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Olearia arckaringensis (Asteraceae: Astereae), a new endangered daisy-bush from northern South Australia.

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Abstract

A new arid zone species from Arckaringa Station is formally described as *Olearia arckaringensis*. It falls in *Olearia* sect. *Eriotriche* Archer ex Benth. and is a distinctive species without any obvious close relatives. Currently it is known only from a single site on a gypseous breakway escarpment and is considered to be critically endangered.

Introduction

This new species of *Olearia* Moench. was discovered by P.J. Lang and R. Brandle during a brief visit to Arckaringa Station in May 2000. It was recognised as new to South Australia and although there was no opportunity to survey the extent of occurrence, there was time to collect herbarium specimens, take photographs, and make habitat notes. The original collection site was then revisited the following month on separate trips by A.C. Robinson and D.E. Symon who both made additional collections but did not find any new occurrences in surrounding areas. Robinson traced the limits of the population spanning c. 0.5 km along the upper slopes of the breakaway escarpment and estimated the total number of plants to be no more than 200. Arckaringa Station was revisited by the author in March 2004 and a day was spent there searching for new populations in potential habitat without success. Brandle, on a nine day biological survey of the nearby Mt Willoughby Station, noted substantial areas of habitat very similar to the type locality, particularly in the Brumby Creek area, but the plant was not found (Brandle et al. 2005). Due to the remoteness and inaccessibility of the terrain, there is still a possibility that undiscovered populations exist in the district. It is hoped that the publication of the new taxon will encourage further effort in searching for additional populations and facilitate its recognition and conservation as a threatened species.

Olearia arckaringensis* P.J.Lang, *sp. nov.

Species nova ad Olearium *sectionem* Eriotrichum *pertinens; foliis dense lanatis, albidis vel pallide subviridi-griseiis, grosse (2–) 4–8 (–10)-serratis, capitulis solitariis in peduncularis terminalibus glandulosis, (1–) 4–8 (–13) cm longis flosculis radii 3-seriatis distinguitur.*

Type: *D.E.Symon 16109 & J.Symon*, 28 Jun. 2000, Arckaringa Station, breakaway slopes facing Arckaringa Creek, Lake Eyre Region, South Australia (holo.: AD212148; iso.: AD, CANB, K, NT, PERTH).

Olearia sp. Arckaringa (*P.J.Lang BSOP-422*) P.J.Lang in W.R.Barker et al., J. Adelaide Bot. Gard. Suppl. 1: 148 (2005).

Illustration: Brandle et al. (2005), p. 16, Fig. 14, as 'Arckaringa Daisy' [branch with flower-heads and foliage].

Small, compact, rounded, long-lived perennial *shrub* to 30 cm high with short-lived stems produced from a thick, furrowed, woody base to 4 cm diameter. *Stems* erect, white-woolly, aging grey. *Leaves* alternate, concolorous, greyish-white to light greenish-grey; indumentum dense, white, woolly, of long, fine, tortuous, intricate, uniseriate, eglandular hairs, holding, and partly obscuring below, plentiful globules of golden resin; lamina (± widely) elliptic, (8–) 13–17 (–27) × 5–16 mm, coarsely (2–) 4–8 (–10)-serrate, undulate and slightly incurved or concave to almost conduplicate, tapering gradually into a short petiole 2–5 (–9) mm long; midrib channelled on adaxial surface, distinctly raised abaxially. *Capitula* terminal, solitary, pedunculate. *Peduncles* terminal, green to reddish-brown, (1–) 4–8 (–13) cm long, striate, viscid, glandular-hairy, bearing 1–3 (–5) small, leaf-like, lanceolate, glandular-hairy bracts; indumentum of biseriate, patent, capitate glandular hairs variable in size, the larger ones with inflated conical bases. *Involucre* cyathiform; bracts 61–80, 3–4-seriate, unequal, pale green with apices grading to light brown or purple, glandular hairy on exposed surfaces with small, biseriate, patent, capitate hairs. *Outer involucral bracts* very narrowly triangular to narrowly lanceolate, 3–7 × 0.4–0.7 mm, flat, entire or with a narrow hyaline erose margin. *Inner involucral bracts* linear, 7–10.5 × 0.8–1.2 mm, weakly keeled with prominent midrib; apex acuminate; margins hyaline, erose to sparsely and irregularly fimbriate; bases

Fig. 1. *Olearia arckaringensis*. a leaves on upper stem; b bud showing involucral bracts; c cypsellas; d flower head. a, b, d from photos by A.C. Robinson (*ACR BSOP-270*).

