

Clarification of species boundaries within the *Ptilotus royceanus* Benl (Amaranthaceae) group

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Summary

Hammer, T.A., Davis, R.W. & Thiele, K.R. (2020). Clarification of species boundaries within the *Ptilotus royceanus* Benl (Amaranthaceae) group. *Austrobaileya* **10(4)**: 628–638. The *Ptilotus royceanus* Benl species group comprises *P. royceanus*, *P. mollis* Benl and *P. maconochiei* Benl. *Ptilotus royceanus* as currently circumscribed has a disjunct distribution, occurring on the border of Western Australia and the Northern Territory and in central Queensland to the east of the range of *P. maconochiei*. *Ptilotus mollis* is endemic in Western Australia. We critically re-examine the morphological boundaries of these species and provide evidence that all Queensland collections currently included in *P. royceanus* are referable to *P. maconochiei*. Updated descriptions and a key are given for all three species.

Key Words: Amaranthaceae; *Ptilotus maconochiei*; *Ptilotus mollis*; *Ptilotus royceanus*; taxonomy; identification key; conservation priority species

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Introduction

Ptilotus (Amaranthaceae) is an Australian genus with *c.* 120 species and a centre of diversity in Western Australia (Hammer *et al.* 2018). A recent molecular phylogenetic study (Hammer *et al.* 2019) has resolved several informally named clades within the genus. The species *P. royceanus* Benl, *P. mollis* Benl and *P. maconochiei* Benl are recovered as a monophyletic clade with high support, informally referred to here as the *P. royceanus* species group ('clade C' in Hammer *et al.* (2019)).

Benl (1970) described *Ptilotus royceanus* and *P. mollis* based on material from Western Australia. *Ptilotus royceanus* was considered by Benl to be morphologically distinctive, being a 'hanging', cremnophilous subshrub with dense indumentum obscuring the vegetative surface, orbicular leaves, and very elongated and interrupted spikes. Benl considered it endemic to the ranges near the border of the Northern Territory and Western

Australia (Figs. 1 & 2). He differentiated *P. mollis* from *P. royceanus* based primarily on the inflorescences of *P. mollis* being compact and forming a densely crowded spike (Figs. 3 & 4). Benl cautioned against assuming a close relationship between the two species, considering the differences in the inflorescences to be significant, though he was unable to make a complete comparison as only a fragmentary specimen of *P. mollis* was available to him (Benl 1970: 6). He regarded that the habit and habitat of *P. mollis* differed from that of *P. royceanus*, being a bushy subshrub growing upright between boulders near creeks. The only known collection at the time was from Warralong Station, Western Australia.

In a subsequent publication, Benl (1979) described *P. maconochiei* based on specimens from Mount Isa, Queensland, commenting that it differed from *P. royceanus* in being a rounded, non-cremnophilous shrub with compact inflorescences (Figs. 5 & 6), and from *P. mollis* in having a densely tomentose rather than silky, silvery-grey leaf indumentum.

Bean (2008) included *P. royceanus* and *P. maconochiei* in a treatment of *Ptilotus* in eastern Australia. Specimens included by Bean as *P. royceanus* from Queensland were described as having compact inflorescences and occurring on rocky slopes, rather than having the characteristic interrupted inflorescences and cremophilous habitat of that species as given by Benl (1970, 1979). He regarded that the two species in Queensland differed in inflorescence shape, with *P. maconochiei* having globose to ellipsoidal inflorescences while those of *P. royceanus* were narrowly cylindrical.

In the present study, taxonomic boundaries within the *P. royceanus* species group are critically re-evaluated and the morphological segregation of species within the group clarified. Updated descriptions and a key are given for all three species.

