

## A new species of *Goodenia* (subg. *Porphyranthus* sect. *Ebracteolatae*) from arid Western Australia and the Northern Territory

David E. Albrecht<sup>1</sup> , Leigh W. Sage<sup>2,4</sup>  and Andrew Schubert<sup>3</sup>

<sup>1</sup>Northern Territory Herbarium, Department of Lands, Planning & Environment,  
PO Box 1120, Alice Springs, Northern Territory 0871

<sup>2</sup>Swan Coastal District, Parks and Wildlife Service WA,  
Department of Biodiversity, Conservation and Attractions,  
Dundebar Rd, Wanneroo, Western Australia 6065

<sup>3</sup>PO Box 2996 Alice Springs, Northern Territory 0871

<sup>4</sup>Corresponding author, email: [leigh.sage@dbca.wa.gov.au](mailto:leigh.sage@dbca.wa.gov.au)

### SHORT COMMUNICATION

The species of *Goodenia* described herein was recognised as distinct in the early 2000s by the lead author when it was found in a remote part of arid Northern Territory towards the Western Australian border. The phrase name *Goodenia* sp. Great Sandy Desert (D.E. Albrecht 10517) NT Herbarium was raised at that time, but the species was not formally described due to insufficient material. As the taxon was not known from further east, the collection location was suspected to be on the eastern edge of its distribution. A suite of specimens collected in arid Western Australia in 2017 and 2024, and subsequently lodged at the NT Herbarium, matched the original specimen of *G.* sp. Great Sandy Desert. Examination of specimens of morphologically similar species housed at PERTH by one of the authors (LWS) uncovered additional specimens of this morphologically and geographically cohesive new taxon. Amongst the PERTH material were two specimens seen by Roger Carolin in the early 1970s. Carolin's annotations on these specimens indicate that he considered them to be a distinct taxon, though his manuscript name (*'Goodenia deserti'*) was never published, and it was not included in his *Flora of Australia* treatment of Goodeniaceae (Carolin 1992).

### Methods and materials

The species description, which largely follows the format of Sage and Shepherd (2024), is based on specimens housed at PERTH and NT. Flowers were rehydrated prior to undertaking floral character observations and measurements. The length of fusion of the abaxial corolla lobes was measured from the sinuses between the abaxial lobes to the sinuses between the adaxial lobes and abaxial 'lip'. The seed images were taken with a Leica K3C microscope camera fitted to a Leica M80 stereomicroscope. A series of images were taken manually at different focal planes and combined into a single image using the focus stacking software Helicon Focus.