thickened, stramineous. *Receptacle* flat. *Ray florets* 36–60, irregularly 3-seriate, female, 11–18 mm long, with sparse, biseriate, patent, botuliform, minute, eglandular hairs scattered externally on the lower limb and upper tube; ligules lavender, or occasionally white, often recurved to lightly revolute in flower, 7–15 × 1.3–2.8 mm, obtuse and minutely (2–) 3-lobed apically; stylar arms ligulate, 1–1.2 mm long, densely and minutely papillate. *Disc florets* 44–72, bisexual, 6.7–9.4 mm long; corolla tube 4.2–5.8 mm long, yellow, glabrous; corolla lobes 5, 0.4–1.3 mm long, triangular, with sparse, biseriate, patent, botuliform, minute, eglandular hairs outside; anthers c. 2 × 0.25 mm with narrow-triangular sterile terminal appendages; stylar arms ligulate, c. 1.1–1.6 × 0.2 mm, densely and minutely papillate, with narrowly ovate to triangular apical appendages 0.4–0.6 mm long, bearing botuliform collecting papillae. *Cypsela* narrowly obovoid, slightly compressed, 2–2.6 × 0.6–0.75 mm, distinctly ribbed, light brown, hirsute with antrorsely inclined duplex hairs; carpopodium conspicuous, central, stramineous. *Pappus* uniseriate, of 18–28 barbellate bristles subequal to the tubular florets. (Fig. 1–3).

Affinities. The new species has no obvious close relative. The combination of dense woolly indumentum on the stems and foliage, glandular hairy peduncles and bracts, serrate leaves and solitary capitula on long peduncles

Fig. 2. Habitat on soft eroded gravelly slopes of erosion gully; the small paler shrubs are *Olearia arckaringensis* which extends from the foreground to just beyond the Western Myall (*Acacia papyrocarpa*) in the centre. Photo A.C. Robinson.

Fig. 3. Habit of *Olearia arckaringensis*: an old gnarled shrub with thick woody base (*P.J. Lang BSOP-431*).

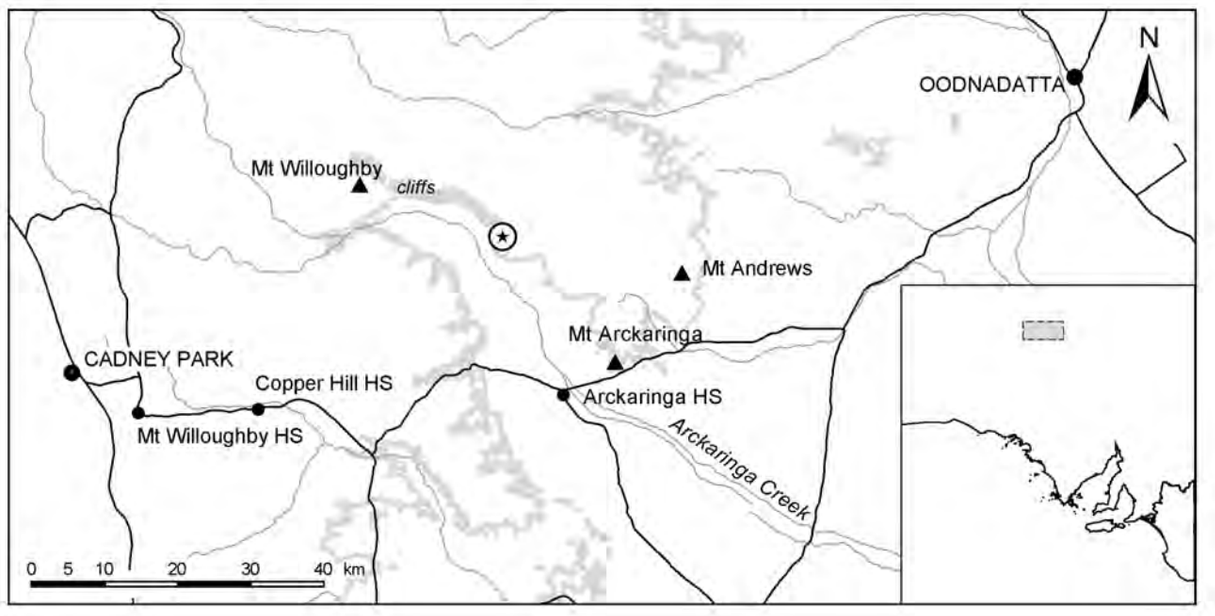

Fig. 4. Known distribution of *Olearia arckaringensis* (★).

is unique in *Olearia*. These features together with the 3-seriate ray (a departure from the usual 1- or 2-seriate condition) and the specialised habitat, make this a very distinctive species.

