Threatened Species Assessment

Caladenia ancylosa
Genoa Spider-orchid

Taxonomy

Caladenia ancylosa (D.L. Jones) G.N. Backh.

The taxon is also referred to as *Arachnorchis ancylosa*. It is poorly known and is probably most closely related to *Caladenia valida*. It grows and hybridises with both *Caladenia peisleyi* and *C. montana* (Backhouse et al. 2016).

This new taxon has been described in the genus *Arachnorchis*, which is not recognised by the National Herbarium of Victoria.

Current conservation status

Listed as threatened under the *Flora and Fauna Guarantee Act 1988* (SAC 2007).

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

Proposed conservation status

Critically Endangered in Australia

Criteria B1ab(iii,iv,v)+2ab(iii,iv,v); C2a(i); D

Species Information

Description and Life History

The taxon is endemic to Victoria. Flowering plant 12-25 cm tall. Leaf 6-12 cm long, 5-10 mm wide. Flowers solitary; perianth segments 2-4 cm long, spreading stiffly, cream with pink to reddish streaks and suffusions; dorsal sepal 2.5-4 cm long, 2.5-3 mm wide, oblong-lanceolate basally, tapered and ending in a thickened osmophore 7-10 mm long; lateral sepals 2.5-4 cm long, 3.5-4.5 mm wide, ovate-lanceolate basally, tapered and ending in a thickened osmophore 6-10 mm long; petals 2-2.5 cm long, 2-2.3 mm wide, narrow-lanceolate basally, tapered to an acuminate tip. Labellum curved forward with apex recurved, lamina broadly ovate-lanceolate, obscurely 3-lobed, 10-13 mm long, 7-9 mm wide (when flattened), cream at base, apex dark red; marginal calli in 7-10 pairs, 0.5-1.2 mm long at base, reducing in length distally; lamina calli in 6 rows, extending well onto mid-lobe, linear to foot-shaped, c. 1 mm long at base of lamina, decreasing in size towards apex (VicFlora 2018).

Both subpopulations have very low numbers of flowering plants each year, with numbers fluctuating and, in some years, no flowering plants are evident. The taxon flowers most prolifically after infrequent summer bushfires, in September and October (Backhouse et al. 2016).

Spider-orchids, in general, use either food deception or sexual deception for pollination, the usual pollinator is male wasps from the family *Thynnidae*. A scent that mimics female thynnid wasp pheromone is produced by the glandular tips of the sepals and acts as a sexual attractant for the pollinators. Once the pollinator reaches the flower, it attempts to copulate with the labellum of the flower, mistaking it for the female wasp, and effects pollination.

Spider-orchids generally reproduce from seed. The fruits normally take 5-8 weeks to reach maturity following pollination and each mature capsule may contain tens of thousands of microscopic seeds that are dispersed by the wind when the capsule dries out. Most spider-orchids grow in a complex relationship with mycorrhizal fungi which is critical for growth and development. The fungus assimilates some nutrients for the orchid, but the degree of

nutritional dependence upon the fungus by spider-orchids is not clearly understood. Some spider-orchids have survived for at least 17 years in the wild, however longevity of most taxa is not known.

Most terrestrial orchids have evolved under conditions of hot summer fires, generally when the plants have been dormant. Some *Caladenia* taxa flower vigorously following hot summer fires, but this may be as much the result of the removal of surrounding vegetation and reduced competition as any chemical effect of the fire. The timing of fire is important, with the best time during late summer or early autumn, after seed dispersal but prior to new plant emergence. Rainfall and temperature also influence flowering. Flowering is often aborted when periods of sustained hot, dry weather follow flower opening.

Generation Length

The generation length of *Caladenia ancylosa* is estimated to be 20 to 40 (midpoint 30) years. The generation time for non-colonial terrestrial orchids is estimated based on the annual replacement of the mother tuber by daughter tubers. Whilst somatically immortal, each individual is susceptible to endogenous exhaustion or environmental causes of mortality at rates that are likely to result in replacement at intervals of several decades only. Such orchids are classed as obligate seed regenerators (OSRs), meaning they are reliant on seed-based recruitment for population maintenance.

Distribution

The taxon is endemic to Victoria, where it is known only from far East Gippsland, between Orbost and Genoa (Backhouse et al. 2016; VicFlora 2018). The altitude range is from 40-150 metres above sea level. The taxon appears to be rare, known from only few sites and low numbers of plants. However, it grows in relatively dense heathy woodland and probably flowers well mainly after summer fires. A few plants flower in most years in open site such as along track margins. There is considerable potential habitat in East Gippsland, so the taxon is possibly more common than current records suggest (Backhouse et al. 2016).

Habitat

The taxon grows in grassy and heathy woodland. It further occurs in tall open forest with an open to dense, shrubby understorey on well-drained yellowish-brown gravelly clay (Backhouse et al. 2016; VicFlora 2018).

Threats

The taxon occurs in State forest, but there is little evidence of any previous or current decline. Roughly half of the likely habitat is protected either in formal parks and reserves or in special protection zones. However, it may be at risk from increasingly dry conditions from reducing rainfall and consequent increase in intensity and severity of bushfires, possibly leading to decline and loss of subpopulations. Very small subpopulations are highly susceptible to stochastic events causing major decline or local extinction within a very short time frame. In addition, some plants grow right on a road edge and are at risk from road maintenance activities.

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 Critically Endangered

The Extent of Occurrence (EoO) across the taxon's range is estimated to be 43 km², based on accepted, post-1970 records from the Victorian Biodiversity Atlas (VBA).

The taxon is estimated to be severely fragmented because of its limited dispersal ability and isolation of subpopulations from one another, with a reduced probability of recolonisation should subpopulations become extinct, resulting in an increased extinction risk to the taxon.

It is estimated to have a single location. In the opinion of the assessor, it is likely to be subject to continuing decline in (iii), (iv) and (v) above, as the habitat may be at risk from increasingly dry conditions from reducing rainfall and consequent increase in intensity and severity of bushfires, possibly leading to decline and loss of subpopulations.

Eligible under Criterion B2 as Critically Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 8 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA. As above, the taxon is estimated to be severely fragmented, has a single location and is likely to be subject to continuing decline in (iii), (iv) and (v) 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:

Eligible under Criterion C2 as Critically Endangered

It is estimated that there are 20 to 50 mature individuals.

The number of mature individuals is inferred to continue to decline and the number of mature individuals in each subpopulation is 50 or fewer.

The taxon's habitat is likely to be at risk from increasingly dry conditions from reducing rainfall and consequent increase in intensity and severity of bushfires, leading to decline and loss of subpopulations. In addition, very small subpopulations are highly susceptible to stochastic events causing major decline or local extinction within a very short time frame.

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 Critically Endangered

The taxon is estimated to have 20 to 50 mature individuals.

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

References

Backhouse, G., Kosky, B., Rouse, D., & Turner, J. (2016). *Bush Gems: A Guide to the Wild Orchids of Victoria, Australia.* Melbourne, Victoria: EBook.

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

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SAC (2007). Flora and Fauna Guarantee Scientific Advisory Committee: Final Recommendation on a Nomination for Listing. Nomination No. 771 *Caladenia ancylosa*.

VicFlora (2018). Flora of Victoria, Royal Botanic Gardens Victoria: *Caladenia ancylosa.* Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/aa0d8676-f0e4-486f-8c56-cc29c32a844d