Threatened Species Assessment

Cyphanthera anthocercidea
Large-leaf Ray-flower

Taxonomy

Cyphanthera anthocercidea (F. Muell.) Haegi

Possible hybrids between *C. anthocercidea* and *C. myosotidea* have been noted in the northern Grampians where the two taxa grow together (VicFlora 2018).

Current conservation status

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

Proposed conservation status

Endangered in Australia

Criterion B2ac(iv)

Species Information

Description and Life History

The taxon is an erect shrub to 3 m high; branches moderately tomentose with branched hairs and sometimes minute glandular hairs. Leaves sessile or subsessile, ovate to narrow-ovate, mostly 25-75 mm long, 8-20 mm wide (juvenile leaves often much larger and petiolate), acute or obtuse, margins flat, virtually glabrous. Inflorescences panicle-like, dense, leafy. Flowers on sparsely pubescent pedicels 2.5-6.5 mm long; calyx campanulate, 3-4 mm long, virtually glabrous; corolla 10-12(-14.5) mm long, virtually glabrous, white with purple striations, lobes ovate-truncate to linear, 4-5.5(-9) mm long, spreading; stamens 2-4 mm long. Capsule more or less globose, 4-5 mm diam.; seeds 2.4-3.5 mm long, pitted, brown. The taxon flowers mainly in spring and summer (VicFlora 2018).

The taxon is a vigorous post-fire seed recruiter, which also germinates readily in response to physical abrasion. Following seed germination, new recruits are observed to flower en masse within 3 years, suggesting that the taxon is not long-lived (David Handscombe pers.comm. 16/01/2019).

Generation Length

The generation length of *Cyphanthera anthocercidea* is estimated to be 50 to 70 years. This is based on an estimated longevity of 10 -30 years and an estimated pre-settlement fire interval of 50-70 years. The taxon is regularly observed recruiting episodically post-fire and, post-settlement, along roadsides in response to physical abrasion by graders or slashers. The taxon is interpreted as an obligate seed regenerator with no capacity to resprout.

Distribution

The taxon is rare in Victoria, where it is apparently confined to Mt Arapiles, the Grampians, and a few localities between Dargo and Mt Baldhead in Gippsland (VicFlora 2018).

A single undated specimen collected at Tatiara in South Australia and close to the Victorian border suggests the taxon once extended interstate and was therefore not strictly a Victorian endemic.

Habitat

In the northern Grampians, the taxon tends to occur along drainage lines in otherwise dry and rocky landscapes (David Handscombe pers.comm. 16/01/2019).

Threats

As the taxon tends to occur along drainage lines and is likely to depend on soil moisture, it is potentially at long-term risk of recruitment failure and seed bank depletion in response to the projected increase in frequency and intensity of extreme drought events.

The taxon is unlikely to be palatable and browsing has not been observed in the field. In the far northern Grampians where the taxon is concentrated, the key herbivores are macropods. Goats and deer are less significant browsers in this area.

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%

A1 Population reduction observed, estimated, inferred or suspected in the past and the causes of the reduction are clearly reversible AND understood AND ceased.

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.

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*]

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.

based on any of the following:

(a) direct observation [*except A3*]

(b) an index of abundance appropriate to the taxon

(c) a decline in area of occupancy, extent of occurrence and/or quality of habitat

(d) actual or potential levels of exploitation

(e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites

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.

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 km²	< 5,000 km²	< 20,000 km²
B2. Area of occupancy (AOO)	< 10 km²	< 500 km²	< 2,000 km²
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:

Eligible under Criterion B1 as Vulnerable

The Extent of Occurrence (EoO) across the taxon's range is estimated to be 11,427 km^2, based on accepted, post-1970 records in the Victorian Biodiversity Atlas (VBA).

The taxon is estimated to be severely fragmented naturally at the regional and landscape scales, with no specialised mechanism for long-distance dispersal.

It is estimated to have 2 locations, and has extreme fluctuations in (iv) above, as prior to European settlement, the taxon was cued almost exclusively by infrequent fire events and population size was likely to have fluctuated in response to fire behaviour and recruitment success. Post-settlement, large populations cued by fire alternate with small roadside stands recurrently stimulated by road maintenance activity. It is likely that post-settlement population size within the footprint of any one fire event fluctuates at greater than ten-fold magnitude.

Eligible under Criterion B2 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 56 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA.

As above, the taxon is severely fragmented, has 2 locations, and has extreme fluctuations in (iv) above.

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 C1 or C2				
C1	An observed, estimated or projected continuing decline of at least (up to a max. of 100 years in future):	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)
C2	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

It is estimated that there are 2,000 to 5,000 mature individuals, but other thresholds under this criterion have not been met. The population size is based on field observations at Mt Zero, Hollow Mountain, and Golton Gorge following the 2014 bushfire (David Handscombe pers.comm. 16/01/2019).

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 km2 or number of locations ≤·5

Evidence:

Eligible under criterion D as Vulnerable

The taxon is estimated to be very restricted.

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. Retrieved from:

https://www.environment.vic.gov.au/__data/assets/pdf_file/0021/50448/Advisory-List-of-Rare-or-Threatened-Plants-in-Victoria-2014.pdf

Jeanes, J.A. (1999). Solanaceae. In N.G. Walsh and T.J. Entwisle (Eds.), *Flora of Victoria Vol. 4, Cornaceae to Asteraceae.* Melbourne: Inkata Press.

VicFlora (2018). Flora of Victoria, Royal Botanic Gardens Victoria: *Cyphanthera anthocercidea.* Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/a2d0cfdc-051f-435a-a481-c70192675079