Threatened Species Assessment

Caladenia venusta
Large White Spider-orchid

Taxonomy

Caladenia venusta G.W. Carr

A single known population in Kilsyth, also referred to as *Caladenia* sp aff *venusta* 1 (Kilsyth Spider-orchid), has separately been nominated and received EPBC status, as with the previously known populations in the Dalyenong area which have been renamed and listed as *Caladenia cretacea*. It has also been suggested by Backhouse and Jeanes (1995) that the populations occurring in the Inglewood and Kiata areas should be revised and require taxonomic attention.

Hybrids with *Caladenia tentaculata* often occur where the two species 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 Victoria

Criteria B2ab(i,ii,iii,iv,v); C2a(i)

Species Information

Description and Life History

The taxon is a flowering plant 20-60 cm tall. Leaf 10-18 cm long, 8-12 mm wide, reddish at base. Flowers 1-2(-3), fragrance resembling mouldy oranges; perianth segments 4.5-10 cm long, white to cream with brownish glandular tips, lateral sepals and petals drooping; sepals flattened at base, 2-7 mm wide, abruptly tapered to a long tail densely covered in glandular hairs; petals shorter than sepals but otherwise similar. Labellum curved forward with apex recurved and lateral lobes erect, lamina ovate, obscurely 3-lobed, 16-25 mm long and 10-15 mm wide (when flattened), white or cream with deep-red calli; margins of lateral lobes fringed with linear calli mostly 2-3.5 mm long, margins of mid-lobe with shorter calli becoming tooth-like near tip; lamina calli in 4 or 6 rows, extending well onto mid-lobe, narrow, foot-shaped, to c. 2 mm long at base of lamina, decreasing in size towards apex. The taxon flowers from September to November (VicFlora 2018). According to Jones and Backhouse, the taxon flowers well after summer fires.

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 (DSE 2000).

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 (DSE 2000).

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 (DSE 2000).

Generation Length

The generation length of *Caladenia venusta* 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

Caladenia venusta occurs westward from Yarram, mainly near the coast, extending well inland in western Victoria.

Habitat

The taxon grows in heathlands, heathy woodlands and woodlands on well-drained and moisture retentive soils (VicFlora 2018).

Threats

Subpopulations and habitat are considered at risk from human visitation/trampling, habitat fragmentation and low genetic diversity, site degradation due to macropod browsing pressure, inappropriate fire regimes and increasingly dry conditions from declining rainfall and consequent increase in severity and intensity of bushfires. Very small subpopulations are highly susceptible to stochastic events causing major decline or local extinction within a very short time frame.

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 Vulnerable

The population reduction over the past 60 to 120 years is estimated to be 25 to 50%, based on (c) and (e) above.

The past population decline is estimated based on habitat clearing and degradation, currently there are very small patches of habitat remaining.

Eligible under Criterion A3 as Vulnerable

The population reduction over the next 60 to 100 years is suspected to be 10 to 40% (midpoint 30%), based on (c) and (e) above.

Using the current decline in habitat quality in areas in Northern Victoria as an indicator of future decline, it can be estimated that the populations will continue to decline due to the currently operating threats and the lack of conservation efforts.

Eligible under Criterion A4 as Vulnerable

The population reduction over any 60 to 120 year period, including both past and future (up to 100 years in the future), is estimated to be 25 to 40%, based on (c) and (e) above. The causes of reduction may not have ceased, be understood or be reversible.

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 B2 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 128 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the Victorian Biodiversity Atlas.

The taxon is estimated to be severely fragmented. There are multiple, small isolated subpopulations that are dependent on conservation management, such that there is increased extinction risk and little or no probability of natural recolonisation should subpopulations become extinct.

It has a continuing decline in (i), (ii), (iii), (iv) and (v) above due to the identified threats, and it is heavily dependent on continued conservation actions.

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 Endangered

It is estimated that there are 500 to 800 mature individuals. This has been hard to estimate, as out of the 20 localities from which it has been recorded, only 3 sites have actual count data. Most populations have been recorded from a single herbarium specimen and, as such, it has been estimated that these sites contain no more than ten individuals. Larger populations have been more regularly or recently observed/monitored by experts and have actual numbers recorded.

The number of mature individuals is estimated to continue to decline, and the number of mature individuals in each subpopulation is likely to be fewer than 250.

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

It is estimated that there are 500 to 800 individuals

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

References

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