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Resolution of the *Ptilotus parvifolius* complex (Amaranthaceae)

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Abstract

The *Ptilotus parvifolius* complex is revised and five species are recognised: *P. parvifolius* (F.Muell.) F.Muell., *P. remotiflorus* Benl, *P. disparilis* Lally, sp. nov., *P. propinquus* Lally, sp. nov. and *P. whitei* (J.M.Black) Lally, comb. nov. Descriptions and distribution maps are provided, and the new species are illustrated.

Introduction

The *Ptilotus parvifolius* complex comprises a number of low, divaricately branched, small-leaved shrubs distributed in central Australia between the MacDonnell Ranges and Lake Hart, west of Woomera, and eastwards to Tibooburra and Winton.

No comprehensive review of this group has been undertaken, apart from their consideration as part of a revision of the genus *Ptilotus* R.Br. for *Flora of Australia* by Benl (unpubl.). The present study was inspired by the considerable variation observed within members of this complex. As a result, five species are now recognised. Two of these, *P. disparilis* Lally and *P. propinquus* Lally, are new and were previously included within a heterogeneous *P. parvifolius* var. *laetus* Benl. Of the previously described taxa, *P. parvifolius* var. *laetus* is now reduced to synonymy under *P. remotiflorus* Benl. *Trichinium whitei* J.M.Black, relegated to synonymy of *P. parvifolius* (as *Trichinium parvifolium*) soon after its publication (Black 1924), is a distinct taxon and is reinstated as *Ptilotus whitei* (J.M.Black) Lally. *Ptilotus parvifolius* (F.Muell.) F.Muell. is retained as originally described (as *Trichinium parvifolium*). The nomenclatural confusion surrounding some members of this complex is also resolved.

Taxonomic History

Trichinium parvifolium was described by Mueller (1859), and later transferred to *Ptilotus* by the same author (Mueller 1868). Mueller's protologue notes his new taxon as having minute ovate leaves 1.3–3 mm long. J.M. Black (1914) described a related new species, *T. whitei*, differing mainly in its longer (5–12 mm long) elliptic-lanceolate leaves. These two species were subsequently treated as conspecific by Black (1924,

1948), and the latter taxon has remained in synonymy ever since. Benl (1970) described *P. parvifolius* var. *laetus*, including in his concept of this taxon the two new species described here (*P. disparilis* and *P. propinquus*), *P. parvifolius* var. *laetus*, and *P. parvifolius* var. *parvifolius*. This latter name was subsequently misapplied by Benl (1970, 1981, 1986, unpubl.) in part, to the taxon treated here as *P. whitei*, presumably based on Black's treatment of that species as a synonym of *P. parvifolius*.

As a result of this study, the widespread taxon in northern South Australia and southern Northern Territory, previously included within the circumscription of the typical form of *P. parvifolius*, is now referred to *P. whitei*, while plants previously included in Benl's concept of *P. parvifolius* var. *laetus* are here treated as *P. parvifolius*, *P. disparilis*, *P. propinquus* and *P. remotiflorus*.

Material from Western Australia, referred to *P. parvifolius* sens. lat. by Benl (1986, unpubl.) is more closely related to *P. beardii* Benl, on the basis of floral morphology, and will be discussed in a future paper (Lally, in prep.).

Materials and methods

This study is based on examination of herbarium collections from AD, CANB, DNA, MEL, NSW and PERTH. All measurements were made from herbarium material (reconstituted where necessary).

Terminology used here to describe the hairs follows that of Benl (1971), as translated by Burbidge (unpubl.). The hairs are basically of the same type (simple) but vary in the degree to which lateral projections are produced at the septa between the primary cells. Some hairs are shown on the accompanying illustrations.

Taxonomy

Key to species

1. Perianth less than 6.5 mm long; tepals with dense wavy hairs at apex **P. disparilis**
- 1: Perianth 9 mm or more long; tepals not as above **2**
2. Leaves to 3.5 mm long, grey-green, glaucous; bracteoles cream to white; Flinders Ranges, S.A. ... **P. propinquus**
- 2: Leaves not as above combination; bracteoles golden brown **3**
3. Stems and leaves hairy; leaves ovate or broadly ovate, margins undulate **P. remotiflorus**
- 3: Stems and leaves glabrous; leaves not as above **4**
4. Tepal apices glabrous; leaves 0.5-2 mm wide, distinctly mucronate; bract shorter than bracteoles; Lake Eyre area, S.A. **P. parvifolius**
- 4: Tepal apices hairy; leaves 1.8-6 mm wide, apiculate or shortly mucronate; bract and bracteoles similar in size; far northern S.A. and southern N.T. **P. whitei**

Ptilotus disparilis Lally, *sp. nov.*

A *P. remotifloro* Benl habitu intricate ramosa et inflorescentia floribus paucioribus minoribus et hirtioribus differt.

Typus: South Australia: 1.4 km N of Copley, Flinders Ranges, 22 Nov. 2001, R.J.Chinnock 9534 (holo: AD; iso: BRI, CANB, MEL).

Intricately branched, strongly divaricate, spinescent *shrub* to 30 cm high; young stems smooth, with dense, webbed, dendritic to verticillate hairs, green, older wood glabrescent, grey-brown. *Leaves* sessile to subsessile, narrowly obovate or elliptic or ovate, 2–5.5 mm long, 0.5–1 mm wide, glabrescent, with sparse to moderately dense (on newer leaves) dendroid hairs, green; apices minutely mucronate, apiculate or acuminate; margins flat. *Inflorescence* rachis to 0.5 cm long, 5–8 flowered. *Bract* 1–1.5 mm long; *bracteoles* 2–2.5 mm long, bract and bracteoles with moderately dense verticillate or nodose hairs at base and on midrib, both with fleshy leaf-like pad at base and hardened golden-brown midrib, remainder chartaceous, cream to white; apices mucronate. *Perianth* 5.5–6.5 mm long, grey-white due to hairs, pinkish-purple underneath. *Tepals* narrowly oblong, concave; margins and apices scarios; outer surface with short (to 0.6 mm), moderately dense, nodose hairs at base, longer (to 1.5 mm), moderately dense, subverticillate or nodose hairs on remainder, denser and wavy towards apex, hairs sometimes just overtopping apex, with short, dense, verticillate hairs beneath, including on margins; apices erose, obtuse or acute; outer tepals marginally longer than inner, glabrous inside; inner tepals with moderately dense, crisped, subverticillate or nodose hairs inside, attached to the margins at approximately half way up tepal, sometimes a few crisped hairs along margins a little below half way. *Stamens* 1.7–3 mm long; *staminodes* 3, to 0.8 mm long, with subverticillate hairs to 1 mm long between the filaments. *Anthers* 0.7–0.8 mm long. *Ovary* strongly gibbous, glabrous or with a few nodose hairs at apex and adjacent to the style; *style* eccentric, 2.2–3.5 mm long, straight or rarely sinuate. Fig. 1.

