

# A revision of the *Coronidium scorpioides* (Asteraceae: Gnaphalieae) complex

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## Abstract

*Coronidium scorpioides* (Labill.) Paul G. Wilson is revised and segregated into four relatively widespread species in south-eastern Australia (*C. scorpioides*, *C. gunnianum* (Hook.) N.G. Walsh, *C. monticola* N.G. Walsh and *C. rutidolepis* (DC.) N.G. Walsh) and one possibly extinct species, *C. densifolium* J.M. Black ex N.G. Walsh, from near Encounter Bay, South Australia. A key to the species and images of representative specimens are provided, and their distribution and ecology are discussed. Lectotypes are chosen for *Helichrysum scorpioides* var. *pygmaeum* F. Muell. and *Helichrysum semipapposum* var. *gunnianum* DC., synonyms of *C. monticola* and *C. scorpioides* respectively.

**Key words:** taxonomy, *Helichrysum*, revision, key to species

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## Introduction

In a paper erecting and monographing *Coronidium* Paul G. Wilson, the last of the Australian genera formerly included in *Helichrysum* Mill. to be segregated, Wilson (2008) commented under the account of *C. scorpioides* (Labill.) Paul G. Wilson that 'it seems probable that several taxa should be recognised' but considered that 'their discrimination would be best carried out by someone with field knowledge of the plants'. The following is an attempt to reconcile herbarium specimens with my own observations of the species complex from the field, original literature and types.

Jeanes' (1999) treatment of *Helichrysum* (now dispersed into other genera in Victoria) separated *H. scorpioides* Labill. and *H. rutidolepis* DC. and noted under the latter species the existence of at least two more-or-less distinct forms – a lowland form, 'closely resembling the type', which was described as having 'narrow-oblong leaves, long bare peduncles, ...and smallish capitula' and plants with 'significantly larger capitula' that included a highland form with 'wider woollier leaves' that 'often lack the bare peduncles of the type'. Subsequently, Ross and Walsh (2003) and Walsh and Stajsic (2007), in successive censuses of Victorian vascular plants, prior to the recognition of *Coronidium*, accepted *H. scorpioides* and *H. rutidolepis* as well as two other informal entities, *H. aff. rutidolepis* (Alps) and *H. aff. rutidolepis* (Lowland Swamps). No published diagnoses were provided for these informally-named entities, but Victorian specimens at MEL had been segregated, at least approximately, into these entities. The present account is a consequence of a critical assessment of these entities and specimens represented in south-eastern Australian herbaria.

*Coronidium scorpioides*, in the broad sense, is distinguished from other members of the genus in having oblong leaves, rather than lanceolate, involucre bracts that are wrinkled or crumpled toward the apex. Wilson (2008) commented on differing subterranean parts as described by various authors, e.g. Haegi (1986) who regarded *H. scorpioides* as being taprooted and *H. rutidolepis* as being rhizomatous. Like Wilson, my observations suggest that all of the entities that comprise *C. scorpioides* sens. lat. are rhizomatous, although there are some differences in the nature of

branching and the true roots that emanate from the rhizomes. *Coronidium* sp. Many Peaks (I.R.Telford 12309) is treated as a synonym of *C. scorpioides* by CHAH (2011), but as indicated by Wilson (2008, p. 309), *Telford 12309* (CANB) represents *C. lanosum* Paul G.Wilson, or a close relative and is not part of the *C. scorpioides* complex.

After examining all material at AD, NSW, HO and MEL that had been determined as either *Helichrysum scorpioides* or *H. rutidolepis*, it became apparent that *H. rutidolepis* sens. str., with the type from the Port Jackson area, is endemic to central-eastern New South Wales, distinguished *inter alia* by the much-branched, spreading habit, consistently small capitula, narrow involucre bracts and subamplexicaul leaves – the latter noted as a diagnostic feature by de Candolle (1838). A combination for this distinct taxon is provided below (as *Coronidium rutidolepis*). Entities that had been associated with *C. rutidolepis* from other states or regions generally included plants with smaller capitula than those determined as *C. scorpioides*, but the foliage and habit generally appeared closer to *C. scorpioides* as represented by its type (from coastal south-eastern Tasmania). Segregation of *C. rutidolepis* from the complex still leaves the remainder of *C. scorpioides* sens. lat. as a diverse entity, but one that is, to a greater or lesser degree, morphologically and ecologically tractable. A very localised entity on the Fleurieu Peninsula, South Australia, has a number of unique features and is readily recognisable (admittedly from a very few herbarium sheets). It is perhaps now extinct due to land clearance and modification. Two other entities can be segregated from *C. scorpioides* sens. str. and, while a few puzzling specimens exist, they are generally readily distinguished morphologically and both have a strong ecological signal. The informally-named taxa listed by Ross and Walsh (2003) and Walsh and Stajsic (2007) are commonly accepted as distinct entities in botanical surveys, and, to some extent at least, have been separated in herbaria. They are here formally named as new species.

## Taxonomy

The following key and descriptions serve to distinguish members of the complex. In 'overlap zones' (typically montane, forested areas, or forested floodplains of major river systems) occasional specimens may possess features, to varying degrees, intermediate

between *Coronidium scorpioides*, *C. gunnianum* (Hook.) N.G.Walsh and *C. monticola* N.G.Walsh. Whether these are true hybrids rather than intermediate forms of an incompletely speciated 'superspecies' can only be speculated upon. Herbarium specimens from AD, CANB, MEL and NSW regarded as intermediates have been indicated as such on determinavit slips, but generally assigned to the species of best fit.

Capitulum measurements are based on pressed herbarium specimens and these are probably slightly more expanded than fresh, unpressed specimens. The order of species reflects the inferred order of relatedness based on morphology.

### 1. *Coronidium rutidolepis* (DC.) N.G.Walsh **comb. nov.**

*Helichrysum rutidolepis* DC. *Prodr.* 6:194 (1838); N.C.W. Beadle et al., *Handb. Vasc. Pl. Sydney District* 386 (1962); N.C.W. Beadle et al., *Fl. Sydney Region* 475 (1963, 1972); A. Fairley & P. Moore, *Native Pl. Sydney District* 317 (1989); L. Robinson, *Field Guide Native Pl. Sydney Region* 139 (1991); R.C. Carolin & M.D. Tindale, *Fl. Sydney Region*, 4th edn, 554 (1994), 5th edn 470 (2009); J. Everett in G.J. Harden (ed.), *Fl. New South Wales* 3:232; pl. 13 (1992). *Gnaphalium rutidolepis* (DC.) Sch.Bip., *Bot. Zeitung* 3: 171 (1845).

**Type:** NEW SOUTH WALES. 'Grassy spots on the banks of Creek, near Port Jackson', New South Wales, Apr. 1824, A. Cunningham (holotype G-DC (photo seen)).

**Illustration:** Fairley & Moore, *loc. cit.* 317 (1989); Robinson, *loc. cit.* 139 (1991); Everett, *loc. cit.* p. 232, pl. 13; all as *Helichrysum rutidolepis*.

