Muelleria

44: 3–10

Published online in advance of the print edition, 9 September 2025

ROYAL BOTANIC GARDENS VICTORIA

How many taxa form part of the *Ozothamnus rodwayi* (Asteraceae: Gnaphalieae) complex?

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Introduction

Ozothamnus rodwayi Orchard *sensu lato* consists of three taxa that are endemic to Tasmania: *Ozothamnus rodwayi sensu stricto*, and two varieties, *O. rodwayi* var. *kingii* (W.M.Curtis) P.S.Short and *O. rodwayi* var. *oreophilus* (W.M.Curtis) P.S.Short (de Salas & Baker 2024). The first taxon in the complex to be described was *Cassinia cuneifolia* A.Cunn. ex DC. in de Candolle's *Prodromus* (de Candolle 1838). This species was transferred to *Ozothamnus* by Hooker (1856) as *O. backhousei* Hook.f., a name that is illegitimate since the combination *Ozothamnus cuneifolius* was available at the time. Bentham (1867), in his *Flora Australiensis,* placed it in *Helichrysum* as *H. backhousei* F.Muell. ex Benth., which must be treated as a *nom. nov.* rather than a *comb. nov.,* since *O. backhousei* was illegitimate, and *H. cuneifolium* was not available (*non H. cuneifolium Benth., op. cit. 633*). Curtis (1974) described the two varieties *H. backhousei var. kingii* W.M.Curtis and *H. backhousei var. oreophilum* W.M.Curtis to accommodate some smaller-leaved forms that also had narrower capitula. Since the combination *O. cuneifolius* was no longer available (*non. O. cuneifolius* (Benth.) Anderb.), the new name *O. rodwayi O*rchard was published by Wilson *et al.* (1992) when they transferred it again to the genus *Ozothamnus*, and the two existing varieties transferred to it.

Abstract

Subspecies of *Ozothamnus rodwayi* are revised, and two infraspecific taxa are raised to the rank of species. A new species, *Ozothamnus vitulinus* de Salas & J.B.Davies, is described. It occurs on substrates derived from sedimentary and metamorphic rocks in western Tasmania and is characterised by its capitula with a larger number of florets (18–28) and a distinctive, parchment-like layer that overlies and obscures the remaining abaxial indumentum.

Keywords: Endemic flora, geology, Tasmania, Asteraceae, alpine vegetation.

ISSN: 0077-1813 (print) · ISSN: 2204-2032 (online)

The three taxa are morphologically similar to each other and share a range of characters that include flat, elliptical to obovate leaves, capitula with white florets, innermost phyllaries possessing white, spreading tips, and an alpine or sub-alpine habitat.

A combination of field work and examination of specimens in the Tasmanian Herbarium (HO, herbarium acronyms per Thiers 2016+) allowed us to reassess the complex as a whole and revealed the presence of a fourth taxon, similar to *O. rodwayi* in gross morphology but restricted to higher-elevation sedimentary substrates, predominantly quartzite.

Taxonomy

Ozothamnus rodwayi Orchard, ***Muelleria*** 7: 522 (1992)

Cassinia cuneifolia A.Cunn. ex DC., *Prodr*. [A.P. de Candolle] 6: 155 (1838); *Ozothamnus backhousei* Hook.f., *Bot. Antarct. Voy. III (Fl. Tasman.)* 1(3): 204 (1856) *nom. illeg. nom. superfl.*; *Helichrysum backhousei* F.Muell. ex Benth., *Fl. Austral*. 3: 632 (1867).

Type: **Australia. [**Tasmania] Van Diemen's Land, on the rocky face of Mount Wellington, i.1819, *A. Cunningham* 104 (holo: photo GDC! G00461750).