### Taxonomy

***Goodenia procumbens*** Albr., L.W.Sage & A.Schub., *sp. nov.*

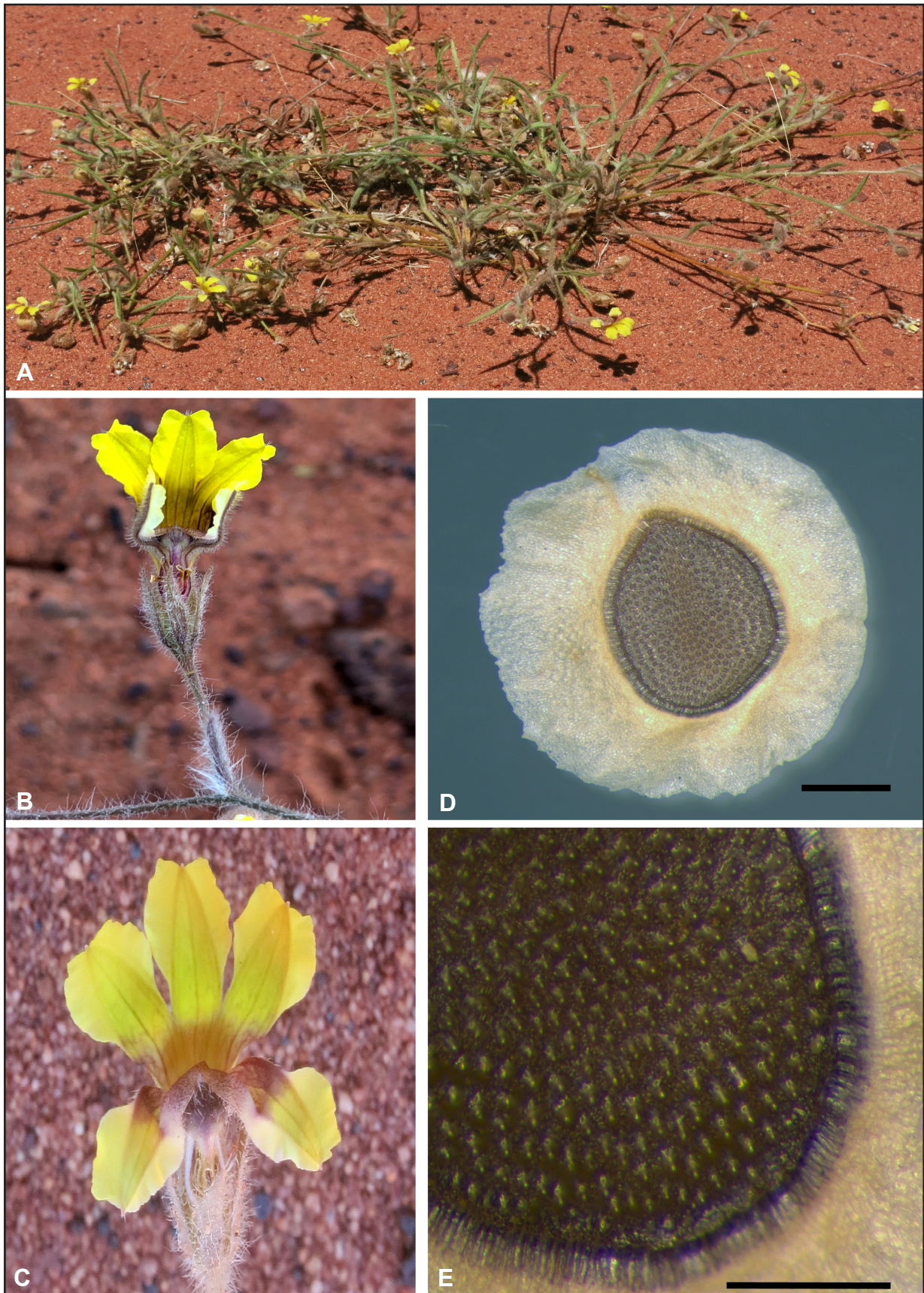
*Typus*: WNW of Tjukurla, Western Australia [precise locality withheld for conservation reasons], 23 October 2017, A. Schubert 1162 (*holo*: NT D0276792; *iso*: PERTH 09692770).

*Goodenia* sp. Great Sandy Desert (D.E. Albrecht 10517) NT Herbarium, Cowie, I.D. & Albrecht, D.E. in Cowie, I.D. & Albrecht, D.E. (eds) (2005), *Checklist of Northern Territory Vascular Plant Species* p. 26 Northern Territory Government, in *FloraNT*, <https://eflora.nt.gov.au/> [accessed 11 November 2024]; Cuff, N.J., Albrecht, D.E., Elliot, L.P., Webb, A.T. & Cowie, I.D. (eds) (2024) *Checklist of the Vascular Plants of the Northern Territory 2024* p. 35, Northern Territory Government, in *FloraNT*, <https://eflora.nt.gov.au/> [accessed 28 February 2025]; Western Australian Herbarium, in *Florabase*, <https://florabase.dbca.wa.gov.au/> [accessed 30 November 2024].

