.5–2.2 mm long, 1.2–1.6 mm wide, smooth, red-brown. **Figs 1–5.**

Fig. 1. Habit of *Hibbertia mathinnicola*, also showing the typical habitat of exposed ridgeline-upper slope topography in open *Eucalyptus sieberi* forest (Skyline Tier, 3 Sep. 2018).

Fig. 2. Abaxial and adaxial views of dried leaves of *Hibbertia mathinnicola*, showing the strigose leaves with mucro (shortest leaf c. 10 mm long). — *M. Wapstra 2669 et al.* (HO).

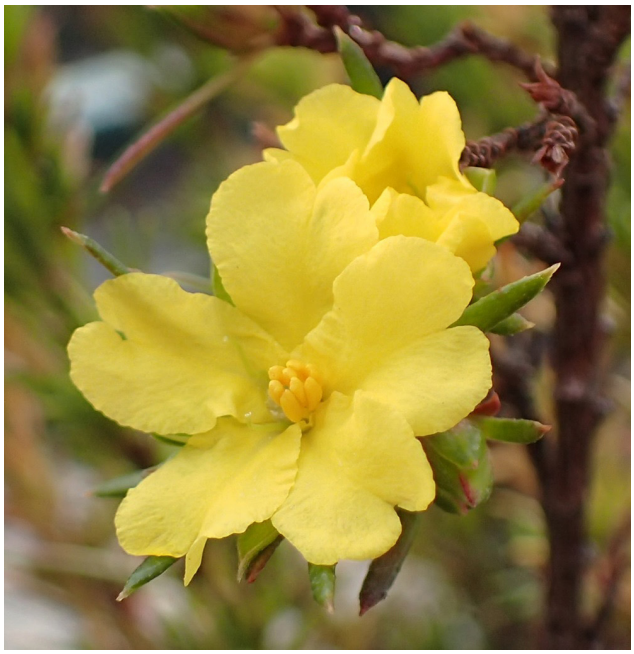

Fig. 3. Flower of *Hibbertia mathinnicola* in cultivation, Royal Tasmania Botanic Gardens, 15 Sep. 2017 (based on material vouchered as *J. Wood 124*, HO), showing the eight stamens clustered on one side of the ovary.

Fig. 4. Dried flower of *Hibbertia mathinnicola*, showing the tomentose to villous ovary surface and moderately strigose sepals. — Holotype.

Fig. 5. Seed of *Hibbertia mathinnicola* from seed orchard, Royal Tasmanian Botanical Gardens, 3 May 2021 (based on material vouchered as *J. Wood 124*, HO). — Photo: J. Wood.

Diagnostic characters. *Hibbertia mathinnicola* is distinguished from *H. calycina* as follows: *Hibbertia mathinnicola* is usually a larger shrub to 1.3 m high [vs *H. calycina*, a smaller shrub or shrublet to 0.7 (–1) m high] with longer leaves, (3.5–) 10–15 (–18) mm [vs (3–) 4–10 (–15) mm], and slightly longer sepals, 4.5–6.5 mm [vs (4.5–) 5–6 mm]. The bracts of the new species are distinctive, being narrowly triangular with a long drawn-out tip and often over 3 mm long [vs triangular to lanceolate bracts, to 2.6 mm, with a blunt to acute tip] (H.R. Toelken, pers. comm., 2021; Toelken 1996).

Remarks. *Hibbertia calycina* does not occur in Tasmania. That species was described as *Pleurandra calycina* by A.P. de Candolle (1817) with the type given as "Hab. In Novae-Hollandiae montibus, Caley. (v.s. sp. in h. Lamb.)" and combined in *Hibbertia* by Wakefield (1955), with no notion that the type was from Tasmania.

Within Tasmania, *Hibbertia mathinnicola* is superficially most similar to *H. riparia*, although any resemblance between the two species is obscure and superficial, and confusion simply does not arise in either the field nor curated herbarium collections. The key to *Hibbertia* species provided in the *Flora of Tasmania Online* (Gray 2009) separates the two species (*H. mathinnicola* included as *H. calycina*) on the arrangement of the leaves ("densely crowded on short lateral branchlets; length:breadth ratio 10–15/1; apex blunt or mucronate" for "*H. calycina*" and "not densely crowded, well dispersed; length:breadth ratio (3–)5(–10):1; apex acute-apiculate" for *H. riparia*). This should be corrected to indicate that the apex of the leaves of *H. mathinnicola* is acute-apiculate (when fresh, almost pungent) and the apex of the leaves of *H. riparia* is acute to obtuse but not apiculate (and when fresh, never almost pungent). *Hibbertia mathinnicola* is an erect, densely branched (sometimes from the base, especially after fire), compact shrub with dark green linear leaves that are tuberculate (hairy to varying degrees depending on age) and, especially when fresh, with a distinctive apiculate mucro that is almost pungent in fresh material, the leaves having a distinct prickly feel and appearance, particularly so on drying), the flowers with 8–10 stamens in a single cluster on one side of the carpels, the ovaries tomentose to villous.