Low-growing, spreading *shrub* to 0.5(–1) m tall, slightly sweetly aromatic. *Branches* ascending, flexible, tomentose when young, with the indumentum often coated with light yellowish-green resin. *Leaves* crowded, alternate, semi-erect to spreading, older ones

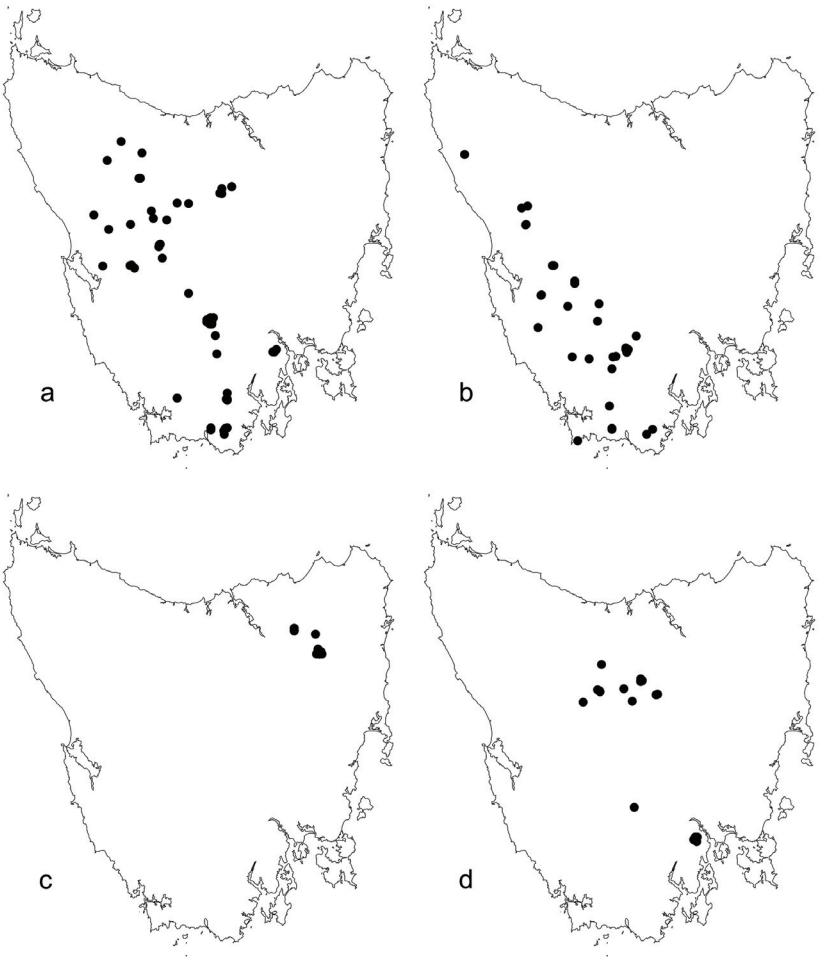

Figure 1: Distribution of collections of taxa in the *Ozothamnus rodwayi* complex: a. *O. rodwayi*. b. *O. vitulinus*. c. *O. kingii*. d. *O. oreophilus*.

reflexed at the base of the lamina; *petiole* 1–2 mm long; *lamina* (5–)7–12(–15) mm long, (2–)3–5(–6) mm wide, coriaceous, flat, broadly obovate to broadly spathulate, widest near the apex; base tapering gradually; margins entire, thickened, glabrous; apex rounded or obtuse; adaxial surface green, viscid; abaxial surface white to cream, felted, sometimes with droplets of yellow-green exudate; midrib indistinct to somewhat visible. *Inflorescence* a dense, corymbose, subspherical, terminal panicle of 10–30 capitula; *capitula* turbinate, 5–6 mm long, 3–4 mm diameter; *outer involucral bracts* broadly obovate to elliptical, pale to mid-brown, hyaline; *inner involucral bracts* spathulate, 8–12, with white spreading tips; *florets* 12–18. *Ovary* eglandular, rarely sparsely glandular, obscurely ridged. *Achenes* 1.5–2 mm long, c. 0.8 mm wide. *Pappus bristles* barbellate, 3–4 mm long. Figs 2a, 3a.