Distribution and habitat. Occurs in a small area to the west of the North Flinders Ranges, between Copley and Farina (near Leigh Creek) in South Australia. Recorded in stony brown clay, on rises around saline depressions and podsol breakaways near mine tailings, in low shrubland of *Tecticornia*, *Gunniopsis* and *Sclerolaena*. Fig. 4.

Notes. This species was previously included in *P. parvifolius* var. *laetus* by Benl (1970), but it differs markedly in having smaller, more densely hairy flowers with the hairs denser at the tepal apices, fewer flowers per inflorescences, and the intricately branched habit.

Etymology. The epithet refers to this species dissimilar floral morphology when compared to other taxa in this complex. (Latin: *disparilis*, dissimilar).

Specimens examined

SOUTH AUSTRALIA: Farina, *Anon. s.n.*, s.dat. (AD 97749543C); On the side of the old railway adjacent main road between Copley and Lyndhurst, R.J.Bates 37422, 28 Apr. 1994 (AD); Farina, c. 55 km N of Leigh Creek on Adelaide-Alice Springs railway, S.Dixon *s.n.*, Jan. 1884 (AD 96215351); Government Gums, Basin of Lake Eyre, S.Dixon *s.n.*, Jan. 1884 (MEL 77346); North Field, Leigh Creek, c. 280 km NNE of Port Augusta, T.R.N.Lothian 4999, 18 Oct. 1968 (AD).

Ptilotus parvifolius (F.Muell.) F.Muell.

Fragm. 6: 229 (1868). — *Trichinium parvifolium* F.Muell., Rep. Pl. Babbage's Exped. 19 (1859). — **Type:** South Australia: Stuart's Ck, 1858, D.Hergott *s.n.* (holo: MEL 2281643).

Ptilotus parvifolius var. *laetus* auct. non Benl: Benl, Mitt. Bot. Staatssamml. München 7: 315 (1970), pro parte; Benl in Jessop, J.P. & Toelken, H.R. (eds), Fl. S. Austral. ed. 4, 1: 330 (1986), pro parte.

Rounded, weakly divaricate, subspinescent *shrub* to 25 cm high; stems striate, glabrous, pale brown. *Leaves* sessile to subsessile, ovate to obovate, 1.5–5.5 (–7) mm long, 0.5–2 mm wide, sometimes clustered on new stem shoots, glabrous on upper surface, lower surface with scattered hairs near base, green; apices mucronate, mucro to 0.5 mm long; margins flat. *Inflorescence* rachis to 2 cm long (rarely to 4 cm), 10–20 flowered (rarely to 50 flowered). *Bract* 3–3.5 mm long; *bracteoles* 4–5.3 mm long; bract and bracteoles with moderate to dense subverticillate hairs mainly near the base and midrib, denser towards base, both chartaceous, golden brown; apices mucronate. *Perianth* 11–12 mm long, pink to pinkish-purple. *Tepals* narrowly oblong, concave; margins and apices scarios; outer surface with short (to 0.8 mm), dense, nodose hairs at base, longer (to 4 mm), sparse to moderately dense (especially near base), nodose or subverticillate hairs on remainder, shorter and less dense near apex, all hairs with tubercles at base, with sparse verticillate hairs beneath, including margins; apices ± acute, glabrous; outer tepals longer than inner by c. 1 mm, glabrous inside; inner tepals with dense, crisped, nodose to subverticillate hairs inside, attached to the margins of the tepals in the lower quarter, hairs extending to half tepal length. *Stamens* 4.5–6.5 (–7)