Distribution. *Hibbertia mathinnicola* has a restricted distribution in the hinterlands of the northeast coast of Tasmania between Scamander and St Helens (Fig. 6). It is known from nine closely-clustered patches of plants associated with ridge systems that are disconnected from one another (Turner *et al.* 2020). Its extent of occurrence (minimum convex polygon) is approximately 95 km² with an area of occupancy of c. 0.43 km² and an estimated abundance of over 15,000 plants (Turner *et al.* 2020).

Habitat. The species occurs in dry sclerophyll forest dominated by *Eucalyptus sieberi* L.A.S.Johnson

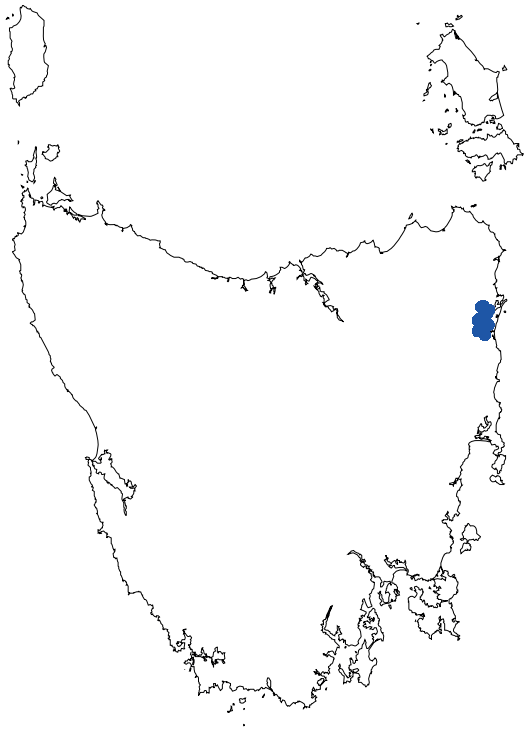

Fig. 6. Distribution of *Hibbertia mathinnicola* in Tasmania.

(Tasmanian ironbark) with a very open understorey on Ordovician-Devonian turbiditic sedimentary sequences known as the Mathinna Supergroup. The species is restricted to highly insolated ridges and adjacent slopes, which are often very steep, sometimes loosely and densely rocky (Fig. 1). It has been recorded from elevation ranges from 110 to 375 m a.s.l.

Phenology. Flowers present throughout most of year, peaking from November to April.

Etymology. The epithet *mathinnicola* is a composite of the word Mathinna and Latin *-cola* (dweller), recognising that the species is wholly restricted to ridgelines and adjacent slopes on the uniquely Tasmanian sedimentary substrate known as the Mathinna Supergroup (Calver *et al.* 2014).

Suggested common name. The name ironbark guineaflower is suggested in recognition of the habitat of the species (restricted to *Eucalyptus sieberi*, Tasmanian ironbark, forests). In Tasmania, this taxon has been previously known as the lesser guineaflower (Wapstra *et al.* 2005–), but this name should be reserved for mainland Australian material of *H. calycina*.

Reservation status. *Hibbertia mathinnicola* occurs only on public land (Turner *et al.* 2020). Some populations are within legislated reserves including the German Town Regional Reserve and Scamander Regional Reserve, but most sites are within public land currently designated as Future Potential Production Forest (Informal Reserve), the status of which is somewhat uncertain pending political decisions on the forest industry in Tasmania.