***Specimens examined*: TASMANIA.** Mt Wellington, 1879, *A.Simson s.n.* (HO); Mount Field East, i.1944, *W.M. Curtis s.n.* (HO); Walls of Jerusalem, West Wall, 25.i.1982, *M.J. Brown 131* (HO); Milligans Peak, near Mount King William I, 28.i.1984, *S.J. Jarman 167* (HO); St Valentines Peak, summit region, 13.i.1986, *P.A. Collier 1196* (HO); Mount Geryon, 31.iii.1986, *P.A. Collier 1309* (HO); Mount Dundas, 03.i.1987, *P.A. Collier 2153* (HO); Precipitous Bluff, summit plateau, 16.i.1987, *J.B. Kirkpatrick s.n.* (HO); Precipitous Bluff, summit plateau, 07.i.1989, *A.M. Buchanan 11366* (HO); Wylds Craig, close to summit, 03.iii.1990, *P.A. Collier 4620* (HO).

Distribution and ecology: Endemic to Tasmania, where it is common to abundant in alpine heathlands and among boulders on the western, central, and southeastern mountains, generally c. 800–1,617 m elevation, including Mt Ossa, Tasmania's highest mountain. Normally found on substrates derived from dolerite (Fig. 1). Flowering Dec.–Feb.

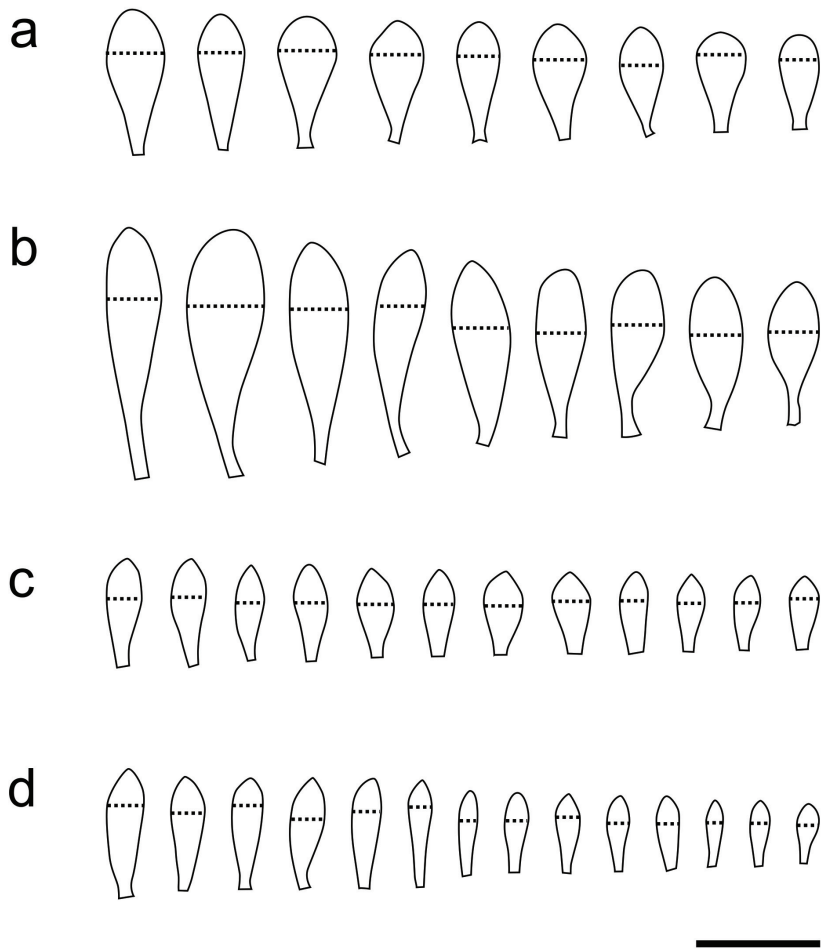

Figure 2: Comparison of leaf shape and size in *Ozothamnus rodwayi sensu lato.* Dashed line denotes approximate widest point of each leaf: a. *O. rodwayi*. b. *O. vitulinus*. c. *O. kingii*. d. *O. oreophilus*. Scale bar = 1 cm.