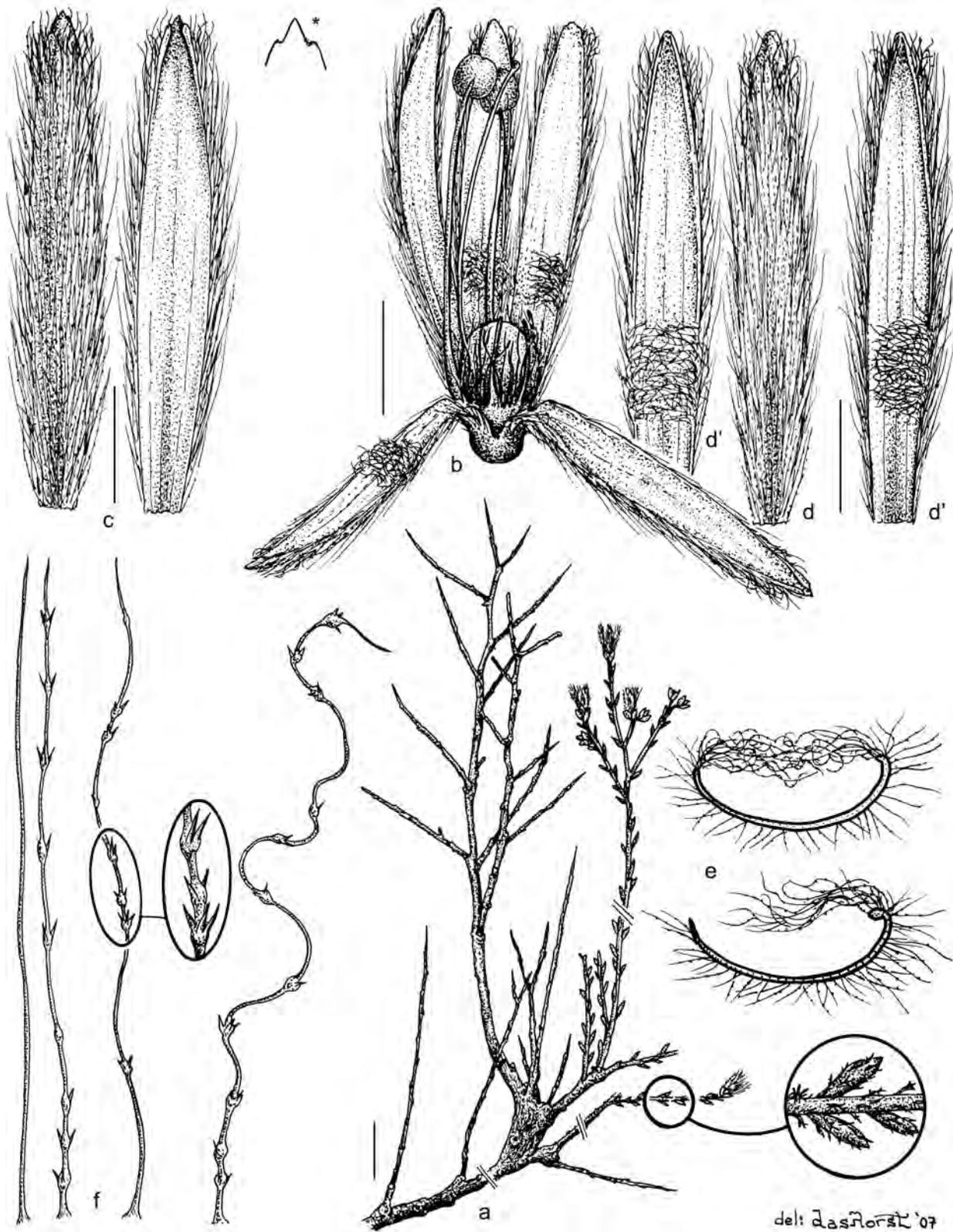


Fig. 1. *Ptilotus disparilis*. a habit; b flower (perianth), opened out; c outer tepals, inner and outer surfaces (* apex of tepal); d inner tepals, outer surface; d' inner tepal, inner surface (one tepal with hairs attached on one side only); e inner tepals, cross sections; f hairs (from left to right): simple, subverticillate ($\times 2$), crisped subverticillate. Scale bars: a 1 cm; b–d 1 mm. R.J.Chinnock 9534.

mm long; *staminodes* 3, 1 mm long, with dense, nodose or subverticillate staminal cup hairs to 0.8 mm long between the filaments. *Anthers* 0.6–1.5 mm long. *Ovary* glabrous or sometimes with a few nodose hairs at the apex and adjacent to the style; *style* eccentric, 6–7 mm long, straight to sometimes sinuate. Fig. 2.

Distribution and habitat. Occurs in a small area in South Australia, between Lake Eyre South, Lake Torrens and Woomera. It grows in red, brown or grey skeletal soils on rocky scree slopes, gibber flats, drainage lines, and on the edges of salt lakes. Associated with chenopods and herbs in low shrubland. Fig. 4.

Notes. *Ptilotus parvifolius* is most similar to *P. whitei*, with which it was previously confused. *Ptilotus parvifolius* differs from this species by its narrow, sessile to subsessile, distinctly mucronate green leaves (usually broader, petiolate, apiculate, grey-green in *P. whitei*), glabrous tepal apices (hairy in *P. whitei*) and the bract shorter than the bracteoles (bract and bracteoles similar size in *P. whitei*).

Specimens examined

SOUTH AUSTRALIA: 31 km SSE of Lake Windabout on power line track, Oakden Hills Station, *F.J.Badman* 4775, 1 Aug. 1991 (AD); 1.1 km N of Homestead, Billa Kalina Station, *F.J.Badman* 10195, 11 July 1998 (AD); Just off the road about 30 km S of Roxby, Roxby Downs Survey 1989, *R.Bates* 17106, 20 Jan. 1989 (AD); Wirraminna Station, west shore of Lake Hart, *R.J.Chinnock* 388, 17, Aug. 1973 (AD); 3.5 km N of Andamooka Post Office on road to current Airport, *D.J.Duval* 17 & *M.K.Jones*, 22 Oct. 2004 (AD); Woomera, *E.Gaubas* s.n., 22 June 1955 (AD 96826435, 966090778); Lake Hart salt lake, Stuart Highway between Pimba and Glendambo, *M.K.Jones* 128 & *D.J.Duval*, 10 Nov. 2005 (AD); Near Spencers Gulf, *Lattorf* s.n., 1881 (MEL 726076); South Australia, *F.Mueller* s.n., s.dat. (AD 96215349); Wirrappa, on Transcontinental railway, ca 15 km W of Pernatty Lagoon, *P.G.Wilson* 2290, 27 July 1962 (AD).

Ptilotus propinquus Lally, sp. nov.

Affinis *P. remotifloro* Benl sed partibus vegetatibus glabris glaucis, et bracteis et bracteolis cremeis ad albas differt.

Typus: South Australia: In Narrina Pound, c. 10 km SSW of Mt Hack and 2.5 km NW of Mt McFarlane (Mt McFarlane is c. 30 km NNE of Blinman), Flinders Ranges, 20 May 1989, *L.Haegi* 3571 (holo: AD 98943059; iso: CANB 00472915, NSW 405752).

Much branched, strongly divaricate, rounded, subsppinescent shrub to 60 cm high; younger stems ± striate, glabrous, glaucous, grey-green, older wood brown. *Leaves* sessile, ovate or obovate, 1–3.5 mm long, 0.5–1 mm wide, clustered with up to 7 leaves at young stem shoots, ± fleshy, glabrous on upper surface, lower surface with scattered hairs near base, grey-green, glaucous; apices mucronate, mucro to 2 mm long; margins flat. *Inflorescence* rachis to 5 cm long, 10–50 flowered. *Bract* and *bracteoles* (3.2–) 4.5–6 mm long, glabrous or with sparse subverticillate hairs at apex and along midrib, translucent, cream to white; apices apiculate. *Perianth* 11–12.5 mm long, pink or purple. *Tepals* narrowly oblong, concave, thickened and keeled at base; margins and apices scarious; outer

surface with short (to 1 mm), moderately dense, nodose or subverticillate hairs at base, longer (to 6 mm), sparse to moderately dense, nodose to subverticillate hairs on remainder, shortening near apex, all hairs with tubercles at base, with short, dense verticillate hairs beneath, including on margins; apices acute, glabrous; outer tepals longer than the inner by 1 mm, glabrous inside; inner tepals with dense, crisped, nodose to subverticillate hairs inside, attached to the margins of tepals in the lower third, hairs extending to just under half tepal length. *Stamens* 6–7 mm long; *staminodes* 3, to 1.5 mm long, with tufts of nodose hairs 0.2–0.5 mm long between the filaments. *Anthers* 0.9 mm long. *Ovary* strongly gibbous, glabrous or rarely with a few nodose hairs at the apex; *style* eccentric, 5.5–6.5 mm long, straight or rarely sinuate. Fig. 3.