Decumbent to ascending rhizomatous *perennial* to c. 50 cm high, freely branched. *Stems* cottony with scattered glands. *Leaves* narrow-elliptic to oblanceolate, 25–50(–70) mm long, 1.5–8(–15) mm wide,  $\pm$ amplexicaul, sometimes auriculate,  $\pm$ concolorous, papery; upper surface scabridulous with scattered glands, otherwise glabrous or sparsely (rarely to moderately) cottony; lower surface smooth, with abundant sessile glands; apex acute to acuminate, rarely obtuse, mostly tapering evenly to a fine weak mucro to 1.5 mm long; margins flat to revolute. *Peduncles* more or less erect, slender (mostly <0.8 mm diam.) with reduced leaves/bracts extending to within c. 1–4 cm of capitulum and not or rarely overlapping base of involucre. *Capitula* solitary,

### Key to species of the *Coronidium scorpioides* complex

- 1 Capitula <18 mm diam., plant under 20 cm high, multistemmed, leafy throughout; stems generally concealed by dense foliage; capitula not conspicuously pedunculate, to some extent concealed by upper leaves. Known from only the Fleurieu Peninsula, SA and possibly extinct ..... **5. *C. densifolium***
- 1: Capitula >18 mm diam., or, if <18 mm diam., then stems not concealed by foliage and capitula distinctly pedunculate and not concealed by upper leaves ..... **2**
- 2 Leaves subamplexicaul, at least some usually slightly auriculate at base, thin-textured, usually distinctly scabridulous above; peduncles commonly ebracteate for (1–)2 cm or more below capitula. Capitula small, 10–15(–18) mm diam; bracts pale yellow or straw-coloured, not or barely exceeding florets, the broadest bracts to 1.5 mm wide. Coast and nearby tableland areas of central NSW; mostly moist forests..... **1. *C. rutidolepis***
- 2: Leaves attenuate to base, neither amplexicaul nor auriculate; not markedly thin-textured; peduncles bracteate up to capitula, the uppermost bracts overlapping the base of the involucre; capitula (10–)15–35 mm diam. when pressed; bracts very rarely shorter than florets..... **3**
- 3 Basal and at least lower stem leaves adaxially scabrous or slightly roughened by persistent short septate hairs or bristles (apparent at ×10 magnification); rosette usually developed, or at least lower leaves broader and close-spaced; capitula mostly 25 mm diam. or more; plants typically of lowland to foothill heathy woodlands and forests and damp forests, rarely in grasslands ..... **4. *C. scorpioides***
- 3: Leaves essentially smooth adaxially, devoid of conspicuous septate multi-celled hairs; basal rosette not or rarely developed and lower leaves barely differing from mid-stem leaves; capitula mostly <25 mm diam.; plants chiefly of lowland grasslands and/or montane to alpine woodland or heath..... **4**
- 4 Involucral bracts usually lemon-yellow or paler; aerial stems not or sparingly branched; leaves distinctly discolorous, upper surface glabrescent, lower surface with ±appressed cottony hairs, or, if ever ±concolorous then glabrescent throughout; apex acuminate, evenly tapered to thickened, but not mucronate, apex; lower- to mid-stem leaves mostly >4 cm long; length:width ratio >8; generally in grasslands on heavy soils, or riverine woodlands..... **2. *C. gunniamum***
- 4: Involucral bracts usually rich yellow to orange; aerial stems often freely branched; leaves ±concolorous or not strongly discolorous, upper surface retaining (often copious) cottony hairs, lower surface with loose woolly hairs; apex acute, with a short (0.5–1 mm) but distinct mucro; lower- to mid-stem leaves mostly <4 cm long; length:width ratio ≤ 8; montane to high-alpine sites ..... **3. *C. monticola***

subglobular, 6–9 mm long, to 15(–18) mm diam. *Involucral bracts* in 5–8 series, pale to brownish-yellow, transversely wrinkled, only the intermediate ones with significantly developed laminae, to 8 mm long and 1.5 mm wide; bracts internal and external to these shorter and narrower, the innermost sometimes lacerate; claw cottony-ciliate proximally. *Florets* with corollas 2.5–4 mm long, the outermost series usually containing some female-only florets. *Cypselas* ±cylindrical, 1.8–2.3 mm long, glabrous, 4-ribbed. *Pappus* slightly shorter than corolla. *Cypselas* of outer female florets lacking a pappus or this reduced to 1–few bristles attached centripetally. Flowers (Dec.–) Feb.–Apr. (–Jun.). (Fig. 1)

**Selected specimens (from c. 85) examined: NEW SOUTH WALES.** Mount Hyland Nature Reserve, *L.M. Copeland 3526* & *I.R. Telford* (BRI, CANB, MEL, NE, NSW); Ellenborough Falls, *L. Haegi 1490* (NSW); 'Petroi', Cunnawarra National Park, *W.A. Cherry 484* & *A.J. Perkins* (BRI, NE, NSW); Mt Wilson, Blue Mtns, *R. Coveny 4094* & *R. Bisby* (NSW); Jenolan Caves Rd, 10.iii.1950, *E.F. Constable s.n.* (NSW); Grassy Gully, 14 miles [22 km] W of Nowra, *F.A. Rodway 4679* (K, NSW).

**Distribution and habitat:** Endemic to New South Wales. Occurs patchily between the Grafton area and Nowra, mostly near-coastal, but also along the Dividing Range (e.g. Dorrigo, Blue Mountains). It is chiefly a species of moist forests and rainforest margins from near sea-level to c. 1250 m at Cunyham Hill (near Jenolan). (Fig. 9a)

**Notes:** As well as the distinguishing characters indicated in the key, this species tends to differ in its habit, which is often described by collectors as sprawling. Other members of the *Coronidium scorpioides* group, while rhizomatous and spreading, generally have more-or-less erect above-ground parts. The very fine peduncles are also characteristic of *C. rutidolepis*.

The capitula are generally pale, but a few specimens from the Jenolan Caves area (e.g. *Constable s.n.*, 10.iii.1950, NSW) have more richly coloured involucral bracts and slightly larger capitula than typical, in addition to quite tomentose stems and leaves, perhaps providing evidence of hybridisation with *C. monticola*