Conservation status. *Hibbertia mathinnicola* has been listed (as *Hibbertia calycina*) as vulnerable (Schedule 4) on the *Tasmanian Threatened Species Protection Act 1995* since the promulgation of the Act. A review of the conservation status by Turner *et al.* (2020) concluded this status remains valid, pending a more thorough population estimate. Given it is a narrow-range endemic species, *H. mathinnicola* is likely to qualify as Vulnerable or Endangered on the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

Additional specimens examined [ordered by date of collection and then c. north to south]

TASMANIA. Upper Scamander on Pitts Hill and Pyramid Hill, 9 Oct. 1980, *M.P. Cameron s.n.* (HO36335); Pyramid Hill, 2 km N of Upper Scamander, 15 June 1981, *A. Moscal 795* (HO); Loila Tier, c. 1 km SW of Loila Pinnacle, 15 June 1981, *A. Moscal 796* (HO); Pyramid Hill, 8 Aug.1981, *F. Duncan s.n.* (HO329905); McIntyre Creek catchment, 6 Apr. 1995, *F. Duncan s.n.* (HO411630); St Helens area, 20 Sep. 1999, *T.W. Dudley s.n.* (HO501301); Skyline Tier, 6 Nov. 2002, *M.Wapstra s.n.* (pers. herb.); Trout Road, Scamander, 17 Dec. 2009, *J. Wood 124* (HO); between Bolpeys Ridge and Catos Road (catchment of Wattle Creek), 13 Nov. 2017, *M. Wapstra 2674 & P. Turner* (HO); Mt Echo (NE of), above Nephele Creek, 14 Nov. 2017, *M. Wapstra 2676, P. Turner & K. Hopkins* (HO); NE of Mt Echo (catchment of Constable Creek), 14 Nov. 2017, *M. Wapstra 2673, P. Turner & K. Hopkins* (HO); Mt Echo, northwest ridge, 14 Nov. 2017, *M. Wapstra 2671, P. Turner & K. Hopkins* (HO); Skyline Tier (near S. end), 14 Nov. 2017, *M. Wapstra 2675, P. Turner & K. Hopkins* (HO); north of Wolfram Creek Track, catchment of Fitzgerald Creek, 15 Nov. 2017, *M. Wapstra 2669, P. Turner & K. Hopkins* (HO); NW of Orieco Hill, SW of Orieco Road, catchment of Eastern Creek, 15 Nov. 2017, *M. Wapstra 2672, P. Turner & K. Hopkins* (HO); Pyramid Hill (continuation of ridge to W of main hill), 15 Nov. 2017, *M. Wapstra 2670, P. Turner & K. Hopkins* (HO); Trout Road, NW of Pitts Hill, 15 Nov. 2017, *M. Wapstra 2665, P. Turner & K. Hopkins* (HO); immediately west of Loila Track (headwaters of Fitzgeralds Creek), 16 Nov. 2017, *M. Wapstra 2668, P. Turner, K. Hopkins & R. Skabo* (HO); SE of Orieco Hill (c. 6 km W of Beaumaris), 16 Nov. 2017, *M. Wapstra 2667, P. Turner, K. Hopkins & R. Skabo* (HO); SE of Orieco Hill (c. 6 km W of Beaumaris), 16 Nov. 2017, *M. Wapstra 2666, P. Turner & K. Hopkins* (HO).

Discussion

Hibbertia mathinnicola is a distinctive shrub that occurs in a locally restricted part of the northeast coastal hinterlands of Tasmania in highly distinctive (and predictable) habitat. The species has been long-recognised as unique amongst the Tasmanian *Hibbertia* and suspected as being an endemic species. This description of the taxon hitherto known as *Hibbertia calycina* in Tasmania adds to the list of narrow-range endemics for the State, their restricted range apparently controlled to a large extent by the underlying geology. *Hibbertia basaltica* is another such narrow-range

endemic within the genus, restricted to Tertiary basalt, and possibly Jurassic dolerite, in southeast Tasmania (Toelken 2013; Buchanan & Schahinger 2005). Within Tasmania, there are several vascular plant species confined to particular geological substrates including Jurassic dolerite, mainly on the central east coast; Devonian granites and granodiorites (again, mainly on the east coast); and Cambrian ultramafics often referred to as serpentine (localised occurrences on the west coast and north coast). There are few vascular plant species, however, wholly associated with sedimentary substrates, especially the Mathinna Group turbidite sequences of the northeast of Tasmania: *Hibbertia mathinnicola* may be unique in this respect.

Acknowledgments

Hellmut Toelken (AD) encouraged the description of this species and provided helpful comments on various aspects of the species' distribution and relationship to other *Hibbertia* species, including diagnostic text. Numerous people assisted with surveys over the last three decades (see Turner *et al.* 2020). David Maynard (Queen Victoria Museum & Art Gallery) provided information on collections held at that institute. Miguel de Salas (Tasmanian Herbarium) provided comments on an earlier draft of the manuscript, assisted with specimen management and digital microscopic imaging. James Wood (Tasmanian Seed Conservation Centre, Royal Tasmanian Botanical Gardens) provided the digital image of the seed.

