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## Studies in *Podolepis* (Asteraceae: Gnaphalieae)

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### Introduction

*Podolepis* Labill., as treated in modern floras (e.g. Everett 1992; Jeanes 1999), is a genus of 20 species confined to Australia and found in all states as well as the Northern Territory and the Australian Capital Territory (AVH 2014). All flora accounts of *Podolepis* s.l. over the last half century have followed the revision by Davis (1957), which also gives a detailed taxonomic and nomenclatural history of the genus. Only two new species, *P. monticola* R.J.F.Hend. and *P. davisiana* D.A.Cooke (Henderson 1969 and Cooke 1985, respectively), have been described since 1957. When specimens from the major Australian herbaria are examined critically, it becomes clear that Davis's revision is quite conservative and that several undescribed taxa have been overlooked and several described taxa should be reinstated. To be fair, Davis did not have access to such a wide range of excellent herbarium material that we enjoy today and type specimens were less accessible before the technology of digital imaging became available.

It is clear from the work of Davis (1957) and more recent taxonomic treatments (e.g. Henderson 1969; Beadle 1980; Cooke 1986; Stanley 1986; Everett 1992; Jeanes 1999), that the morphology of the intermediate involucre bracts is of importance in the delineation of species in *Podolepis*. This remains true in the present study, but other characters such as indumentum, leaf size and shape and capitulum size are also taken into account. Furthermore, some species are apparently habitat specific.

*Podolepis* is generally regarded as polyphyletic (e.g. Short et al. 1989; Anderberg 1991; Konishi et al. 2000) and in need of revision. Should species be removed from *Podolepis* s.l., combinations for some of them already

### Abstract

Herbarium specimens of species of *Podolepis* s. str. with ray florets longer than the capitula and a discrete intermediate involucre bract claw were examined. Particular attention was paid to specimens previously determined as *P. jaceoides* (Sims) Voss, *P. canescens* A.Cunn. ex DC. and *P. rugata* Labill. As a result, four species and two subspecies are described as new: *P. decipiens* Jeanes, *P. eremaea* Jeanes, *P. linearifolia* Jeanes, *P. remota* Jeanes, *P. rugata* subsp. *glabrata* Jeanes and *P. rugata* subsp. *trullata* Jeanes. To accommodate the observed variation, two species, *P. aristata* Benth. and *P. laevigata* Gand., are reinstated and the following new combinations made: *Podolepis aristata* subsp. *affinis* (Sond.) Jeanes, *P. aristata* subsp. *auriculata* (DC.) Jeanes, and *P. rugata* subsp. *littoralis* (G.L.Davis) Jeanes. The diagnostic characters of the relevant taxa are tabulated. Keys, distribution maps and information about cytology (where available), habitat and conservation status are presented.

**Key words:** *Scalia*, taxonomy, morphology, diagnostic features, threatened species

exist in other genera. For example, initial molecular work (Konishi et al. 2000) supports the reinstatement of both *Panaetia* Cass. and *Siemssenia* Steetz at some level, and the removal of *P. kendallii* (F.Muell.) F.Muell. and *P. georgei* Diels (the latter to *Schoenia ayersii* (F.Muell.) J.M.Black; see Wilson 1992). From the molecular work (Konishi et al. 2000) and involucral bract and flower morphology, *Podolepis* s. str. likely consists only of those 18 species in the key below. This includes all 16 species in which the lamina of the intermediate involucral bracts is discrete from the claw (i.e. attached only at the apex of the claw) and the ray florets far exceed the involucral bracts. *Podolepis* s. str. also includes *P. arachnoidea* (Hook.) Druce and *P. neglecta* G.L.Davis, in which the intermediate involucral bracts are not completely discrete from the claw, as these two species appear in the same clade as those representatives of the former group included in the molecular phylogeny (Konishi et al. 2000). The species complexes *P. jaceoides* (Sims) Voss, *P. rugata* Labill., *P. aristata* Benth. and closely related species are dealt with in this paper. *Podolepis laciniata* Froid is included in the key here, but is described in Froid (2015) and is distinguished from *P. robusta* (Maiden & Betche) J.H.Willis by the longer ligules on the ray corolla. *Podolepis arachnoidea*, *P. gracilis* (Lehm.) Graham, *P. hieracioides* F.Muell., *P. longipedata* A.Cunn. ex DC., *P. monticola*, *P. neglecta* and *P. nutans* Steetz, which are also part of *Podolepis* s. str., will be dealt with at a later point.

Chromosome numbers for several species in *Podolepis* s. str. have been determined as  $n=8-12$  (Turner 1967; Short 1986; Watanabe et al. 1999) and their associated vouchers are preserved at MEL. These specimens have been redetermined according to the taxonomy of the current paper and the chromosome numbers are given in the taxonomic section where available. Turner (1967) referred to a specimen (his number 5586 erroneously cited as 5584) he identified as *P. jaceoides* as having  $n=c. 30$ . I have examined this specimen and it is difficult to place based on the morphology of the involucral bracts. It is possibly a hybrid of uncertain parentage or may be a polyploid, which may account for the unusually high chromosome number.

## Materials and methods

This paper is based on the examination of qualitative and quantitative characters observed in herbarium specimens of *Podolepis*, in which the lamina of the intermediate involucral bracts is discrete from the claw and the ray florets far exceed the involucral bracts. Specimens from AD, BRI, CANB, DNA, HO, LY, MEL, PERTH and type specimens housed in other herbaria, which are listed in the taxonomic section, were studied. All the measurements given in the descriptions were taken from dried specimens and may differ slightly from the dimensions of living plants.

### Key to species of *Podolepis* s. str.

- |  |                               |
|--|-------------------------------|
| 1 Lamina of intermediate involucral bracts not completely discrete from the claw .....   | 2                             |
| 1: Lamina of intermediate involucral bracts completely discrete from claw .....  | 3                             |
| 2 Ligules of ray corolla well-developed and far exceeding length of involucral bracts; lamina of involucral bracts smooth (sometimes slightly wrinkled in dry specimens) .....                     | <b><i>P. neglecta</i></b>     |
| 2: Ligules of ray corolla small and barely exceeding length of involucral bracts; lamina of involucral bracts deeply transversely rugose .....   | <b><i>P. arachnoidea</i></b>  |
| 3 Lamina of intermediate involucral bracts transversely rugose at least towards the apex .....   | 4                             |
| 3: Lamina of intermediate involucral bracts virtually smooth (sometimes slightly wrinkled in dry specimens) .....  | 6                             |
| 4 Lamina of intermediate involucral bracts often shorter than their claw, lamina 1–2.5 mm long; capitula <10 mm diam. ....   | <b>6. <i>P. canescens</i></b> |
| 4: Lamina of intermediate involucral bracts about as long as or longer than their claws, lamina usually 2.5–10 mm long; capitula usually >10 mm diam. except rarely in depauperate specimens ..... | 5                             |
| 5 Apex of involucral bracts more or less obtuse; capitula mostly 20–30 mm diam.; plant perennial .....   | <b>5. <i>P. rugata</i></b>    |
| 5: Apex of involucral bracts acute to aristate; capitula mostly 10–20 mm diam.; plant annual .....   | <b>9. <i>P. aristata</i></b>  |
| 6 Apex of lamina of intermediate involucral bracts acute to aristate .....   | 7                             |
| 6: Apex of lamina of intermediate involucral bracts retuse to obtuse .....   | 16                            |

<b>7</b> Lamina of intermediate involucre bracts shorter than their claws .....	<b>8</b>
<b>7:</b> Lamina of intermediate involucre bracts as long as or longer than their claws .....	<b>10</b>
<b>8</b> Lamina of intermediate involucre bracts narrow-trullate, less than twice as wide as their claws .....	<b>5. <i>P. rugata</i></b>
<b>8:</b> Lamina of intermediate involucre bracts ovate or $\pm$ triangular, more than twice as wide as their claws .....	<b>9</b>
<b>9</b> Lamina of intermediate involucre bracts ovate-acuminate, more or less flat (sometimes slightly wrinkled in dry specimens); Western Australia, Northern Territory and South Australia .....	<b>7. <i>P. eremaea</i></b>
<b>9:</b> Lamina of intermediate involucre bracts $\pm$ triangular, usually with an adaxial bowl-like depression just above junction with the claw; South Australia, north-eastern New South Wales and Queensland .....	<b><i>P. longipedata</i></b>
<b>10</b> Ligules of ray corolla pink or mostly yellow but apically tinged purple .....	<b>11</b>
<b>10:</b> Ligules of ray corolla only yellow .....	<b>12</b>
<b>11</b> Ligules of ray corolla pink; lamina of intermediate involucre bracts ovate, longer than broad, straw coloured, transparent, scarious .....	<b><i>P. gracilis</i></b>
<b>11:</b> Ligules of ray corolla yellow, tinged with purple at the apex; lamina of intermediate involucre bracts transverse-elliptic, broader than long, reddish-brown, not transparent, rigid .....	<b><i>P. nutans</i></b>
<b>12</b> Capitula mostly 5–10(–15) mm diam.; laminas of intermediate involucre bracts mostly 2–3(–4) mm long; plants from dry inland habitats .....	<b>13</b>
<b>12:</b> Capitula mostly (10–)15–30 mm diam.; laminas of intermediate involucre bracts mostly >4 mm long; plants from various habitats .....	<b>14</b>
<b>13</b> Involucre bracts closely imbricate, hiding the claws; lamina of intermediate involucre bracts broad ovate to sub-orbicular, somewhat concavo-convex, often nearly as wide as long .....	<b>8. <i>P. remota</i></b>
<b>13:</b> Involucre bracts loosely imbricate, not hiding the claws; lamina of intermediate involucre bracts ovate, more or less flat (sometimes slightly wrinkled in dry specimens), much narrower than long .....	<b>7. <i>P. eremaea</i></b>
<b>14</b> Capitula mostly 10–20 mm diam.; plants annual; southern half of Australia .....	<b>9. <i>P. aristata</i></b>
<b>14:</b> Capitula mostly 20–30 mm diam.; plants perennial; eastern Australia .....	<b>15</b>
<b>15</b> Basal leaves linear, mostly 3–6 mm wide, glabrous or nearly so; apex of involucre bracts usually long-acuminate to aristate; mostly grasslands .....	<b>4. <i>P. linearifolia</i></b>
<b>15:</b> Basal leaves usually lanceolate to oblanceolate, rarely linear, mostly 5–20 mm wide, variously hairy; apex of involucre bracts acute to acuminate; various habitats .....	<b>1. <i>P. jaceoides</i></b>
<b>16</b> Involucre bracts closely imbricate, hiding the claws, somewhat concavo-convex; small annuals from north-west and central Australia .....	<b>8. <i>P. remota</i></b>
<b>16:</b> Involucre bracts loosely imbricate, not hiding the claws, more or less flat (sometimes slightly wrinkled in dry specimens); robust perennials from southern and eastern Australia .....	<b>17</b>
<b>17</b> Lamina of intermediate involucre bracts shorter than their claws; capitula usually 3–20 in terminal clusters .....	<b><i>P. hieracioides</i></b>
<b>17:</b> Lamina of intermediate involucre bracts similar in length or longer than their claws; capitula solitary or in loose or contracted cymes .....	<b>18</b>
<b>18</b> Basal and cauline leaves linear; plants $\pm$ glabrous or glabrescent except for prominent axillary hair tufts on basal leaves .....	<b>3. <i>P. laevigata</i></b>
<b>18:</b> Basal and cauline leaves not linear; plants variously hairy .....	<b>19</b>
<b>19</b> Basal leaves to 20 mm wide; stems often several; capitula usually solitary, or rarely a few in loose cymes; slender plants mostly of lowland habitats but extending into the alps .....	<b>2. <i>P. decipiens</i></b>
<b>19:</b> Basal leaves mostly 15–65 mm wide; stem usually solitary; capitula usually 5–11 in a dense contracted cyme; robust plants of montane to alpine habitats .....	<b>20</b>
<b>20</b> Basal leaves woolly to glabrescent, ovate to obovate, 35–65 mm wide, petioles winged; from mountainous areas of north-eastern New South Wales and south-eastern Queensland .....	<b><i>P. monticola</i></b>
<b>20:</b> Basal leaves glabrous or hairy, but not woolly, oblong to spatulate, mostly 15–35 mm wide, petioles not markedly winged; alpine and subalpine areas of south-eastern New South Wales and Victoria .....	<b>21</b>
<b>21</b> Ligules of ray corolla yellow to orange, 9–13 mm long, teeth to 2 mm long; claw of involucre bracts c. 1 mm wide; capitula 15–25 mm diam.; mature cypselas <3 mm long .....	<b><i>P. robusta</i></b>
<b>21:</b> Ligules of ray corolla yellow, 14–20 mm long, teeth 2–4.5 mm long; claw of involucre bracts 1.5–2 mm wide; capitula 25–30 mm diam.; mature cypselas 3–4.5 mm long .....	<b><i>P. laciniata</i></b>

## Taxonomy

### 1. *Podolepis jaceoides* (Sims) Voss, *Vilm.*

*Blumengärtn.* ed. 3, 1: 536 (1894)

**Basionym:** *Scalia jaceoides* Sims, *Bot. Mag.* 24: t. 956 (1806); *Podolepis acuminata* R.Br., *Hortus Kew.* edn 2, 5: 82 (1813), nom. illeg. (the earlier *Scalia jaceoides* is cited in synonymy); *Podolepis jaceoides* (Sims) Druce, *Rep. Bot. Exch. Club Soc. Brit. Isles, Suppl.* 2: 641 (1917), isonym; *Podolepis jaceoides* (Sims) Domin, *Biblioth. Bot.* 22(89): 1230 (1930), isonym.

**Type:** CULTIVATED. 'A native of New South Wales, ... Introduced by Mr. Loddiges of Hackney,' (cultivated in England), not located (lectotype, illustration in *Bot. Mag.* 24: t. 956 (1806)!, here designated).

*Podolepis papillosa* R.Br. ex Pépin, *Ann. Fl. Pomone* 2: 88 (1833); *Podolepis papillosa* R.Br. ex Jacques, *Ann. Fl. Pomone* 3: 213 (1835) isonym. **Type:** 'Cultivated in the Jardin des Plantes, Paris, France', no locality, no date, no collector (neotype P, *vide* Mabberley (1999), *n.v.*).

*Podolepis contorta* Lindl., *Edwards's Bot. Reg.* 24: p. 64 misc. (1838). **Type:** 'A native of Van Diemen's Land, whence seeds of it were sent to the Horticultural Society by Mr. J. Bunce', not located.

*Podolepis simplicicaulis* F.Muell. *Second Rep. Gov. Bot. Veg. Colony* 12 (1854), nom. nud.

*Podolepis papillosa* Gand., *Bull. Soc. Bot. France* 65: 46 (1918), nom. illeg. *non* R.Br. ex Pépin (1833). **Type:** 'Australia, N. S. Wales ad Warrumbungle Range (*Forsyth!*), Victoria (*Walter!*): New South Wales, Warrumbungle Ranges, x.1899, *W. Forsyth s.n.* (lectotype, LY 0000142, *vide* McGillivray (1973), photo!, isolectotype, NSW 25486, photo!, JSTOR Global Plants); NW Victoria, x.1900, *C. Walter s.n.* (excluded syntype, LY, photo! (= *P. aristata* subsp. *affinis*)).

