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# *Goodenia quartzitica* (Goodeniaceae), a new range-restricted species discovered in a remote part of the eastern Gascoyne bioregion

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## SHORT COMMUNICATION

The diminutive but hardy new species of *Goodenia* Sm. (Goodeniaceae) described below was discovered in 2013 by Charlie Nicholson and Peter Curry while they were exploring part of the Lake Nabberu basin, north-west of the Shoemaker meteorite impact crater on the Cunyu Station leasehold. While walking through a breakaway-rimmed valley believed to have been traversed by the cameleer Robyn Davidson during her famous trek from Alice Springs in the late 1970s (Davidson 1980), they were drawn to climb a low hill strewn with exposed quartz rubble in an otherwise open valley dominated by chenopods. It was here, mid-way up the north-facing slope, that they discovered these remarkable little plants growing amongst the quartz (Figure 1). They returned to the region in 2017 to hunt for further populations but unfortunately none were found. While there is only one collection available for study, this new species is highly distinctive, and it is hoped that its description will encourage others travelling and working in this remote part of Western Australia to search for more populations.

**Goodenia quartzitica** K.A.Sheph., *sp. nov*.

*Type*: Cunyu Station, Western Australia [precise locality withheld for conservation reasons], 1 September 2013, *C.J. Nicholson & P.J. Curry* 1001 (*holo*: PERTH 08984875; *iso*: CANB).

*Goodenia* sp. Cunyu (C.J. Nicholson & P.J. Curry 1001), Western Australian Herbarium, in *FloraBase*, https://florabase.dpaw.wa.gov.au/ [accessed 28 February 2019].

Perennial *herb* to 10 cm high, glabrous except for a tuft of simple hairs at base of leaves and a mix of simple and glandular hairs on floral parts. *Leaves* basal, strongly revolute, 12–65 mm long, 0.8–1.1 mm wide, glabrous, apex rounded to acute. *Scapes* glabrous, usually shorter than leaves, 45–60 mm long, with 1 or 2 (rarely 3) flowers; pedicels 3.5–8 mm long, not articulate, with scattered red-tipped glandular hairs 0.05–0.2 mm long and sparse simple hairs to 0.25 mm long; bracts linear to narrowly oblong, 2–5.5(–6.5) mm long, 0.6–0.8 mm wide, glabrous, apex subacute to acute; bracteoles absent. *Sepals* 5, free from the ovary almost to the base, narrowly elliptic, 3.5–3.9 mm long, 1–1.2 mm wide, with scattered red- or pale brown-tipped glandular hairs 0.05–0.15 mm long on both surfaces, apex rounded to acute. *Corolla* pale mauve to light purple, with a bright yellow throat, 15–18 mm long; tube *c.* 2.5 mm long, with a small pouch; outer surface with moderately dense red-tipped glandular hairs 0.05–0.15 mm long and sparse simple hairs to 0.25 mm long; inner surface with scattered simple


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hairs 0.15–0.2 mm long towards the top of the throat, becoming denser towards the base; auricle 4–5 mm long, 1–2 mm wide, glabrous with moderately dense simple white hairs 0.3–0.6 mm long on the outer margin; abaxial corolla lobes *c.* 5 mm long, *c.* 2 mm wide, basally connate for *c.* 5 mm to the junction with the adaxial lobes, with equal wings 4–4.7 mm long, 1.6–2 mm wide; adaxial corolla lobes *c.* 9 mm long, *c.* 2 mm wide, basally connate for *c.* 1 mm, with equal wings 4.2–4.5 mm long, 1.8–2.1 mm wide. *Stamen* filaments linear, *c.* 2.5 mm long; anthers elliptic, *c.* 4.8 mm long, mucronulate. *Ovary* to 2.8 mm long, glabrous outside with long hairs to 1.2 mm long inside at the base, septum almost obsolete, ovules *c.* 10 per locule; style to 5 mm long, glabrous; indusium depressed-obovate, *c.* 1.9 mm long, *c.* 3 mm wide, with scattered simple hairs 0.3–0.75 mm long becoming denser towards the base, with conspicuous white bristles 0.1–0.3 mm long on upper and lower lips. *Fruit* an ellipsoid capsule, glabrous. *Seeds* flat, bronze, 3.3–3.5 mm long, 2–2.1 mm wide (excluding wing); wing bronze, 0.7–1 mm wide. (Figure 1)

*Diagnostic characters*. This species is readily distinguished from all other species of *Goodenia* by the following combination of characters: strongly revolute, glabrous leaves to 65 mm long; ebracteolate inflorescences that are shorter than the leaves and have 1 or 2 (rarely 3) flowers with sepals almost free from the ovary; a pale mauve to light purple corolla with a bright yellow throat and moderately dense, red-tipped glandular hairs and sparse simple hairs on the outer surface; and bronze, winged seeds.

*Other specimen examined*. WESTERN AUSTRALIA: [locality withheld for conservation reasons] 12 Sep. 2017, *C.J. Nicholson & P.J. Curry s.n.* (PERTH).

*Phenology*. It is difficult to predict a flowering time for *G. quartzitica* given the limited material available for study. Plants were in full flower when the type collection was made at the start of September in 2013 and only one mature fruit with seed was evident on otherwise sterile plants at the same location on a subsequent visit in late September 2017. Many other species of *Goodenia* in the arid Eremaean Botanical Province favour 'water-gaining sites' (Sage & Piggott 2003), but *G. quartzitica* grows in a particularly harsh and dry environment on a water shedding site. It is likely therefore that this species rapidly responds to rainfall events and an extended season of reproduction will only occur if there is sufficient soil moisture or follow up rains (C.J. Nicholson pers. comm.).