Materials and methods

Dried specimens of *Ptilotus maconochiei*, *P. mollis* and *P. royceanus* housed at BRI, MEL and PERTH were examined, covering the geographic range of all three species. Specimens were critically evaluated irrespective of current determinations and compared to the protologues and type specimens, the latter accessed as high-resolution digital images through *JSTOR Global Plants* (<https://plants.jstor.org/>). Types were examined by the authors unless indicated that an image only was seen by *i.d.v.* (*imago digitalis visa*). Distribution maps were produced using georeferenced records retrieved from the Australasian Virtual Herbarium (<https://avh.chah.org.au/>). Dimensions in descriptions are inclusive (e.g. 1.0–1.7 is given as 1–1.7).

Common abbreviations in the specimen citations are Mt (Mountain/Mount) and NP (National Park).

Results and discussion

Critical examination of all available specimens from throughout the ranges of the species in the *Ptilotus royceanus* group revealed that all three species are clearly separable based on morphological differences.

Ptilotus mollis is the most distinctive species within the group, being morphologically divergent from the other two. As Benl (1970) pointed out, the indumentum covering the stems and leaves of *P. mollis* consists of long, silky, silvery grey hairs, noticeably different from the white, thickly tomentose indumentum of the other two species. *Ptilotus mollis* can also be segregated from *P. maconochiei* and *P. royceanus* in having sepals that are 1.8–3 mm long and a style that is 0.5–0.7 mm long, the latter species having longer sepals and style (see below).

Ptilotus maconochiei can be readily segregated from Western Australian and Northern Territory populations of *P. royceanus* (referred to here as ‘western *P. royceanus*’) on the basis of habitat, leaf shape, inflorescence shape, staminal cup length and style length.

The habitat of western *P. royceanus* is quite different from *P. maconochiei*, and appears to be unique within the genus. Plants grow in the narrow fissures of red sandstone cliff faces (**Fig. 2**), making it quite narrowly distributed in the Petermann Ranges on the border of Western Australia and the Northern Territory (**Map 1**). By contrast, *P. maconochiei* grows on rocky slopes or mesas with laterite, shale or quartzite (**Fig. 5**).

Leaves of *Ptilotus maconochiei* are somewhat variable, ranging from broadly ovate to obovate or conspicuously fimbriate (fan-shaped) on the same individual. Leaves on western specimens of *P. royceanus* are never fimbriate, instead being orbicular to broadly ovate. Leaves of western *P. royceanus* are noticeably shorter than *P. maconochiei*, which are more variable in length based on the shape of the leaf (e.g. sometimes being wider than long).

Ptilotus maconochiei consistently has flowers in tightly compact inflorescences, while inflorescences in western *P. royceanus* are conspicuously interrupted, the stems with terminal inflorescences often being pendulous on plants that hang from rock walls of gorges. Some specimens of western *P.*



Fig. 1. Inflorescence of *Ptilotus royceanus* (Jobson 10779 & Davis, NT). Photo: T.A. Hammer.



Fig. 2. Habit of *Ptilotus royceanus* (Jobson 10779 & Davis, NT). Photo: T.A. Hammer.



Fig. 3. Inflorescences of *Ptilotus mollis* (*van Leeuwen 4845*, PERTH). Photo: R.W. Davis.



Fig. 4. Habit of *Ptilotus mollis* (*van Leeuwen 4845*, PERTH). Photo: R.W. Davis.



Fig. 5. Inflorescence of *Ptilotus maconochiei* (Purdie 8598, CANB). Photo: M. Fagg (Australian Plant Image Index: dig 25946).

royceanus rarely have flowers that are loosely compact (especially towards the apex) and not as elongated and pendulous as is usual, but are none the less distinct from those in Queensland in that the rachis is clearly visible between the flowers.

In the protologue for *Ptilotus maconochiei*, Benl (1979) incorrectly gave the staminal cup length as 3.5–4.5 mm long. This is clearly an error, as it would make the staminal cup nearly as long as the sepals, and does not match the isotype that we examined (PERTH 01558218). All specimens of *P. maconochiei* available to us consistently had staminal cups 0.6–0.8 mm long. Staminal cups in western *P. royceanus*

were consistently shorter (0.2–0.4 mm long). The style also differed significantly between *P. maconochiei* and western *P. royceanus*, the former being 1.6–2 mm long and the latter 1–1.4 mm long.