Notes: Within the complex, *Ozothamnus rodwayi* is morphologically closest to *O. vitulinus*, from which it is easiest to differentiate by its spathulate or broadly obovate leaves that are widest close to the apex, by its visible, felted indumentum that partly obscures the midrib but is visible and not obscured by a parchment-like layer. It differs from both *O. kingii* and *O. oreophilus* in its low-growing habit with ascending branches (the latter two are erect shrubs), its larger leaf size, leaf shape (Fig. 2), and the larger number of inner involucral bracts and florets in each capitulum.

Ozothamnus vitulinus de Salas & J.B.Davies, ***sp. nov***.

Ozothamnus rodwayi var. 'Quartzite' (M.F. de Salas 1300) Tasmanian Herbarium.

Type: **Australia.** Tasmania, Mount Anne, NE ridge, 1 km N of summit, 18.ii.1989, *J.R. Croft 10159 & M.M. Richardson* (holo: HO 306907; iso: CBG, CHR, MEL).

Low-growing, spreading *shrub* to 1 m tall, slightly sweetly aromatic. *Branches* ascending, flexible, tomentose when young, with the indumentum somewhat coated with pale yellowish resin. *Leaves* crowded, alternate, semi-erect to spreading, older ones reflexed at the base of the lamina; *petiole* 1–3 mm long; *lamina* (8–)14–18(–21) mm long, (3–)5–6 mm wide, coriaceous, slightly folded at the midrib, obovate to elliptical to oblanceolate, widest between the middle and the distal 1/3; base tapering gradually; margins entire, narrowly recurved, glabrous; apex obtuse to rounded, slightly recurved; adaxial surface green, viscid; abaxial surface white to cream, with a layer of clear, glossy, parchment-like resin obscuring the underlying, very shortly-felted indumentum; midrib dark, raised, and distinct the whole length of the lamina. *Inflorescence* a corymbose, terminal panicle of (5–)10–15(–25) capitula; *capitula* turbinate, c. 5 mm long and wide; *outer involucral bracts* obovate to narrowly elliptical, pale to mid-brown, hyaline; *inner involucral bracts* spathulate, 10–14, with white, spreading tips; *florets* (18–)21–25(–28). *Ovary* conspicuously glandular. *Pappus bristles* barbellate, 3–4 mm long. Figs 2b, 3b, 4, 5.

***Specimens examined*: TASMANIA:** Mount Murchison, i.1894, *L. Rodway 408* (HO); Lower Moonlight Ridge, near tarns, 20.iii.1984, *A.M. Buchanan 2950* (HO); Jubilee Range, 13.i.1985, *A.M. Buchanan 5203* (HO); Mt Karamu, SE ridge, 14.i.1987, *A.M. Buchanan 9448* (HO); Mount Pollux, 13.ii.1987, *J.B. Kirkpatrick s.n.* (HO); Charles Range, 17.ii.1987, *J. Wells s.n.* (HO); Algonkian Mt, 07.iii.1990, *S.J. Jarman s.n.* (HO); Mt Edith, near summit. Arthur Pieman Conservation Area., 03.ii.2015, *M.F. de Salas 1300 & M.L. Baker* (HO); Mt Louisa, summit., 08.ii.2016, *M.F. de Salas 1718, M.L. Baker & M.J.M. Brown* (HO).

Etymology: The species epithet is derived from the Latin *vitulinus* (calf-like), alluding to the vellum-like layer over the abaxial indumentum, which is a diagnostic character for this species.

Distribution and ecology: Endemic to Tasmania, where it can be found growing in alpine heathland and short shrubbery on the western and southwestern mountains

Figure 3: Leaf indumentum in *Ozothamnus rodwayi sensu lato*: a. *O. rodwayi*. b. *O. vitulinus*. c. *O. kingii*. d. *O. oreophilus*. Scale bar = 1 cm. Image by Matthew Baker, Tasmanian Herbarium.