*Distribution and habitat*. *Goodenia quartzitica* is found north-west of Wiluna within the Gascoyne bioregion and Eremaean Botanical Province (Western Australian Herbarium 1998–). It grows in red, loamy soil with exposed quartz rubble on the north-facing side of a low ridge within the saline Nabberu Lake system, near a low halophytic shrubland of *Frankenia*, *Eremophila*, *Maireana glomerifolia*, *Ptilotus albidus*, *P. schwartzii*, *Tecticornia* and *Carpobrotus*. Testing of the habitat soil revealed a pH of 5.6 and total dissolved solids (TDS) of 70 ppm (A. Shade pers. comm.).

*Conservation status*. *Goodenia quartzitica* was recently listed as Priority One under Conservation Codes for Western Australian Flora (Western Australian Herbarium 1998–), under the name *G.* sp. Cunyu (C.J. Nicholson & P.J. Curry 1001). It has only been recorded from the type locality, which is situated on Proterozoic age quartz sandstone and siltstone within salt lake country on a pastoral lease (P.J. Curry pers. comm.). While approximately 20,000 individual plants were estimated at this site, no other plants were found during searches of nearby, superficially similar areas with exposed quartz. It is unclear how vulnerable this species is to various threats such as grazing, fire or drought, but no evidence of population decline was observed at the time of collection (C.J. Nicholson pers. comm.).

*Etymology*. This epithet *quartzitica* alludes to the habitat in which this species grows.


Figure 1. *Goodenia quartzitica*. A – Charlie Nicholson taking notes while collecting this species on a slope of exposed quartz rubble; B – pale mauve flowers with a bright yellow throat; C – habit; D – linear leaves and ellipsoid fruit capsule; E – bronze, winged seeds. Images by Peter Curry and Charlie Nicholson.

*Vernacular name*. Quartz-loving Goodenia.

*Affinities*. Despite having sepals that are almost free from the ovary, a characteristic diagnostic of many species *G.* subg. *Monochila* (G.Don) Carolin sect. *Velleia* (Sm.) K.A.Sheph. (formerly *Velleia* Sm.; see Shepherd *et al.* 2020), *G. quartzitica* is best placed within subg. *Porphyranthus* (G.Don) K.A.Sheph. sect. *Ebracteolatae* (K.Krause) K.A.Sheph. on account of its lack of bracteoles and seeds with a broad wing 0.7–1 mm wide; however, its closest relatives remain uncertain. Based on Carolin's (1992a) key, it falls within Group 6 and is morphologically similar to the poorly known *G. pallida* Carolin and the more widespread *G. muelleriana* Carolin due to the shared presence of glabrous leaves without auricles, simple and glandular hairs on the outer corolla and equal-length bristles on both lips of the indusium. Both species have distributions centred on the Pilbara bioregion and are easily distinguished from the diminutive *G. quartzitica* by their taller habit (40–50 cm high vs 10 cm) with racemose inflorescences on scapes 20–30 cm long (vs few flowers on scapes 4.5–6 cm long), and shorter sepals (*c.* 2 mm long vs 3.5–3.9 mm long) that are adnate to the ovary (vs sepals 3.5–3.9 mm long that are almost free from the ovary).

*Goodenia macroplectra* (F.Muell.) Carolin is another species within sect. *Ebracteolatae* with free sepals similar to *G. quartzitica*; however, this white-flowered species is pollinated by moths (K.R. Thiele pers. comm.) and has a distinctive corolla spur that is twice as long as the ovary.

*Goodenia quartzitica* is also somewhat similar to *G. exigua* F.Muell. (previously *V. exigua* (F.Muell.) Carolin) from subg. *Goodenia*, a small species with terete-spathulate leaves that is associated with saline clay pans near the south coast of Western Australia (Carolin 1992b; Western Australian Herbarium 1998–). *Goodenia quartzitica* can be separated from this species by its linear leaves with a rounded apex (vs terete-spathulate leaves with a distinctive yellow, aristate tip), scapose habit with pedicellate flowers (vs sessile or almost sessile flowers), and lack of bracteoles (vs linear bracteoles 1–2 mm long).

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## References

Carolin, R.C. (1992a). *Goodenia*. *In*: George, A.S. (ed.) *Flora of Australia*. Vol. 35. pp. 147–281. (Australian Biological Resources Study: Canberra.)

Carolin, R.C. (1992b). *Velleia*. *In*: George, A.S. (ed.) *Flora of Australia*. Vol. 35. pp. 282–297. (Australian Biological Resources Study: Canberra.)

Davidson, R. (1980). *Tracks*. (J. Cape: London.)

Sage, L.W. & Pigott, J.P. (2003). Conservation status of *Goodenia* (Goodeniaceae) in Western Australia, including a review of threatened, rare and poorly known species. *Journal of the Royal Society of Western Australia* 86: 123–132.

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. doi: 10.3897/phytokeys.152.49604

Western Australian Herbarium (1998–). *FloraBase—the Western Australian Flora*. Department of Biodiversity, Conservation and Attractions. https://florabase.dpaw.wa.gov.au/ [accessed 28 February 2019].