All specimens determined as *Ptilotus royceanus* from Queensland fell within the morphological range of *P. maconochiei*, and were clearly different from western (i.e. true) *P. royceanus*. They occur in similar habitats to *P. maconochiei*, had a similar range of leaf shapes, dense inflorescences with the rachis not visible between the flowers, staminal cups 0.6–0.8 mm long and styles 1.6–2 mm long.

Bean (2008) gave sepal length (as ‘tepal’ length) as a character discriminating *Ptilotus maconochiei* from the Queensland specimens of *P. royceanus* he examined, indicating that the sepals of *P. maconochiei* were 5–7 mm long and those of Queensland *P. royceanus* were 4–5 mm long. In the protologues, Benl (1970, 1979) gave the sepal length of *P. maconochiei* as 4.5–5 mm long and of *P. royceanus* as 5–6 mm long. Our examinations showed that sepal lengths in all specimens from Queensland, regardless of species determination, overlapped significantly and had a range of 4–6 mm long. *Ptilotus royceanus* from Western Australia and the Northern Territory had a range of 4.5–5.8 mm long. Given the clear overlap in measurements amongst all specimens, we do not regard sepal length as a good character for the use of discriminating these two species.

Bean (2008) also used inflorescence shape in his key separating *Ptilotus maconochiei* and *P. royceanus*, describing inflorescences in *P. maconochiei* as globose to ellipsoidal compared with narrowly cylindrical shape for Queensland *P. royceanus*. Inflorescence shape in these species is a factor of inflorescence length, shorter inflorescences appearing more globose and longer ones more cylindrical. Inflorescences in *Ptilotus* are indeterminate, their length varying widely within a species given local environmental conditions (e.g. a longer growing season). A specimen of *P. maconochiei* near Mt Isa (BRI [AQ699277]) had an inflorescence of similar shape and length to specimens identified as *P. royceanus* from Queensland.

Given the discrete morphological differences between western *Ptilotus royceanus* and those recognised in Queensland by Bean (2008), the clear morphological overlap between Queensland *P. royceanus* specimens and *P. maconochiei*, and the geographic disjunction between the Queensland populations determined as *P. royceanus* and the range of western *P. royceanus* in Western Australia and Northern Territory (**Map 1**), we here recircumscribe *P. maconochiei* to include the Queensland specimens previously referred to as *P.*

royceanus. Revised taxonomic concepts of the species within the *P. royceanus* group are given below.

Taxonomy

Ptilotus maconochiei Benl, *J. Adelaide Bot. Gard.* 1: 201–204, figs 1, 2 (1979). **Type:** Queensland. BURKE DISTRICT: Mt Isa, 8 March 1976, *G. Benl Au64 & J.R. Maconochie* (holo: M 0241487 *i.d.v.*; iso: AD 97904169 *i.d.v.*, B 100272696 *i.d.v.*, BM 000895592 *i.d.v.*, BRI [AQ0332686] *i.d.v.*, CANB 353258 *i.d.v.*, DNA D0013856 *i.d.v.*, G 00236989 *i.d.v.*, K 000357022 *i.d.v.*, M 0241488 *i.d.v.*, MEL 538277 *i.d.v.*, NSW 821430 *i.d.v.*, NY 00341969 *i.d.v.*, P 00609980 *i.d.v.*, PERTH 01558218).

