

## *Pseudanthus orbicularis* Tangled Pseudanthus

### Taxonomy

*Pseudanthus orbicularis* (Mull. Arg.) Halford & R.J.F. Hend.

### Current conservation status

Categorised as Rare in the 2014 Advisory list of rare or threatened flora (DEPI 2014).

### Proposed conservation status

Vulnerable in Victoria

Criterion D2

### Species Information

#### Description and Life History

The taxon is a low wiry shrub to c. 50 cm high, densely and divaricately branched, glabrous to minutely scabrous. Leaves rather scattered, ovate to suborbicular, mostly 1.5–4 mm long, 1–3 mm wide, apex obtuse and often recurved, more or less flat, glabrous; petiole to c. 0.5 mm long. Male flowers with sepals ovate, c. 1 mm long, often reddish, inner ones larger; stamens all half as long as sepals or shorter. Female flowers with sepals c. 2 mm long, acute, reddish; ovary ovoid. Capsule obloid, 3–5 mm long, 1.5–2 mm wide; seed 2.5–4 mm long, reddish-brown. Flowers mainly September to November (VicFlora 2018).

#### Generation Length

The generation length of *Pseudanthus orbicularis* is estimated to be 35 to 50 years. This is based on a plausible longevity of 25–50 years or more, and likely episodic recruitment from a long-persistent soil-stored seedbank in response to bushfire at pre-settlement intervals of 35–50 years. The taxon is likely to be a fire-sensitive obligate seed regenerator, although its capacity to resprout is unknown. It may also recruit opportunistically in response to seasonal conditions or localised site disturbance events resulting in a low rate of trickle recruitment.

#### Distribution

The taxon is found mostly in eastern Victoria, but with a western outlier near Bacchus Marsh and pre-1900 collections from Mount Macedon and Bendigo (VicFlora 2018). It has a disjunct distribution with local concentrations in the Brisbane Ranges, Werribee Gorge, and Lerderberg Gorge in the west, and the Licola, Stockdale, Snowy River Gorge, Bemm River, Genoa, and Howe Range districts in the east. It is also found in NSW (VicFlora 2018).

#### Habitat

The taxon is rare in Victoria, often found on rocky sites (VicFlora 2018).

#### Threats

Current threats to the taxon are difficult to identify with any confidence. Long-term future threats may include adult mortality and recruitment failure in response to extreme drought stress, and targeted browsing by Sambar Deer (*Rusa unicolor*) or other native and exotic herbivores, particularly during extended droughts and during the early stages of seed-based recruitment. The susceptibility of the taxon to browsing is unknown.

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The taxon may also be threatened by repeat fire events at intervals approaching the tolerable fire interval for the taxon, although this risk may be moderated by the relatively slow rates of fuel accumulation in dry, rocky habitats.

Historic decline of the taxon due to habitat loss to agriculture is likely to be negligible given the rocky substrates and low nutrient status of soils at all known sites.

## IUCN Criteria

Criterion A. Population size reduction. Population reduction (measured over the longer of 10 years or 3 generations) based on any of A1 to A4			
	Critically Endangered	Endangered	Vulnerable
A1	≥ 90%	≥ 70%	≥ 50%
A2, A3, A4	≥ 80%	≥ 50%	≥ 30%
<p>A1 Population reduction observed, estimated, inferred or suspected in the past and the causes of the reduction are clearly reversible AND understood AND ceased.</p> <p>A2 Population reduction observed, estimated, inferred or suspected in the past where the causes of the reduction may not have ceased OR may not be understood OR may not be reversible.</p> <p>A3 Population reduction, projected or suspected to be met in the future (up to a maximum of 100 years) [(a) cannot be used for A3]</p> <p>A4 An observed, estimated, inferred, projected or suspected population reduction where the time period must include both the past and the future (up to a max. of 100 years in future), and where the causes of reduction may not have ceased OR may not be understood OR may not be reversible.</p> <p style="text-align: center;"><i>based on any of the following:</i></p> <ul style="list-style-type: none"> <li>(a) direct observation [except A3]</li> <li>(b) an index of abundance appropriate to the taxon</li> <li>(c) a decline in area of occupancy, extent of occurrence and/or quality of habitat</li> <li>(d) actual or potential levels of exploitation</li> <li>(e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites</li> </ul>			

## Evidence:

### Ineligible under Criterion A

There is insufficient evidence to determine whether there has been or will be a reduction in population sufficient to meet any threshold for Criterion A.