Distribution and habitat. Known from a small area on the eastern side and crest of the North Flinders Ranges, South Australia. Recorded growing in bare shaly clay soil, on ironstone hills, gypseous breakaways or rocky gullies, with *Casuarina* over chenopods, or with scattered mallees. Fig. 4.

Notes. Although included in *P. parvifolius* var. *laetus* sens. lat. by Benl (1970), this species differs in its glabrous, glaucous vegetative parts, larger, cream to white bracts and bracteoles, and tepals which are keeled at the base. It is unusual in having tubercles at the base of the hairs on the outer tepals (visible at high magnification) which give the tepals a ‘grainy’ appearance at low magnification. This feature is also shared, although less obviously, by *P. parvifolius*. It is interesting to note too that some flowers have stamens with weakly developed filaments, and anthers absent, possibly all staminodes, an uncommon feature in Amaranthaceae.

Etymology. The epithet refers to the close relationship of this species to several other taxa in this complex. (Latin: *propinquus*, a relation, kinsman, or near).

Specimens examined

SOUTH AUSTRALIA: S of Chambers Gorge, *R.Bates* 22935, 14 Apr. 1990 (AD); Wertaloona Pastoral Lease, to north of track into Moro Gorge, 6 km E of Moro Gorge Waterfall, *R.J.-P.Davies* s.n., 22 June 1993 (AD 99442011); Balcanoona to Copley Rd, 10 kms W of Nepabunna, *L.Edmunds* s.n., 13 Nov. 1989 (AD 98949001, CBG 9316123); South Australia, “300 miles up”, *Greenwood & W.Gill* s.n., Apr. 1916 (NSW 29680); Gammon Ranges National Park, *V.J.Levitzke* 0553, 21 July 1979 (AD); Angepena Station, *D.E.Murfet* 4162, 29 Sept. 2002 (AD); Gammon Ranges National Park, 5.5 km E of Italowie Gap, gullies S of road, *H.P.Vonow* 2184, 27 July 1994 (AD); 8.8 km Balcanoona Homestead at 250°, *L.D.Williams* 11848, 27 Mar. 1981 (AD).

Ptilotus remotiflorus Benl

Mitt. Bot. Staatssamml. München 12: 335 (1976). —

Type: Queensland: 62 miles [100 km] W of Winton on the Boullia road, 19 Mar. 1972, *H.Reeve* 81 (holo: CANB 245501).

Ptilotus parvifolius var. *laetus* Benl, Mitt. Bot. Staatssamml. München 7: 315 (1970), pro parte. — **Type:** New South Wales: Tero Ck Stn, c. 60 miles [96 km] NW of White