Erect *shrubs* 30–100 cm high. *Stems* terete, their surface obscured by a densely tomentose indumentum of crisped nodose hairs; older stems woody and glabrescent. *Basal leaves* not seen. *Cauline leaves* obovate to broadly ovate or sometimes flabellate, 5–22 mm long, 5–26 mm wide, densely tomentose with crisped nodose hairs, the indumentum obscuring the surface; bases subsessile to petiolate, the petiole 1–5 mm long; margins entire. *Inflorescences* spiciform, terminal or axillary, solitary when axillary or in clusters of 2 or 3 when terminal, ovoid to cylindrical, pink, 15–30 mm long, 10–15 mm wide; apex acute. *Bracts* ovate, 1.9–2.1 mm long, 1.1–1.5 mm wide, abaxially densely tomentose with crisped nodose hairs, adaxially glabrous; midrib conspicuous, pink; apex acute, falcately curved. *Bracteoles* narrowly ovate, 1.8–2.3 mm long, 1.3–1.5 mm wide, abaxially densely tomentose with crisped nodose hairs, adaxially glabrous; midrib conspicuous, pink; apex acute, falcately curved. *Outer sepals* lanceolate, 4.8–6 mm long, 0.8–1.2 mm wide, pink, abaxially villous with spreading nodose hairs, adaxially glabrous; apex truncate, white, glabrous, with in-rolled margins. *Inner sepals* lanceolate, 4–5.8 mm long, 0.7–1 mm wide, pink, abaxially villous with spreading nodose hairs, adaxially glabrous; apex truncate to acute, glabrous, white, with in-rolled margins. *Fertile stamens* 5; *filaments* cream, 1.2–2.2 mm long, unequal in length, filiform; *anthers* cream or pink, 0.4–0.5 mm long, 0.2–0.3 mm



Fig. 6. Habit of *Ptilotus maconochiei* (Purdie 8598, CANB). Photo: M. Fagg (Australian Plant Image Index: dig 25946).

wide. *Staminal cup* symmetrical, not lobed, 0.6–0.8 mm long, glabrous. *Ovary* obovoid, pink, 0.9–1.4 mm long, 0.8–1.2 mm wide, densely villous with straight nodose hairs. *Style* straight, 1.6–2 mm long, centrally fixed on the ovary. *Stigma* unlobed, capitate. *Fruit* smooth, membranous. *Seed* glossy, black, 1.2–1.3 mm long, 0.9–1 mm wide. **Figs. 5 & 6.**

Additional selected specimens examined: Queensland. BURKE DISTRICT: Oskar's valley, 15 km N of Mt Isa, Jun 1996, *Barrs SB24* (BRI); Mt Isa lookout, Sep 2005, *Johnston 05-101* (BRI); Tourist lookout near race course, Mt Isa, 9 Apr 1975, *George 12968* (PERTH); Fountain Range, 54 km SE of Mt Isa, Jul 1989, *Harris 411* (BRI). GREGORY NORTH DISTRICT: Ayrshire Hills, N of Winton, Sep 2008, *Fensham 5819* (BRI); NW of Winton (Ayrshire Hills), Sep 2005, *Johnston 0509-2* (BRI); Mt Edward Graves, Brighton Downs, Jul 2012, *Silcock JLS1243 & Winter* (BRI); Diamantina NP, Fly Mesa, Apr 1997, *Forster PIF20760 & Holland* (BRI). MITCHELL DISTRICT: Mt Stewart near Jundah, Sep 1984, *Hando s.n. & Joyce* (BRI [AQ396011]). WARREGO DISTRICT: Emmet Pocket Lookout, Idalia NP, Mar 1996, *Forster PIF18836 et al.* (BRI); Idalia NP, Emmet Pocket Lookout, Feb 2000, *Nicholls SN18* (BRI); Idalia National Park, Emmet

Pocket Lookout area, Dec 2012, *Purdie 8598* (CANB); NW of Lisburne Homestead on Eton Vale boundary, Sep 2011, *Silcock JLS1017 & McRae* (BRI); 'Etonvale' Station, Jun 1984, *Blick s.n.* (BRI [AQ440577]); Tree Snake Hill, 8 km N of house, N of old mill, 4 km W of Blackall – Adavale road, Sep 2011, *Silcock JLS1026 & McRae* (BRI); Lynbryon, hills S of Scrubby Creek road, Jun 2011, *Silcock JLS903* (BRI). GREGORY SOUTH DISTRICT: Mt Henderson, 22 km E of Birdsville turnoff towards Windorah, Aug 2013, *Silcock JLS1558* (BRI); 72 km W of Windorah, Jul 1936, *Blake 12119* (BRI).