**Illustrations:** Sims (1806) No. 956; Cunningham et al. (1981) p. 664; Cooke (1986) fig. 710 D; Everett (1992) p. 264.

**Herb** to 50 cm tall, renewed annually from perennial rootstock. **Stems** 1–several, produced annually from a thickened persistent rootstock, erect, unbranched or sparingly branched, variously woolly or cobwebbed, sometimes glabrescent. **Leaves** covered sparsely to densely with flattened elongate to coiled multicellular hairs, sometimes glabrescent, margins ±flat to revolute, entire; basal leaves several in a sparse rosette, usually lanceolate to oblanceolate, rarely linear, 3–15(–20)

cm long and 5–15(–20) mm wide, petiolate, base amplexicaul covering an inconspicuous adaxial tuft of long hairs (white on dried specimens); cauline leaves alternate, sessile, stem-clasping, usually linear to linear-lanceolate, 1–10(–20) cm long and 2–10(–15) mm wide, apex acuminate. **Peduncles** 4–15 cm long, with several scarious scale leaves below the involucre passing into the leafy stem. **Capitula** hemispherical, mostly 20–40 mm diam., solitary or a few in loose cymes. **Involucral bracts** many-seriate, with linear glandular claws, unequal (outermost shortest, intermediate longest); lamina scarious, virtually flat (sometimes slightly wrinkled in dry specimens), smooth, shiny, ±ovate; intermediate bracts 10–18 mm long, apex acute to acuminate, often slightly asymmetric and twisted, claw c. 1 mm wide at the narrowest point and shorter than, to about as long as, the lamina; inner bracts with claw longer than lamina. **Florets** bright yellow; ray florets female, 20–50, ligules linear, 15–30 mm long, 3(–5)-toothed, teeth to 5 mm long, to c. 1 mm wide; disc florets bisexual, numerous. **Cypselas** 2–3 mm long, c. 1 mm wide, papillose; pappus bristles 20–40, barbellate, shortly connate at base, 6–10 mm long. (Figs 1a, 2)

**Selected specimens examined:** SOUTH AUSTRALIA. Hindmarsh Island. 17.x.1930, *E.H. Ising* 3853 (AD 97410208); Naracoorte, 3.xi.1945, *N.S. Tiver* 14304 (AD 98672218); Mt Graham, 21.xi.1882, *Tate s.n.* (AD 97631670); Flinders Chase National Park, beside Cape du Couedic road, 21.x.1985, *J.H. Willis s.n.* (MEL 2119203); Swamps near Mt Benson, 1895, *Dr Englehart s.n.* (MEL 544018); Kingston – Lucindale railway corridor, 23.x.2006, *D.J. Duval* 621 (AD 201366); Lake Bonney, 1882, *C. Wehl s.n.* (MEL 716639); Mt Gambier (MEL 716727); 4.5 km direct ESE of Maitland, 20.ix.1994, *R.L. Taplin & D.E. Murfet* BS63-496 (AD 99705368); Freeling Cemetery, 23.x.1966, *D.N. Kraehenbuehl* 1799 (AD 96713047); Sandergrove, c. 10 km SW of Strathalbyn, 2.xi.1926, *J.B. Cleland s.n.* (AD 95830060); Biscuit Flat c. 8 km SW of Conmurra, xi.1969, *K.M. Alcock* 188 (AD 97041036). QUEENSLAND. Rockhampton, *A. Dietrich* 1796, 259, 268, 1454 (MEL 544019, MEL 568369, MEL 568370, MEL 544020, AD 97943570); Terrick Terrick, 20.ix.1960, *S.L. Everist* 6337 (AD 98619303, BRI 406093); Longreach, x.1913, *E. Jarvis s.n.* (BRI 365445); 'Burenda', Augathella, x.1998, *M. Pedon s.n.* (BRI 664025); Mitchell Highway, 98 km S of Cunnamulla, 18.ix.2004, *A.R. Bean* 23137 (BRI 697235); 'Woolga', Tambo, 28.ix.1950, *G.A. Morrison s.n.* (BRI 365444); 12 km E of Capella, 8.iii.1995, *R.J. Fensham* 2801 (BRI 639616); 8 km N of Clermont, 7.ix.1997, *R.J. Fensham* 3315 (BRI 657938); South Galway, about 40 miles SW of Windorah, 2.viii.1963, *S.L. Everist* 7418 (BRI 41211); 2

miles E of Peak Downs Station, 17.ix.1964, *Adams 1299* (CBG 143694). **NEW SOUTH WALES.** Kallara Station. Creek 4.5 km E of homestead along station track, 23.x.1981, *L. Haegi 2073* (MEL 617177 (Fig. 2), AD 98227197); Berrigan, 29.x.1923, *J.L. Soues s.n.* (MEL 610531); Wilcannia, near Darling River, 27.ix.1976, *M.G. Corrick 5609* (MEL 628685); 34.2 km E of Bourke High School en route to Brewarrina, 20.viii.1987, *R.G. Coveny 12643* (MEL 115764, BRI 429168); River Road 10 miles S of Menindie, x.1979, *E. Baker s.n.* (AD 98672187); Matakana, 200 m SE of highway railway crossing, 8.x.2000, *K.D. Hill 5562* (AD 129136); Widdin Brook, 26 miles SW of Denman, 7.x.1959, *R. Story 6771* (CBG 72863, CBG 79657); c. 5 km E of Wollar on road to Bylong, 23.x.1990, *S.M. Prober s.n.* (CBG 491390); Travelling Stock Route 8 km N of Barraba, 1.x.1993, *S.M. Prober s.n.* (CBG 492529); Hunter Valley. "Darrowby" c. 3.5 km W of Broke along the road to Milbrodale, 3.x.1993, *J. Palmer 444* (CBG 474502). **AUSTRALIAN CAPITAL TERRITORY.** Queanbeyan-Cooma railway easement, 1 km S of Williamsdale Road, 19.iii.1993, *I. Crawford 2195* (CBG 9317307). **VICTORIA.** Rutherglen, 30.x.1936, *R.A. Black 481* (MEL 2301839, MEL 2300128); Cape Otway along coast at highest point, 12.iii.1962, *A.C. Beauglehole 19748* (MEL 1505398, AD 97907322); Near Oberon Bay Beach, Wilsons Promontory, 14.xi.1908, *Audas & St John s.n.* (MEL 648804); Chiltern Regional Park, Mt Pleasant Road N of Chiltern, 31.x.1979, *A.C. Beauglehole 66002* (MEL 1580237); Killawarra State Forest 20 km NW of Wangaratta P.O., 30.x.1979, *A.C. Beauglehole 65849* (MEL 1580244); **TASMANIA.** V.D.L., *Gunn 362* (MEL 716723); Marshall Bay, Flinders Island, 16.x.1966, *J.S. Whinray 1616* (CBG 484659); Marshall Plains, Flinders Island, 14.vi.1877, *A. Simson 574* (HO 507893).

**Distribution and habitat:** Found in South Australia, Queensland, New South Wales, Australian Capital Territory, Victoria and Tasmania. Most collections are from riverine woodlands and mallee in the arid zone of inland South Australia, Queensland and New South Wales, but also known from near coastal areas such as south-eastern South Australia, Rockhampton area, Sydney area, Wilsons Promontory, Cape Otway and Flinders Island. The near coastal occurrences of *Podolepis jaceoides* in south-eastern South Australia, Victoria and Flinders Island represent a significant incursion of this species into more mesic habitats. (Fig. 16a)

**Conservation status:** Reasonably common, widespread and represented in conservation reserves.

**Flowering period:** Mostly August to November.

**Cytology:** No data available.

**Notes:** The taxonomy and nomenclature of *Podolepis jaceoides* and related species has been problematic as is

evident from the way these plants have been determined and arranged in the major Australian herbaria. The large number of names reduced to synonymy under *P. jaceoides* in the literature is also noteworthy (see Davis (1957) and APNI (2014)).

*Podolepis jaceoides* has long been regarded as a widespread and variable species from south-eastern Australia. In the protologue of *Scalia jaceoides*, Sims (1806) described the involucre bracts (referred to as calyx scales) as 'linear, terminated with a broader, ovate-acuminate, scariose [*sic*] appendix'. The accompanying illustration (Sims 1806) shows the lamina of the involucre bracts as having acute apices. Robert Brown (1813) described *Podolepis acuminata* R.Br., an illegitimate name as he cited the earlier *Scalia jaceoides* in synonymy. However, the choice of the epithet '*acuminata*' and his brief description of the involucre bracts (referred to as *calycis*) as '*aequatis ovatis acuminatis*' (Brown 1813) is evidence that the plants Brown saw had ovate-acuminate involucre bracts. The provenance of the original specimens of *P. jaceoides* and those Brown referred to as *P. acuminata* in the protologue is New South Wales (Sims 1806; Brown 1813), possibly in the vicinity of Port Jackson, although *P. acuminata* is not mentioned in the Robert Brown diaries (Vallance et al. 2001).

Prior to the current study, it was found that in all the Australian herbaria accessed, the preserved specimens stored under the name *P. jaceoides* had acuminate, acute, obtuse or retuse apices to the intermediate involucre bracts, suggesting that more than one taxon was present. Those with acute to acuminate apices to the intermediate involucre bracts can be separated readily into two distinct species based mainly on indumentum and involucre bract and leaf morphology (see Table 1). One of these species is *P. jaceoides* s. str., which agrees well with the illustration in Sims (1806), the other is a less widespread species primarily from grasslands herein described and named as *P. linearifolia* Jeanes.

Those specimens with retuse to obtuse apices to the intermediate involucre bracts can also be separated readily into two distinct species based on leaf morphology and indumentum (see Table 1). One is widespread and common in south-eastern Australia, and the other is rare and probably endemic to Victoria. The name *P. laevigata* Gand., applies to the latter while the widespread species is herein described and named as *P. decipiens* Jeanes.

**Typification:** There is a specimen at MEL with an original label in Brown's hand, which reads 'R. Brown *Iter Australiense* 2258 *Podolepis acuminata* Br.', but with no locality information. A later worker has annotated the sheet 'Co-type material *Podolepis acuminata* R.Br. Robert Brown No. 2258 (Port Jackson, N.S.W.) 1802-5'. There is a duplicate of this collection (also numbered 2258) at the Natural History Museum, London (BM) with an original label in Brown's hand with the provenance given as Port Dalrymple (Launceston, Tasmania). It appears that both the MEL and the BM specimens were collected at Port Dalrymple (not Port Jackson) and hence are not type material of *P. acuminata*. This is further borne out by the fact that the involucre bract apices are not acuminate in these specimens. Unfortunately no herbarium specimens can be located that are type material of either *P. jaceoides* or *P. acuminata*, but it is clear that this species has at least some, if not all, of the involucre bracts ovate with acuminate apices.

The identity of *P. contorta* Lindl. from 'Van Diemen's Land' remains a mystery. The taxon was described as having acuminate involucre bracts (Lindley 1838), but I have seen no specimens from the Tasmanian mainland with bracts that match that description except for an old Gunn collection at MEL simply labelled V.D.L. However,

*P. jaceoides* has been collected more recently on Flinders Island, so perhaps the type material (if any exists) had its origins there. Without any firm evidence to the contrary it is prudent to regard *P. contorta* as an unusual floral form of *P. jaceoides*. For additional commentary on synonymy of *P. jaceoides*, including *P. papillosa* R.Br. ex Pépin, *P. papillosa* R.Br. ex Jacques, *P. papillosa* Gand., see Mabberley (1999).

## 2. *Podolepis decipiens* Jeanes, **sp. nov.**

**Type:** VICTORIA. SW of Mt Langi Ghiran between Western Highway and railway line, 2.xi.1981, *M.G. Corrick* 7528 (holotype MEL 606866! (Fig. 3), isotypes, AD 98316202!, CBG 329381!, HO 58964!).

*Podolepis macrocephala* F.Muell. *First Rep. Gov. Bot. Veg. Colony* 14 (1853) nom. nud.

*Podolepis laevigata sensu* Victoria, Keilor Plains, ix.1900, *C. Walter s.n.* (excluded syntype, LY 0000144, photo!); Victoria, Mentone, 6.x.1907, *J.R. Tovey s.n.* (excluded syntype, LY 0000145, photo!) *non* Gand.

*Podolepis jaceoides sensu* Davis (1957), Cooke (1986), Everett (1992), Jeanes (1999) *p.p. non* (Sims) Voss.

**Illustrations:** Davis (1957) figs 2–7; Beadle (1980) fig. 292 A1–A5; Jeanes (1999) fig. 154h (all as *P. jaceoides*).

**Table 1.** A summary of the diagnostic characters and habitat information of *Podolepis jaceoides* and similar species. Length and width measurements are abbreviated as L and W respectively.

	<i>P. decipiens</i>	<i>P. jaceoides</i>	<i>P. laevigata</i>	<i>P. linearifolia</i>
<b>Leaf indumentum</b>	woolly to scabrous with flattened multicellular hairs or glabrescent	woolly to scabrous with flattened multicellular hairs or glabrescent	± glabrous	glabrous or with fine hairs on midrib below and on margins
<b>Basal leaf shape</b>	lanceolate to oblanceolate or ovate to obovate	lanceolate or oblanceolate, rarely linear	linear	linear
<b>Basal leaf size</b>	30–200 mm L × 5–25 mm W	30–200 mm L × 5–20 mm W	50–130 mm L × 1–5 mm W	50–170 mm L × 3–6(–10) mm W
<b>Hair tufts at base of basal leaves</b>	hidden by leaf bases	hidden by leaf bases	conspicuous	hidden by leaf bases
<b>Cauline leaf shape</b>	linear to linear-lanceolate	linear-lanceolate	linear	linear
<b>Cauline leaf size</b>	10–100 mm L × 2–15 mm W	10–200 mm L × 2–15 mm W	10–80 mm L × 1–3 mm W	10–80 mm L × 1–4 mm W
<b>Apex of intermediate involucre bracts</b>	retuse to obtuse	broadly acute, to acuminate, often twisted	retuse to obtuse	usually long-acuminate or aristate
<b>Habitat</b>	lowland to alpine forests, grasslands and herbfields	lowland forests, grassy woodlands and mallee scrubs	probably Buloke/ Grey Box woodlands	mostly grassland

*Herb* to 70 cm tall, renewed annually from perennial rootstock. *Stems* 1–several, produced annually from thickened persistent rootstock, erect, unbranched or sparingly branched, variously woolly or cobwebbed, rarely glabrescent. *Leaves* covered sparsely to densely with flattened elongate to coiled, multicellular hairs, rarely glabrescent, margins  $\pm$ flat to revolute, entire; basal leaves several in a sparse rosette, lanceolate, oblanceolate, ovate or obovate, 3–13(–20) cm long and 5–15(–30) mm wide, petiolate, base amplexicaul covering an inconspicuous adaxial tuft of long hairs (white or brown on dried specimens); cauline leaves alternate, sessile, stem-clasping, usually linear to linear-lanceolate, mostly 1–5(–10) cm long and 2–10(–15) mm wide, apex acuminate. *Peduncles* 4–10 cm long, with several scarious scale leaves below the involucre passing into the leafy stem. *Capitula* hemispherical, mostly 20–40 mm diam., usually solitary. *Involucral bracts* many-seriate, with linear glandular claws, unequal (outermost shortest, intermediate longest); lamina scarious, virtually flat (sometimes slightly wrinkled in dry specimens), smooth, shiny,  $\pm$ ovate; intermediate bracts 7–15 mm long, apex retuse to obtuse, claw c. 1 mm wide at the narrowest point and shorter than, to about as long as, the lamina; inner bracts with claw longer than lamina. *Florets* bright yellow or orange; ray florets female, 20–40, ligules linear, 15–30 mm long, 3(–5)-toothed, teeth to 8 mm long, to c. 1 mm wide; disc florets bisexual, numerous. *Cypselas* 2–4 mm long, c. 1 mm wide, papillose; pappus bristles 20–40, barbellate, shortly connate at base, 6–10 mm long. (Figs 1b, 3)

**Selected specimens examined: SOUTH AUSTRALIA.** Along road W of Italowie Gorge, Gammon Range National Park, 4.xi.1993, *R. Bates 34840* (MEL 2061695, AD 99427050); Hallett's Cove c. 20 km SW of Adelaide, 9.x.1920, *J.B. Cleland s.n.* (AD 97233373); Aldinga Bay on cliff top roadside, 3.xi.1983, *D.J.E. Whibley 8754* (AD 98402259); c. 15 km W of Penola, 18.x.1982, *J.Z. Weber 7684* (AD 98317018); Honans Scrub, 20.xi.1988, *R. Bates 16204* (AD 98850051); Mona Siding c. 5 km west of Bute, 12.x.1966, *D.J.E. Whibley 1651* (AD 97013233); Hundred of Ramsay, 24.xi.1968, *B.J. Blaylock 1147* (AD 97005190); Native Wells Native Forest Reserve S of Mt Burr, xi.2005, *R.J. Bates 66838* (AD 189540); Klein Point, S of Stansbury, 17.x.2006, *D.J. Duval 599* (AD 201236); Botenella Hills, 30 km NE of Kimba, 28.viii.1992, *D.N. Kraehenbuehl 5581* (AD 99327079); Burra, hilltop above the old copper mine, 21.x.1981, *N.N. Donner 8376* (AD 98210248); Arthurton Primary School, x.2003, *R. Bates 61350* (AD 155379); Yorketown to Minlaton, 22.ix.1994, *R.J.*