Prostrate, procumbent or low spreading, multi-stemmed, perennial herb to c. 0.2 m high. *Stems* straight to slightly zig-zag, with an indumentum of stiff, spreading, straight to curved hairs 0.2–0.8 mm long and finer, weaker, often tangled hairs to c. 2.5 mm long, underlying tissue visible beneath indumentum, a dense tuft of white hairs in the leaf and bract axils. *Leaves* in a basal rosette and extending up the stems, occasionally fasciculate, narrowly oblanceolate, entire or occasionally with few, small, spreading, linear to narrowly triangular lobes 0.5–12 mm long, usually folded longitudinally or occasionally partially flattened, with a central vein or ridge; lamina 5–105 mm long, 0.5–3.1(–4) mm wide (excluding lobes if present), with an indumentum of stiff, ascending to spreading, straight to curved hairs 0.1–1 mm long and finer, weaker, often tangled hairs to c. 2 mm long on both surfaces and margins, underlying tissue visible beneath indumentum; apex rounded; base attenuate. *Flowers* arranged along main stems and lateral branches in terminal raceme-like cymes; bracts 4–41 mm long, indistinguishable from leaves, becoming smaller distally, entire; bracteoles absent; pedicels sigmoid, distally upturned or almost straight, 5–50 mm long, indumentum as for stems but additionally with minute, gland-tipped hairs c. 0.05 mm long, particularly distally; articulation line 1–1.5(–3) mm below the fruit, not prominent. *Sepals* free at or slightly below midway along the length of the fruit, equal or subequal, lanceolate to elliptic, 4–6.5 mm long, 0.9–1.6 mm wide, erect, with a moderately dense indumentum of minute, gland-tipped hairs c. 0.05 mm long and longer stiff, spreading to ascending, non-glandular hairs 0.2–1 mm long abaxially, with non-glandular hairs in distal half adaxially; apex acute. *Corolla* 10.5–18 mm long, predominantly yellow, brown/maroon at least in the proximal half of the adaxial lobes and brown/maroon flecked auricles, without enations, pouch evident but not pronounced, 2.1–3 mm long, 1.3–1.5 mm wide; outer surface with moderately dense gland-tipped hairs to c. 0.1 mm long and moderately dense longer, stiff, spreading to ascending, non-glandular hairs 0.2–1 mm long, inner surface with moderately dense short, spreading to descending, non-glandular hairs <0.1 mm long below midpoint, glabrous above; abaxial corolla lobes 3.5–4.5(–8.2) mm long, 1.4–2.5 mm wide, apex acute and slightly protruding, basally fused for a further 5.5–8 mm; wings 2–4.2(–6.5) mm long, 0.8–1.7 mm wide,  $\pm$  entire, slightly undulate, subequal to or slightly exceeding the lobe; adaxial corolla lobes 6–11.2 mm long, 1.4–2 mm wide, apex acute and slightly protruding, basally fused for a further 2.5–4 mm; auricle 1.7–3.9 mm long, 2–2.7 mm wide, glabrous except for 0.1–0.2 mm long simple hairs along the inner margin; wing above auricle 3–6.3 mm long, 0.6–1.6 mm wide; wing opposite auricle 2–5.8 mm long, 0.7–1.7 mm wide. *Stamen* filaments linear, 2–3.5 mm long, 0.15–0.35 mm wide; anthers narrowly oblong to oblong-elliptic, 1.2–2 mm long, 0.5–0.9 mm wide. *Style* 4–5.5 mm long, 0.55–0.7 mm wide, with scattered, white hairs 0.5–0.7 mm long distally; indusium truncate depressed obovate to truncate transversely elliptic, 1.2–2.3 mm long, 2.2–2.8 mm wide, both surfaces with minute gland-tipped hairs and non-glandular hairs, both lips with dense, white bristles 0.1–0.5 mm long. *Ovary* with septum one-third to one-half as long as locules, with 15–31 ovules in 2 rows; septum with a few non-glandular hairs toward outer margins. *Fruit* globose to broadly ellipsoid, dorsiventrally compressed, 6–8(–9.5) mm long, 6–8 mm wide, with moderately dense gland-tipped hairs to 0.1 mm long and scattered stiff, spreading, non-glandular hairs to c. 1 mm long; valves opening at maturity. *Seed* body ovate, dark brown, 2.1–3 mm long, 1.5–2 mm wide, with numerous evenly distributed, small, acute projections; wing thin-textured, 0.8–2 mm wide, wider on one side, cream. (Figure 1)