Distribution and habitat: *Ptilotus maconochiei* is endemic to Queensland, in the Burke, Gregory North, Mitchell, Warrego and Gregory South pastoral districts (**Map 1**). The habitat is typically described as slopes or edges of stony ridges, outcrops or mesas with laterite, shale or quartzite and with scattered vegetation consisting of *Acacia* Mill., *Eucalyptus* L'Her. or *Triodia* R.Br.

Phenology: *Ptilotus maconochiei* has been collected flowering and fruiting from June to September, with outlying collections from February to April.

Conservation status: *Ptilotus maconochiei* is listed as **Near Threatened** in Queensland under the *Nature Conservation (Wildlife) Regulation 2006*.

Ptilotus mollis Benl, *J. Roy. Soc. West. Aust.* 53: 4–5, fig. 3 (1970). **Type:** Western Australia. Gorge Range, Warralong Station, 1 May 1941, *N.T. Burbidge 780* (holo: PERTH 00999288)

Low rounded *shrubs* 30–40 cm high. *Stems* terete, densely villous with long, silky, nodose hairs that obscure the surface, becoming woody and glabrescent with age. *Basal leaves* not seen. *Cauline leaves* ovate to obovate, 10–28 mm long, 5–12 mm wide, densely silky-villous with nodose hairs obscuring the surface; bases subsessile to petiolate, petiole 1–6 mm long; margins entire. *Inflorescences* spiciform, axillary or terminal, arranged in a condensed panicle, cylindrical, 5–20 mm long, 6–8 mm wide, pinkish white; apex acute. *Bracts* broadly ovate to ovate, 1.8–2.1 mm long, 1.2–1.4 mm wide, abaxially densely villous with crisped, nodose hairs, adaxially glabrous; midrib conspicuous, brown; apex acute, slightly falcately curved. *Bracteoles* ovate to narrowly ovate, 2.3–2.5 mm long, 1–1.1 mm wide, abaxially densely villous with crisped, nodose hairs, adaxially glabrous; midrib conspicuous, brown; apex acute, slightly falcately curved. *Outer sepals* oblanceolate to lanceolate, 2.2–3 mm long, 1–1.1 mm wide, pink, abaxially villous with spreading nodose hairs, adaxially glabrous; apex acute, white, glabrous. *Inner sepals* lanceolate, 2–2.8 mm long, 0.6–0.9 mm wide, pink, abaxially villous with spreading nodose hairs, adaxially glabrous; apex acute, glabrous, white. *Fertile stamens* 5; *filaments* 0.5–1.1 mm long, unequal in length, filiform, cream; *anthers* 0.4–0.5 mm long, 0.2–0.3 mm wide, cream or pink. *Staminal cup* symmetrical, not lobed, 0.3–0.4 mm long, glabrous. *Ovary* obovoid, 0.7–0.9 mm long, 0.7–0.9 mm wide, white, densely villous with straight, nodose hairs. *Style* straight, 0.5–0.7 mm long, centrally fixed on the ovary. *Stigma* unlobed, capitate. *Fruit* smooth, membranous. *Seed* c. 1.4 mm long, c. 0.9 mm wide, glossy, dark brown. **Figs. 3 & 4.**