*Bates 38445* (AD 99606047). **QUEENSLAND.** Maryland, S border of Queensland, xi.1884, *E. Hukey 72* (MEL 716634). **NEW SOUTH WALES.** Kosciuszko National Park, near Cave Creek, c. 300 m upstream of Blue Waterhole area, 27.xi.2003, *N.G. Walsh s.n.* (MEL 2212513); 2.5 km W from Connors Hill, Snowy Mountain Highway, 10.ii.1996, *M. Ito 96075* (MEL 2030528); Sturt Highway, 16 km W of Euston towards Buronga, 12.x.2000, *R.G. Coveny 18810* (MEL 2067881, AD 118642, CBG 550703); Mulloon Creek, 12 km due E of Hoskinstown, on the Hoskinstown-Braidwood road, 11.xii.1984, *M.J. Taylor 419* (MEL 294996); Cotter River District. Upper northern slopes of Mt Gingera, Bimbera Range, 10.i.1961, *R. Schodde 1240* (AD 96227169); East of Jenner S.F., c. 40 km N of Tenterfield, 19.x.2003, *A.R. Bean 21023* (BRI 576376); Rules Point N of Kiandra, 9.xii.1977, *I.R. Telford 6914* (CBG 7708537); Penrose State Forest between Marulan and Moss Vale, 28.x.1971, *R. Pullen 4410* (CBG 228550); 4 miles from Guyra along the Guyra-Ebor Road, 27.xi.1970, *I.R. Telford 2408* (CBG 37107); Morton National Park, via Bundanoon, 23.x.1965, *J. & R. McKean 1158* (CBG 337593). **VICTORIA.** One Tree Hill Regional Park, 7.xi.1981, *A.C. Beaglehole 69840* (MEL 1580236); West Wail Flora and Fauna Reserve, 15.x.1986, *A.C. Beaglehole 86196* (MEL 1586474); 11 km SW of Wangaratta P.O., 6.xi.1985, *A.C. Beaglehole 81387* (MEL 679806); 14 km NNE of Wedderburn P.O., 12.viii.1975, *A.C. Beaglehole 50159* (MEL 2165830); Kooloonong, 1.x.1969, *N. MacFarlane s.n.* (MEL 2160907); Timberoo Forest Reserve c. 18 km SW of Ouyen P.O., 20.ix.1972, *A.C. Beaglehole 40419* (MEL 1505399); Native Dog Plain, Benambra-Wulgulmerang Road, 9.i.1971, *A.C. Beaglehole 35970* (MEL 521110); Victoria Valley, Grampians, x.1976, *P.K. Gullan s.n.* (MEL 523917); Goat Track, Grampians, 22.xi.1972, *B. Conn s.n.* (MEL 645424); Melbourne-Bairnsdale rail-line, 2.6 km E of Munro, 1.xi.1991, *I.D. Lunt 91/44* (MEL 2011427); Wilkin c. 22.5 km SW of Casterton P.O., 30.x.1960, *A.C. Beaglehole 8235* (MEL 2160914); Alpine National Park, Wonnangatta-Moroka unit. Surveyors Ck Forestry Camp, beside water supply dam, 15.xii.2000, *N.G. Walsh 5268* (MEL 2089856). **TASMANIA.** Lake Ada, 14.ii.1992, *A. Moscal 22629* (HO 143749, MEL 7059969); Great Western Tiers, Lake Highway, 5.7 km N from Breona, 18.i.1989, *F.E. Davies 994 & P. Ollerenshaw s.n.* (HO 134581, MEL 1600573, CBG 8900345); Saddle c. 1 km NW of Pine Lake, 13.ii.1989, *P.S. Short 3397* (MEL 220233); Domain Hobart, 3.xii.1970, *Swarbrick 5540* (BRI 533392); Between Derwent River Bridge and Bronte, Tasmania, 27.i.1949, *N.T. Burbidge 3397* (HO 14530, CBG 19621); Talinah Lagoon, c. 5 km W of Lake Augusta, 2.iii.1987, *R. Burns ANBG1167* (CBG 8700698); Top of Jacobs Ladder, Ben Lomond National Park, 29.i.2000, *A.C. Rozefelds 1605* (HO 504332); Epping Forest, 24.i.1986, *F. Duncan s.n.* (HO 506592); Ironstone Mountain, 19.i.1972, *D. Steane s.n.* (HO

532637); Waverley Flora Park, 4.xi.2007, *M. Wapstra* 270 (HO 551947); Vale of Belvoir, 14.iii.2010, *A.M. Buchanan* 17372 (HO 555869); Pieman River heads, 23.ii.1930, *H.F. Comber* 2116 (HO 14529).

**Distribution and habitat:** Found in South Australia, Queensland, New South Wales, Victoria and Tasmania. Most collections are from a wide range of non-arid habitats including near coastal, alpine, sub-alpine and plains country grasslands, woodlands and open forests. In Queensland, known only from a single collection near Stanthorpe. (Fig. 16b)

**Conservation status:** Reasonably common, widespread and present in conservation reserves.

**Flowering period:** Mostly August to February, depending upon altitude.

**Cytology:** No data available.

**Notes:** *Podolepis decipiens* shows considerable variation across its range, but from the specimens available there appear to be no readily definable segregate taxa. Plants from alpine areas usually have a well-developed rosette of ovate to obovate leaves, relatively short unbranched stems, large capitula, often orange florets and the apex of the claws of the involucre bracts are usually reddish. All of these features can be observed in lowland plants, but rarely in combination. Some plants from grasslands near Melbourne have long, broad claws on the intermediate involucre bracts, sometimes exceeding the lamina and reminiscent of those of *P. hieracioides* F.Muell.

Apparent hybrids between *P. decipiens* and *P. rugata* Labill. subsp. *rugata* have been collected at Gorae West near Portland, Victoria (see notes under *P. rugata* subsp. *rugata*).

**Etymology:** From the Latin *decipiens* = deceiving; this species is similar to, and has been confused with, *Podolepis jaceoides*.

### 3. *Podolepis laevigata* Gand., *Bull. Soc. Bot. France* 65: 46 (1918)

**Type:** VICTORIA. 'Australia, Victoria ad Wimmera (*Reader!*), Keilor Plains (*Walter!*) et Mentone (*Tovey!*): Pastures, Wimmera, 7.x.1892, *F.M. Reader* s.n. (lectotype, LY 0000143, *fide* McGillivray (1973), photo! (Fig. 4)); Keilor Plains, ix.1900, *C. Walter* s.n. (excluded syntype, LY 0000144, photo!); Mentone, 6.x.1907, *J.R. Tovey* s.n. (excluded syntype, LY 0000145, photo!). Both excluded syntypes are *P. decipiens*.

*Podolepis jaceoides sensu* McGillivray (1973) *non* (Sims) Voss.

**Herb** to 40 cm tall, possibly renewed annually from perennial rootstock. **Stems** several, produced annually from a thickened persistent rootstock, erect, unbranched, glabrous or glabrescent. **Leaves** virtually glabrous, margins  $\pm$ flat to revolute, entire; basal leaves several in a sparse rosette,  $\pm$  linear, 5–13 cm long and 1–5 mm wide, petiolate, base amplexicaul with a conspicuous adaxial tuft of long hairs (brown or white on dried specimens); cauline leaves alternate, sessile, linear, mostly 1–8 cm long and 1–3 mm wide, apex acuminate. **Peduncles** 4–8 cm long, with several scarious scale leaves below the involucre passing into the leafy stem. **Capitula** hemispherical, mostly 15–25 mm diam., usually solitary. **Involucre bracts** many-seriate, with linear glandular claws, unequal (outermost shortest, intermediate longest); lamina scarious, virtually flat (sometimes slightly wrinkled in dry specimens), smooth, shiny,  $\pm$ ovate; intermediate bracts 7–12 mm long, apex retuse to obtuse, claw c. 1 mm wide at the narrowest point and shorter than, to about as long as, the lamina; inner bracts with claw longer than lamina. **Florets** bright yellow; ray florets female, 20–30, ligules linear, 10–20 mm long, 3(–5)-toothed, teeth to 4 mm long, 0.5–1 mm wide; disc florets bisexual, numerous. **Cypselas** 2–2.5 mm long, c. 1 mm wide, papillose; pappus bristles 20–40, barbellate, shortly connate at base, 5–8 mm long. (Figs 1c, 4)

**Specimens examined:** VICTORIA. Charlton, x.1917, *W.W. Watts* s.n. (MEL 624730); Wimmera, Australia Felix, *s.dat.*, *Anon.* s.n. (MEL 716596); NW of Horsham (MEL 716640); Daylesford, 1878, *R. Wallace* 139 (MEL 274872); North-central. Nathalia, 10.x.1932, *J.H. Willis* s.n. (MEL 2165118); The Wimmera. Nhill, *St E. D'Alton* 46 (MEL 716644); Wimmera, *Dallachy* s.n. (MEL 716656); Carrs Plain, *C. Walter* s.n. (MEL 2165537); Wycheproof, ix.1917, *W.W. Watts* 411 (MEL 624729); Wimmera, *Dallachy* s.n. (MEL 2165119); Warracknabeal, 10.xi.1891, *J.G.O. Tepper* s.n. (AD 97704546); Coromby, x.1889, *J.G.O. Tepper* s.n. (AD 97704575); Murray River, 1895, *H. Hawthorne* s.n. (MEL 1508132).

**Distribution and habitat:** Apparently endemic to Victoria where it is found in the Wimmera, Riverina and Midlands Natural Regions (Conn 1993). Most of the collections are old and the labels contain no information on habitat. However, given the known distribution, it is possibly found mainly in *Allocasuarina luehmannii*

*Eucalyptus microcarpa* woodland on heavy non-calcareous soils. (Fig. 16c)

**Conservation status:** There are few collections of this species, the most recent of which was made in 1986. It appears that it may have always been localised and occurs in Buloke/Grey Box woodlands, which have been extensively cleared. There is no evidence that it occurs in any biological reserves. Recommend Endangered (3E) by criteria of Briggs and Leigh (1996) and Critically Endangered (CR) by criteria of IUCN (2013).

**Flowering period:** September to November.

**Cytology:** No data available.

**Typification:** In the protologue of *Podolepis laevigata*, Gandoger provided the following Latin description: *Glaberrima, folia glaucescentia linearia, phylla involucri obtusa albida flosculis multo breviora, pappus niveus* (= very glabrous, leaves glaucous linear, involucre leaves (= bracts) obtuse whitish much shorter than the florets, pappus snowy white). As noted above, I consider the three syntype specimens to be representative of two species (*P. decipiens* and *P. laevigata*). McGillivray's (1973) selection of the Reader specimen as the lectotype is appropriate as it most closely matches Gandoger's description (1918).

**Notes:** In general appearance this species resembles *Podolepis linearifolia*, but differs mainly in the intermediate involucre bracts having an obtuse apex and broader claws, and the rosette leaves having conspicuous tufts of axillary basal hairs. The two species also grow in different habitats.

#### 4. *Podolepis linearifolia* Jeanes, sp. nov.

**Type:** VICTORIA. Old RAAF Base Laverton, northwest corner of base, 10.xii.2007, J.A. Jeanes 1805 (holotype, MEL 2296546! (Fig. 5), isotypes, CANB 699493!, NSW 832116!, K!).

*Podolepis* sp. aff. *jaceoides* (Basalt Plains) *sensu* Ross (1993).

*Podolepis* aff. *jaceoides sensu* Watanabe et. al. (1999).

*Podolepis* sp. 1 *sensu* Jeanes (1999).

*Podolepis* sp. Basalt Plain (V.Stajsic 2244) Vic. Herbarium *sensu* APNI (2014).

**Illustration:** Jeanes (1999) fig. 154i (as *Podolepis* sp. 1).

**Herb** to 60 cm tall, renewed annually from perennial rootstock. **Stems** usually several, produced annually from a thickened persistent rootstock, erect, usually

unbranched, usually sparsely woolly or hispid, glabrescent with age. **Leaves** virtually glabrous, but often with fine hairs on abaxial midrib and on margins, margins  $\pm$ flat to revolute, entire; basal leaves rosetted, numerous,  $\pm$ linear, 5–17 cm long and 3–6(–10) mm wide, petiolate, base amplexicaul covering an inconspicuous adaxial tuft of long hairs (white on dried specimens); cauline leaves alternate, sessile, stem-clasping, linear, mostly 1–8 cm long and 1–4 mm wide, apex acute to acuminate. **Peduncles** 2–8 cm long, with several scarious scale leaves below the involucre passing into the leafy stem. **Capitula** hemispherical, mostly 20–30 mm diam., solitary or a few in loose cymes. **Involucre bracts** many-seriate, with linear glandular claws, unequal (outermost shortest, intermediate longest); lamina scarious, virtually flat (sometimes slightly wrinkled in dry specimens), smooth, shiny,  $\pm$ ovate; intermediate bracts 7–15 mm long, apex usually long-acuminate to aristate, claw slender, c. 0.5 mm wide at the narrowest point and shorter than, to about as long as, the lamina; inner bracts with claw longer than lamina. **Florets** bright yellow or orange; ray florets female, 20–40, ligules linear, 10–30 mm long, 3(–5)-toothed, teeth to 5 mm long, to c. 1 mm wide; disc florets bisexual, numerous. **Cypselas** 2–3 mm long, c. 1 mm wide, papillose; pappus bristles 20–40, barbellate, shortly connate at base, 6–9 mm long. (Figs 1d, 5) Chromosome numbers:  $n=10$ ,  $2n=20$ .

**Selected specimens examined:** SOUTH AUSTRALIA. 10 km SW of Burra on Adelaide-Peterborough road, 19.x.1981, N.N. Donner 8166 (AD 98210352, CBG 350200, HO 63478); Button Grass swamp near Mt Burr, 30.x.1977, R. Bates 4009 (AD 97748024); Hynum and Robertson, 3.xi.1945, N.S. Tiver s.n. (AD 98672181). NEW SOUTH WALES. Berrigan, 29.x.1923, J.L. Sones s.n. (CBG 339068). VICTORIA. RAAF Air Base, Laverton, 5.xi.1996, N.G. Walsh 4637 (MEL 2051250); About 3.5 km north of Rowsley, 28.x.2000, V. Stajsic 2698 & 2699 (MEL 2135003, MEL 2135004, HO 523357, CANB 554769); Derrimut Grasslands, above northern edge of Andersons Swamp, 10.xi.1995, P.S. Short 4574 (MEL 2028052); 15 km west of Maryborough P.O., 22.xi.1979, A.C. Beauglehole 66600 (MEL 1580243); Near Omeo, 1893, D. Sullivan 7 (MEL 716537); Immediately SW from Deer Park Railway Station on the Ballarat line, 14.xii.1992, V. Stajsic 2244 (MEL 2102870); Deer Park, corner of Fitzgerald and Boundary Roads, 29.x.1991, R. Robinson s.n. (MEL 2011738); Railway easement 4.5 km west of Glenrowan, southern verge, 30.xi.2003, R. Thomas 779 (MEL 2220642); Intersection of Dingee-Rochester Road and Bendigo-Tennyson Road, x.2003, D. Marshall s.n. (MEL 2236280);

Winghee Swamp, bend in Tennyson-Huntly Road, 14.ix.1992, *P. Foreman M125* (MEL 2016852).

**Distribution and habitat:** Scattered across south-eastern Australia between the Clare Valley in South Australia and Omeo in Victoria. Mostly found on grasslands, but may also occur in grassy woodlands, open forests and around swamps. (Fig. 16d)

**Conservation status:** Overall *Podolepis linearifolia* is probably vulnerable as much of its former habitat has been lost to rural and urban development. In Victoria it now persists in small isolated pockets, mostly on the basalt plains grasslands to the north and west of Melbourne and on the northern plains grasslands (both EPBC listed threatened communities). Its current status in New South Wales, based on a single 1923 collection, is unknown. In South Australia it is known from very few collections mostly in the south-east of the state. Most known localities for this species are on small road and rail reserves which are vulnerable to weed invasion, altered fire regimes, browsing by stock and feral animals, and road and rail works. Due to the extensive loss of habitat and the paucity of recent collections, I would suggest Vulnerable (3VC-) by criteria of Briggs and Leigh (1996) and Vulnerable (VU) by criteria of IUCN (2013).

**Flowering period:** September to December.

**Cytology:** Chromosome number determinations of  $n=10$ ,  $2n=20$  were reported by Watanabe et al. (1999) under the name *Podolepis* aff. *jaceoides* (Sims) Voss.

**Notes:** This species was first recognised in Ross (1993) as *Podolepis* sp. aff. *jaceoides* (Basalt Plains). Since that time it has become well known to many botanists and plant survey workers in the Victorian grasslands. It is readily distinguished from *P. jaceoides* by its linear, usually glabrescent basal leaves, generally smaller capitula, narrower claws and long-acuminate laminas on the intermediate involucre bracts.