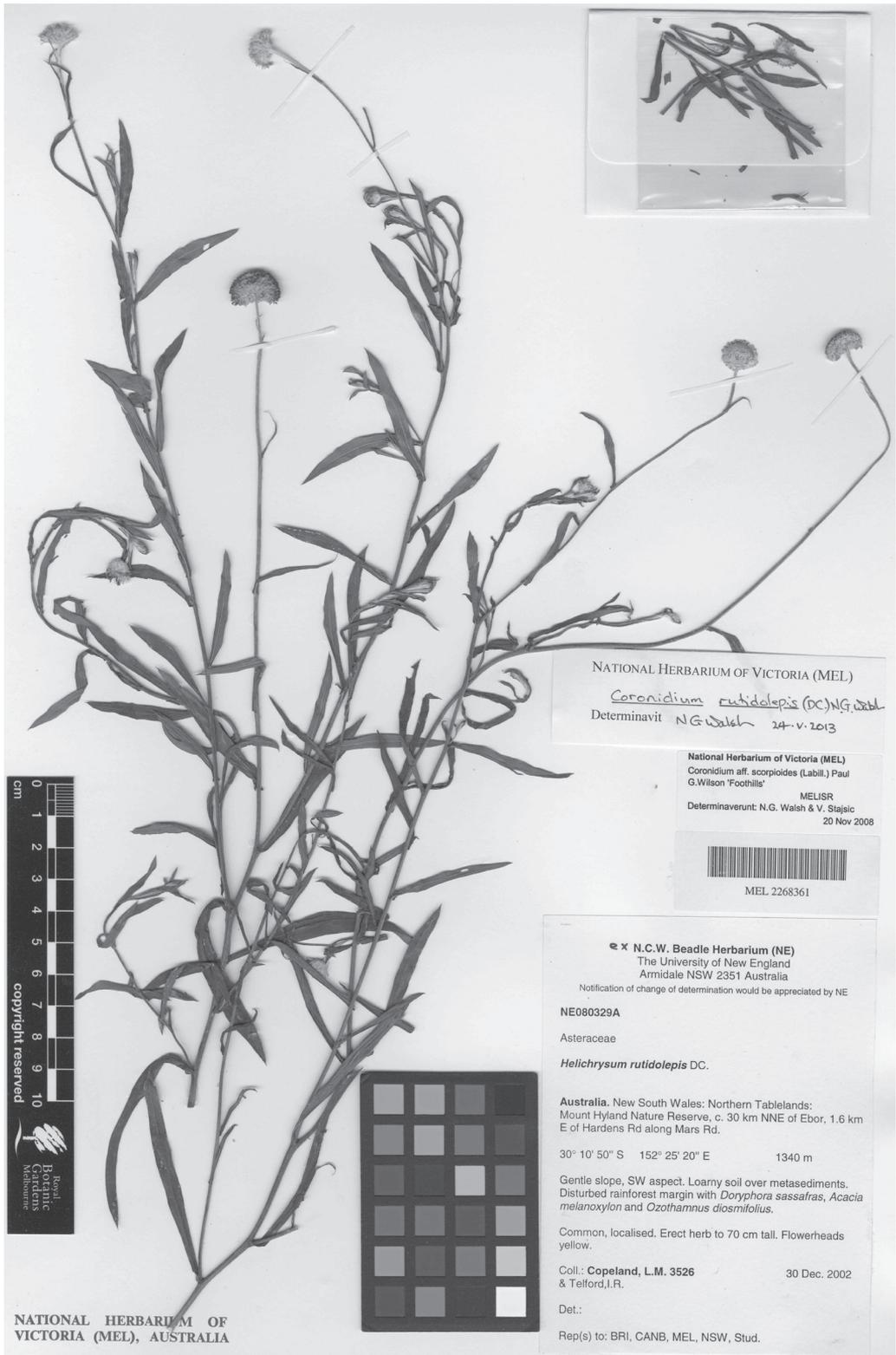


Figure 1. Representative specimen of *Coronidium rutidolepis* (L.M. Copeland 3526, MEL 2268361)

which is known to occur in the general area. A specimen from Ellenborough Falls, near Taree (*L. Haegi* 1490, NSW) is also unusually tomentose.

The holotype at G-DC is clearly labelled in Cunningham's hand 'Grassy spots on the banks of creeks near Port Jackson, April 1824'; however, Curry et al. (2001) suggest that in April, Cunningham was some distance from Port Jackson and heading south toward the Monaro district. An April 1824 collection by Cunningham of *Blechnum cartilagineum* Sw. from Stone Quarry Creek near Picton (MEL 2149090) suggests he may have not have been too remote from Port Jackson, at least at the beginning of that month, and perhaps made a small error in dating the collection of *C. rutidolepis*. The description of the habitat and locality is very consistent with its known occurrences.

**Conservation status:** Although of limited geographic extent, *Coronidium rutidolepis* appears to be locally common, is well represented in reserves and hence is not considered threatened.

## 2. *Coronidium gunnianum* (Hook.) N.G.Walsh comb. nov.

*Helichrysum gunnianum* Hook., *Icon. Pl.* t. 320 (1841); *Gnaphalium gunnianum* (Hook.) Sch.Bip., *Bot. Zeitung* 3: 172 (1845).

**Type: TASMANIA.** *R. Gunn* 502 (holotype K 910320, photo at MELI; isotype MEL 2161044!). (Fig. 2)

W.M. Curtis, *Stud. Fl. Tasmania* 2:328, 329 (1963) *p.p.* as *Helichrysum scorpioides*; N.T. Burbidge & M. Gray, *Fl. A.C.T.* 415 (1970); G.M. Cunningham, W.E. Mulham, P.L. Milthorpe & J.H. Leigh, *Pl. Western New South Wales* 702 (1981); L. Haegi, in J.P. Jessop & H.R. Toelken (eds), *Fl. S. Australia* 3:1531;

SGAP, *Fl. Melbourne* edn 1, 114 (1991); J.A. Jeanes in N.G. Walsh & T.J. Entwisle (eds), *Fl. Victoria* 4:785 (1999) *p.p.*; D. & B. Jones, *Native Pl. Melbourne and adjoining areas* 132 (1999); all as *Helichrysum rutidolepis*.

*Helichrysum erosum* Schldtdl., *Linnaea* 20:595 (1847). **Type:** South Australia. *H. Behr s.n.*, 1844 or 1845 (holotype HAL 98323, photo seen JSTOR<sup>®</sup> 2000–2013).

*Helichrysum* aff. *rutidolepis* (Lowland Swamps) *sensu* Walsh & Stajsic 2007, pp. 57. 209.

*Coronidium* sp. Lowland Swamps (*V.Stajsic* 4226) Vic. Herbarium *sensu* CHAH (2011).

**Illustrations.** G.M. Cunningham et al. loc. cit.; L. Haegi

loc. cit. p. 1529, fig. 694 G; SGAP loc. cit.; D. & B. Jones loc. cit.; Jeanes loc. cit. p. 786, fig 156b *p.p.*; all as *Helichrysum rutidolepis*.

Erect rhizomatous *perennial*, to c. 50 cm high, sparingly branched. *Stems* appressed-cottony. *Leaves* linear to oblanceolate, attenuate at base, (15–)20–65 mm long, 1–4(–9) mm wide, discolorous, firm-textured; upper surface smooth, glabrous or with sparse, appressed cottony hairs, sometimes with scattered glands; lamina or lower surface ±obscured by appressed cottony indumentum, with abundant sessile glands; apex acuminate, slightly thickened but not mucronate; margins recurved to revolute. *Peduncles* erect, mostly >1 mm diam., with reduced leaves/bracts extending to capitula and overlapping bases of the involucre bracts. *Capitula* solitary, subglobose to depressed-turbinate (10–)13–20(–25) mm diam. *Involucre bracts* in 5–8 series, pale yellow to brownish-yellow, transversely wrinkled, only the intermediate ones with significantly developed lamina, 6–10.5 mm long, (1–)1.5–2(–3) mm wide; claw cottony-ciliate proximally. *Florets* with corollas 3.5–5 mm long, the outer series containing some female-only florets. *Cypselas* ±cylindrical, 1.3–1.9 mm long, glabrous, obscurely 4-ribbed. *Pappus* slightly shorter to slightly longer than florets. Female florets usually with a pappus but this sometimes reduced or lacking. Flowers (Nov.–) Feb. –Apr. (–Jun.). (Figs 2–4)

**Selected specimens (from c. 200) examined: SOUTH AUSTRALIA.** Honans Scrub Reserve, *R. Bates* 4811 (AD); Thomas Gully, Mt Bold Reservoir, *T.S. Te* 915 & *D.J. Duval*, *M.C. O'Leary* (HO, MEL, NSW); St Johns Bushland Park, Lobethal, *A.G. Spooner* 11008 (AD). **NEW SOUTH WALES.** Glenn Innes, February 1914, *H.M.R. Rupp s.n.* (NSW); Travelling Stock Route, 4.5 km N of Binda, *N. Taws* 198 (CANB, NSW); Chatsbury Travelling Stock Reserve, c. 30.5 km NNE of Goulburn, *I. Crawford* 7630 (CANB, MEL, NSW); ½ mile [1 km] south of Albury, *E.J. McBarron* 4630; Sunnyside Rd, Rocky Hall, 19.ii.2001, *J. Miles s.n.* (NSW). **VICTORIA.** East of Burns Rd, Laverton North, *S.J. Platt* 113 (MEL); Rocky Plains, Suggan Buggan, 21.v.1969, *N.A. Wakefield s.n.* (MEL); Parolus Bridge Track, adjacent to Ovens River, 13.iii.1991, *N.T. Rossiter s.n.* (MEL); Grampians, east side of Victoria Range, *A.C. Beauglehole* 30247 (MEL); Jack Smith Lake Wildlife Reserve, *A.C. Beauglehole* 74758 (MEL); 9 km W of Omeo, *P.C. Jobson* 1920 (MEL). **TASMANIA.** 'Forsterville', Campbell Town, *L. Gilfedder* 167 (HO); Clyne Vale, *A. Simson* 491 (HO); Seven Mile Beach Rd, *A.M. Buchanan* 15527 (HO); Verwood Rd, Forest Lagoon, *A. Brown* 169 (AD, AK, CHR, MEL, HO, NSW, RSA, NT)

**Distribution and habitat:** Occurs through south-eastern Australia from central-eastern New South Wales, north-eastern to south-western Victoria, south-eastern South Australia and eastern Tasmania. A solitary collection apparently from Glen Innes in north-eastern New South Wales (*Rupp s.n.*, NSW 597121) is an isolated outlier. Principally a species of grasslands and riverine woodlands (under *Eucalyptus camaldulensis* Dehnh.) on soils that are prone to inundation. Mostly at low elevations (under c. 100 m a.s.l.), but many populations on the Southern Tablelands of New South Wales and the Australian Capital Territory are from elevations above 700 m, and the Glen Innes collection was probably from around 1000 m. (Fig. 9b)

**Notes:** A few collections from the higher-altitude parts of the range of *C. gunnianum* such as Cave Ck near Kiandra, New South Wales (e.g. *A.N. Rodd 1655* (NSW)), Cobungra and Wulgulmerang areas in eastern Victoria, (e.g. *Jobson 1920* (MEL), *Wakefield s.n.*, 21.v.1969 (MEL) respectively) combine features of *C. gunnianum* and *C. monticola* in having brightly coloured capitula and broader leaves with more indumentum adaxially than is typical for *C. gunnianum*. These specimens are morphologically and ecologically intermediate between the two species, typically recorded from treeless 'frost hollows' surrounded by subalpine woodland.