Additional selected specimens examined: **Western Australia.** c. 15 km E of Port Hedland – Wittenoom Road, 77 km SW of Marble Bar, May 2011, *Saligari TRS 72-07 & Grantham* (PERTH); Ripon Hills, entrance to abandoned Ripon Hill Mining Centre, May 2001, *van Leeuwen 4845* (PERTH); c. 40 km SSW of Marble Bar on Panorama Station, Apr 2014, *Loudon WEC-001 et al.* (PERTH); c. 2.7 km E of Marble Bar Road & 28.4 km N of Nullagine, May 2013, *Woodman 100-03 & McFarlane* (PERTH); 60.9 km NNE of Nanutarra Roadhouse, Cane River Conservation Park, Jun 2011, *Dillon CR 9160 & Markey* (PERTH); WNW of Red Hill Station, outside of the West Pilbara Iron project area, Aug 2008, *True LCH 24941* (PERTH); 21.2 km W of Nullagine – Newman Road to Bamboo Springs Homestead, Aug 2004, *Chinnock 9657* (PERTH); Rudall River Region, Jun 1987, *Hart 955* (PERTH); 61 km NW of Tom Price, Sep 2007, *Thoma ET1317* (PERTH); c. 150 km SE of Port Hedland, 50 km E of the Great Northern Highway on western edge of Panorama Station, Aug 2010, *Stratton BS 02 & Saligari* (PERTH); c. 93 km WNW of Newman, Sep 2010, *Bull ONS JSF 338.02* (PERTH); c. 77 km NW of Newman on Great Northern Highway, Jul 2015, *Thiele 5254* (PERTH).

Distribution and habitat: *Ptilotus mollis* is endemic in Western Australia, mostly in the Pilbara IBRA (Interim Biogeographic Regionalisation for Australia) bioregion but with the eastern-most occurrence in the Little Sandy Desert IBRA bioregion (**Map 1**). It is typically found on rocky scree slopes or hillsides, often with ironstone, on skeletal red or brown clayey loam soils, and it is typically associated with *Acacia* or *Triodia*-dominated plant communities.

Phenology: Flowering and fruiting from May to August.

Conservation status: *Ptilotus mollis* is listed by Smith & Jones (2018) as **Priority Four** under Conservation Codes of Western Australian Flora.

Ptilotus royceanus Benl, *J. Roy. Soc. West. Aust.* 53: 1–4, figs 1, 2 (1970). **Type:** Western Australia. Bungabiddy Rockhole, Walter James Range, 5 October 1966, *A.S. George 8314* (holo: PERTH 01139363; iso: B 100272695 *i.d.v.*, CANB 251193 *i.d.v.*, K 000357017 *i.d.v.*, M 0241502 *i.d.v.*, MEL 2279190 *i.d.v.*, NSW 821275 *i.d.v.*, PERTH 01139371, RSA 0000623 *i.d.v.*).

Erect or usually hanging, cremnophilous *subshrubs*, 30–60 cm high. *Stems* terete, densely woolly with crisped, nodose hairs