**Etymology:** From the Latin *linearis* = linear, *folia* = leaf; the leaves of this species are more or less linear.

**5. *Podolepis rugata*** Labill., *Nov. Holl. pl.* 2: 57, t. 208 (1806)

**Type:** WESTERN AUSTRALIA. 'In terrâ Van-Leuwin', *Nova Hollandia*, no date, *Labillardiere s.n.* (lectotype, GH00011355 (left-hand specimen only), here designated, photo! JSTOR Global Plants).

Erect or decumbent *herb* to 50 cm tall, renewed annually from a perennial thickened rootstock. *Stems* 1–several,

**Table 2.** A summary of the diagnostic characters of the subspecies of *Podolepis rugata* and habitat information. Length and width measurements are abbreviated as L and W respectively.

	<i>P. rugata</i> subsp. <i>rugata</i>	<i>P. rugata</i> subsp. <i>littoralis</i>	<i>P. rugata</i> subsp. <i>glabrata</i>	<i>P. rugata</i> subsp. <i>trullata</i>
<b>Leaf indumentum</b>	± lanate	± glabrous	± glabrous	± glabrous
<b>Basal leaf shape</b>	linear to linear-lanceolate	oblanceolate	linear to linear-lanceolate	oblanceolate
<b>Basal leaf size</b>	30–100(–150) mm L × 3–13(–20) mm W	50–120 mm L × 3–10 mm W	30–100(–150) mm L × 3–13(–20) mm W	50–120 mm L × (4–) 8–14 mm W
<b>Cauline leaf shape</b>	linear to linear-lanceolate	oblanceolate to spatulate	linear to linear-lanceolate	oblanceolate to spatulate
<b>Cauline leaf size</b>	30–80(–100) mm L × 2–10 mm W	50–100(–160) mm L × 5–10(–15) mm W	10–80(–100) mm L × 2–10 mm W	30–60(–100) mm L × 3–5(–10) mm W
<b>Shape of intermediate involucre bract lamina</b>	ovate	ovate to ovate-lanceolate	ovate	trullate
<b>Surface of intermediate involucre bract lamina</b>	transversely rugose	transversely rugose	transversely rugose	virtually flat (tips reflexed) and smooth
<b>Apex of intermediate involucre bracts</b>	obtuse	obtuse	obtuse	acute to acuminate
<b>Habitat</b>	mostly inland mallee scrubs	coastal sand dunes	mostly inland mallee scrubs	coastal sand dunes

**Key to the subspecies of *Podolepis rugata***

- 1** Lamina of intermediate involucre bracts narrow-trullate, virtually flat except for reflexed tips, smooth; leaves glabrous; Yorke Peninsula and Kangaroo Island South Australia ..... **5d. *P. rugata* subsp. *trullata***
- 1:** Lamina of intermediate involucre bracts ovate or oblong, deeply transversely rugose; leaves glabrous or hairy; widespread ..... **2**
- 2** Plants decumbent, lacking a definite basal rosette; leaves fleshy, glabrous, oblanceolate; lamina of intermediate involucre bracts ovate to oblong; near-coastal scrub on sand; South Australia ..... **5c. *P. rugata* subsp. *littoralis***
- 2:** Plants erect, with a definite basal rosette; leaves thin-textured, hairy or glabrous; lamina of intermediate involucre bracts ovate; habitats various; widespread ..... **3**
- 3** Plants variously woolly; southern Australia ..... **5a. *P. rugata* subsp. *rugata***
- 3:** Plants virtually glabrous; South Australia and Victoria ..... **5b. *P. rugata* subsp. *glabrata***

unbranched or sparingly branched, variously woolly, cobwebbed or glabrous. *Leaves* woolly, cobwebbed or glabrous, margins  $\pm$ flat to revolute, entire, apex obtuse or acute to acuminate; basal leaves several in a sparse rosette, soon withering, or absent, narrow-lanceolate to oblanceolate, 3–10(–15) cm long and 3–13(–20) mm wide, petiolate; cauline leaves alternate, sessile, stem-clasping, fleshy or thin-textured, linear to linear-lanceolate or oblanceolate to spatulate, 1–10(–16) cm long and 1–10(–15) mm wide. *Peduncles* 3–10 cm long, with several scarious scale leaves below the involucre passing into the leafy stem. *Capitula* hemispherical, mostly 12–30 mm diam., solitary or a few in loose cymes. *Involucre bracts* many-seriate, with linear glandular claws c. 1 mm wide, unequal (outermost shortest, intermediate longest); lamina scarious, often golden-brown, usually deeply, transversely rugose, oblong to  $\pm$  ovate, rarely almost flat (except for reflexed tips) and narrow-trullate (in subsp. *trullata*); intermediate bracts 6–15 mm long, apex obtuse to acuminate, claw about as long as, or longer than, the lamina; inner bracts with claw much longer than lamina. *Florets* bright yellow; ray florets female, 30–70, ligules linear, 10–25 mm long, 3(–5)-toothed, teeth to 5 mm long, to c. 1 mm wide; disc florets bisexual, numerous. *Cypselas* 2–3 mm long, c. 1 mm wide, papillose; pappus bristles 30–60, barbellate, shortly connate at base, 6–10 mm long. Chromosome numbers:  $n=10$ ,  $2n=20$ .

**Cytology:** Chromosome number determinations of  $n=10$ ,  $2n=20$  were reported by Turner (1967) and Watanabe et al. (1999). Vouchers cited by Turner here refer to *Podolepis rugata* subsp. *rugata*, and that by Watanabe et al. to *P. rugata* subsp. *glabrata* Jeanes.

**5a. *Podolepis rugata* Labill. subsp. *rugata***

*Illustrations:* Labillardiere (1806) t. 208; Grieve & Blackall (1975) p. 792 (both as *P. rugata*).

Erect *herb* to 50 cm tall. *Stems* 1–several, erect, unbranched or sparingly branched, variously woolly or cobwebbed. *Leaves* woolly or cobwebbed, thin-textured; basal leaves several in a sparse rosette, soon withering; cauline leaves usually linear to linear-lanceolate, 1–10(–12) cm long and 2–10(–15) mm wide. *Capitula* solitary or a few in loose cymes, 12–25 mm diam. *Involucre bracts* with lamina scarious, often golden-brown, deeply transversely rugose,  $\pm$ ovate, apex obtuse. (Figs 1e, 6)

**Specimens examined: WESTERN AUSTRALIA.** 7 km N of Mt Esmond; 172 km NE of Esperance, 19.ix.1995, *B. Archer 102* (MEL 2039182 (Fig. 6)); Eyre Botanical District. E of Barker Inlet, 4.i.1992, *W.R. Archer 401924* (MEL 2018560); Coolgardie Botanical District. 36.9 km W of Balladonia, 17.x.1995, *K. Watanabe 341* (MEL 2027531); 22 miles E of Cocklebidy, 13.ix.1965, *B.L. Turner 5576* (MEL 602792); 387 km E of Norseman, 4.ix.1962, *T.E.H. Aplin 1720* (MEL 2165855); c. 20 km S of Ravensthorpe on Hopetoun Road, 9.xi.1983, *P.S. Short 2349 & L. Haegi s.n.* (MEL 1525042); c. 173 km along Eyre Highway east of Balladonia Hotel, 24.x.1968, *Hj. Eichler 20434* (AD 97424200); Quarrum Nature Reserve, E of Irwin Inlet, 26.xi.2003, *R.J. Cranfield 19527* (CANB 594130). **SOUTH AUSTRALIA:** 10.1 km E of Nundroo, 16.x.1995, *K. Watanabe 337* (MEL 2027520, AD 99609140); Nullarbor Plain, 1.6 km W of Ivy Tanks Eyre Peninsula, 31.viii.1974, *A.C. Beaglehole 49482* (MEL 1602543); Nullarbor. 12 km S of highway along western dog fence, 21.x.1983, *H.R. Toelken 7584* (MEL 1575134, AD 98415015, CBG 8800077); Eastern Nullarbor Plain. Tallowan Tank c. 75 km NW of Fowlers Bay, 7.x.1954, *J.B. Cleland s.n.* (AD 97233251); 20 km W of Yalata Roadhouse, 27.ix.1984, *A. Robinson 7593* (AD 98524008); North West Plains. c. 56 km east of the Western Australian border, near

the Eyre Highway, 15.ix.1960, *P. Wilson 1665* (AD 96140057); 5 miles W of Nundroo on Eyre Highway, 16.xi.1968, *J.W. Wrigley s.n.* (CBG 32875). **VICTORIA.** Mouth of the Glenelg, *W. Allitt s.n.* (MEL 222521); In Victoria on the Glenelg River, 1857, *F. Mueller s.n.* (MEL 2165850); Nelson Bay Coastal Reserve, 2.x.1982, *A.C. Beaglehole 71146* (MEL 1579763); Portland, *W. Allitt s.n.* (MEL 222522).

**Distribution and habitat:** Scattered across the southern part of Western Australia and South Australia as far east as the Portland district of south-west Victoria, in a range of habitats including mallee, chenopod scrubland, grassland, woodland and coastal dune scrubland. (Fig. 16e)

**Conservation status:** Widespread, moderately common and well represented in conservation reserves.

**Flowering period:** August to November.

**Notes:** Some specimens from coastal areas of Western Australia (e.g. Cape le Grande, Oldfield River mouth) approach subsp. *littoralis* in overall appearance, but they have the woolly leaves and stems of subsp. *rugata*. Apparent hybrids between *Podolepis rugata* subsp. *rugata* and *P. decipiens* have been collected at Gorae West near Portland, Victoria. The overall appearance of these plants and the size and shape of the involucre bracts suggests determination as *P. decipiens*, but the bracts are shallowly transversely rugose, which is a character found in *P. rugata*.

### 5b. *Podolepis rugata* subsp. *glabrata* Jeanes, subsp. nov.

**Type:** **VICTORIA.** Murray-Sunset National Park. Near the intersection of Nowingi Line Track and Rocket Lake Track, 24.xi.2011, *J.A. Jeanes 2744* (holotype, MEL 2356596! (Fig. 7), isotypes CANB!, SI!, PAL!).

*Podolepis centauroides* F.Muell. in sched., nom. nud. (MEL 222507).

**Illustration:** Jeanes (1999) fig. 154e (as *P. rugata* var. *rugata*).

Erect *herb* to 50 cm tall. *Stems* 1–several, erect, unbranched or sparingly branched, more or less glabrous. *Leaves* more or less glabrous, thin-textured; basal leaves several in a sparse rosette, soon withering; cauline leaves usually linear to linear-lanceolate, 1–10(–12) cm long and 2–5(–10) mm wide. *Capitula* solitary or a few in loose cymes, 12–25 mm diam. *Involucre bracts* with lamina scarious, often golden-brown, deeply transversely rugose, ±ovate, apex obtuse. (Figs 1f, 7)

**Specimens examined: SOUTH AUSTRALIA.** Hambidge Conservation Park, 4.8 km SW of Prominent Hill, 29.ix.1983, *J.D. Briggs 1275* (MEL 678056, AD 98721203, CBG 8315971); Swan Reach, 5 km from Nildottie, 27.x.1995, *E. Salkin 165* (MEL 2070952); 7 km E of Taillem Bend on Route 12 (Mallee Highway), 17.x.1996, *K. Watanabe 696* (MEL 2034808, AD 99741233); About 10 km west of Walker Flat, 24.ix.1979, *A.G. Spooner 6513* (AD 98041248); Billiat Conservation Park, 29.xi.1984, *R.V. Southcott 8932* (AD 98513273); Willaston, c. 40 km NNE of Adelaide, 5.ix.1957, *D. Krahenbuehl 2722* (AD 97712595); Moonta Bay, Marine Parade, 3.xi.1982, *D.J.E. Whibley 8411* (AD 98313124); Crown lands WNW of Kimba, 5.x.1981, *C.R. Alcock 8851* (AD 98152128); 4 miles W of Stenhouse Bay, 19.x.1966, *M.E. Phillips s.n.* (CBG 28318). **VICTORIA.** Big Desert S.F. – south of Danyo, 10.xii.2003, *I.R.K. Sluiter 04-08* (MEL 2236277); Big Desert. Archibold Track 8.7 km S of Nine Mile Square Track, 21.xi.1986, *G.R. Lucas 394* (MEL 113771); Wyperfeld National Park – Dattuck Track, 7.xi.1979, *A. Morton 439* (MEL 2165848); Sunset Country. Berrook Track 25.8 km W of Sunset Tank, 14.x.1986, *G.R. Lucas 296* (MEL 690575, CBG 8905075); Murray-Sunset National Park. Bambill South Track, 5.8 km S of Settlement Road, 25.xi.2011, *J.L. Birch 446* (MEL 2355902); Underbool Track about 10.9 km south of Pheeney's Track, 8.x.2008, *J.A. Jeanes 1976* (MEL 2325541, CANB 709602); 33 km south of Murrayville, 21.xi.1981, *E. & G. Gardiner s.n.* (AD 98151048); 60 km SW of Mildura, 1 km S of Rocket Lake eastern end, 9.x.1977, *B. Barnsley 079*, *M.D. Crisp s.n.* & *D.J. Cummings s.n.* (CBG 7706684).

**Distribution and habitat:** Scattered across South Australia, east from the Eyre Peninsula, and into north-eastern Victoria in mallee scrublands, woodlands and open forests. (Fig. 16f)

**Conservation status:** Widespread, moderately common and well represented in conservation reserves.

**Flowering period:** September to November.

**Notes:** Subspecies *glabrata* is similar in overall appearance to subsp. *rugata*, but is usually quite glabrous or at least early-glabrescent.

**Etymology:** From the Latin *glabrata* = almost without hairs; the plants of this subspecies are more or less hairless.

### 5c. *Podolepis rugata* subsp. *littoralis* (G.L.Davis) Jeanes, stat. nov.

**Basionym:** *Podolepis rugata* Labill. var. *littoralis* G.L.Davis, *Proc. Linn. Soc. New South Wales* 81: 267–268, figs 73–74 (1957).

**Type: SOUTH AUSTRALIA.** Cape Couedie (=Cape du Couedic), Kangaroo Island, i.1907, *R.S. Rogers s.n.* (holotype, NSW 25380, photo!).

*Illustrations:* Davis (1957) fig. 73 (as *P. rugata* var. *littoralis*).

Erect or decumbent *herb* to 30 cm tall. *Stems* 1–few, unbranched or sparingly branched, glabrous. *Leaves* glabrous, fleshy; basal leaves not in a well-defined rosette, several, oblanceolate, 5–12 cm long, 3–10 mm wide; cauline leaves usually oblanceolate to spatulate, 3–10(–16) cm long and 5–10(–15) mm wide. *Capitula* often solitary on long peduncles, 12–25 mm diam. *Involucral bracts* with lamina scarious, often golden-brown, deeply transversely rugose, ovate to ovate-lanceolate, apex obtuse. (Figs 1g, 8)

**Specimens examined: SOUTH AUSTRALIA.** D'Estree Bay, J.G.O. Tepper *s.n.* (MEL 716242 (Fig. 8)); Greenly Island, off the south-west coast of Eyre Peninsula, 29.xi.1976, *T.S. Fatchen s.n.* (AD 97709143); Lincoln National Park, north-east of Tournefort, 6.xi.1979, *P.C. Heyligers 79031* (AD 98009414, CANB 288544); Southern Kangaroo Island. Between Kingscote and Vivonne Bay, *J.B. Cleland s.n.* (AD 97233381); Innes National Park, lowermost dune leading from "Ethel" Wreck Beach, 7.x.1974, *D.E. Symon 9568* (AD 98672169); Kangaroo Island. Pennington Bay, 12.i.1987, *D. Symon 14287* (AD 98705503); On cliffs at Port Noarlunga c. 27 km SSW of Adelaide, 5.x.1926, *J.B. Cleland s.n.* (AD 97233382); Coffin Bay National Park, 12.x.2001, *S. Williams CBP295* (AD 131179); 53 miles from Port Lincoln towards Cowell, 21.xi.1968, *J.W. Wrigley s.n.* (CBG 32490).

**Distribution and habitat:** Confined to coastal dune scrublands in South Australia between Adelaide and Streaky Bay. (Fig. 16g)

**Conservation status:** Widespread, moderately common and well represented in conservation reserves.

**Flowering period:** September to November.

**Typification:** Davis (1957) nominated a single element of NSW 25380 as the holotype of *Podolepis rugata* var. *littoralis* and the other two elements as paratypes. Since there is a single label and all three elements appear to be part of the same collection, the whole sheet should be regarded as the holotype.