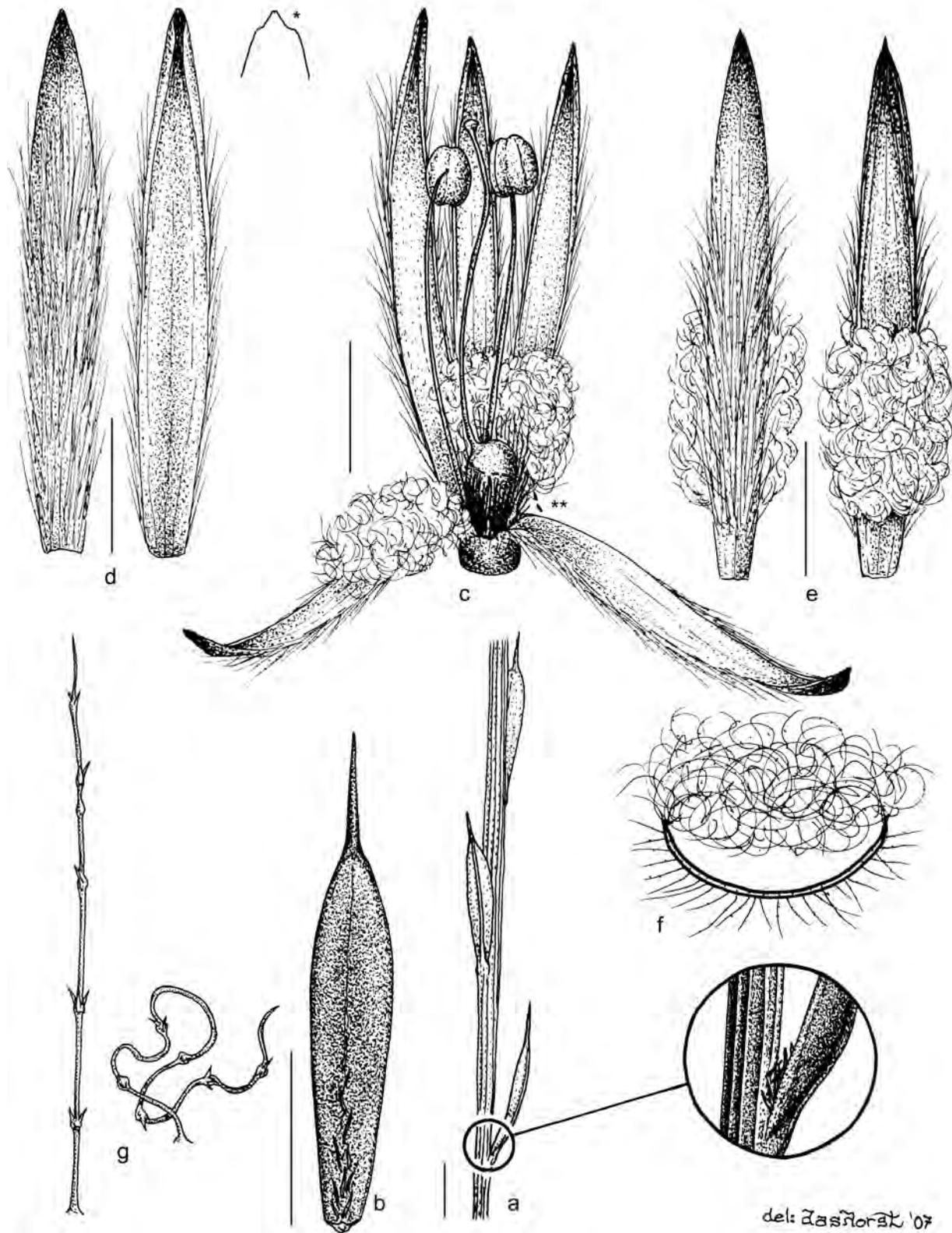


Fig. 2. *Ptilotus parvifolius*. a habit; b leaf; c flower (perianth), opened out (** hairs removed to show ovary); d outer tepals, inner and outer surfaces (* apex of tepal); e inner tepals, inner and outer surfaces; f inner tepal, cross section; g hairs (left to right): subverticillate, crisped subverticillate. Scale bars: a–b 3.5 mm; c–e 0.25 mm. *D.J.Duval 17 & M.K.Jones.*

Cliffs, 6 Dec. 1968, *B.Parker & M.Stanger 112* (holo: CANB 187524; iso: AD 97126227, 98132247, CANB 330897; M, MEL, NSW *n.v.*).

Ptilotus sp. Cordillo Downs (*B.Lay 1487*) W.R.Barker in W.R.Barker et al., *J. Adelaide Bot. Gard. Suppl.* 1: 47 (2005).

Illustrations. G. Benl, *Mitt. Bot. Staatssamml. München* 12: 337, figs a–g (1976); G.M. Cunningham et al., *Pl. W. New S. Wales* 288 (1981), photograph, as *P. parvifolius* var. *laetus*; G.J. Harden, *Fl. New S. Wales* 1: 259 (1990), as *P. parvifolius* var. *laetus*.

Much-branched, divaricate subspinescent *shrub* to 60 cm high; stems striate, with subverticillate to verticillate hairs, dense on younger parts, grey-green, older wood glabrescent, brown. *Leaves* petiolate, petiole to 2 (–6) mm long, ovate to broadly ovate, rarely narrowly ovate, 3–8 (–18) mm long, (1–) 1.6–4.8 (–7) mm wide, clustered on new stem shoots, hairs as for stems, dark green, drying blackish; apices mucronate, mucro to 0.8 mm long; margins usually undulate, rarely flat. *Inflorescence* rachis to 6 cm long, 10–40 flowered. *Bract* and *bracteoles* 3–4.5 mm long, bract usually slightly shorter than bracteoles, glabrescent or with subverticillate or nodose hairs along midrib, denser towards base, chartaceous, golden brown; apices mucronate. *Perianth* 9–13 mm long, purple or deep pink. *Tepals* narrowly oblong-obovate, concave; margins and apices scarious; outer surface with short (to 1 mm), dense, nodose hairs at base, longer (to 5 mm), moderately dense, nodose or subverticillate hairs on remainder, shorter near apex, with short, sparse, verticillate hairs beneath, including on margins; apices erose, acute, glabrous; outer tepals longer than inner by 1–1.5 mm, glabrous inside; inner tepals with dense, crisped, nodose or subverticillate hairs inside, attached to the margins of the tepals in the lower quarter, hairs extending to a third or just under half tepal length. *Stamens* 6–7 mm long; *staminodes* 3, 1 mm long, hidden among the dense nodose or subverticillate staminal cup hairs to 1 mm long. *Anthers* to 1.1 mm long. *Ovary* glabrous or sometimes with a few nodose hairs at the apex and adjacent to the style; *style* eccentric, 6–7.5 mm long, straight to often sinuate.

Distribution and habitat. Occurs in far north western New South Wales, from around Wilcannia westwards to Tibooburra, in far north-east of South Australia at Needle Hill, just north of Cordillo Downs homestead, and in south-eastern Queensland, from south of Quilpie to near Winton. Grows in loams or clays with abundant exposed shale, rocks or stones (silcrete), on hillslopes, rocky screes and gullies, in open plain, tableland or semi-desert areas. Associated with chenopod shrubland and with *Grevillea*, *Acacia*, *Eremophila* and *Senna*. Fig. 4.

Notes. Previous authors (e.g. Benl 1981, Benl 1986, Hnatiuk 1990, Benl unpubl.) record this taxon (as *P. parvifolius* var. *laetus*) as occurring in Western Australia, South Australia, Queensland and New South Wales.

These concepts included the newly recognised South Australian endemics *P. disparilis* and *P. propinquus*, with true *P. remotiflorus* occurring in South Australia, Queensland and New South Wales. The material determined by Benl as *P. parvifolius* var. *laetus* from Western Australia represents a new taxon allied to *P. beardii* Benl, the subject of a future paper.

Ptilotus parvifolius var. *laetus* is here placed in synonymy under *P. remotiflorus*. Benl (1976, unpubl.) distinguished *P. remotiflorus* from other members of the *P. parvifolius* complex by its “uneven juvenile indumentum combined with interrupted spikes”, but these features are also shared with *P. parvifolius* var. *laetus*. Both entities also share many other similarities in vegetative and floral morphology, and continued recognition of *P. parvifolius* var. *laetus* as a separate taxon is not warranted.

Ptilotus remotiflorus is easily separated from other members of the *P. parvifolius* complex by its hairy stems and hairy, ovate, dark green, usually undulate leaves. *Ptilotus disparilis* also has hairy stems and leaves, but this species differs in having very small flowers (5.5–6 mm long versus 9–12 mm long in *P. remotiflorus*) with dense wavy hairs at the tepal apices (tepal apices glabrous in *P. remotiflorus*).

Ptilotus remotiflorus is listed as Rare under the Environment Protection and Biodiversity Conservation Act 1999, but with its expanded circumscription, including populations on reserved lands, it is suggested that this taxon no longer requires special protection.

Representative specimens examined

QUEENSLAND: 110 km NW of Quilpie, *W.R.Archer 1205941*, 12 May 1994 (MEL); 5.2 km W of Vergemont Homestead, W of Longreach, *A.R.Bean 22262*, 17 May 2004 (BRI, CANB); 12 miles [19 km] SSE of Toompine, *L.Pedley 2455*, 11 Sept. 1967 (BRI, CANB); ca 14 km SW of Merrigal Homestead, *R.W.Purdie 2087*, 11 Apr. 1984 (BRI, CANB).