There are some forms of *C. gunnianum* that are somewhat distinctive and a more rigorous study might formally recognise these. One is a short-leaved form with small capitula from grasslands of e.g. the Monaro tableland NSW (e.g. *Crawford 3707* (CANB, NSW), *Taws 948* (CANB, NSW), Fig. 4), but similar plants occur on the Gippsland plain in Victoria at low altitude, and here are sympatric with the more commonly encountered form with longer leaves and broader capitula (e.g. *Platt 113* (MEL), Fig. 3). Plants of intermediate form occur through at least the latter region and occasional specimens may be found with both leaf types. This variation may in part be seasonal. The type represents a form with relatively small capitula and slightly broader leaves than both the above forms (Fig. 2). It occurs in Tasmania and along the Murray River floodplain in Victoria and New South Wales and is linked, geographically (e.g. in the Grampians region, western Victoria) and morphologically with the other forms.

The name *Helichrysum semipapposum* var. *gunnianum* DC., based on a different type, is synonymous with *C. scorpioides* (see below).

**Conservation status:** This is a relatively infrequently encountered species and, like the lowland grassland communities with which it is commonly associated, it is undoubtedly much reduced from its former range, and is considered vulnerable in Victoria (DSE 2005). This is likely to be an appropriate assessment of its status throughout its range. Many of the southern New South Wales occurrences are from travelling stock routes which are refuges of many rare and/or depleted species.

### 3. *Coronidium monticola* N.G. Walsh sp. nov.

**Type:** VICTORIA. Mt Stirling, eastern slopes near The Monument, *M.G. Corrick 7992* (holotype: MEL 602607; isotypes MEL 602593, NSW 686900). (Fig. 5)

*Helichrysum scorpioides* var. *pygmaeum* F. Muell., *Monthly Notices, Pap. & Proc. Roy. Soc. Tasmania* for 1870: 14 (1871). **Type:** Tasmania. 'Alpine summit of Mt Wellington', *s.d.*, *Abbott & F. Mueller s.n.* (lectotype here chosen: MEL 2161165!).

W.M. Curtis, *Stud. Fl. Tasmania* 2:328, 329 (1963) p.p.; N.T. Burbidge & M. Gray, *Fl. A.C.T.* 383 (1970) p.p.; A. Costin, M. Gray, C. Totterdell & D. Wimbush, *Kosciuszko Alpine Fl.* 210, 343 (2000); J. Murphy & B. Dowling, *Pl. Victorian High Country*, 50 (2012); all as *Helichrysum scorpioides*.

G.R. Cochrane, B.A. Fuhrer, E.R. Rotherham, J.H. Willis, J. & M. Simmons, *Fl. Pl. Victoria & Tasmania* 102 (1980); J. Everett in G.J. Harden, *Fl. New South Wales* 3:232 (1992) p.p.; J.A. Jeanes in N.G. Walsh & T.J. Entwisle (eds), *Fl. Victoria* 4:785 (1999) p.p.; M.G. Corrick & B.A. Fuhrer, *Wildfl. Victoria* 23 (2000); all as *Helichrysum rutidolepis*

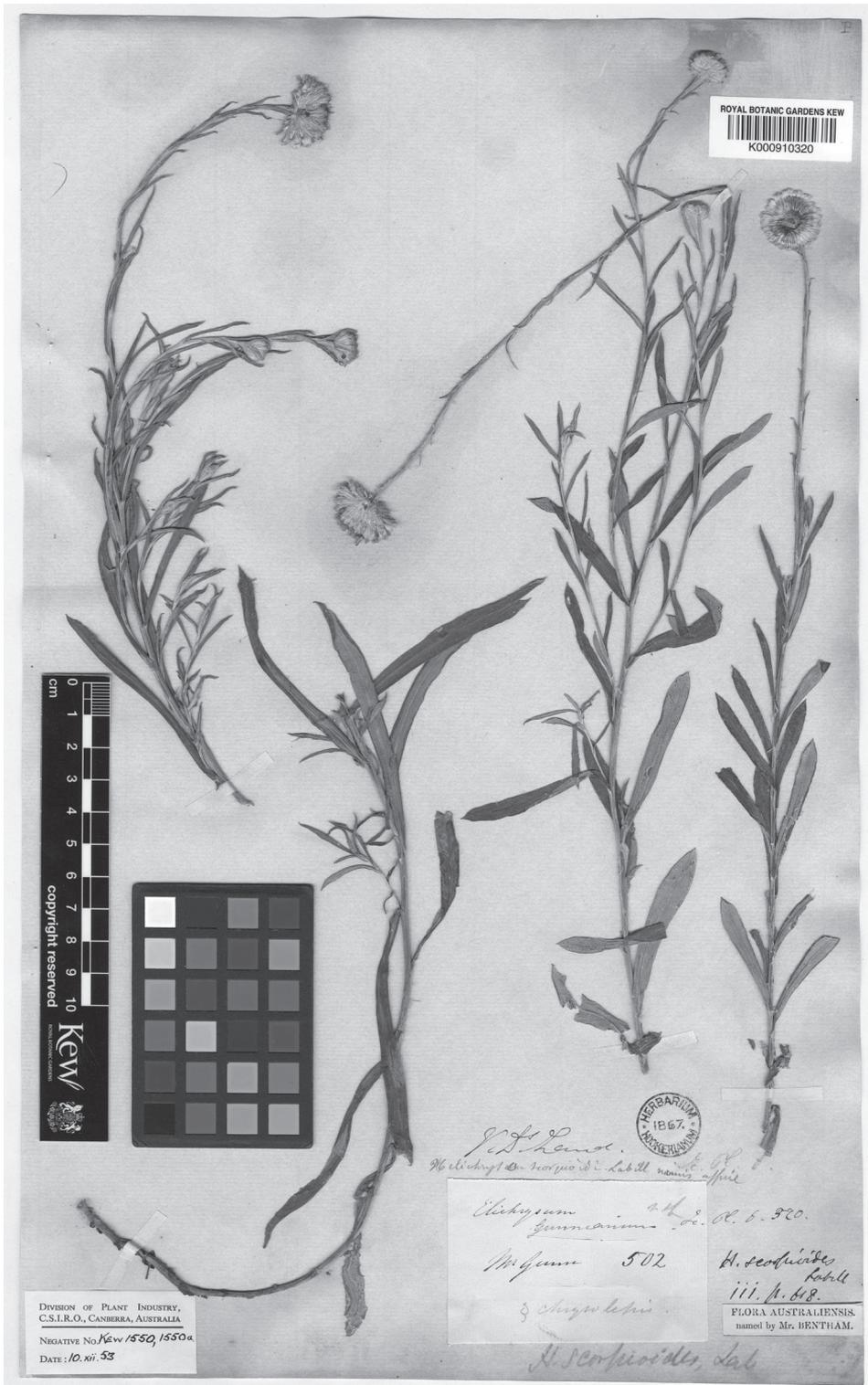
*Helichrysum* aff. *rutidolepis* (Alps) *sensu* Walsh & Stajsic (2007), pp. 57, 209.