**Notes:** Some specimens of *Podolepis rugata* subsp. *rugata* from coastal areas of Western Australia (e.g. Cape le Grande, Oldfield River mouth) approach subsp. *littoralis* in overall appearance, but they have the typical woolly leaves and stems of the former.

**5d. *Podolepis rugata* subsp. *trullata* Jeanes, subsp. nov.**

**Type: SOUTH AUSTRALIA.** Yorke Peninsula. Road to Cape Spencer Lighthouse, SE side of road. Innes National Park, 7.xi.2006, *T. Jaques INP-296* & *T. Lewis* (holotype, AD 1974771, isotype MEL 2366399!) (Fig. 9).

Erect or decumbent *herb* to 40 cm tall. *Stems* 1–few, unbranched or sparingly branched, glabrous. *Leaves* glabrous, fleshy; basal leaves not in a well-defined rosette, several, oblanceolate, 5–12 cm long, (4–)8–14 mm wide; cauline leaves usually oblanceolate to spatulate, 3–6(–10) cm long and 3–5(–10) mm wide. *Capitula* often solitary on long peduncles, 12–25 mm diam. *Involucral bracts* with lamina scarious, transparent white, virtually flat (sometimes slightly wrinkled in dry specimens), smooth, narrow-trullate, apex acute to acuminate, reflexed at and before anthesis. (Figs 1h, 9)

**Selected specimens examined: SOUTH AUSTRALIA.** Innes National Park about 1 km inland from Pondalowie Bay, 10.x.1980, *P.C. Heyligers 80142* (CANB 294329, AD 98050343); Cape Spencer Lighthouse Road (down slope) western side, 20.x.2005, *T. Jaques INP-110* & *T. Lewis s.n.* (AD 186191); West Cape in Innes National Park, 16.x.2008, *D.J. Duval 1300* & *K.H. Brewer* (AD 231084); Busby Islet, 22.xi.1982–1.xii.1982, *K. Casperson 3145* (AD 98301037); Innes National Park, southern end of eastern boundary, 6.x.1974, *C.R. Alcock 4538* (AD 97524004); Innes National Park, Royston Head, 11.x.1974, *J.Z. Weber 4242* (AD 97445340); Althorpes, ix.1907, *R.S. Rogers s.n.* (AD 97241116); Innes National Park, Shell Beach, x.2003, *R. Bates 61380* (AD 155444); Cape Spencer, Innes National Park, 13.ix.2006, *D.J. Duval 576* (AD 198111).

**Distribution and habitat:** Endemic to South Australia where known from several localities on the southern Yorke Peninsula (mostly within the Innes National Park), Althorpe Islands and Busby Islet off Kangaroo Island where it grows in near-coastal scrub on sandy soil. One locality is described as low *Eucalyptus diversifolia* mallee scrubland. Plants often grow amongst and out of low bushes in fairly dense scrub. (Fig. 16h)

**Conservation status:** Most known localities are in close proximity to each other and are protected within a biological reserve, but this taxon is most likely rare. I suggest Rare (2RCt) status by criteria of Briggs and Leigh (1996) and Near Threatened (NT) by criteria of IUCN (2013).

**Flowering period:** September to November.

**Notes:** *Podolepis rugata* subsp. *trullata* has been confused with *P. rugata* subsp. *littoralis*, but in the latter the laminas of the involucre bracts are ovate to oblong, deeply transversely rugose and apically obtuse.

**Etymology:** From the Latin *trullata* = shaped like a brick-layer's trowel; this is the shape of the lamina on the intermediate involucre bracts.

**6. *Podolepis canescens* A.Cunn. ex DC., Prodr. 6: 163 (1838)**

**Type:** NEW SOUTH WALES. '*in collibus rupestribus circa Croker's range in Novâ-Hollandiâ ad occid. Vallis Wellingtoniae nov. flor. legit cl. Cunningham... (v.s. comm. à cl. inv.)*': Croker's Range, xi.1825, A. Cunningham 39 (lectotype, BRI-AQ354837, *vide* G.L. Davis (1957), photo! JSTOR Global Plants, isolectotype, MEL 696480!); Rocky hills near Croker's Range in the country lying W from Wellington valley, xi.1825, A. Cunningham 127 (possible isolectotype, MEL 2280347!); Exposed rocky sides of hills, Croker's Range, xi.1825, A. Cunningham 1763 (possible isolectotype, BM 810533, photo! JSTOR Global Plants); Hills of Croker's Range, 1825, A. Cunningham s.n. (residual syntype, BM 810534, photo! JSTOR Global Plants).

*Podolepis inundata* A.Cunn. ex DC., Prodr. 6: 163 (1838). **Type:** New South Wales. '*in inundatis ad ripas flum. Lachlan in Novâ-Holl. (v.s. comm. à cl. invent.)*': Inundated parts of L. R., no date, A. Cunningham s.n. (lectotype, K 000899338, here designated, photo! JSTOR Global Plants); Damp banks (liable to inundation) of the Lachlan River N. S. Wales, 29.iv.1817, A. Cunningham 47 (probable isolectotype, K 000899337, photo! JSTOR Global Plants).

*Podolepis rubida* Maiden & R.T.Baker, Proc. Linn. Soc. New South Wales 10: 587 (1895). **Type:** New South Wales. Bathurst, 20.xi.1895, W.J.C. Ross s.n. (holotype, MEL 716219!).

Annual herb to 60 cm tall. Stems 1–several, erect, usually branched, sparsely woolly, often glabrescent, reddish. Leaves woolly below, sparsely woolly above and often glabrescent, margins ± revolute, entire; basal leaves often few in a sparse rosette, not always present at anthesis, usually linear-oblongate, 5–8 cm long and 2–7 mm wide, petiolate, base amplexicaul, apex acute; cauline leaves alternate, sessile, stem-clasping, decurrent, usually linear, 1–5 cm long and 2–4 mm wide, apex acute. Peduncles 1–4 cm long, with several scarios

scale leaves below the involucre passing into the leafy stem. Capitula hemispherical, mostly 5–8(–10) mm diam., many in loose cymes, rarely solitary. Involucre bracts many-seriate, with slender linear, glandular claws, unequal (outermost shortest, intermediate longest); lamina scarios, straw-coloured to golden brown, shallowly transversely rugose at least distally, shiny; intermediate bracts 2–6 mm long, apex acute or shortly acuminate, claw c. 0.25 mm wide at the narrowest point and often longer than the lamina, lamina lanceolate to ovate, 1–2.5 mm long, base truncate to obtuse; inner bracts with claw much longer than lamina. Florets yellow; ray florets female, 20–30, ligules linear, 6–10 mm long, usually 3-toothed, teeth to 3 mm long, to c. 0.5 mm wide; disc florets bisexual, numerous. Cypselas terete, c. 1.5 mm long, c. 0.5 mm wide, papillose; pappus bristles 15–20, barbellate, virtually free, 3–4 mm long. (Figs 1i, 10)

**Specimens examined:** NEW SOUTH WALES. 1.9 km west of Glen Alice on road towards Rylstone, 15.xii.2005, R. Johnstone 1711 (MEL 2264178 (Fig. 10), NSW 493723, K); 1.7 km SSE along Charlton Road from the Windsor-Singleton Road, c. 3 km NE of Bulga, 27.ix.2009, R.G. Coveny 19387 (MEL 2340151, NSW 592543, BRI, CANB, NE); Hill End, x.1885, Dr. J. Lauterer 31 (MEL 696402); N. S. Wales, A. Cunningham s.n. (MEL 2160879 part A); Dubbo, vii.1883, Betche 63 (MEL 696403); Dubbo, 14.ix.1883, Betche 60 (MEL 716218); c. 2 km west of Glen Alice on road to Rylstone, 4.xii.2007, R. Johnstone 2286 & A.E. Orme (CANB 712079, NSW 759349, K).

**Distribution and habitat:** Found mostly in the Central Tablelands and Central Western Slopes of New South Wales. Habitats include open forests, woodlands and grassy woodlands. (Fig. 17a)

**Conservation status:** The paucity of collections, particularly recent ones, in Australian herbaria suggests that this species is probably quite rare and possibly threatened. Suggest Poorly Known (K-) by criteria of Briggs and Leigh (1996) and Near Threatened (NT) by criteria of IUCN (2013).

**Flowering period:** Mostly August to November.

**Cytology:** No data available.

**Notes:** Distinguished from other *Podolepis* species by a combination of characters including its upright twiggy habit, small capitula and tiny, transversely rugose involucre bract laminas. In overall appearance, *P. canescens* resembles *P. eremaea*, but that species has virtually flat involucre bract laminas (sometimes

slightly wrinkled in dry specimens) and favours more arid habitats.

**Typification:** The type locality of *Podolepis canescens* is the Crokers Range about 70 kilometres south-west of Wellington in New South Wales. Excellent type material is available that shows the plants to be tall and slender with linear leaves and small capitula (mostly < 8 mm diameter). The intermediate involucre bracts have tiny (~ 3 mm long) ovate-acuminate, shallowly transversely rugose laminae on long slender claws often exceeding the lamina. Plants fitting this description are found from the Central Tablelands and Central Western Slopes of New South Wales.

All the type specimens bar one are designated as having been collected in November 1825, and all were from, or near, the Croker's Range. Although these specimens are numbered differently, it is unclear whether these are shipping numbers associated with specimen dispersal by Cunningham to the British Museum and to de Candolle, or collection numbers (Orchard 2012; Orchard & Orchard 2013). Hence, despite differing numbers, it is possible that at least two of the residual syntypes could in fact be isoelectotypes.

The type sheet of *Podolepis inundata* in the Herbarium Hookerianum at Kew Botanic Gardens contains five elements, all of the same taxon and probably part of the same gathering. The sheet has been split rather

arbitrarily into two parts, each part with a separate collecting label and a different herbarium number. The two elements on the right hand side (K 000899338) have been selected as the lectotype as they are more complete and in better condition than the three elements on the left (K 000899337).

### 7. *Podolepis eremaea* Jeanes, *sp. nov.*

**Type:** WESTERN AUSTRALIA. Ashburton Botanical District. Rocky slope c. 17 km SW of Kumarina, 27.viii.1995, *P.S. Short 4247* (holotype MEL 2027659! (Fig. 11), isotypes AD!, BRI!, CANB!, K!, NSW!, PERTH!, SI!, TI!).

*Podolepis canescens* var. *affinis sensu* F.Muell. & Tate *p.p.* (in respect to *Helms s.n.* (MEL 2160903!)) *non* (Sond.) F.Muell. & Tate.

*Podolepis* sp. *sensu* Watanabe et al. (1999: Kumarina W.A. *P.S. Short 4247*).

*Podolepis* sp. Carnarvon Range (D.J. Edinger Nats 33) WA Herbarium *sensu* APNI (2014).

*Podolepis* sp. Great Victoria Desert (A.S. George 8219) WA Herbarium *sensu* APNI (2014).

*Podolepis* sp. Wollunga Well (D.E. Albrecht 8794) NT Herbarium *sensu* APNI (2014).

Annual herb to 70 cm tall. Stems 1–several, ± erect, usually branched, woolly to cobwebbed below and near leaf axils, otherwise often glabrescent, brown

**Table 3.** A summary of the diagnostic characters of *Podolepis canescens* and similar species. Length and width measurements are abbreviated as L and W respectively.

	<i>P. canescens</i>	<i>P. eremaea</i>	<i>P. remota</i>
<b>Leaf indumentum</b>	woolly below, sparsely woolly and often glabrescent above	woolly to cobwebbed below, less densely woolly above	woolly to cobwebbed below, less densely woolly above
<b>Basal leaf shape</b>	linear-oblongate	oblongate	linear
<b>Basal leaf size</b>	50–80 mm L × 2–7 mm W	30–120 mm L × 3–12 mm W	20–50 mm L × 2–4 mm W
<b>Cauline leaf shape</b>	linear	linear-lanceolate	linear
<b>Cauline leaf size</b>	10–50 mm L × 2–4 mm W	10–100 mm L × 3–10 mm W	10–50 mm L × 2–4 mm W
<b>Diameter of capitula</b>	5–8(–10) mm	5–10 mm	10–15 mm
<b>Shape of intermediate involucre bract lamina</b>	ovate, base truncate to obtuse	ovate, base obtuse	broad-ovate to sub-orbicular
<b>Length of intermediate involucre bract lamina</b>	1–2.5 mm	2–3(–4) mm	3–4 mm
<b>Apex of intermediate involucre bract lamina</b>	acute to acuminate	acute to acuminate	±obtuse
<b>Surface of intermediate involucre bract lamina</b>	shallowly transversely rugose in apical half	virtually flat and smooth (often slightly wrinkled in dry specimens)	slightly concavo-convex

or reddish. *Leaves* woolly to cobwebbed below, less densely woolly above, margins  $\pm$  revolute, entire; basal leaves often withered at anthesis, few in a sparse rosette, usually oblanceolate, 3–12 cm long and 3–12 mm wide, petiolate, base amplexicaul, apex acute; cauline leaves alternate, sessile, stem-clasping, decurrent, usually linear-lanceolate, 1–10 cm long and 3–10(–20) mm wide, apex acute. *Peduncles* 1–4 cm long, with several scarious scale leaves below the involucre passing into the leafy stem. *Capitula* hemispherical, mostly 5–10 mm diam., many in loose cymes or corymbose panicles, rarely solitary. *Involucral bracts* many-seriate, overlapping loosely, with slender linear, glandular claws, clearly visible, unequal (outermost shortest, innermost longest); lamina scarious, straw-coloured, virtually flat (sometimes slightly wrinkled in dry specimens), smooth, shiny; intermediate bracts 4–8 mm long, apex acute to acuminate, claw c. 0.25 mm wide at the narrowest point, c. as long as lamina or longer, lamina 2–3(–4) mm long, ovate, base obtuse; inner bracts with claw much longer than lamina. *Florets* yellow; ray florets female, 20–30, ligules linear, 5–8 mm long, usually 3-toothed, teeth to 2 mm long, c. 0.5 mm wide; disc florets bisexual, numerous. *Cypselas* terete, c. 1.5 mm long, c. 0.5 mm wide, papillose; pappus bristles 15–20, barbellate, virtually free, 2–4 mm long. (Figs 1j, 11) Chromosome number:  $n=10$ .

**Selected specimens examined: WESTERN AUSTRALIA.**

Shark Bay, x.1877 (MEL 696457); Victoria Desert, 13.ix.1891, *R. Helms s.n.* (MEL 2160903); 1.5 km E of Queen Victoria Spring at Trap Site 2 in Queen Victoria Nature Reserve, 16.x.1995, *D.J. Edinger 976* (PERTH 4240480); 5.7 km S by track of Ilkurlka Roadhouse. Great Victoria Desert, 4.x.2010, *R. Davis 11585* (PERTH 8248532); Gullewa, Mugga Mugga Hill, approx. 56.8 km SW of Yalgoo, 26.ix.2006, *A. Markey 4956* (PERTH 7826230); Gibson Desert Eagle Camp Zone 6, ix.1992, *Desert Dreaming Expedition 42* (PERTH 3170233); 11 km W of Argus Corner, on PNC Hwy, 26.xi.1986, *D.J. Pearson 106* (PERTH 859923); 13 miles NW of Albion Downs woolshed, Ereman Province, 19.ix.1958, *N.H. Speck 1478* (CANB 108301). **NORTHERN TERRITORY.** Gibeannie paddock, 1 mile S of homestead, 25.viii.1955, *G. Chippendale 563* (MEL 2165624); Elkedra Station 23 km NW towards Hatches Creek, 10.viii.1979, *T.S. Henshall 2755* (MEL 571315, DNA, CANB 290935); 10 km N of Aileron, 3.ix.1978, *J.R. Maconochie 2405* (MEL 575780, DNA, CANB 293752, MO, BRI, G); 8 miles E of Ayers Rock, 20.ix.1968, *A. Nicholls 980* (DNA 15335, MEL 2165625); 17 miles S of Mt Wedge Station, 19.ix.1956, *M. Lazarides 6061* (DNA 19068, MEL 2165622, CANB

108298, CANB 108299); 38 km SSW of Mt Olga, Foster Cliff Road, 7.ix.2009, *P.K. Latz 24846* (DNA 194256, AD, NT); Alywarr Desert, 29.x.1992, *D.J. Parsons 256* (DNA 89239, NT, MO); 45 km SW of Lake Neale-Amadeus Junction, 27.viii.1973, *J.R. Maconochie 1874* (DNA 8051); Alice Springs, 19.viii.1998, *C.R. Michell 1800* (DNA 135308, NT, DREF). **SOUTH AUSTRALIA.** 27 km NE from Pipalyatjara, 31.viii.1995, *P.J. Lang & P.D. Canty BS23-25033* (AD 99642287); Flinders Ranges, Mawson Plateau, vii.1996, *R. Bates 42643* (AD 99841279); West end of Hopkins Lake, just south of Sir Frederick Range, 1.viii.1962, *D.E. Symon 2231* (AD 97545291); About 18 km NE of Mt Kintore summit, 10.ix.1978, *N.N. Donner 6645* (AD 97901072); Immediately north of Claude Hill, immediately south of Northern Territory border, 4.ix.1978, *N.N. Donner 6489* (AD 97847535); About 14 km by road NW of Krewinkel Hill, 3.ix.1978, *D.J.E. Whibley 6716* (AD 97845200); Between Deering Hills and Mann Ranges, c. 14.5 km NE of Mt Cooperinna, 8.ix.1978, *D.J.E. Whibley 6860* (AD 97844454); Lake Eyre. Finke River Track, 14 km E of Mt Dare, 14.v.2001, *R. Bates 58549* (AD 137001); Hill c. 4.5 km N of Kalka, 30.v.2000, *P.J. Lang, P.D. Canty & A.C. Robinson BS23-30195* (AD 109597); Danggali Conservation Park. Five km N of turn off to Mulga Dam, 3.iii.1993, *D.D. Cunningham 610* (AD 99317013).