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Criterion B. Geographic range in the form of either B1 (extent of occurrence) and/or B2 (area of occupancy)			
	Critically Endangered Very restricted	Endangered Restricted	Vulnerable Limited
B1. Extent of occurrence (EOO)	< 100 km <sup>2</sup>	< 5,000 km <sup>2</sup>	< 20,000 km <sup>2</sup>
B2. Area of occupancy (AOO)	< 10 km <sup>2</sup>	< 500 km <sup>2</sup>	< 2,000 km <sup>2</sup>
AND at least 2 of the following 3 conditions:			
(a) Severely fragmented OR Number of locations	= 1	≤ 5	≤ 10
(b) Continuing decline observed, estimated, inferred or projected in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) area, extent and/or quality of habitat; (iv) number of locations or subpopulations; (v) number of mature individuals			
(c) Extreme fluctuations in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) number of locations or subpopulations; (iv) number of mature individuals			

## Evidence:

### Ineligible under Criterion B

The Area of Occupancy (AoO) across the taxon's range is estimated to be 120 km<sup>2</sup>, but other thresholds under this criterion have not been met.

Criterion C. Small Population size and decline				
	Critically Endangered	Endangered	Vulnerable	
Number of mature individuals	< 250	< 2,500	< 10,000	
AND at least one of <u>C1</u> or <u>C2</u>				
<u>C1</u>	25% in 3 years or 1 generation (whichever is longer)	20% in 5 years or 2 generations (whichever is longer)	10% in 10 years or 3 generations (whichever is longer)	
<u>C2</u>	An observed, estimated, projected or inferred continuing decline AND least 1 of the following 3 conditions:			
(a)	(i) Number of mature individuals in each subpopulation	≤ 50	≤ 250	≤ 1,000
	(ii) % of mature individuals in one subpopulation =	90 – 100%	95 – 100%	100%
(b)	Extreme fluctuations in the number of mature individuals			

## Evidence:

### Ineligible under Criterion C as Data Deficient

There is no available estimate of population size for the taxon.

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Criterion D - Very small or restricted population			
	Critically Endangered	Endangered	Vulnerable
Number of mature individuals (observed or estimated)	<50	<250	<1,000
D2 - Only applies to the VU category Restricted area of occupancy or number of locations with a plausible future threat that could drive the species to critically endangered or Extinct in a very short time.	-	-	D2 - Typically: AoO < 20 km <sup>2</sup> or number of locations < 5

## Evidence:

### Eligible under Criterion D2 as Vulnerable

The taxon is estimated to be very restricted. The taxon has a restricted distribution, occurring in 1 to 4 locations, such that this restriction makes the taxon capable of becoming Critically Endangered or Extinct within a time frame of one or two generations. This is in response to the impact of the identified long-term threats, notably drought stress, browsing by native and exotic herbivores, and increased fire events.

**Criterion E (Quantitative Analysis) was not addressed as the taxon does not have a detailed Population Viability Analysis.**

## References

DEPI (2014). *Advisory list of rare or threatened plants in Victoria - 2014*. Department of Environment and Primary Industries, Melbourne.

VicFlora (2018). Flora of Victoria, Royal Botanic Gardens Victoria: *Pseudanthus orbicularis*. Retrieved from: <https://vicflora.rbg.vic.gov.au/flora/taxon/e61ac947-d8a4-4a11-8426-c938858faff4>