*Diagnostic features.* *Goodenia procumbens* is a prostrate, procumbent or low spreading, multi-stemmed, perennial herb unique within subg. *Porphyranthus* sect. *Ebracteolatae* (K.Krause) K.A.Sheph. (Shepherd *et al.* 2020) by the following combination of characters: narrow, oblanceolate, entire or occasionally lobed leaves 0.5–3.1(–4) mm wide; all vegetative parts covered in an indumentum of stiff, ascending to spreading (spreading only on stems), straight to curved hairs and finer, weaker, often tangled hairs; sepals





**Figure 1.** *Goodenia procumbens*. A – habit; B – section of inflorescence showing indumentum on axis, pedicel, sepals and external surface of corolla; note dense hairs in bract axil; C – flower showing the subequal width wings of the adaxial lobes with brown/maroon pigment on the proximal half; D – seed; E – magnified section of seed body showing numerous evenly distributed small acute projections. Scale bars: D = 1 mm; E = 0.5 mm. Vouchers *A. Schubert* 1160 (A, C), *A. Schubert* no voucher WA Ngururpa IPA, 14.4 km SE of Lamanbendah (B), *D.E. Albrecht* 10517 (D, E). Photographs by Andrew Schubert (A–C), David Albrecht (D, E).



4–6.5 mm long; yellow corolla with some brown/maroon pigmentation, the outer surface with moderately dense, gland-tipped hairs to *c.* 0.1 mm long and moderately dense, longer, stiff, spreading to ascending, non-glandular hairs 0.2–1 mm long, and an inner surface with moderately dense short, spreading to descending, non-glandular hairs <0.1 mm long below midpoint and glabrous above; globose to broadly ellipsoid, dorsiventrally compressed fruits, 6–8(–9.5) mm long and 6–8 mm wide; and dark brown seeds 2.1–3 mm long and 1.5–2 mm wide, with numerous evenly distributed, small, acute projections and a thin-textured wing 0.8–2 mm wide.

*Other specimens examined.* WESTERN AUSTRALIA: [localities withheld for conservation reasons] 12 Sep. 2015, *D.E. Albrecht* 14592, (CANB, PERTH); 20 July 2016, *T. Blake* DD 1271 (PERTH); 23 July 2016, *T. Blake* DD 1328 (PERTH); 8 July 1975, *B.C. Crisp* 342 (AD); 9 Sep. 2015, *R. Davis* 12658 (PERTH); 25 July 1967, *A.S. George* 8912 (PERTH, SYD); 28 July 1967, *A.S. George* 9042 (PERTH); 20 July 2016, *M. Goods* DD 999 (PERTH); 28 July 2016, *M. Goods* DD 1134 (PERTH); 5 Sep. 1998, *G.L. Liddelow* GD 9 (PERTH); 30 Apr. 2021, *J. Mitchell* LMJM-01 (PERTH); 30 Oct. 2017, *A. Schubert* 1160 (NT, PERTH); 25 Oct. 2017, *A. Schubert* 1161 (NT); 27 Oct. 2017, *A. Schubert* 1163 (NT); 19 July 2024, *A. Schubert* 1713 (NT); 19 July 2024, *A. Schubert* 1716 (NT); 19 July 2024, *A. Schubert* 1723 (NT); 5 Aug. 2016, *P. Trickett* DD 1472 (PERTH). NORTHERN TERRITORY: 17 Aug. 2003, *D.E. Albrecht* 10517 (AD, NT, PERTH).

*Phenology.* Flowering and fruiting specimens have been collected from July to October; however, it is likely to be reproductive at any time of the year if adequate soil moisture is available.