**Distribution and habitat:** Widespread across inland Western Australia, South Australia and the Northern Territory. Two isolated collections from eastern South Australia suggest it may occur in New South Wales. Found in mallee, chenopod scrubland, heathland and grassland. (Fig. 17b)

**Conservation status:** Widespread, reasonably common and found in conservation reserves.

**Flowering period:** Mostly August to October.

**Cytology:** The chromosome number of  $n=10$ , was reported by Watanabe et al. (1999) as *Podolepis* sp. from *P.S. Short 4247*, which was selected as the type of *P. eremaea*.

**Notes:** This species can be distinguished by the small capitula and tiny, virtually flat laminas on the intermediate involucral bracts that are often shorter than their claws. It is superficially similar to *P. canescens*, but the bracts are transversely rugose in that species. *Podolepis eremaea* could also be confused with *P. remota* but that species has more closely overlapping involucral bracts, and the laminas of the intermediate bracts are broad-ovate to sub-orbicular and usually more or less obtuse to acute at the apex.

**Etymology:** From the Greek *erēmaios* = desert; in reference to the preferred habitat of this species.

**8. *Podolepis remota* Jeanes, sp. nov.**

**Type:** WESTERN AUSTRALIA. About 20 km NE of Weelarrana Homestead on Jigalong Road, 29.viii.1995, A.A. Mitchell PRP472 (holotype MEL 238350! (Fig. 12), isotype PERTH 4340078!).

Annual *herb* to 30 cm tall. *Stems* 1–several, ± erect, usually branched, woolly to cobwebbed below and near leaf axils, otherwise often glabrescent, brown or reddish. *Leaves* woolly to cobwebbed below, less densely woolly above, margins ± revolute, entire; basal leaves often withered at anthesis, few in a sparse rosette, usually ± linear, 2–5 cm long and 2–4 mm wide, petiolate, base amplexicaul, apex acute; cauline leaves alternate, sessile, stem-clasping, decurrent, ± linear, 1–5 cm long and 2–4 mm wide, apex acute. *Peduncles* 1–4 cm long, with several scarious scale leaves below the involucre passing into the leafy stem. *Capitula* hemispherical, mostly 10–15 mm diam., few to many in loose cymes or corymbose panicles, rarely solitary. *Involucral bracts* many-seriate, closely imbricate, completely covering the slender, linear, glandular claws, unequal (outermost shortest, innermost longest); lamina scarious, pale, slightly concavo-convex, shiny; intermediate bracts 4–8 mm long, apex ± obtuse to acute, claw c. 0.25 mm wide at the narrowest point, shorter or longer than lamina, lamina 2.5–4 mm long, broad-ovate to sub-orbicular, base obtuse; inner bracts with claw much longer than lamina, apex often acute to acuminate. *Florets* yellow; ray florets female, 20–30, ligules linear, 8–14 mm long, usually 3-toothed, teeth c. 1 mm long, c. 0.5 mm wide; disc florets bisexual, numerous. *Cypselas* terete, c. 1.5 mm long, c. 0.5 mm wide, papillose; pappus bristles 10–20, barbellate, virtually free, 3–4 mm long. (Figs 1k, 12)

**Specimens examined:** WESTERN AUSTRALIA. 4 km SE of The Governor, 7.2 km SSW of Mt Robinson, 4 km NNE of Padtherung Hill, Hamersley Range, 15.viii.1992, *S. van Leeuwen* 1282A (PERTH 7507208); 4 km SE of The Governor, 4 km NNE of Padtherung Hill, 7.2 km SSW of Mt Robinson, Hamersley Range, 16.viii.1992, *S. van Leeuwen* 1301 (PERTH 3057593); 220 km S of Newman, 6.x.1989, *B. Nordenstam & A. Anderberg* 383 (PERTH 1690213); Cape Range Peninsula, beach 10 km N of Exmouth, Carnarvon Region, 2.x.1995, *S. Hunger & N. Kilian* 4196 (PERTH 6723998); c. 30 km along the Blowholes/Dampier Salt Road from the North West Coastal Highway, 14.x.1983, *P.S. Short* 2065 (MEL 1523260). NORTHERN TERRITORY. 8 km due S of Mt Samuel and c. 1 km N of NT/SA border, 3.ix.2009, *D.E. Albrecht* 13058 (NT/DNA 213894); Track from Katajuta to Walytjatjata, c.

10 km due NE of Mt Le Hunte, 1.ix.2009, *D.E. Albrecht* 12962 (NT 213893).

**Distribution and habitat:** Widespread across inland Western Australia and the Northern Territory. Its occurrence in South Australia is anticipated as it has been collected about one kilometre north of the Northern Territory/South Australia border. Found in mallee, chenopod scrubland, heathland and grassland. (Fig. 17c)

**Conservation status:** Probably reasonably common and well conserved, but poorly known and under-collected due to its remoteness and seasonality.

**Flowering period:** Mostly August to October.

**Cytology:** No data available.

**Notes:** This species can be distinguished by the small capitula and the laminas on the involucre bracts that are somewhat concavo-convex and overlap tightly hiding the claws. The laminas of the intermediate involucre bracts are broad-ovate to sub-orbicular and are more or less obtuse to acute at the apex. *Podolepis eremaea* is similar in overall appearance, but it has slightly smaller capitula and loosely overlapping involucre bract laminas with the claws clearly visible. The involucre bract laminas are more or less flat (sometimes slightly wrinkled in dry specimens), ovate and acute to acuminate at the apex.

**Etymology:** From the Latin *remota* = scattered, remote, distant; in reference to the distribution of this species.

**9. *Podolepis aristata* Benth., Enum. pl. 64 (1837).**

**Type:** WESTERN AUSTRALIA. 'Swan River. (Hügel); no location, no date, no collector (holotype, W 0047209, photo!); no location, no date, no collector (possible isotype, MEL 696477!).

Annual *herb* to 50 cm tall. *Stems* 1–several, decumbent or erect, unbranched or branched, woolly to cobwebbed below and near leaf axils, otherwise often glabrescent, brown or reddish. *Leaves* woolly to cobwebbed, less densely so above, margins flat to ± revolute, entire, sometimes undulate; basal leaves often withered at anthesis, few in a sparse rosette, usually oblanceolate, 3–12 cm long and 3–15 mm wide, petiolate, base amplexicaul, apex acute; cauline leaves alternate, sessile, stem-clasping, decurrent, usually linear-lanceolate, 1–12 cm long and 3–15 mm wide, apex acute. *Peduncles*

**Key to the subspecies of *Podolepis aristata***

- 1 Lamina of the intermediate involucre bracts more or less flat (sometimes slightly wrinkled in dry specimens) ..... 2  
 1: Lamina of the intermediate involucre bracts shallowly to deeply transversely rugose ..... 3  
 2 Apex of intermediate involucre bracts acuminate to aristate ..... **9a. *P. aristata* subsp. *aristata***  
 2: Apex of intermediate involucre bracts obtuse to acute ..... **9b. *P. aristata* subsp. *affinis***  
 3 Apex of intermediate involucre bracts acuminate to aristate ..... **9c. *P. aristata* subsp. *auriculata***  
 3: Apex of intermediate involucre bracts obtuse to acute ..... **9b. *P. aristata* subsp. *affinis***

1–6 cm long, with several scarios scale leaves below the involucre passing into the leafy stem. *Capitula* hemispherical, mostly 10–20(–25) mm diam., many in loose cymes, rarely solitary. *Involucre bracts* many-seriate, with slender linear, glandular claws, unequal (outermost shortest, intermediate longest); lamina scarios, straw-coloured to golden brown, virtually flat to deeply transversely rugose, shiny; intermediate bracts 6–12 mm long, apex obtuse, acute, acuminate or aristate, claw c. 0.25 mm wide at the narrowest point and shorter than the lamina, lamina 4–10 mm long, ±triangular, base truncate; inner bracts with claw longer than lamina. *Florets* yellow; ray florets female, 20–30, ligules linear, 10–20 mm long, 3(–5)-toothed, teeth to 3 mm long, 0.5–1 mm wide; disc florets bisexual, numerous. *Cypselas* terete, 1.5–2 mm long, c. 0.5 mm wide, papillose; pappus bristles 15–20, barbellate, virtually free, 4–8 mm long. Chromosome numbers:  $n=10$ ,  $2n=20$ ;  $n=11$ .

**Cytology:** Chromosome numbers of  $n=10$ ,  $2n=20$  were reported by Turner (1967), Short (1986) and Watanabe et al. (1999) under the name *Podolepis canescens*. The voucher cited by Turner (Turner 5422) in this study corresponds to *P. aristata* subsp. *auriculata*, while voucher Turner 5345 refers to *P. aristata* subsp. *aristata*. The voucher cited by Short (Short 1271) here refers to *P. aristata* subsp. *affinis*. Vouchers cited by Watanabe et al. (1999) as Short 4421, Watanabe 159 and Watanabe 355 here refer to *P. aristata* subsp. *affinis*, while Short 4319 belongs to *P. aristata* subsp. *aristata* (all  $n=10$ ). The chromosome number determination of  $n=11$  reported by Turner (1967) under the name *P. auriculata*, voucher Turner 5406, here corresponds to *P. aristata* subsp. *auriculata*.

**Typification:** In the protologue of *Podolepis aristata*, Bentham described the involucre bracts (*involucri squamis*) as ‘*acutissimis aristatis aureofuscis non rugosis*’ meaning ‘very acute, aristate, yellow-brown and not

rugose’. The holotype is housed at the Vienna Herbarium (W). There is a possible syntype at MEL, from the Steetz herbarium, but this specimen lacks locality information and, although Hügel’s name appears on the label, it is uncertain if he made the collection.

**9a. *Podolepis aristata* subsp. *aristata***

*Podolepis chrysantha* Endl., *Bot. Zeitung (Berlin)* 1: 458 (1843); *Podolepis aristata* var. *chrysantha* (Endl.) Steetz, *Pl. Preiss.* 1(3): 466 (1845). *Type:* Western Australia. ‘Nova Hollandia austro-occidentalis’: Canning River, *Preiss* 52 (syntype, MEL 696485!); Western Australia, *Preiss* 52 (syntype, MEL 696433!).

*Podolepis subulata* Steetz, *Pl. Preiss.* 1(3): 465 (1845); *Podolepis canescens* A.Cunn. ex DC., f. *minor* Siebert & Voss *Vilm. Blumengärtn. ed. 3*, 1(1): 536 (1894). *Type:* Western Australia. ‘In solo sublimoso districtus Vasse’, xii.1839, *Preiss* 54 (lectotype, SS-G-4947, here designated, photo! JSTOR Global Plants, isoelectotypes, LD 1054916, photo! JSTOR Global Plants, MEL 242521!, MEL 696475!); ‘In col. Swan River’, 1843, *Preiss* 54 (syntype, G 301392, photo! JSTOR Global Plants).

*Podolepis aristata* Benth. var. *minor* Benth., *Fl. austral.* 3: 605 (1867). *Type:* Western Australia. ‘Vasse river, *Preiss*, n. 54; between Moore and Murchison rivers, Drummond, 6<sup>th</sup> Coll. n. 155’: Vasse River, no date, *Preiss* 54 (syntypes, MEL 242521!, MEL 696475!); no location, no date, *J. Drummond 155* (syntype, MEL 2166262!).

Annual herb to 50 cm tall. *Involucre bracts* many-seriate, with slender linear, glandular claws, unequal (outermost shortest, intermediate longest); lamina scarios, straw-coloured, virtually flat (sometimes slightly wrinkled in dry specimens), shiny; intermediate bracts 7–12 mm long, apex long-acuminate or aristate, claw c. 0.25 mm wide at the narrowest point and shorter than the lamina, lamina 4–10 mm long, ±triangular, base truncate; inner bracts with claw longer than lamina. (Figs 11, 13)

**Selected specimens examined: WESTERN AUSTRALIA.**

*In interior a sinu regis* George III (Inland, bay of King George III (King George Sound)), 8.xi.1840, *L. Preiss* 60 (MEL 696434, MEL 696443); c. 15.5 km west of Mullewa along the road to Geraldton, 1.ix.1982, *P.S. Short* 1603 (MEL 618683 (Fig. 13)); Bindoon Road, c. 2 km NE of Bullsbrook East, 25.x.1977, *J.H. Willis* s.n. (MEL 2118777); c. 10 km S of Three Springs on main road to Carnamah, 9.ix.1986, *P.S. Short* 2810 (MEL 1555592, PERTH, AD, CANB); c. 3 km SW of Ardingly along road to Geraldton, 20.x.1983, *P.S. Short* 2142 (MEL 1524324, PERTH); One mile south-west of Manmanning, 18.ix.1989, *B.H. Smith* 1219 (MEL 1588721, PERTH, CBG 9204175, BRI, CHR, E); No. 2 Rabbit Proof Fence, c. 6 km SE of Kirwan, 18.ix.1985, *B.J. Conn* 2227 (MEL 1586880, PERTH, NY, E); Kalbarri National Park, S of township between Red Bluff and park boundary, 21.ix.1982, *M.G. Corrick* 8121 (MEL 644316); c. 18 km E of Jurien along main road to Brand Highway, 30.x.1995, *P.S. Short* 4514 (MEL 2027979, PERTH, TI); Dingo Rock, 24.x.1995, *P.S. Short* 4453 (MEL 2027918, TI); 14.8 km SW of Wongan Hills on Wilding Road, 15.x.1997, *J.A. Vaganian* 153 (MEL 2146279); c. 2 km S of Binu, 27.x.1995, *P.S. Short* 4494 (MEL 2027959).

**Distribution and habitat:** Confined to Western Australia where scattered between Esperance and Exmouth and found in a wide range of habitats including woodlands, open forests and mallee scrub. (Fig. 17d)

**Conservation status:** Widespread, common and well represented in conservation reserves.

**Flowering period:** Mostly August to November.

**Notes:** This subspecies is apparently confined to Western Australia although some specimens of the subsp. *affinis* from South Australia (including the lectotype) with flat laminas on the involucre bracts could easily be mistaken for it. These specimens may

have acute to shortly acuminate apices to the involucre bract laminas, but lack the aristate apices of subsp. *aristata*.

**9b. *Podolepis aristata* subsp. *affinis* (Sond.)**

**Jeanes, comb. et stat. nov.**

**Basionym:** *Podolepis affinis* Sond., *Linnaea* 25: 507 (1853); *Podolepis canescens* A.Cunn. ex DC. var. *affinis* (Sond.) F.Muell. & Tate, *Trans. & Proc. Roy. Soc. South Australia* 16: 366 (1896).