SOUTH AUSTRALIA: 4 km SW of Needle Hill, Cordillo Downs Station, *F.J.Badman 4876*, 16 Aug. 1991 (AD); 3 km SW of Needle Hill, Cordillo Downs Station, *F.J.Badman 4883*, 16 Aug. 1991 (AD); 16.5 km N along track from Cordillo Downs homestead, *D.J.Duval et al. 919*, 24 Oct. 2007 (AD); The Needle, Cordillo Downs Station, *B.Lay 1487*, 7 June 1980 (AD).

NEW SOUTH WALES: Woonaminta, via Wilcannia, *W.Bauerlen s.n.*, Sept. 1887 (NSW 29852); 3.7 km S of Olive Downs Hsd, on the Jump Up Loop Road, NNW of Tibooburra in Sturt NP, *R.G.Coveny 13436 et al.*, 2 Sept. 1989 (AD, NSW); Mt Wood, near summit, NE of Tibooburra in Sturt NP, *R.G.Coveny 13541 et al.*, 5 Sept. 1989 (AD, CANB, MEL, NSW); Nuntherungie, *C.M.Cunningham & P.L.Milthorpe 1171*, 19 Sept. 1973 (NSW); western side of McDonald Peak, ca 2.5 km ESE of Binerach Downs, *N.N.Donner 5684*, 9 May 1977 (AD); Onepah, *W.E.Mulham 947*, Dec. 1976 (CANB); Silver City Hwy, 45 km N of Tibooburra, *J.Pickard 3228*, 3 Jan. 1976 (NSW); Mt Poole, *W.Webster s.n.*, 1881 (MEL 2221458).

***Ptilotus whitei* (J.M.Black) Lally, comb. nov.**

Trichinium whitei J.M.Black, *Trans. & Proc. Roy. Soc. South Australia* 38: 464 (1914). — **Type:** South Australia, 30 miles [48 km] E of Deep Well, Lake Eyre Basin, 23 Sept. 1913, *S.A.White s.n.* (holo: AD 97749543A; iso: K *n.v.*, MEL 2281661 fragm.).

Trichinium parvifolium auct. non. F.Muell.: J.M. Black, *Fl. S. Austral.* 2: 211 (1924), pro parte.

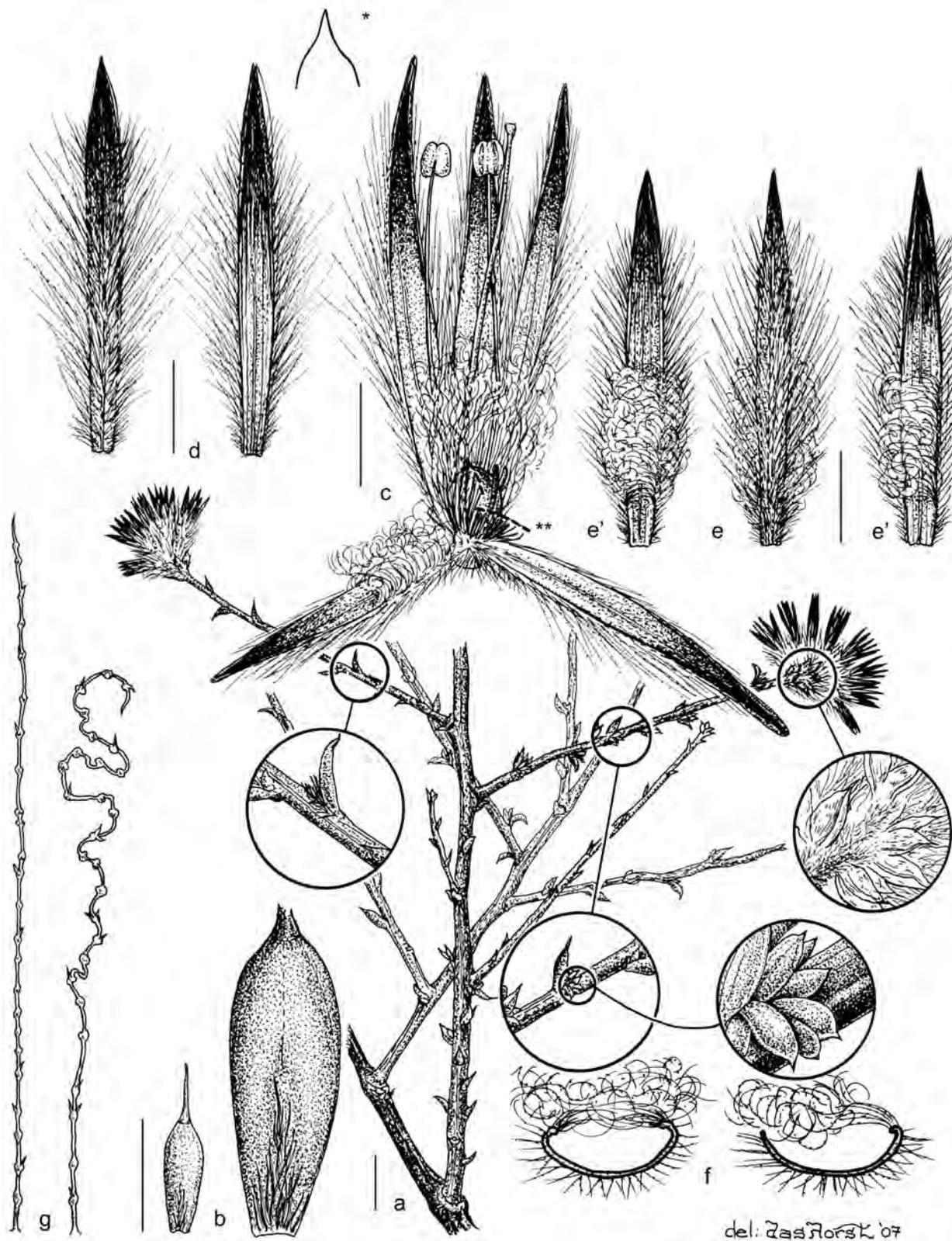


Fig. 3. *Ptilotus propinquus*. a habit; b leaves: new (left), older (right); c flower (perianth), opened out (** hairs removed to show ovary); d outer tepal, inner and outer surfaces (* apex of tepal); e inner tepals, outer surface; e' inner tepals, inner surface (one tepal with hairs attached on one side); f inner tepals, cross section; g hairs (left to right): nodose to subverticillate, crisped nodose to subverticillate. Scale bars: a–b 1.5 mm; c–d 2.5 mm; e 20 mm. D.E.Murfet 4162.