*Distribution and habitat.* *Goodenia procumbens* occurs in arid parts of Western Australia and the Northern Territory, mostly within about 150 km of the border separating the two jurisdictions. Most records are within the Great Sandy Desert bioregion (north and east of Kiwirrkurra, and north-west and south-east of Walangurru), with fewer records within the Central Ranges bioregion (north and north-west of Tjukurla). There is a solitary isolated record from west of Patjarr within the Gibson Desert bioregion (Figure 2). The general region is poorly surveyed, and additional populations are likely to be found with greater survey effort.

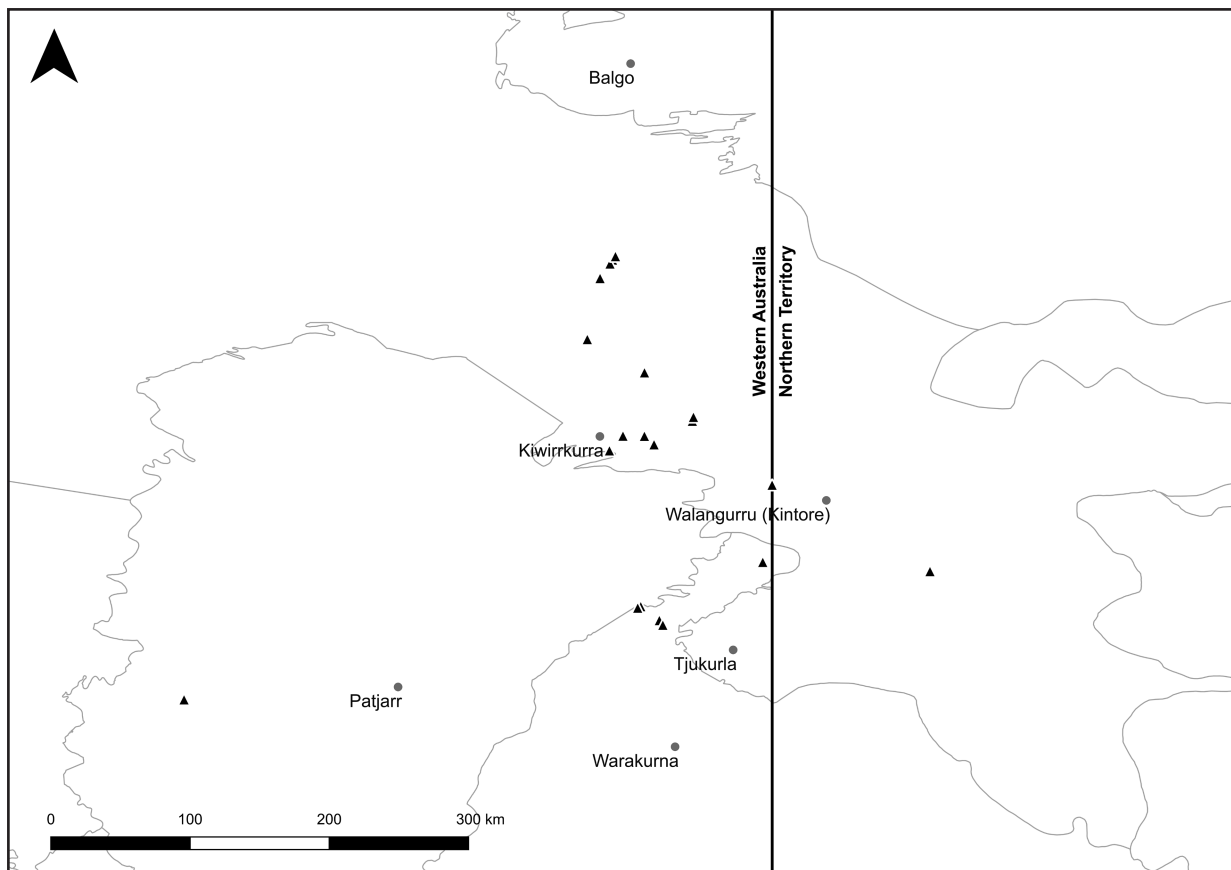
Most records are from sand plains and dune swales, with fewer records from plains or very gentle slopes with sandstone outcropping or lateritic gravel. There is a solitary record from an area with calcrete outcropping. Collections have typically been made in hummock grassland 0.5–3 years post-fire, sometimes with a sparse overstorey of *Allocasuarina decaisneana*, *Corymbia opaca*, *Eucalyptus pachyphylla*, *E. gamophylla* or *Acacia* spp. Commonly recorded associated species include *Triodia pungens*, *T. longiceps*, *Sida cardiophylla*, *Dicrastylis exsuccosa*, *Seringia exastia*, *Scaevola* spp. and *Ptilotus* spp.