(Fig. 1), mostly on metamorphic and sedimentary substrates (predominantly quartzite, but also sandstone and conglomerate, e.g. Moonlight Ridge, West Coast Range), and mostly above 800 m elevation, though sometimes lower near the west coast (e.g. Mt. Karamu, at c. 400 m elevation). Flowering Dec.–Mar.

Notes: *Ozothamnus vitulinus* is superficially similar to *O. rodwayi* in habit and leaf shape, but it differs by having longer, narrower leaves that are normally widest in the distal third, but further from the apex, with the apex more often obtuse rather than rounded. The abaxial midrib is markedly dark and raised compared to *O. rodwayi*, and the margins are narrowly but clearly recurved. The indumentum of the abaxial lamina is obscured by a parchment-like layer (Fig. 5) that somewhat resembles that seen in *Ozothamnus antennaria* (DC.) Hook.f. Despite this, *O. antennaria* clearly differs from *O. vitulinus* by having appressed-pubescent achenes (sessile-glandular in *O. vitulinus*) and concolorous inner involucral bracts with erect apices (in *O. vitulinus* these have distinctly white, spreading apices); *O. vitulinus* has the largest number of florets per capitulum, up to 28, of any of the four species in the complex, the closest being *O. rodwayi* with 12–18.

Ozothamnus kingii (W.M.Curtis) de Salas & J.B.Davies, ***comb.*** & ***stat. nov***.

Helichrysum backhousei var. *kingii* W.M.Curtis, *Rec. Queen Victoria Mus.*50: 3 (1974); *Ozothamnus rodwayi* var. *kingii* (W.M.Curtis) P.S.Short, *Muelleria* 7(4): 522 (1992).

Type: **Australia.** Tasmania, Mount Barrow, elev. c. 4,300 feet, 6.ii.1970, *H.J. King s.n.* (holo: HO15243!; iso HO!, AD, NSW, photo MEL!).

Erect to spreading *shrub* to 1.5 m tall, often with a greyish, cinerascent appearance, slightly sweetly aromatic. *Branches* erect to spreading, brittle, tomentose when young. *Leaves* alternate, erect to semi-erect, often incurved on drying; *petiole* 1 mm long; *lamina* (4–)6–9(–11) mm long, 2–3 mm wide, coriaceous, flat, narrowly obovate to narrowly elliptical, widest in the distal half, base tapering gradually; margins entire, thickened, tomentose; apex obtuse; adaxial surface green, papillose, not or scarcely viscid, cobwebbed when young, glabrescent; abaxial surface cream to white, loosely tomentose, almost cottony; midrib indistinct or partially to totally obscured by the indumentum. *Inflorescence* a dense, corymbose, terminal panicle of 20–30(–40) capitula; *capitula* conical to campanulate, 4–5 mm long and 2.5–4 mm wide; *outer involucral bracts* broadly ovate to elliptical, brown, frequently suffused with red or purple, hyaline; *inner involucral bracts* linear, 3–4, with cream to white, spreading tips; *florets* 10–14. *Ovary* with conspicuous yellow glands, rarely only sparsely glandular or with fine, woolly trichomes. *Achenes* c. 1.5 mm long, c. 0.8 mm wide. *Pappus bristles* barbellate, 3–4 mm long. Figs. 2c, 3c.

***Specimens examined*: TASMANIA:** Ben Lomond, 01.i.1973, *D.A. Ratkowsky s.n. & A.V. Ratkowsky* (HO); Ben Lomond NP, above NTAC Ski Lodge, 27.ii.2010, *J. Wood 207 & N. Tapson* (HO); Ben Lomond National Park Ski Village, 04.ii.1983, *S.J. Forbes 1398* (HO); Ossians Throne, Ben Lomond, 18.i.1992, *A. Moscal 22392* (HO); Coal Mine Crag, Ben Lomond, 19.i.1992, *A. Moscal 22535* (HO); Mt Barrow, 25.ii.1993, *A. Moscal 24602* (HO); Track to Legges Tor, Ben Lomond National Park, 02.iii.1996, *A.C. Rozefelds 133* (HO); Legges Tor, Ben Lomond, 28.iv.1998, *A.M. Buchanan 15204* (HO); Ben Lomond National Park. Hamilton Crags, 09.ii.2022, *M.F. de Salas 2743 & M.L. Baker* (HO).