Ptilotus parvifolius auct. non (F.Muell.) F.Muell.: J.M. Black, Fl. S. Austral., ed. 2, 2: 327 (1948), pro parte.

Ptilotus parvifolius auct. non (F.Muell.) F.Muell. var. *parvifolius*: Benl, Mitt. Bot. Staatssamml. München 7: 315 (1970), pro parte; Benl in Jessop, J.P. (ed.), Fl. Central Australia 79 (1981), pro parte; Benl in Jessop, J.P. & Toelken, H.R. (eds), Fl. S. Austral., ed. 4, 1: 330 (1986).

Illustrations. J.M. Black, Trans. & Proc. Roy. Soc. South Australia 38: pl. 38 (1914), as *Trichinium whitei*; J.M. Black, Fl. S. Austral. 2: 211, pl. 15(2) (1924), as *Trichinium parvifolium*; J.M. Black, Fl. S. Austral., ed. 2, 2: 327, fig. 460 (1948), as *Ptilotus parvifolius*; G. Benl in J.P. Jessop & H.R. Toelken (eds), Fl. S. Austral. ed. 4, 1: 330, fig. 186 (1986), as *Ptilotus parvifolius* var. *parvifolius*.

Much-branched, sometimes divaricate *shrub* to 100 cm high, some old branchlets \pm sub-spinescent; stems striate, glabrous, sometimes glaucous, new stems yellowish or grey-green, older wood brown to grey-black. *Leaves* petiolate, petiole to 3 mm long, narrowly obovate to broadly obovate, sometimes \pm spatulate, 4–12(–15) mm long, (1–)1.8–6 mm wide, clustered at young stem shoots, glabrous, pale green to yellowish or grey-green, sometimes glaucous; apices apiculate, rarely acuminate or shortly mucronate, mucro to 1 mm long; margins flat, or sometimes undulate. *Inflorescence* rachis to 4 cm long (rarely to 7 cm), 10–40 flowered. *Bract* and *bracteoles* 3.5–6 mm long, bract slightly shorter than bracteoles, glabrous or sometimes with sparse to dense, subverticillate hairs at apex and/or along midrib, chartaceous, golden brown; apices mucronate. *Perianth* 9–12.5(–14) mm long, pale pink, pale purple, or grey (from hairs) over red underneath. *Tepals* narrowly oblong, concave; margins and apices scarious; outer surface with short (to 1.5 mm), dense, nodose hairs at base, longer (to 6 mm), moderately dense, nodose hairs on remainder, including margins, shorter near apex, with short, dense, verticillate hairs beneath, including on margins and apices; apices erose obtuse or acute, usually hairy, rarely glabrous; outer tepals longer than the inner by 0.5 mm, glabrous inside; inner tepals with dense, crisped, nodose or subverticillate hairs inside, attached to the margins of the tepals in the lower third, hairs extending to between half to 2/3 tepal length. *Stamens* 5.5–6.5 mm long; *staminodes* 3, 1 mm long, hidden among the dense nodose or subverticillate staminal cup hairs to 1 mm long. *Anthers* 1.2–1.5 mm long. *Ovary* glabrous; *style* eccentric, 5.6–7.5 mm long, straight to often sinuate.

Distribution and habitat. Occurs in far northern South Australia and the southern Northern Territory in an area adjacent to the Simpson Desert in the east, west to just beyond the Stuart Highway, and from near Coober Pedy in South Australia north to Barrow Creek in the Northern Territory. Grows in red, brown or yellow skeletal soils of gravelly clay or sand, on gibber plains, scree slopes, quartzitic sandstone hills, limestone outcrops, rocky

breakaways, gullies and creekbeds. Associated with chenopod and *Acacia* scrub, or tall shrubland, often with a grassy understorey. Fig. 4.

Notes. This common species has been known as *Ptilotus parvifolius* var. *parvifolius*, but true *P. parvifolius* is restricted to a small area east of Woomera (see under that species for details).

As is common with J.M. Black collections, the type material of *P. whitei* at AD is mounted with a mixture of other *Ptilotus* collections, including unrelated collections of *P. whitei*. The holotype comprises the specimen located on the top left hand corner of the sheet and includes the illustrations and fragments under this specimen, running down the left side of the sheet (on the largest sheet of paper attached to the mounting card), and a further small fragment mounted on a piece of tissue paper on the right side of the sheet, above the label. All the holotype material is annotated with a pencilled, circled '1', and assigned the accession number AD 97749543A.

Some variation in perianth length, indumentum and inflorescence size, as well as leaf shape is evident in this species. Perianth size usually ranges from 9 mm long to 12.5 mm long, with larger perianths variously densely or sparsely hairy, and usually with a more prominent, scarious, sparsely hairy or rarely glabrous apex. A collection from NW of Coober Pedy (*Copley 905*) has perianths to 14 mm long, with prominently scarious, acute, \pm glabrous apices. Smaller perianths are usually densely hairy with a much less prominent, scarious, hairy apex, sometimes with the hairs overtopping the apex. The inflorescence in plants with smaller perianths is often longer than those with larger perianths (e.g. *Nelson 1990*). A collection from NW of Oodnadatta (*Badman 6819*) has unusually narrow, almost linear leaves *c.* 1 mm wide. This variation does not exhibit any geographic pattern, nor does it correlate with any other morphological features, and in all other respects these specimens match typical *P. whitei* and are not considered worthy of formal taxonomic recognition.

Ptilotus whitei is distinguished from other members of the complex by its larger, usually distinctly petiolate, glabrous, grey-green (sometimes glaucous), obovate leaves, and tepals with hairs to, and sometimes overtopping, the apex. *Ptilotus parvifolius* has previously been treated as conspecific with *P. whitei*, but the former taxon has narrower green leaves with a distinct mucro (apiculate in *P. whitei*), the bract shorter than the bracteoles (similar sizes in *P. whitei*) and glabrous tepal apices.