*Conservation status.* Listed as Priority Three under Conservation Codes for Western Australian Flora (Western Australian Herbarium 1998–). In Western Australia, the species is currently known from a small number of locations outside the conservation estate within an area that is under immediate threat from mining activities. In the Northern Territory, where it is known with certainty from only a single location, it is currently listed as Data Deficient (Northern Territory Herbarium 2015–). Further survey work in the region between the known population and the NT/WA border should be undertaken as a matter of priority.

*Etymology.* Named from the Latin *procumbens* (lying forward), in reference to the habit of the species.

*Common name.* Procumbent Goodenia.

*Affinities.* *Goodenia procumbens* is a member of subg. *Porphyranthus* sect. *Ebracteolatae* (Shepherd *et al.* 2020); however, in the absence of molecular data its affinities within that group remain uncertain. It has been confused with *G. microptera* F.Muell. and *G. armitiana* F.Muell., and is also superficially similar to *G. maideniana* W.Fitzg. and *G. virgata* Carolin.



**Figure 2.** Distribution of *Goodenia procumbens* (▲) in arid parts of Western Australia and the Northern Territory near the border between the two jurisdictions, based on PERTH and NT specimens, with IBRA region boundaries (Australian Government Department of Agriculture, Water and the Environment 2012) in grey.

*Goodenia microptera* differs from *G. procumbens* in its erect to spreading habit (*cf.* prostrate, procumbent or low spreading), often broader lower leaves (1.7–12 mm wide *cf.* 0.5–3.1(–4) mm wide), the disparity in indumentum between vegetative and floral organs (i.e. basal leaf indumentum dominated by simple non-glandular hairs whilst indumentum of distal pedicels and flowers dominated by glandular-tipped hairs *cf.* non-glandular hairs forming the prominent hair type throughout though small glandular hairs present distally), shorter sepals (2–3 mm long *cf.* 4–6.5 mm long), the wing above the auricle on adaxial corolla lobe being consistently much narrower than the opposite wing (*cf.* wings  $\pm$  similar), fewer ovules (6–12 *cf.* 15–31 ovules) and the reticulate seeds (*cf.* with numerous evenly distributed, small, acute projections). Also, the corolla usually has two patches of brown/maroon towards the margins of the abaxial lip, just below the outer two lobes. Based on current records *G. microptera* occurs no further east than *c.* 122.2 degrees longitude.

*Goodenia armitiana* differs from *G. procumbens* in its ascending to erect habit (*cf.* prostrate, procumbent or low spreading), usually partially varnished stems (*cf.* not varnished), consistently unlobed leaves (*cf.* at least some lobed leaves usually present), tightly conduplicate to involute linear bracts (*cf.* bracts longitudinally folded, narrowly oblanceolate), densely glandular hairy external corolla surface with no or sparse non-glandular hairs (*cf.* moderately dense gland-tipped hairs and non-glandular hairs), recurved abaxial corolla lobes (*cf.* not recurved), weakly developed wings on adaxial lobes (wing above auricle 1.4–4 mm long, 0.1–0.5(–1.1) mm wide *cf.* 3–6.3 long, 0.6–1.6 wide; wing opposite auricle 0.8–2.6 mm long, (0.1–)0.3–1.2 mm wide *cf.* 2–5.8 mm long, 0.7–1.7 mm wide), the wing above the auricle also being consistently much narrower than the opposite wing (*cf.* wings  $\pm$  similar), and the generally greater distance between pedicel articulation and fruit base ((1.2–)1.5–4 mm) *cf.* 1–1.5(–3) mm). *Goodenia armitiana* occurs within the distribution range of *G. procumbens*.