References

Australian Plant Name Index [APNI] (continually updated). IBIS database. (Centre for Australian National Biodiversity Research, Australian Government: Canberra). http://www.cpbr.gov.au/cgi-bin/apni [accessed: 21 Apr. 2021].

Buchanan, A.M. & Schahinger, R.B. (2005). A new endemic species of *Hibbertia* (Dilleniaceae) from Tasmania. *Muelleria* 22: 105–109.

Burbidge, N.T. & Gray, M. (1970). *Flora of the Australian Capital Territory*. (Australian National University Press: Canberra).

Calver, C.R., Baillie, P.W., Banks, M.R. & Seymour, D.B. (2014). Ordovician-Lower Devonian successions. In: K.D. Corbett, P.G. Quilty & C.R. Calver (eds), *Geological Evolution of Tasmania*. (Geological Society of Tasmania, Tasmania Division: Hobart). [*Geological Society of Australia Special Publication* 24]

Candolle, A.P. de (1817). Dilleniaceae. In: *Regni Vegetabilis Systema Naturales* 1: 411–438. (Treuttel & Würtz: Paris).

Curtis, W.M. & Morris, D.I. (1975). *The Student's Flora of Tasmania*, Part 1: *Gymnospermae, Angiospermae: Ranunculaceae to Myrtaceae* (2nd edn, 1981 reprint). (Government Printer: Hobart).

de Salas, M.F. & Baker, M.L. (2021). *A Census of the Vascular Plants of Tasmania, including Macquarie Island*. (Tasmanian Herbarium, Tasmanian Museum & Art Gallery: Hobart).

Gray, A.M. (2009). 92 Dilleniaceae, version 2019:1. In: de Salas, M.F. (ed.), *Flora Tasmania Online* (Tasmanian Herbarium, Tasmanian Museum & Art Gallery: Hobart). https://flora.tmag.tas.gov.au/treatments/dilleniaceae/ [accessed: 21 Apr. 2021].

Harden, G.J. & Everett, J. (1990). Dilleniaceae. In: Harden, G.J. (ed.), *Flora of New South Wales*. (University of New South Wales Press Ltd: Sydney).

Hopkins, K. (1996). *The Distribution of* Hibbertia calycina *(Guinea Flower) in the St Helens – Scamander Area*. Report to the Eastern Tiers District, Forestry Tasmania, December, 1995. (Forestry Tasmania: Hobart).

Toelken, H.R. (1996). Dilleniaceae. In: Walsh, N.G. & Entwisle, T.J. (eds), *Flora of Victoria* 4: 300–313. (Inkata Press: Melbourne).

Toelken, H.R. (1998). Notes on *Hibbertia* (Dilleniaceae) 2. The *H. aspera–H. empetrifolia* complex. *Journal of the Adelaide Botanic Gardens* 18(2): 107–160.

Toelken, H.R. (2000). Notes on *Hibbertia* (Dilleniaceae) 3. *H. sericea* and associated species. *Journal of the Adelaide Botanic Gardens* 19: 1–54.

Toelken, H.R. (2013). Notes on *Hibbertia* subg. *Hemistemma* (Dilleniaceae) 9. The eastern Australian *H. vestita* group, including *H. pedunculata* and *H. serpyllifolia*. *Journal of the Adelaide Botanic Gardens* 26: 31–69.

Turner, P.A.M, Wapstra, M., Woolley, A., Hopkins, K., Koch, A.J. & Duncan, F. (2020). Long-term monitoring of the threatened lesser guineaflower *Hibbertia calycina* (DC.) N.A.Wakef. (Dilleniaceae) in Tasmania. *Papers and Proceedings of the Royal Society of Tasmania* 154: 61–82.

Wakefield, N.A. (1955). Flora of Victoria: new species and other additions – 7. *The Victorian Naturalist* 72(8): 118–122.

Wapstra, M., French, B., Tyquin, V. & Skabo, R. (2011). From presumed extinct to probably secure? The resurrection and ongoing management of *Hibbertia rufa* (brown guineaflower) in north-east Tasmania. *Tasforests* 19: 54–70.

Wapstra, H., Wapstra, A., Wapstra, M. & Gilfedder, L. (2005–, updated annually). *The Little Book of Common Names for Tasmanian Plants*. (Department of Primary Industries, Water & Environment: Hobart). https://dpipwe.tas.gov.au/conservation/publications-forms-and-permits/publications/little-book-of-common-names-for-tasmanian-plants [accessed: 25 Oct. 2021].

Willis, J.H. (1972). *A Handbook to Plants in Victoria*, Vol. 2: *Dicotyledons*. (Melbourne University Press: Melbourne).