*Coronidium* sp. Alps (*L.A. Craven 2141*) Vic. Herbarium *sensu* CHAH (2011).

*Coronidium* sp. Foothills (*M.G. Corrick 7095*) Vic. Herbarium *sensu* CHAH (2011).

**Illustrations.** Cochrane et al. *loc. cit.*; Jeanes *loc. cit.* p. 786, Fig. 156b, p.p. as *Helichrysum rutidolepis*; Costin et al. *loc. cit.* p. 201 as *Helichrysum rutidolepis*; Murphy & Dowling *loc. cit.* as *Helichrysum scorpioides*; Corrick & Fuhrer *loc. cit.* as *Helichrysum scorpioides*.

Ascending to erect, rhizomatous *perennial*, to c. 35 cm high, often freely branched above base, occasionally



**Figure 2.** Type specimen of *Coronidium gunnianum* (R. Gunn s.n., K 000910320, reproduced with permission, Royal Botanic Gardens, Kew), typical of lowland swamps and riparian woodlands of southern New South Wales, northern Victoria and Tasmanian midlands



**Figure 3.** Representative specimen of *Coronidium gunnianum* (S. Platt 113, MEL 667314); form with large capitula and long leaves, typical of lowland grasslands of southern Victoria and Tasmania



Figure 4. Representative specimen of *Coronidium gunnianum* (I. Crawford 7630, MEL 2337162); form with small capitula and short leaves, typical of New South Wales tablelands

simple. *Stems* densely cottony, glands present but usually obscured. *Leaves* obovate to oblanceolate, 20–50 mm long, 3–12 mm wide, attenuate at base, ±concolorous or at least, not strongly discoloured, firm-textured; upper surface smooth, cottony, often densely so, lower surface cottony to densely woolly, with many glands, but these mostly obscured by indumentum; apex obtuse to acute, shortly mucronate (mucro 0.5–1 mm long); margins recurved, rarely flat. *Peduncles* erect, mostly c. 1.5 mm diam. below capitulum; uppermost bracts overlapping base of involucre. *Capitula* solitary, depressed-hemispherical, 18–30 mm diam. *Involucral bracts* in c. 7–10 series, bright golden yellow to orange, transversely wrinkled, the intermediate ones oblanceolate to spatulate, 10–13 mm long, 2.5–3 mm wide; claws cottony-ciliate proximally. *Florets* with corollas 4–5.5 mm long, the outer 2–4 series of female-only florets. *Cypselas* narrowly cylindrical, 2–2.5 mm long, 4-ribbed, glabrous. *Pappus* subequal to or slightly exceeding corolla. Pappus of female florets complete or somewhat reduced centrifugally. Flowers Jan.–Mar. (–Apr.). (Fig. 5)

**Selected specimens (from c. 170) examined: NEW SOUTH WALES.** 3.5 km SW from Charlottes Pass, *M. Ito* 96042 & *T. Nishino, Y. Kita* (MEL, NSW); Bombala River, c. 17 km NE of Bibbenluke, *I. Crawford* 825 (CANB, MEL); 10 km N of Ingebyra on road to Jindabyne, *L. Haegi* 2730 (AD, NSW); Gudgenby, Queanbeyan, 14.i.1912, *R.H. Cambage s.n.* (NSW). **AUSTRALIAN CAPITAL TERRITORY.** Ginini Flat, Brindabella Range, *T.G. Hartley* 13646 (CANB, NSW). **VICTORIA.** Panorama Hill, Falls Creek, *D.E. Albrecht* 251 (AD, MEL); Clover Flat, 47 km NE of Licola, *P.C. Jobson* 1982 (MEL); Mt Buller, *R. Melville* 3215 (K, MEL); Near Sassafras Pass, *G.W. Carr* 5794 (MEL). **TASMANIA.** Headwaters of Mountain River, Mount Wellington, *A.E. Orchard* 5206 (HO, MEL); Ben Lomond National Park, near Ranger Headquarters, *M.G. Noble* 28428 (HO, MEL); Quamby Bluff summit, *A. Moscal* 12597 (HO, MEL); Pine Lake, *A.E. Orchard* 5821 (HO); Mt Barrow, *A.C. Rozefelds* 170 (HO)

**Distribution and habitat:** Occurs through higher parts of the Great Dividing Range and adjacent outliers from c. Braidwood, New South Wales, through the Australian Capital Territory to Mt Buller and Mt Useful areas, Victoria. In Tasmania, it occurs in the north-east mountains (Mt Barrow, Ben Lomond), the Central Plateau area and on and near Mt Wellington near Hobart. It appears to be absent from south-western mountains. The altitude range is from about 1000 m,

where associated with montane forests of e.g. *Eucalyptus delegatensis* R.T.Baker, up to and beyond the treeline to c. 2100 m near the summit of Mt Kosciuszko. Soils are often gravelly or rocky and usually well-drained. (Fig. 9c)

**Notes:** In general, plants at higher altitudes are more densely cottony, often appearing grey-white overall, and usually of reduced stature and less branched compared to those at the lower part of the range. The type of *Helichrysum scorpioides* var. *pygmaeum* F.Muell. is of an extremely reduced form from Mt Wellington, Tasmania. From herbarium collections, this form seems to be particularly prevalent on that mountain, but similar plants are found on other exposed summits (e.g. Mt Kosciuszko, New South Wales and Mt Feathertop, Victoria).

Mueller labelled a collection of his from 'summit of Mt Timbertop' (MEL 1517347) as *Helichrysum scorpioides* var. *montanum* F.Muell., but this name does not appear to have been published. This specimen is of the lower-altitude form of the species – i.e. with leaves having relatively light indumentum on adaxial surfaces.

See notes under *C. rutidolepis*, *C. gunnianum* and *C. scorpioides* relating to plants of somewhat intermediate character.

The type specimen has been selected to represent the commonest, most widespread form (in my experience), rather than the very reduced, woolly tomentose form encountered on exposed summits.

**Conservation status:** Widespread in montane to alpine areas through its range and well represented in national parks and other reserves. It is not regarded as rare or threatened.

**Etymology:** From the Latin *mons* – mountain and *cola* – a dweller, referring to its habitat.

#### 4. *Coronidium scorpioides* (Labill.) Paul G. Wilson, *Nuytsia* 18:326 (2008)

*Helichrysum scorpioides* Labill., *Nov. Holl. Pl. Sp.* 2:45, t. 191 (1806); N.C.W. Beadle et al., *Handb. Vasc. Pl. Sydney Dist.* 386 (1962); W.M. Curtis, *Stud. Fl. Tasmania* 2:328, 329 (1963) *p.p.*; N.T. Burbidge & M. Gray, *Fl. A.C.T.* 383 (1970); N.C.W. Beadle et al., *Fl. Sydney Region* 475 (1963, 1972); L. Haegi in J.P. Jessop & H.R. Toelken (eds), *Fl. S. Australia* 3:1529 (1986); A. Fairley & P. Moore, *Native Pl. Sydney District* 317 (1989); G.R.A. Dashorst & J.P. Jessop, *Pl. Adelaide Plains & Hills* 150, 151 (1990); L. Robinson, *Field*



Figure 5. Type specimen of *Coronidium monticola* (M.G. Corrick 7992, MEL 602607)

*Guide Native Pl. Sydney Region* 139 (1991); SGAP, *Flora of Melbourne* edn 1, 114 (1991); R.C. Carolin & M.D. Tindale, *Fl. Sydney Region*, 4th edn, 554 (1994), 5th edn 470 (2009); J. Everett in G.J. Harden, *Fl. New South Wales* 3:232, pl. 13 (1992); J.A. Jeanes in N.G. Walsh & T.J. Entwisle (eds), *Fl. Victoria* 4:784 (1999); D. & B. Jones, *Native Pl. Melbourne and adjoining areas* 132 (1999); M.G. Corrick & B.A. Fuhrer, *Wildfl. Victoria* 23 (2000); E. Mayfield, *Fl. Otway Plain & Ranges* 2:76 (2013). *Gnaphalium scorpioides* (Labill.) Poir. in Lam. & Poir., *Encycl. Suppl.* 2:808 (1812); *Xeranthemum scorpioides* (Labill.) Poir. in Lam. & Poir., *Encycl. Suppl.* 3:143 (1813).