obscuring the surface, becoming woody and glabrescent with age. *Basal leaves* not seen. *Cauline leaves* orbicular to broadly ovate, 4–15 mm long, 4–10 mm wide, densely woolly with crisped, nodose hairs obscuring the surface; bases sessile to petiolate, petiole 0–2 mm long; margins entire. *Inflorescences* spiciform with interrupted or rarely loosely compact flowers, terminal or rarely axillary, pendulous, solitary, indeterminate shape, pink, 40–150 mm long, 8–10 mm wide; apex acute. *Bracts* ovate, 1.8–2.2 mm long, 0.6–1.2 mm wide, abaxially densely woolly with crisped, nodose hairs, adaxially glabrous; midrib conspicuous, pink; apex acute, falcately curved. *Bracteoles* narrowly ovate, 2–2.4 mm long, 0.8–1.2 mm wide, abaxially densely woolly with crisped, nodose hairs, adaxially glabrous; midrib conspicuous, pink; apex acute, falcately curved. *Outer sepals* lanceolate, 4.8–5.8 mm long, 0.6–0.8 mm wide, pink, abaxially villous with spreading nodose hairs, adaxially glabrous; apex truncate, white, glabrous, with in-rolled margins. *Inner sepals* lanceolate, 4.5–5.5 mm long, 0.5–0.7 mm wide, pink, abaxially villous with spreading nodose hairs, adaxially glabrous; apex truncate to acute, glabrous, white, with in-rolled margins. *Fertile stamens* 5; *filaments* 1.3–2.7 mm long, unequal in length, filiform, cream; *anthers* 0.4–0.5 mm long, 0.2–0.3 mm wide, cream or pink. *Staminal cup* symmetrical, not lobed, 0.2–0.4 mm long, glabrous. *Ovary* obovoid, pink, 0.9–1.2 mm long, 0.8–1 mm wide, densely villous to woolly with crisped, nodose hairs. *Style* straight, 1–1.4 mm long, centrally fixed on the ovary. *Stigma* unlobed, capitate. *Fruit* smooth, membranous. *Seed* glossy, *c.* 1.3 mm long, *c.* 0.9 mm wide, black. **Figs. 1 & 2.**

Additional selected specimens examined: **Western Australia.** Bungabiddy Rockhole, NE of Ngaanyatara – Giles, Sandy Blight junction tract, Apr 2013, *Keighery s.n.* & *Moyle* (PERTH 08718202); 27 km N of Great Central Road on Sandy Blight Junction Road, Bungabiddy Rockhole, Jul 2013, *Brand 362* (PERTH); Bungabiddy Rockhole, *c.* 26 km N on the Sandy Blight Road from the Warakurna road at the main rockhole, Jun 2007, *Sweedman 7102* (PERTH); Bangalbirri [Bangalburri] Rockhole, Apr 1972, *Maconochie 1384* (BRI, MEL,

PERTH); Pingkalpiri [Pungkilpirri] Rockhole, Walter James Range, Jun 1989, *Pearson DJP651* (PERTH); Walter James Range, Mar 1993, *Chapman 893* (PERTH); Glen Cumming, Rawlinson Range, Jul 1967, *George 8825* (PERTH); Pangkupirri [Pungkilpirri] Rockhole, Walter James Range, Sep 2006, *Vonow HPV3075 et al.* (PERTH); Just E of Pass of the Abencerrages, Rawlinson Range, Jul 1974, *George 12147* (PERTH); Glen Cummings, Rawlinson Range, 1972, *Robinson s.n.* (PERTH 00224057); Glen Cumming Gorge, Aug 2012, *Blake DD364* (PERTH). **Northern Territory.** W side of gorge, 24.6 km E of Docker River crossing, Aug 2013, *Jobson 10779 & Davis* (NT, PERTH); 0.5 mile [*c.* 0.8 km] E Ewalinga Rockhole, Petermann Ranges, Sep 1969, *Maconochie 780* (MEL, PERTH); Dean Range, Aug 1973, *Latz 4185* (MEL, PERTH).

Distribution and habitat: *Ptilotus royceanus* is restricted to the Petermann Ranges on the Western Australia and Northern Territory border in the Central Ranges IBRA bioregion (**Map 1**), where it typically occurs in narrow rock crevices on the vertical walls of gorges composed of red sandstone. Nearby rocks are often dominated by *Triodia* spp. with scattered shrubs.

Phenology: Flowering and fruiting from June to September, but with outlying collections from March and April.

Conservation status: *Ptilotus royceanus* is listed as **Near Threatened** in the Northern Territory under the *Territory Parks and Wildlife Conservation Act*, but not listed as of conservation concern in Western Australia. Many Western Australian collections are from the same site, variously given as Pungkilpirri, Bungabiddy or Bangalburri Rockhole. The species may be restricted to just a few locations. Given its very restricted distribution and specific habitat, we recommend that the conservation status of *P. royceanus* in Western Australia be re-evaluated.