**Type: SOUTH AUSTRALIA.** 'Murray. Port Lincoln. Dombey-bay (= Tumby Bay)': Dombey-bay, no date, ?*J.F.C. Wilhelmi* s.n. (lectotype, MEL 696474!, here designated, isolectotype, MEL 696425!); Murray, no date, *F. Mueller* s.n. (residual syntypes, MEL 2160921!, MEL 2160924!, MEL 696466!, MEL 1517389!, MEL 2160878!, MEL 696461!, MEL 696464!, GH 11351 (four right-hand specimens only) photo! JSTOR Global Plants); Port Lincoln, no date, ?*J.F.C. Wilhelmi* s.n. (residual syntypes, MEL 696476!, MEL 696463!).

*Podolepis canescens* sensu Lander (1987), Cooke (1986), Everett (1992) *p.p.*, Jeanes (1999) *non* A.Cunn. ex DC.

*Podolepis papillosa* sensu NW Victoria, x.1900, *C. Walter* s.n. (excluded syntype, LY, photo!) *non* Gand.

**Illustrations:** Grieve & Blackall (1975) p. 791; Cunningham et al. (1981) p. 664; Cooke (1986) fig. 710 A; Everett (1992) p. 264; Jeanes (1999) fig. 154d (all as *P. canescens*).

Annual herb to 40 cm tall. *Involucre bracts* many-seriate, with slender linear, glandular claws, unequal (outermost

**Table 4.** A summary of the diagnostic characters and distribution of the subspecies of *Podolepis aristata*

	<i>P. aristata</i> subsp. <i>affinis</i>	<i>P. aristata</i> subsp. <i>aristata</i>	<i>P. aristata</i> subsp. <i>auriculata</i>
<b>Leaf indumentum</b>	woolly below, sparsely woolly and often glabrescent above	cobwebbed below, less densely cobwebbed above	woolly to cobwebbed below, less densely above
<b>Shape of intermediate involucre bract lamina</b>	ovate, base obtuse	±triangular, base truncate	triangular to ovate, base truncate
<b>Apex of intermediate involucre bracts</b>	obtuse or acute to shortly acuminate	aristate	aristate
<b>Surface of intermediate involucre bracts</b>	virtually flat and smooth to deeply transversely rugose in apical half	virtually flat and smooth (often slightly wrinkled in dry specimens)	deeply to shallowly transversely rugose in apical half
<b>Distribution</b>	southern half of the continent from central Queensland to Shark Bay	Western Australia from Israelite Bay to Shark Bay	inland areas from central Queensland to Shark Bay

shortest, intermediate longest); lamina scarious, straw-coloured to golden brown, almost flat (sometimes slightly wrinkled in dry specimens), or shallowly transversely rugose at least distally, shiny; intermediate bracts 6–12 mm long, apex acute or shortly acuminate, claw c. 0.25 mm wide at the narrowest point and shorter than the lamina, lamina 4–8(–10) mm long, lanceolate to ovate, base obtuse to truncate; inner bracts with claw longer than lamina. (Figs 1m, 1n, 14)

**Selected specimens examined: WESTERN AUSTRALIA.**

6 km N of Wanarra Road turnoff to Perenjori along Great Northern Highway, 23.viii.1995, *P.S. Short 4175* (MEL 2027588, PERTH); Northern edge of Wargangering Rock, 21.x.1995, *P.S. Short 4421* (MEL 2027886); Wooramel River, 1889, *G.D. Robinson s.n.* (MEL 716821); Murchison River, 1892, *A. Weston s.n.* (MEL 716820); Eastern Highway between 58 miles west of Coolgardie and Southern Cross, 4.x.1961, *J.H. Willis s.n.* (MEL 2165634); Geraldton-Mt Magnet road, 24 miles E of Pindar, 10.ix.1966, *R.V. Smith 66/416* (MEL 1514574); Beside Northern Highway 63 km N of Paynes Find, 13.ix.1992, *M.G. Corrick 10946* (MEL 2014117); 180 km N of Leonora on road to Wiluna, 30.viii.1992, *M.G. Corrick 10872* (MEL 2014041); Tammin, 18.ix.1978, *R.J. Cranfield 585* (MEL 597794); 2.5 miles S of Wannoo, 16.ix.1968, *M.E. Phillips s.n.* (CBG 35781). **SOUTH AUSTRALIA.** Near Stuarts Range, 1885, *Winnecke s.n.* (MEL 696458); 1 km SW of homestead, Bulgunnia Station, 14.xi.1992, *F.J. Badman 6492* (MEL 2097980); Spencers Gulf (MEL 696417); Fowlers Bay, *Richards s.n.* (MEL 696422, MEL 716243); Clarendon, 1882, *O. Tepper s.n.* (MEL 696419); Yorke Peninsula, 1879, *O. Tepper 236, 282 & 450* (MEL 696426, MEL 696427, MEL 696415); Venus Bay, *J. Warburton s.n.* (696414); Near upper end of Spencers Gulf, 1887, *L. Wehl s.n.* (MEL 716846); Port Augusta, 1886, *J.P. Richards s.n.* (MEL 716558). **QUEENSLAND.** Milo Station, 13.2 km along track to Eight Mile Creek Catchment, NNW of Adavale, 5.viii.2009, *P.I. Forster 35533* (MEL 2340198); Caiwarro, Hungerford, Paroo, ix.1885, *J. Cotter s.n.* (MEL 696409, MEL 696468). **NEW SOUTH WALES.** Mossgiel, x.1885, *L. Brückner s.n.* (MEL 2160882); Murrumbidgee River, 1878, *G. Day s.n.* (MEL 2160881); 26 km SE of Broken Hill on Menindee road, 30.viii.1981, *M.G. Corrick 7312* (MEL 591902, CANB 8309601); Booligal, Lachlan River, ix.1887, *A. Bell s.n.* (MEL 716826); Lachlan River, ix.1878, *F. Mueller s.n.* (MEL 696405); Bourke, Darling River, ix.1884, *L. Henry s.n.* (MEL 696411); Cockburn, viii.1921, *E.R. Reed s.n.* (AD 97828032); "Tandulya" c. 25 miles SE of Louth, 23.ix.1966, *C.W.E. Moore 4172* (CANB 177673); "Mulyah" Additional, about 43 km south of Louth, 24.ix.1978, *C.W.E. Moore 8009* (CANB 305494, CANB 305495). **VICTORIA.** 5 km SW of Sunset

Tank and 30 km by road NNE of Cowangie, 3.x.1979, *M.G. Corrick 6406* (MEL 559433 (Fig. 14)); Wyperfeld National Park. Wonga Lake, 7.xi.1976, *A.C. Beaglehole 55286* (MEL 2160883); 5.2 km W of Mt Jenkins. Wirrengren Plain, near tank 1 km NE of Home Point, xi.1985, *D.M. Parkes s.n.* (MEL 1545175); c. 14 km north of Sunset Tank, 29.ix.1980, *P.S. Short 1165* (MEL 575573, CANB 298053, CANB 9218630); Underbool Tank area, 25.ix.1972, *A.C. Beaglehole 40450* (MEL 2160884); c. 50 km west of Ouyen, 3.x.1986, *C.E. & D.T. Woolcock s.n.* (MEL 1564875); Lake Rd, c. 200 m south of Meyers Rd, 8 km due N from Natimuk, 14.xi.2005, *N.G. Walsh 6343* (MEL 2275856); Sunset Plain, c. 16 km SW of Mt Crozier, 28.viii.1983, *R.J. Adair 2003* (MEL 238382); Near Murtoa, 3.x.1892, *F.M. Reader s.n.* (MEL 696397).

**Distribution and habitat:** Scattered across semi-arid parts of southern Australia from central New South Wales and south-west Queensland to Shark Bay in Western Australia. Found in a range of habitats including mallee, chenopod scrubland and woodland. (Fig. 17e)

**Conservation status:** Widespread, common and well represented in conservation reserves.

**Flowering period:** Mostly August to November.

**Typification of *Podolepis affinis*:** In the protologue of *Podolepis affinis*, Sonder described the involucre bracts (*involucri squamis*) as '*ovatus cuspidato-acuminatus subfusco-hyalinis planis*' meaning ovate, cuspidate to acuminate, pale brown to colourless and flat. Several apparent type specimens have been examined, and the involucre bracts range from almost flat (i.e. not rugose) in the 'Dombey (= Tumby) Bay' and 'Port Lincoln' specimens at MEL to deeply rugose in most of the 'Murray' specimens. Because the 'Dombey Bay' specimens most closely match the description in the protologue, one of these has been selected as the lectotype specimen. Although most of the 'Murray' syntypes have rugose involucre bract laminae, they appear to represent the same variable taxon as the lectotype.

**Notes:** The degree of rugosity of the involucre bract laminae of *Podolepis affinis* varies considerably. Some plants, particularly from the western part of its range, have almost flat laminae whilst those from the east have generally deeply rugose ones, however this is not consistent. In some cases the degree of rugosity of the involucre bracts varies somewhat between capitula on the same plant, possibly related to maturity.

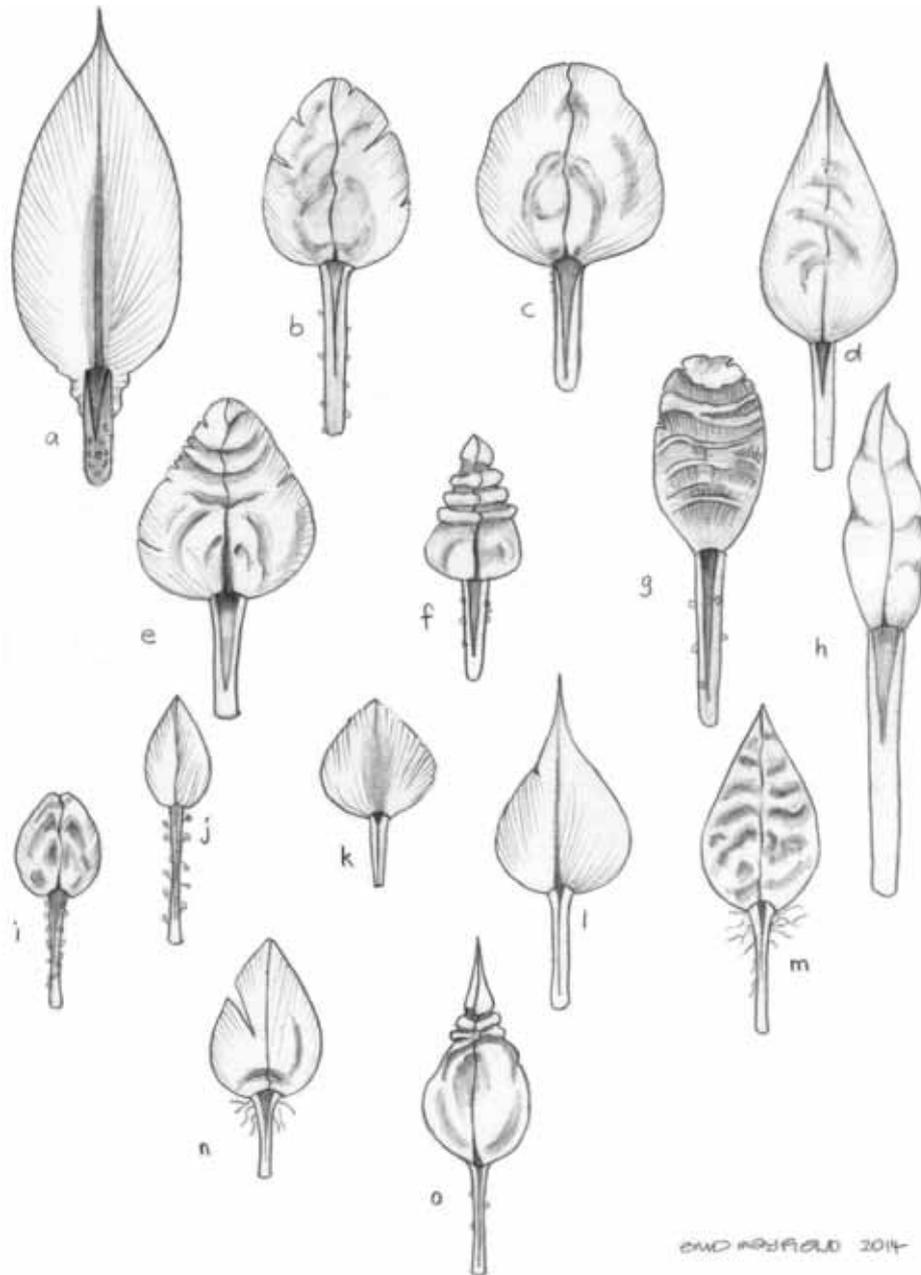
**9c. *Podolepis aristata* subsp. *auriculata* (DC.)**Jeanes, **comb. et stat. nov.****Basionym:** *Podolepis auriculata* DC., *Prodr.* 6: 162 (1838).**Type: WESTERN AUSTRALIA.** 'In Novâ-Hollandiâ ad canum marinorum sinum legit cl. Gaudichaud et mecum comm.....(v.s.; Shark Bay, 1830, M. Gaudichaud s.n. (lectotype, G 1092, fide G.L. Davis (1957), photo!, MEL 2280346!, photo of lectotype).*Podolepis pallida* Turcz., *Bull. Soc. Imp. Naturalistes Moscou* 24(2): 78 (1851). **Type:** Western Australia. 'Drum. coll. v. n. 387', *Nova Hollandia*, no date, *Drummond* 387 (holotype, KW 1001501, photo! JSTOR Global Plants, isotypes, BM 810531 (three right-hand specimens only), G 301390, A 11354, GH 11353, photos! JSTOR Global Plants, MEL 2280273!, PERTH 1182498!).*Podolepis canescens* var. *affinis* sensu F.Muell. & Tate p.p. (in respect to *Helms* s.n. (MEL 2165350!)) non (Sond.) F.Muell. & Tate.*Podolepis canescens* sensu Jessop (1981) non A.Cunn ex DC.**Illustrations:** Davis (1957) figs 58–64; Grieve & Blackall (1975) p. 791 (both as *P. auriculata*).Annual herb to 50 cm tall. *Involucral bracts* many-seriate, with slender linear, glandular claws, unequal (outermost shortest, intermediate longest); lamina scarious, straw-coloured to golden brown, transversely rugose in distal half, rarely almost flat, shiny; intermediate bracts 7–12 mm long, apex aristate, claw c. 0.25 mm wide at the narrowest point and shorter than the lamina, lamina 5–10 mm long, ± triangular to ovate, base truncate; inner bracts with claw longer than lamina. (Figs 1o, 15)**Selected specimens examined: WESTERN AUSTRALIA.** c. 14 km SE of Carnarvon, along the North West Coastal Highway, 12.x.1983, *P.S. Short* 2033 (MEL 1523259 (Fig. 15), PERTH, AD); Geraldton-Mt Magnet road, 15 mls E of Wurago & c. 66 mls E of Mullewa S, 10.ix.1966, *R.V. Smith* 66/429 (MEL 1514572); 42 miles N of Gascoyne Junction, 24.viii.1965, *B.L. Turner* 5406 (MEL 602408); Shark Bay. 76 km W of Overlander Roadhouse on Denham Road, 30.x.1989, *B. Nordenstam* & *A. Anderberg* 209 (MEL 1598544, S); c. 8 km S of Wooramel Roadhouse along NW Coastal Highway, 6.ix.1995, *P.S. Short* 4344 (MEL 2027787, PERTH, AD, TI); Yaringa North Station, east side of Shark Bay, 8.viii.1964, *J. Galbraith* WA233 (MEL 2165346); 100 miles S of Carnarvon, 26.viii.1965, *B.L. Turner* 5422 (MEL 602788).**NORTHERN TERRITORY.** Walara, 11.x.1978, *E.A. Chesterfield*s.n. (MEL 2312459, MEL2312460); Ooraminna Range, 6.x.1993, *P.K. Latz* 13417 (MEL 278961); 20 km S of Alice Springs on Old South Road, 11.viii.1988, *G. Leach* 2069 (MEL 295327); Wallara Ranch road 13 km W of Stuart Highway at Meteorite Craters, 14.viii.1979, *A. Morton* 273 (MEL 559434); c. 36 miles south of Alice Springs on sandplain south of Ooraminna Range, 5.viii.1979, *A. Morton* 73 (MEL 1516415); 49 km along road to Kings Canyon (turn off from Lasseter Highway), 12.x.1996, *K. Watanabe* 679 (MEL 2034792, DNA, TI); 29 km E of Horseshoe Bend Homestead, 9.xi.1993, *P.K. Latz* 13493 (MEL 725492, DNA); George Gill Range, Penny Springs, 14.vii.1968, *A.C. Beaglehole* 26789 (MEL 1578337); 25 km W of Henley Craters; Ernest Giles Road, 25.viii.1998, *D.E. Albrecht* 8784 (NT 96167). **SOUTH AUSTRALIA.** 18 m W of Welbourn Hill, W of Oodnadatta, 26.vi.1967, *A.C. Beaglehole* 22742 (MEL 1578546); 15 km S of NT border on Tarcoola-Alice Springs railway line, 20.viii.1979, *B. Lay* 1237 (MEL 591157); Great Victoria Desert, N.C.S.S.A. Survey. 3 km E of Camp 5 and 3 km S along seismic line, 23.viii.1980, *C.R. Alcock* 8174 (MEL 222436, AD); Koodnanie Creek, Birdsville Track, 30.ix.1960, *R. Filson* 3307 (MEL 646045); Mt Caroline, northwest Reserve, ix.1966, *H. Shirley* 12 (DNA 22114); 85 km N of Tallaringa Well, 20.ix.1988, *A.C. Robinson* 578 (DNA 56470, AD); 45 km NE of Welbourn Hill, 20.ix.1978, *J.C. Cardale* s.n. (CANB 278051); 46 km S of Kulgera along Stuart Highway, 4.viii.1988, *P.S. Short* 3126 (MEL 115531). **QUEENSLAND.** 60 miles E of Quilpie, viii.1971, *M. Cameron* s.n. (DNA 33540); Stoneleigh Lease, northern section of Thylungra, 31.viii.2010, *J. Silcock* JLS675 (DNA 216437, BRI); Georgina River, 1889, *A. Henry* s.n. (MEL 716812, MEL 716225). **NEW SOUTH WALES.** Lake Cobham, ix.1887, *Bauerlen* s.n. (MEL 716206); From Duroodoo to Nangarna, 28.xii.1860, *Beckler* s.n. (MEL 696406).**Distribution and habitat:** Widespread across inland parts of Australia from Shark Bay to western New South Wales and south-western Queensland. Found in mallee, chenopod scrubland, heathland and grassland. (Fig. 17f)**Conservation status:** Widespread, common and well represented in conservation reserves.**Flowering period:** Mostly August to November.**Notes:** In most cases identified readily by the deeply transversely rugose involucral bract laminae that are aristate at the apex. Towards the eastern end of its range the involucral bracts on some specimens are less obviously aristate at the apex and the laminae less deeply rugose. These specimens can be difficult to differentiate from *Podolepis aristata* subsp. *affinis*.