**Type: TASMANIA.** 'in capite Van-Diemen', J.J.H. Labillardière (holotype FI 94140 (photo seen); isotypes: MEL 1586096!, G-DC, (photo seen), G (Herb. Boissier, photo seen); HAL (111521, photo seen JSTOR<sup>®</sup> 2000–2013); possible isotype P (698477, photo seen JSTOR<sup>®</sup> 2000–2013)).

*Helichrysum buphthalmoides* Sieber ex Spreng., *Syst. Veg.* 3:484 (1126). **Type:** New South Wales. 'Nov. Holl.' *F. Sieber* 333, *fide* DC., *Prodr.* 6:194 (1838), (isotypes G-DC (photo seen), G (Herb. Boissier; photo seen), GH (14328, photo seen JSTOR<sup>®</sup>), HAL (111520, photo seen JSTOR<sup>®</sup> 2000–2013)).

*Helichrysum semipapposum* var. *gunnianum* DC., *Prodr.* 6:195 (1838). **Type:** Tasmania. *R. Gunn* (lectotype, here selected *Gunn* 248 (G-DC photo seen); residual syntype *Gunn* 262 (G, herb. Boissier, photo seen)).

**Illustrations.** Haegi *loc. cit.* 1529, fig. 694H; Fairley & Moore, *loc. cit.* 317; Dashorst & Jessop *loc. cit.*; Robinson, *loc. cit.* 139; Everett, *loc. cit.* p. 232; Jeanes *loc. cit.* 786fig. 156a; Corrick & Fuhrer *loc. cit.* all as *Helichrysum scorpioides*; E. Mayfield *loc. cit.*

Ascending to erect rhizomatous *perennial* 5–55 cm high. *Stems* simple or few-branched usually from a basal rosette, cottony and minutely glandular. *Rosette leaves* (when present) obovate to oblanceolate, mostly (20–)30–90 mm long, 3–14(–21) mm wide; *stem leaves* similar but narrower with attenuate apices, becoming  $\pm$ linear, usually discolourous, moderately firm-textured; upper surface hispid to scabrous from retained bases of coarse septate hairs 0.3–0.7 mm long, sometimes overlain with fine cottony hairs; lower surface with cottony hairs, interspersed with numerous sessile or subsessile glands; apex obtuse to acute, usually with a distinct mucro c. 0.5–1 mm long; margins flat to

recurved. *Peduncles* erect, c. 1.5–2.5 mm diam. below capitulum, with uppermost leaves/bracts subtending and overlapping the base of the involucre. *Capitula* solitary, depressed-hemispherical, 20–35 mm diam. *Involucral bracts* in 5–8 series, usually pale or lemon-yellow, rarely golden-yellow, transversely wrinkled, the intermediate ones spatulate, 8–14 mm long, 2.5–3.5 mm wide; claws cottony-ciliate proximally. *Florets* with corollas 4.5–7.5 mm long, the outermost series with some female-only. *Cypselas* narrowly cylindrical, 2–3.5 mm long, 4-ribbed, glabrous. *Pappus* equal to or slightly exceeding corolla. Pappus of outer female florets normally developed.  $n=24$  (Watanabe et al. 1999:785) or c. 42 (Carr et al. 1999:1003; voucher specimens of both counts confirmed at MEL). Flowers (Sep.–)Oct.–Jan. (–Feb.). (Figs 6, 7)

**Selected specimens (from c. 835) examined: SOUTH AUSTRALIA.** c. 25 km N of Lucindale, *J.Z. Weber* 7337 (AD, MEL); Rivoli Bay, Oct. 1848, *F. Mueller s.n.* (MEL); Douglas Gully Scrub, *A.W. Bell* 104 (AD, MEL). **QUEENSLAND.** c. 1 km SW of Amys Peak, Kroombit Tops State Forest, *E.J. Thompson BIL73 & B.K. Symon, P. Sharpe* (BRI, NSW). **NEW SOUTH WALES.** 'Wattleridge', c. 5 km N of Backwater, *K.A. McColl* 12/98 & *J. Plaza* (BRI, NSW); Dumaresq Dam, 10 km NW of Armidale, *L.M. Copeland* 3899 & *D.M. Raets* (BRI, CANB, MEL, NE, NSW, PERTH); Old Bell's Line, Mount Tomah, *C.K. Ingram* 27384 (NSW); Green Cape, *J. Armstrong* 731 (NSW). **AUSTRALIAN CAPITAL TERRITORY.** Near Gibraltar Falls, *G. Stewart* 374 & *B. O'Shea, S. Young* (CANB, NSW). **VICTORIA.** Jamieson Rd, 18 miles [30 km] from Eildon, *T.B. Muir* 1634 (MEL); Grampians, *K. Watanabe* 224 & *T. Denda, Y. Suzuki* (MEL, TI); 4.6 km W of Genoa, *J.H. Ross* 3523 & *C.A. Coles* (AD, CANB, HO, MEL, NSW, S); Point Danger, 6 km SE from Portland, *N.G. Walsh* 5680 & *Z. Smith* (MEL). **TASMANIA.** Near Bellerive, *F.H. Long* 550 (HO); Waldheim Chalet, 7.iii.1949, *W.M. Curtis s.n.* (HO); Georgetown, *T.E. Burns* 95 (HO); Coles Bay, *A.M. Buchanan* 205 (HO); The Neck, Bruny Island, *A.T. Dobson* 77268 (CHR, HO); Fortescue Bay, track to Cape Hauy, *A. Brown* 88 (AD, AK, HO, MEL).

**Distribution and habitat:** Widespread and common through south-eastern Australia from near the Queensland–New South Wales border to Port Lincoln, South Australia and through most of Tasmania. Occurrences are generally confined to sites within c. 250 km of the coast. An outlying occurrence in the north is known from Kroombit Tops (central-eastern Queensland) with apparently no intervening records. Habitats in which *C. scorpioides* occurs are diverse, but usually reasonably well-drained open forest to heathy

