Threatened Species Assessment

Caladenia amoena
Charming Spider-orchid

Taxonomy

Caladenia amoena D.L. Jones

Current conservation status

Listed as Endangered under the *Environment Protection and Biodiversity Conservation Act 1999*.

Listed as threatened under the *Flora and Fauna Guarantee Act 1988*.

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

Proposed conservation status

Critically Endangered in Australia

Criteria A2ace+3ce+4ce; B1ab(i,ii,iii,v); C1+2a(i); D

Species Information

Description and Life History

The Charming spider-orchid is a flowering orchid 5 -12 cm tall, with leaves 3 - 8 cm long, 7 - 9 mm wide, sometimes dotted purplish at the base. Flowering usually with 1, rarely 2; perianth segments 1.5 - 2.5 cm long, yellowish-green with red stripes; dorsal sepal linear to linear-lanceolate, 2 - 2.5 cm long, 2.5 - 3 mm wide, narrowed to a linear-involute section just before the osmophore; osmophore1.5 - 2.5 mm long with uncrowded sessile dark brown cells; lateral sepals oblong-lanceolate, 1.7 - 2.3 cm long, slightly falcate, more or less parallel or crossed, involute section terminated by an osmophore similar to that on the dorsal sepal; petals linear-lanceolate, 1.5 - 1.8 cm long, acuminate. Labellum curved forward, flattish to concave in middle region, cordate, 3-lobed, 9 - 12 mm long and 8 - 11 mm wide (when flattened), yellowish green with a recurved reddish mid-lobe; margins entire in basal portion, lateral lobes toothed towards mid-lobe, mid-lobe with 6 - 8 pairs of broad teeth; lamina calli in 4 irregular rows ending at the mid-lobe, foot-shaped, fleshy, reddish, c. 3 mm long at base of lamina, diminishing in size toward apex (RBGV 2016).

The taxon has a summer dormancy period, which commences when temperatures increase, and soils dry out in late spring. The orchids shoot in response to soaking rains in late autumn, initially producing only a single green leaf. Growth of the plants occurs during late autumn, winter and spring and flowering occurs in August and early September.

Generation Length

The generation length of *Caladenia amoena* is estimated to be 20 to 40 (midpoint 30) years. Generation time for non-colonial terrestrial orchids is estimated to be a nominal 30 years 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 likely to result in replacement at intervals of several decades only. Such orchids are classed as obligate seed regenerators (OSRs) reliant on seed-based recruitment for population maintenance.

Distribution

The taxon occurs to the north east of Melbourne in the Greensborough-Plenty-Hurstbridge area within the Victorian Midlands interim bioregion, with two populations at Plenty Gorge on public land and one at Wattle Glen on private land.

Habitat

The Charming Spider-orchid is typically found in grassy dry forest; *Eucalyptus melliodora* (Box Ironbark) Forest on sandy loams derived from sandstone and mudstone.

Threats

The taxon is threatened by habitat loss and fragmentation, invasive species and lack of conservation on private land. Grazing and trampling by Sambar deer *(Rusa unicolor*) is a new and increasing threat.

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:

Eligible under Criterion A2 as Critically Endangered

The population reduction over the past 60 to 120 years is estimated to be 99%, based on (a), (c) and (e) above.

Many sites and much of the habitat were lost in the last century due to land clearing.

The causes of the reduction may not have ceased, be understood or be reversible.

Eligible under Criterion A3 as Critically Endangered

The population reduction over the next 60 to 100 years is projected to be 0 to 100%, based on (c) and (e) above.

There may be a population increases as a result of translocations and management, but population size, poor genetic diversity and low rainfall may make an increase impossible. In 2016/17 deer had damaged the soil at

Wattle Glen so much that there was sheet erosion of soil off the hillside. At Plenty Gorge the soil cover is shallow and poor, and soil needs to be deepened by breaking up litter.

Eligible under Criterion A4 as Critically Endangered

The population reduction over any 60 to 120 year period, including both past and future (up to 100 years in the future), is suspected to be 0 to 100 (likely 99) %, based on (c) and (e) above. The causes of reduction may not have ceased, be understood or be reversible.

Past reductions were based on loss of sites and habitat due to land clearing. Future reductions are based on small population size, poor genetic diversity, low rainfall and the impact of exotic herbivores.

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 24 km², based on accepted, post-1970 records from the Victorian Biodiversity Atlas. The EoO has been made equal to the AoO to ensure consistency with the definition of AoO as an area within EoO.

The taxon is estimated to be severely fragmented, There are three small, isolated subpopulations that are all at risk from known threats, including stochastic events, such that there is increased extinction risk and little or no probability of recolonisation should subpopulations become extinct.

It is estimated to have two locations. The Plenty Gorge and Wattleglen subpopulations are very small and prone to stochastic threats. The private land site is not protected and land clearing is possible.

It has a continuing decline in (i), (ii), (iii) and (v) above, based on a worst-case scenario of habitat damage, low rainfall and impacts of exotic species.

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 C1 as Critically Endangered

It is estimated that there are 20 to 30 mature individuals. The taxon is regularly monitored by orchid experts at Plenty Gorge and Wattle Glen, so numbers are reliable.

There is an estimated continuing decline of 0to 100% (midpoint 50%) within a time frame of one generation.

Eligible under Criterion C2 as Critically Endangered

It is estimated that there are 20 to 30 mature individuals. The taxon is regularly monitored by orchid experts at Plenty Gorge and Wattle Glen, so numbers are reliable.

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

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 30 mature individuals.

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.

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Jeanes, J. and Backhouse, G. (2006). *Wild orchids of Victoria, Australia*. Aquatic Photographics, Seaford, Australia.

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