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**Figure 1.** Intermediate involucre bracts from dried herbarium specimens  $\times 5$  **a.** *Podolepis jaceoides*; **b.** *P. decipiens*; **c.** *P. laevigata*; **d.** *P. linearifolia*; **e.** *P. rugata* subsp. *rugata*; **f.** *P. rugata* subsp. *glabrata*; **g.** *P. rugata* subsp. *littoralis*; **h.** *P. rugata* subsp. *trullata*; **i.** *P. canescens*; **j.** *P. eremaea*; **k.** *P. remota*; **l.** *P. aristata* subsp. *aristata*; **m.** *P. aristata* subsp. *affinis* (transversely rugose); **n.** *P. aristata* subsp. *affinis* (more or less flat); **o.** *P. aristata* subsp. *auriculata*



Figure 2. Representative specimen of *Podolepis jaceoides* (MEL 617177)



Figure 3. Holotype of *Podolepis decipiens* (MEL 606866)



Figure 4. Lectotype of *Podolepis laevigata* (F.M.Reader s.n. LY 0000143).  
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Figure 5. Holotype of *Podolepis linearifolia* (MEL 2296546)



Figure 6. Representative specimen of *Podolepis rugata* subsp. *rugata* (MEL 2039182)



Figure 7. Holotype of *Podolepis rugata* subsp. *glabrata* (MEL 2356596)



Figure 8. Representative specimen of *Podolepis rugata* subsp. *littoralis* (MEL 716242)



Figure 9. Isotype of *Podolepis rugata* subsp. *trullata* (MEL 2366399)



Figure 10. Representative specimen of *Podolepis canescens* (MEL 2264178)



Figure 11. Holotype of *Podolepis eremaea* (MEL 2027659)



Figure 12. Holotype of *Podolepis remota* (MEL 238350)



Figure 13. Representative specimen of *Podolepis aristata* subsp. *aristata* (MEL 618683)



Figure 14. Representative specimen of *Podolepis aristata* subsp. *affinis* (MEL 559433)

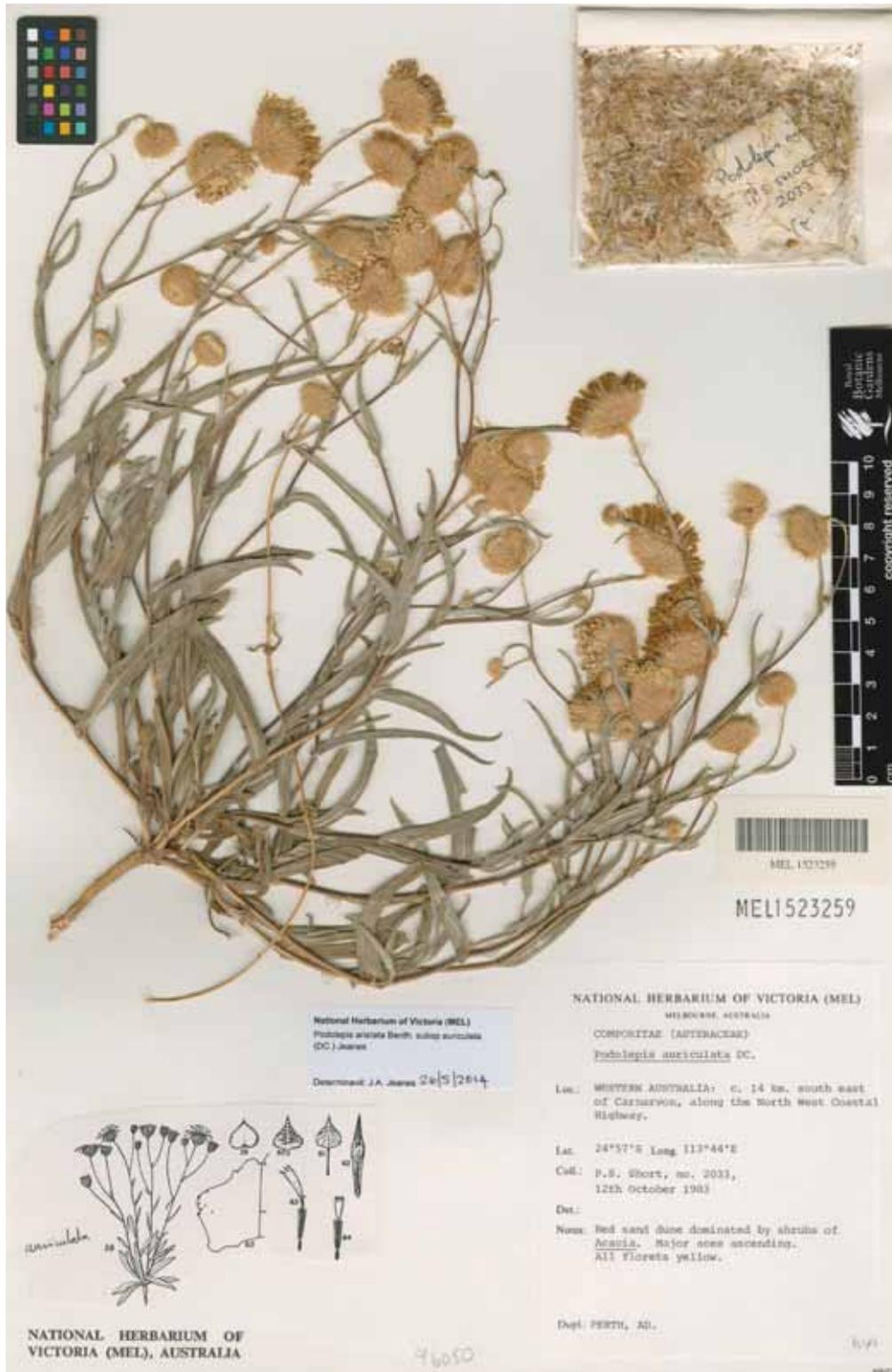
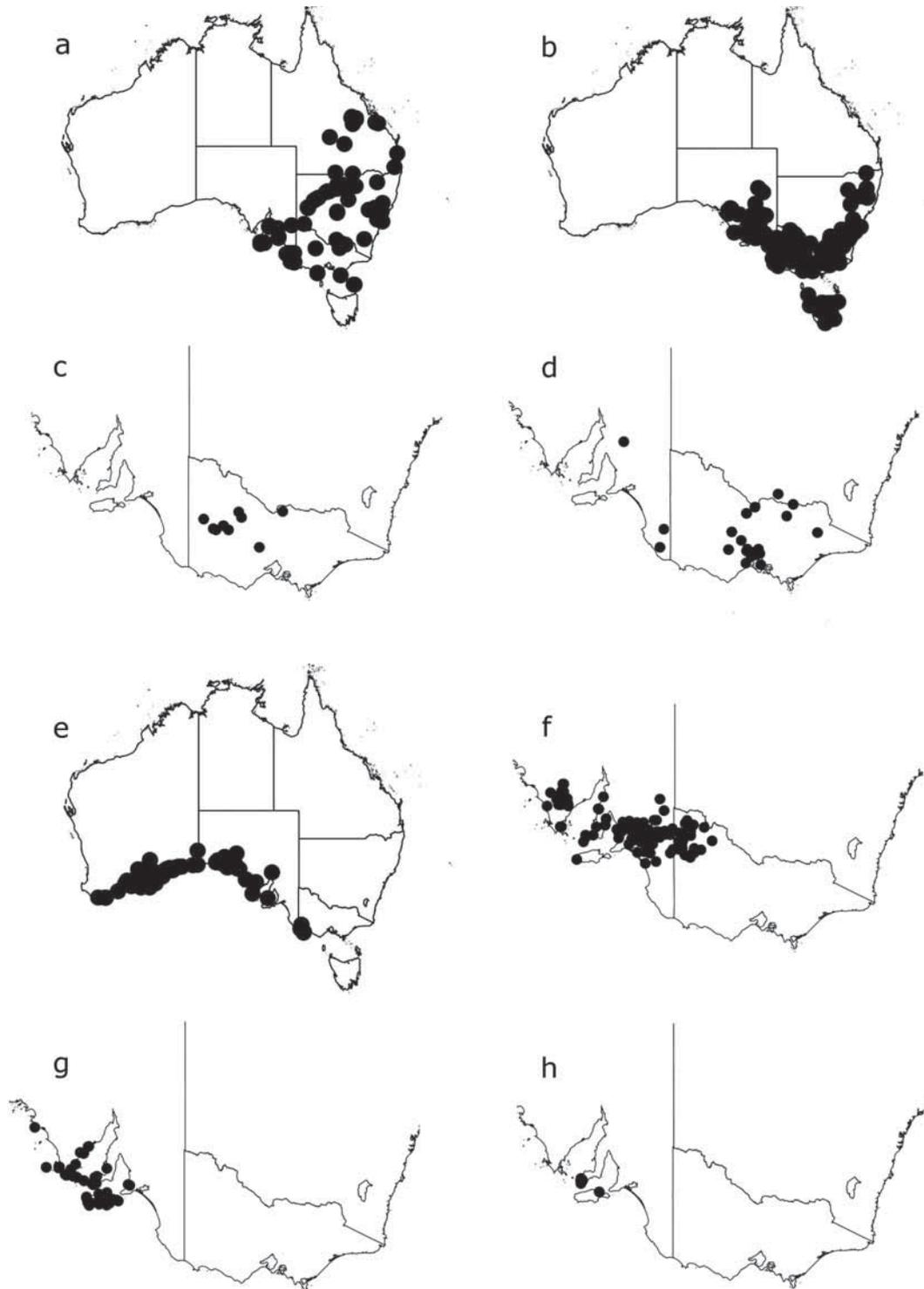
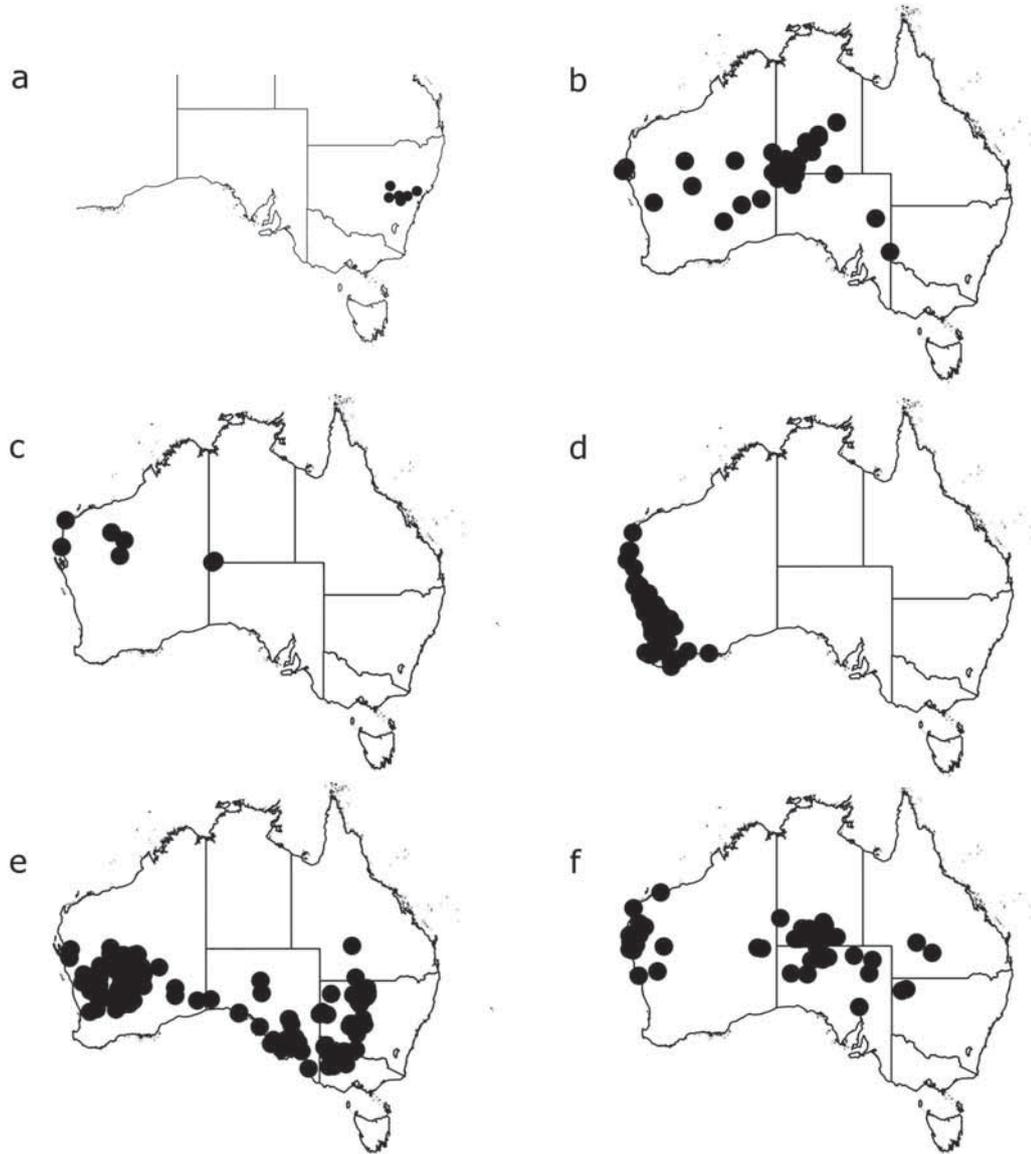


Figure 15. Representative specimen of *Podolepis aristata* subsp. *auriculata* (MEL 1523259)



**Figure 16.** Distribution of **a.** *Podolepis jaceoides*; **b.** *P. decipiens*; **c.** *P. laevigata*; **d.** *P. linearifolia*; **e.** *P. rugata* subsp. *rugata*; **f.** *P. rugata* subsp. *glabrata*; **g.** *P. rugata* subsp. *littoralis*; **h.** *P. rugata* subsp. *trullata*



**Figure 17.** Distribution of **a.** *Podolepis canescens*; **b.** *P. eremaea*; **c.** *P. remota*; **d.** *P. aristata* subsp. *aristata*; **e.** *P. aristata* subsp. *affinis*; **f.** *P. aristata* subsp. *auriculata*