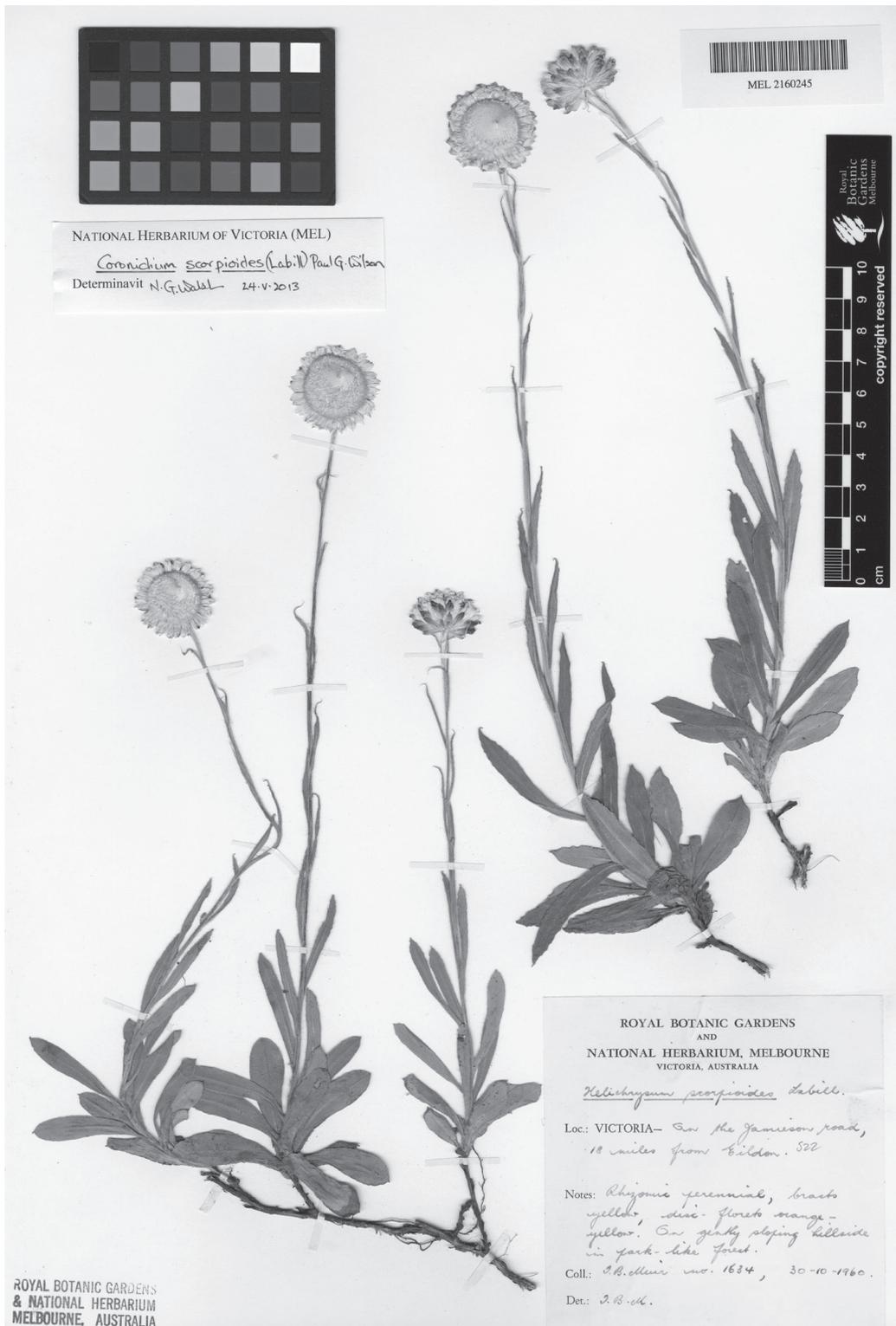
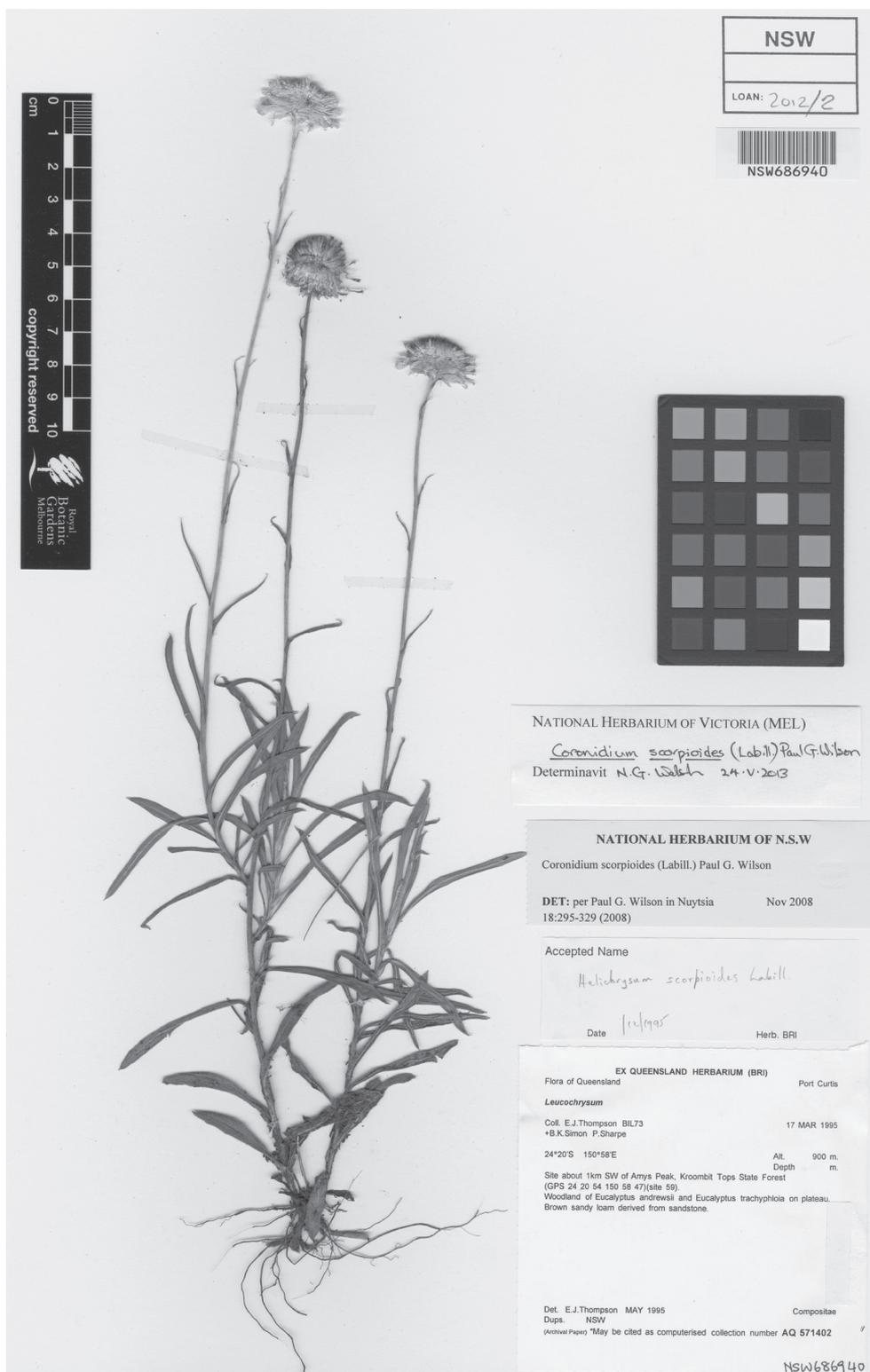


Figure 6. Representative specimen of *Coronidium scorpioides* (T.B. Muir 1634, MEL 2160245); typical form with well-developed basal rosette, unbranched scape and large capitulum



**Figure 7.** Representative specimen of *Coronidium scorpioides* (E.J. Thompson BIL73, NSW 686940); form with poorly developed basal rosette, branched scape and smaller capitula

woodlands, rarely grasslands or heathland, from near sea-level to c. 800 m a.s.l. (Fig. 9d)

**Notes:** The form represented by the type, with short near-basal internodes forming a rosette-like base and simple or rarely-branched scapes, is common throughout the range of the species (Fig. 6). In some areas, and particularly in the northern part of the range, more freely-branched plants lacking a rosette-like base may be common (Fig. 7). The capitula of this form are often smaller than the typical form, and the leaves and stem bracts inclined to be narrower with more revolute margins and adaxial surfaces distinctly scabrous rather than merely hispid from the persistent hair bases. At their extremes these two forms appear distinct, but they are linked by such a confusing array of intermediate forms that I have not been able to separate them satisfactorily.

A few specimens exist that could be regarded as intermediate between *C. scorpioides* and *C. monticola* (e.g. Pine Lake Tasmania, *T.E. Burns 665* (HO), Mt Arthur summit, *A.M. Buchanan 7* (HO)) and *C. scorpioides* and *C. gunnianum* (Vale of Belvoir Tasmania, *M. Visoiu 587* (HO)). These 'intermediates' are in habitats that could be interpreted as being transitional (in terms of altitude and landform) between characteristic habitats of the two species involved.