Molecular studies by Cross et al. (2002) indicate that *Olearia* as currently recognised is polyphyletic although some congruence was found with abaxial hair types that form the basis of the five sections recognised by Bentham (1867). These sections, and the existing generic concept, have been maintained as a working classification pending further resolution of the phylogeny.

Olearia arckaringensis belongs in section *Eriotriche* Archer ex Benth., a heterogenous group defined by the presence of densely intricate woolly hairs on the abaxial leaf surface. Some species in this section also have biseriate, capitate glandular hairs on other parts of the plant, as found on the peduncles and bracts of *O. arckaringensis*. There are also indications of possible affinities with some species in section *Merismotriche* Archer ex Benth. Similar glandular hairs are well represented in that section, and the inflorescence type of solitary capitula on long terminal peduncles is found in several species there, although hitherto absent in sect. *Eriotriche*. The presence of both conical and non-conical biseriate, capitate glandular hairs in *Olearia arckaringensis* is a feature shared with *Olearia stuartii* (F.Muell.) F.Muell. ex Benth. and three related species[1] which Lander (1989) recognised as a natural group in sect. *Merismotriche*.

Distribution. Endemic to the Arckaringa Hills in northern South Australia (Fig. 4).

[1] *Olearia gordonii* Lander, *O. humilis* Lander and *O. xerophila* (F.Muell.) F.Muell. ex Benth.

Ecology. This is an arid zone species occurring in an area with an average rainfall under 180 mm per annum. The only known population occurs in the soft, eroding upper slopes of a dissected breakaway escarpment. The soil is a powdery white matrix with angular ochre-coloured gravel and occasional gypsum crystals 0.5 to 2 cm long, some of which are clustered in small rosettes.

The plant community is a Low Very Open Woodland of *Acacia papyrocarpa* Benth. (Western Myall) and/or *Eucalyptus socialis* F.Muell. ex Miq. (Beaked Red Mallee) with sparse *Acacia tetragonophylla* F.Muell. (Dead Finish) shrubs. Prominent in the very open ground layer were: *Anemocarpa saxatilis* (Paul G.Wilson) Paul G.Wilson, *A. podolepidium* (F.Muell.) Paul G.Wilson, *Enneapogon* spp., *Goodenia calcarata* F.Muell., *G. chambersii* F.Muell., *Stackhousia clementii* Domin, and the following seven species recorded by Symon (2007) as facultative gypsophiles: *Arabidella glaucescens* E.A.Shaw, *Flaveria australasica* Hook., *Goodenia fascicularis* F.Muell. & Tate, *Minuria annua* (Tate) Tate ex J.M.Black, *Ptilotus barkeri* Benl, *P. whitei* (J.M.Black) Lally and *Zygophyllum crassissimum* Ising.

The State-listed rare species *Ptilotus barkeri* is of particular note as an ecological associate and indicator of potential habitat. This small, long-lived perennial shrub is distributed more widely within breakaway country of the Lake Eyre Region but is still largely confined to similar powdery, white, gypseous substrates as occupied by *Olearia arckaringensis*.

Symon made a field note on the strong resemblance of the *Olearia* to the two species of *Anemocarpa* growing on site. These are 'paper daisy' plants that develop woody bases and have similar soft whitish to grey foliage. *Olearia arckaringensis*, *Ptilotus barkeri*

and the *Anemocarpa* species all exhibit a well developed capacity to regrow from their woody basal parts, a useful adaptation in such an extreme environment.

Conservation status. The estimated population size of less than 250 individuals means that this species is at least Endangered (EN), based on criterion D of the IUCN 2001 categories adopted by the National Parks and Wildlife Coucil (2003). The small population makes it especially susceptibe to potential impacts of climate change. When revisited in 2004 during a drought, some smaller plants of the long-lived species had died and many were in poor condition, with only an estimated 10-15% foliage cover remaining. With this observed decline, and in continuation of drought conditions over the last few years, it is reasonable to treat the species as Critically Endangered (CR), based on IUCN 2001 criteria [B.2.a & c.(iv)].

Etymology. The epithet refers to the only known locality. Although 'Arckaringa' is thought to be derived from an aboriginal name, its origin and meaning have been lost.

Specimens examined, other than the type (all deposited at AD)

SOUTH AUSTRALIA: **Lake Eyre:** *P.J. Lang BSOP-422, BSOP-431*, 11 May 2000, 23.2 km direct NNW of Arckaringa HS, Arckaringa Station, on breakaway escarpment; *A.C. Robinson BSOP-270, BSOP-275, BSOP-276*, 29 Jun. 2000, 33km [by track] NW of Arckaringa H.S.; *P.J. Lang BSOP-915 to BSOP-918*, 20 Mar. 2004, Arckaringa Station, SA.

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