Representative specimens examined

NORTHERN TERRITORY: 25 km NW of Idacowra Homestead, *D.E. Albrecht 5519*, 8 Nov. 1993 (AD, DNA, MEL, NT); 8 km E of The Ghan Historical Site, 10 km SSW of Alice Springs, *M.J. Barritt 37*, 23 Apr. 1988 (DNA, MEL, NT); S side of Mt Sonder, *A.C. Beauglehole ACB27371*, 22 July 1968 (DNA, NSW); 8 km S of Sunrise Bore, Beddome Range, *H. Coulson 27 & P. Latz*, 18 Aug. 1992 (DNA, MEL); Rodgers Pass, 48 km W of Stuart Highway on the Wallara Ranch road, *L.A. Craven*

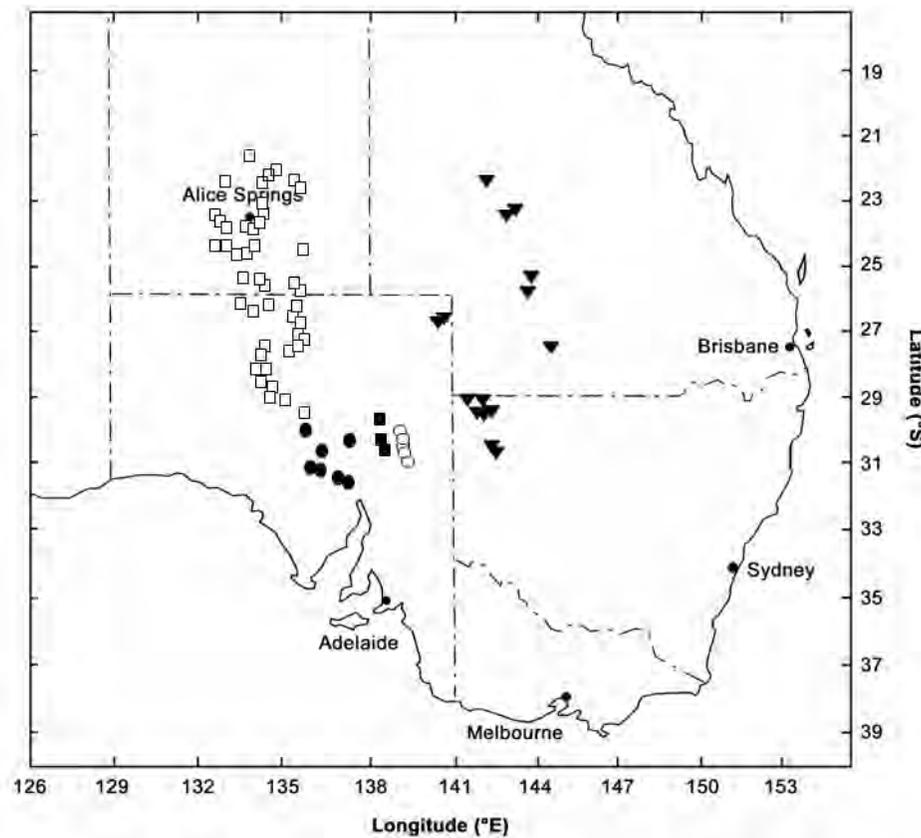


Fig. 3. Distribution map. ■ *Ptilotus disparilis*; ● *P. parvifolius*; ○ *P. propinquus*; ▼ *P. remotiflorus*; □ *P. whitei*.

8180, 11 Sept. 1983 (CANB); Andado Station, *P.K.Latz* 6832, 17 Apr. 1977 (AD, DNA, MEL); 35 km E of Horseshoe Bend Homestead, *P.K.Latz* 13521, 10 Nov. 1993 (DNA, MEL, NT); 12 miles [19 km] W of Huckitta Station, *M.Lazarides* 5936, 9 Sept. 1956 (AD, CANB, MEL); 27 miles [43 km] ESE of Alice Springs, *D.J.Nelson* 1990, 27 Jan. 1970 (AD, DNA); 12 miles [19 km] SW of Mt Swan Station, *R.A.Perry* 3327, 11 Mar. 1953 (AD, CANB, MEL); Half-way between Mt Sonder and Redbank Gorge, West Macdonnell Ranges, *J.H.Willis s.n.*, 21 July 1966 (CANB 267508, MEL 503144); Undoolya Gap, *R.E.Winkworth* 680, 9 Nov. 1954 (CANB).

SOUTH AUSTRALIA: Eringa Waterhole, Lindsay Creek, Hamilton Station, *F.J.Badman* 1667, 28 Apr. 1985 (AD, MEL); c. 10 km E of Kruses Dam, Todmorden Station, *F.J.Badman* 6819, 3 Aug. 1993 (AD, NSW); 10 km E of England Hill, Copper Hills Station, *F.J.Badman* 6915, 6 Aug. 1993 (AD); Moon Plain, Breakaways W side, *R.Bates* 63041, Aug. 2004 (AD); Coober Pedy "Breakaway" ca 32 km NW of Coober Pedy, ca 2.5 km NE of Shell Patch Bore, *P.Copley* 905, 15 Aug. 1984 (AD); Copper Hills to Oodnadatta Rd, *E.M.James* 154, 25 May 2000 (AD); Oodnadatta Common, *B.J.Knight* K013, 11 Sept. 1977 (AD); ca 40 km N of Millers Creek Homestead, c. 120 km NE of Kingoonya, *B.Lay* 650, 13 Oct. 1971 (AD); Mt Sarah, 1 mile [1.61 km] S of Homestead, *T.R.N.Loethian* 2089, 14 Aug. 1963 (AD); Arckaringa Amphitheatre area, ca 80 km SW of Oodnadatta, *T.R.N.Loethian* 2169, 15 Aug. 1963 (AD); Foothills of Emery Ranges, ca 22 km E of Pedrika, *T.R.N.Loethian* 4818, 27 July 1968 (AD, NSW); Tieyon, *P.L.Milthorpe* 3078, 1 Nov. 1974 (NSW); ca 6.5 km WNW of Mt Alexander, *D.E.Symon* 9128, 19 Sept. 1974 (AD, CANB); E face of Mabel Range near headwaters of Malakilla Creek, *D.E.Symon* 9184, 21 Sept. 1974 (AD, CANB).

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