**Note on synonymy:** In de Candolle's *Prodromus* (1838), the entry for 'var. *gunnianum*' appears directly beneath *Helichrysum semipapposum* (Labill.) DC. (p. 195) rather than with *H. scorpioides* (p. 194), but in the accompanying diagnosis, it is distinguished from *H. scorpioides*, and the collections in G-DC clearly show this to have been labelled by de Candolle as *H. scorpioides* var. *gunnianum*. The section in which *H. semipapposum* is included is characterised by 'capitulis corymbosis' a trait clearly not applicable to *H. scorpioides* or the other five taxa in that group (section 'capitulis solitariis') in the *Prodromus*. The placement of the protologue for var. *gunnianum* appears to be an error. The two syntype specimens of *Helichrysum semipapposum* var. *gunnianum* in G-DC (*Gunn 248* and *Gunn 262*) are fragmentary, but both are from plants with distinctly hispid leaves, unlike those of *C. gunnianum*. The more complete of the two, *Gunn 242* is chosen as the lectotype specimen. The leaves of these specimens are somewhat narrower than in Labillardière's type specimens of *Helichrysum scorpioides* but I have no doubt that the name *H. semipapposum* var.

*gunnianum* should be placed in synonymy under what is here recognised as *C. scorpioides*.

**Conservation status:** *Coronidium scorpioides* is the most common and widespread member of the complex. It is well reserved in national parks etc. and is not regarded as rare or threatened.

### 5. *Coronidium densifolium* J.M.Black ex N.G.Walsh **sp. nov.**

**Type:** SOUTH AUSTRALIA. Lower Mt Lofty Range, Black Swamp (c. 25 km NNE of Victor Harbour on railway), 25.iv.1968, *J.B. Cleland s.n.* (holotype: AD 97308301!). (Fig. 8)

Ascending to erect ?rhizomatous *perennial*, to c. 12 cm high, branches numerous from base and along main stems, the whole plant probably domed *in vivo*. *Stems* densely woolly but largely hidden by leaves (internodes shorter than leaves). *Leaves* lanceolate to oblanceolate, 15–30 mm long, 3–6 mm wide, both surfaces initially cottony, but finally hispid to scabrous from retained coarse septate hair-bases c. 0.3 mm long, interspersed (both surfaces) with numerous sessile or subsessile glands, c. concolorous, papery or a little thicker-textured, margins flat to recurved. *Peduncles* barely elongated, erect, c. 1.5–2 mm diam. below capitulum, with stem leaves/bracts not much reduced, subtending and overlapping the outer involucre bracts. *Capitula* solitary, seemingly almost sessile at tips of branches, ±hemispherical, 10–15 mm diam. *Involucre bracts* in 5–8 series, pale yellow to brownish-yellow, transversely wrinkled, the intermediate ones oblanceolate to spatulate, 5–7(–8) mm long, 1.2–1.8 mm wide, all but the innermost transversely wrinkled to some degree; claws cottony-ciliate proximally. *Florets* with corollas c. 4 mm long, the outermost series including some female-only florets. All florets with well-developed pappus 3.5–4 mm long, slightly shorter than florets. Cypselas narrow-cylindrical, c. 1.5 mm long (immature only), 4-ribbed, glabrous,. Flowers Sep.–Jan.(–Apr.) (4 records only). (Fig. 8)

**Specimens examined:** SOUTH AUSTRALIA. Encounter Bay, 6.ix.1924. *J.B. Cleland s.n.* (AD); Encounter Bay, Cape Jervis Rd, 24.i.1948, *J.B. Cleland s.n.* (AD, 2 sheets); Encounter Bay, Cape Jervis Rd, 20.i.1948, *J.B. Cleland s.n.* (AD) [note by J.M. Black on latter specimen notes 'Jervis Bay Rd near Air-pylon'].



Figure 8. Type specimen of *Coronidium densifolium* (J.B. Cleland s.n., AD 97308301)

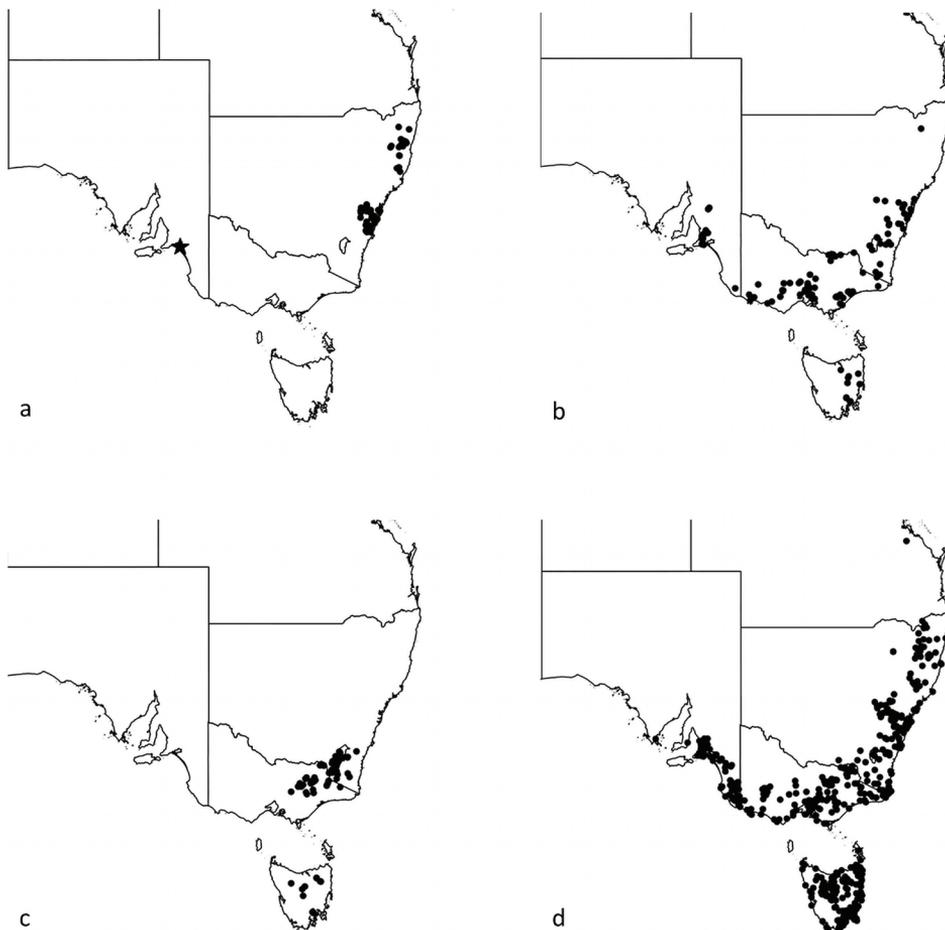
**Distribution and habitat:** Although there are no extant populations known, from the locality information the species probably inhabited broombush (*Melaleuca uncinata* R.Br.) and mallee on laterite soils and/or open woodland and heath, including *Banksia ornata* Meisn., over white sands (D. Duval, pers. comm.). (Fig. 9a)

**Notes:** Despite searches in the type and other presumed suitable localities by botanists with a good knowledge of the local flora, no further populations of *C. densifolium* have been discovered (D. Duval, R. Bates, pers. comm.). The few specimens of this plant were collected over a period of more than 40 years from at least two distinct localities. Nonetheless, absence of mature seed may suggest that it is a rarely occurring, sterile 'sport' of *C. scorpioides* (inferred by the conspicuous septate indumentum of the leaves). Most

of the inflorescences on the specimens are relatively young and the few apparently mature capitula have been heavily predated by insect larvae (which is very common in this group). What appears to be normal pollen is present in open florets.

**Conservation status:** Until further collections of *C. densifolium* can confirm otherwise, it must be regarded as extinct.

**Etymology:** The epithet was one used by J.M. Black on the two collections made before his death in 1951. It was never published, but is appropriate to the leafiest of the members of the *C. scorpioides* complex, and is formalised here.



**Figure 9.** Distribution of **a.** *Coronidium rutidolepis* (dots), *C. densifolium* (star); **b.** *C. gunnianum*; **c.** *C. monticola*; **d.** *C. scorpioides*

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I have found the JSTOR® Global Plants facility <<http://plants.jstor.org>> particularly useful in tracing previously unrecorded types.

Two referees made valuable suggestions to improve the manuscript.

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