Distribution and ecology: Endemic to Tasmania, where it can be found in alpine and subalpine shrubbery and heathland on Ben Lomond massif and Mt Barrow (Fig. 1), on dolerite-derived soils, normally above 1,200 m elevation. Flowering Jan.–Feb.

Notes: *Ozothamnus kingii* is a taller and broader shrub than the rest of the taxa in the complex. Its leaves are substantially shorter and narrower than those of *O. rodwayi* and *O. vitulinus*, and the abaxial indumentum is more cottony than felted, obscuring the midrib and leaf margins. This is the only taxon in the complex to have an evident adaxial indumentum, giving the plants a distinctly grey appearance, even from a distance. It differs clearly from *O. oreophilus* in the much shorter indumentum of the latter. *Ozothamnus kingii* also has its abaxial midrib and margins somewhat or mostly obscured by its indumentum, whereas they are clearly evident, raised and dark in *O. oreophilus*. *Ozothamnus kingii* has the narrowest capitula, fewest number of florets, and fewest number of inner involucral bracts in the complex, and the inner involucral bracts have the least conspicuous white tips of any of the four taxa.

Figure 4: Holotype of *Ozothamnus vitulinus*.

Key to taxa in the *Ozothamnus rodwayi* complex

1. Low, spreading shrubs with ascending branches; leaves obovate or spathulate, > 3 mm wide; capitula with ≥ 8 white-tipped inner involucral bracts 2
1: Erect, densely-branched shrubs with erect branches; leaves elliptical to oblanceolate, < 3 mm wide; capitula with ≤ 6 white-tipped inner involucral bracts 3
2. Abaxial indumentum felted, visible; leaf margins thickened but not recurved; midrib indistinct or partially obscured; florets 12–18 ..... ***O. rodwayi***
2: Abaxial indumentum obscured by a parchment-like layer; leaf margins recurved; midrib distinct, raised, dark; florets (18–)21–25(–28) ..... ***O. vitulinus***
3. Adaxial lamina cobwebby, lending plants a distinctly silvery-grey appearance; abaxial midrib and margin indistinct; capitula with 3–4 white-tipped inner involucral bracts ..... ***O. kingii***
3: Adaxial lamina viscid, with no distinct indumentum, lending plants a yellowish-green appearance; abaxial midrib and margins dark and distinct; capitula with 5–6 white-tipped inner involucral bracts ..... ***O. oreophilus***

Ozothamnus oreophilus (W.M.Curtis) de Salas & J.B.Davies, ***comb.*** & ***stat. nov***.

Helichrysum backhousei var. *oreophilum* W.M.Curtis, *Rec. Queen Victoria Mus.*50: 3 (1974); *Ozothamnus rodwayi* var. *oreophilus* (W.M.Curtis) P.S.Short, *Muelleria* 7(4): 522 (1992).

Type: **Australia.** Tasmania, Mount Wellington, elev. c. 3,500 feet, 19.i.1945, *W.M.Curtis s.n.* (holo: HO15244!).

Erect or sometimes spreading *shrub* to 1 m tall, slightly sweetly aromatic. *Branches* erect, tomentose when young, with the indumentum often coated with light yellowish-green resin. *Leaves* crowded, alternate, semi-erect or erect to spreading; *petiole* 1–2 mm long; *lamina* (5–)7–12(–15) mm long, (2–)3–5(–6) mm wide, coriaceous, flat, oblanceolate, or elliptical to narrowly elliptical, rarely spathulate, broadest very near the apex; base tapering gradually; margins entire, thickened, glabrous; apex obtuse, rarely acute; adaxial surface green, viscid; abaxial surface white to cream, felted, sometimes with droplets of yellow-green exudate, with the midrib distinctly evident, dark and raised. *Inflorescence* a dense, corymbose, subspherical, terminal panicle of 10–30 capitula; *capitula* turbinate, 5–6 mm long, 3–4 mm diameter; *outer involucral bracts* broadly obovate to elliptical, pale to mid-brown, hyaline; *inner involucral bracts* spathulate, 8–12 with white spreading tips; *florets* 12–18. *Ovary* eglandular, rarely sparsely glandular, obscurely ridged. *Achenes* 1.5–2 mm long, c. 0.8 mm wide. *Pappus bristles* 3–4 mm long, barbellate. Figs. 2d, 3d.