Key to the *Ptilotus royceanus* species group

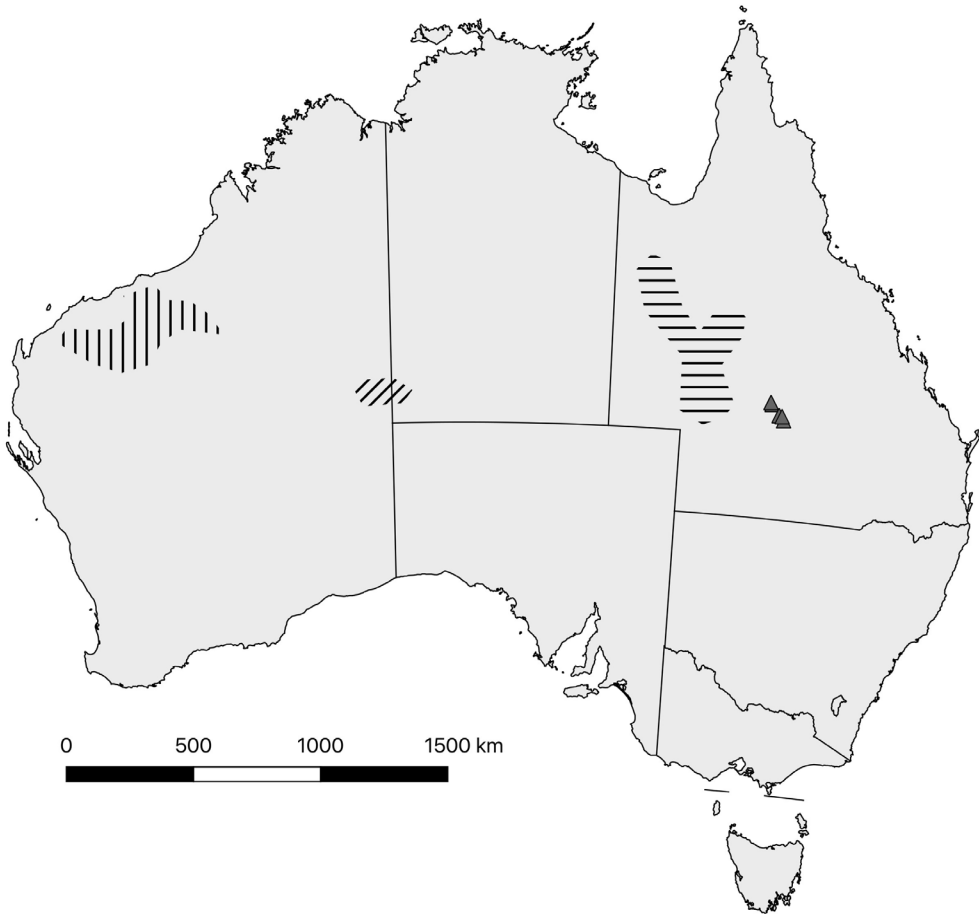
- 1 Stems and leaves densely white-tomentose; sepals > 3.5 mm long;
style > 0.9 mm long **2**
1. Stems and leaves densely silvery-grey silky-villous; sepals
< 3.1 mm long; style < 0.8 mm long **P. mollis**
- 2 Inflorescences interrupted or rarely loosely compact; staminal cup
0.2–0.4 mm long; style 1–1.4 mm long **P. royceanus**
2. Inflorescences tightly compact; staminal cup 0.6–0.8 mm
long; style 1.6–2 mm long **P. maconochiei**

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Map 1. The distributions of the three species as inferred from records retrieved from the Australasian Virtual Herbarium (<http://avh.chah.org.au/>): *Ptilotus mollis* (vertical shading), *P. royceanus* (diagonal shading), *P. maconochiei* (horizontal shading) and Queensland records of *P. royceanus* (triangles) *sensu* Bean (2008) reassessed in the present study.