*Goodenia virgata* superficially resembles *G. procumbens* but differs in its erect or occasionally spreading habit (*cf.* prostrate, procumbent or low spreading), glabrous vegetative parts (or with an occasional non-glandular hair <0.5 mm long *cf.* indumentum of non-glandular hairs), acute leaf apex (*cf.* rounded), shorter and narrower sepals 2.5–3.5 mm long, 0.5–0.8 mm wide (*cf.* 4–6.5 mm long, 0.9–1.6 mm wide), fewer ovules (6–12 *cf.* 15–31 ovules), colliculate seeds (*cf.* with numerous evenly distributed, small, acute projections) and the preference for saline habitats. *Goodenia virgata* occurs within the distribution range of *G. procumbens*.

*Goodenia maideniana* (and the closely related *G. anfracta* J.M.Black) superficially resemble *G. procumbens* but differ in having strigose hairs (i.e. appressed, straight) on vegetative parts, sepals and exterior of corolla (*cf.* hairs spreading to curved), the corolla lobe wings extending far beyond the tip of corolla lobes (*cf.* subequal to or slightly exceeding the lobe), the colliculate seeds (*cf.* with numerous evenly distributed, small, acute projections), and the preference for saline habitats. *Goodenia maideniana* occurs within the distribution range of *G. procumbens*.

*Notes.* Although most leaves are entire, at least some lobed leaves are present on the majority of specimens. There is some variation in the indumentum on vegetative parts, especially in the length of the shorter, rigid hairs and in the density of the longer, weaker hairs. Variation was also noted in the width of wings on the two adaxial corolla lobes, with the wing above the auricle being slightly narrower to subequal to the opposite wing. Although the majority of fruits were less than 8 mm long, a few were larger with a corresponding higher number of ovules.

### Acknowledgments

We thank Sally Mumford for preparing Figure 1, Steve Dillon and Kelly Shepherd for their helpful comments on the manuscript and Julia Percy Bower (PERTH), for prioritising the incorporation of NT duplicates of this species and the inclusion of the phrase name on the Western Australian vascular plant census to facilitate completion of the manuscript. We also acknowledge the traditional owners of Kiwirrkurra, Ngururra and Ngaanyatjarra for permission to access their country and collect specimens.

### References

- Australian Government, Department of Agriculture, Water and the Environment (2012). *Interim Biogeographic Regionalisation for Australia (IBRA), version 7*. Canberra, ACT. <https://www.environment.gov.au/land/nrs/science/ibra> [accessed 9 December 2024].
- Carolin, R.C. (1992). *Goodenia*. In: George, A.S. (ed.) *Flora of Australia*. Vol. 35. pp. 147–281. (Australian Government Publishing Service, Canberra.)
- Northern Territory Herbarium (2015–). *FloraNT – Northern Territory Flora Online*. Department of Lands, Planning and Environment. <http://eflora.nt.gov.au> [accessed 9 December 2024]
- Sage, L.W. & Shepherd, K.A. (2024). *Goodenia austrina* and *G. vanleeuweniana* (Goodeniaceae), two new blue-flowered species from Western Australia. *Nuytsia* 35: 91–99. <https://doi.org/10.58828/nuy01080>
- Shepherd, K.A., Lepschi, B.J., Johnson, E.A., Gardner, A.G., Sessa, E.B. & Jabaily, R.S. (2020). The concluding chapter: recircumscription of *Goodenia* (Goodeniaceae) to include four allied genera with an updated infrageneric classification. *PhytoKeys* 152: 27–104. <https://doi.org/10.3897/phytokeys.152.49604>
- Western Australian Herbarium (1998–). *Florabase—the Western Australian Flora*. Department of Biodiversity, Conservation and Attractions. <https://florabase.dbca.wa.gov.au/> [accessed 8 April 2025]