***Specimens examined*: TASMANIA:** Mt Wellington, summit, 03.ii.1849, *J. Milligan 1041* (HO); Pine Lake, 28.ii.1970, *W.M. Curtis s.n.* (HO); Walls of Jerusalem, i.1973, *A.V. Ratkowsky s.n.* (HO); Mt Wellington, near Dead Island, 08.i.1976, *D.A. Ratkowsky s.n. & A.V. Ratkowsky* (HO); Windy Moor, near Mt Field East, 19.i.1982, *A.M. Gray s.n.* (HO); Walls of Jerusalem. The Temple, 19.i.1983, *A. Moscal 1420* (*HO*); Wild Dog Tier, 09.iii.1984, *A. Moscal 6820* (HO); Sandbanks Tier, Great Lake, 26.i.1987, *P.A. Collier 2233* (HO); Liffey Bluff, 07.iii.1990, *A. Moscal 18989* (HO); Near Chalice Lake, Cathedral Mountain, 01.i.1993, *A.M. Buchanan 12756* (HO); Springs Hotel, below carpark. Top of small track down to main Springs carpark. Mt Wellington, 21.xi.2004, *R. Minchin s.n.* (HO).

Distribution and ecology: Endemic to Tasmania, where it can be found in alpine heathland and shrubbery on the Central Plateau, Mt Field, Mt Wellington and the Southern Ranges (Fig. 1), mostly on dolerite-derived substrates, and normally above 1,000 m elevation, although occasionally lower (e.g. The Springs, c. 600 m elevation. Flowering Dec.–Feb.

Notes: *Ozothamnus oreophilus* is similar to *O. kingii* but differs by having slightly longer and narrower leaves which are distinctly viscid and a dark and distinct abaxial midrib, in contrast to the partially or totally obscured midrib of *O. kingii*.

Discussion

The four taxa reviewed in this study form two clear pairs from a morphological point of view: *Ozothamnus rodwayi* and *O. vitulinus* are morphologically closer to each other than to the other two taxa, with a spreading, low-growing habit, larger leaves and capitula, more florets, and more inner involucral bracts with conspicuous, spreading white tips. In contrast, *O. kingii* and *O. oreophilus* are broadly similar in their erect, bushy

habit, smaller leaves, narrower capitula, fewer florets, and relatively few inner involucral bracts with much less conspicuous white tips.

Although O. *rodwayi* and *O. vitulinus* occur sympatrically at several localities, including Moonlight Ridge, Frenchmans Cap and the Tyndall Range, intermediate forms have not been observed. Similarly, *O. rodwayi* and *O. oreophilus* grow sympatrically at Mt Wellington, Mt Field and the northern margin of the Central Plateau, but with no intermediate forms recorded. In contrast, the range of *O. kingii* does not overlap with that of any of the other three taxa, making it difficult to establish if they are capable of hybridising. Due to their distinctiveness, we have chosen to treat all four taxa at the rank of species.

Acknowledgements

The authors would like to thank Bush Blitz for access to some of the localities where *O. vitulinus* were made, as well as Ines Schonberger, Brendan Lepschi (CANB) and Andre Messina (MEL) for specimen photographs. We would also like to thank Mark Wapstra for constructive discussions and comments on this manuscript and on *Ozothamnus* taxonomy in general, and Matthew Baker for creating Figure 3 and for constructively reviewing this manuscript.

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Figure 5: Abaxial leaf surface of *Ozothamnus vitulinus*, showing the distinctive, clear and glossy, parchment-like layer that overlies the indumentum.