

Caladenia bicalliata subsp. *bicalliata* Limestone Ridge Spider-orchid

Taxonomy

Caladenia bicalliata subsp. *bicalliata* R.S. Rogers

There are two subspecies, with the nominate *Caladenia bicalliata* subsp. *bicalliata* having larger, greyish cream, usually freely opening (although short-lived) flowers with dark brownish glandular tails, and it is this subspecies that has been recorded in Victoria (Backhouse et al. 2016).

Current conservation status

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

Proposed conservation status

Endangered in Victoria

Criterion D

Species Information

Description and Life History

The taxon is a flowering plant 6-15 cm tall. Leaf narrow-linear, 10-20 cm long, 2-5 mm wide. Flowers 1 or 2; perianth segments 1-2.5 cm long, flat in basal half, margins enrolled in distal half, greyish white, sometimes with darker stripes, not spreading widely; dorsal sepal 1.2-2.5 cm long, 1.5-2.5 mm wide, incurved; lateral sepals 1.2-2.5 cm long, 2-3 mm wide, obliquely deflexed; petals 1-2 cm long, 1-2 mm wide, obliquely erect to horizontal. Labellum 6-8 mm long, 6-7 mm wide (when flattened), cream with reddish stripes breaking up into spots and blotches; margins with short blunt teeth, apex recurved, lamina calli in 2 rows, anvil-shaped. Flowers from September to October (VicFlora 2018).

Caladenia bicalliata has short-lived flowers and is apparently self-pollinating, although flowers generally open freely, if only for a few days (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 (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



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emergence. Rainfall and temperature also influences flowering. Flowering is often aborted when periods of sustained hot, dry weather follow flower opening (DSE 2000).

Generation Length

The generation length of *Caladenia bicalliata* subsp. *bicalliata* is estimated to be 30 to 50 years. Long-term observation and monitoring of populations of terrestrial orchids in general suggests that there is very low recruitment over decades, and individual plants may be very long-lived, possibly several decades.

Distribution

The taxon is known from just a single location and subpopulation of fewer than 100 plants, near Kentbruck in the Discovery Bay Coastal Park in south-western Victoria. The entire population is within a conservation reserve (VicFlora 2018).

The taxon was only discovered in Victoria in 2009 and nothing is known of its previous distribution or abundance in Victoria, where it reaches the extreme eastern limit of its national range. Its specialised habitat is extremely limited in Victoria, so the taxon is likely to have always been rare.

Habitat

The taxon occurs on low coastal scrub on consolidated sand dunes with exposed limestone rocks on sandy loam soils (Backhouse et al. 2016; VicFlora 2018).

Threats

The taxon's specialised habitat is extremely limited in Victoria so it is likely to have always been rare. The sole site is protected in a reserve. Very small subpopulations are highly susceptible to stochastic events causing major decline or local extinction within a very short time frame (VicFlora 2018).

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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>based on any of the following:</p> <ul style="list-style-type: none"> (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

The past population reduction does not meet the threshold for eligibility under criterion A2, and the future population reduction does not meet the threshold for eligibility under criterion A3.

The taxon was only discovered in Victoria in 2009 and nothing is known of its previous distribution or abundance in Victoria. There is no indication of any current or future decline.

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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 ²	< 5,000 km ²	< 20,000 km ²
B2. Area of occupancy (AOO)	< 10 km ²	< 500 km ²	< 2,000 km ²
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 Extent of Occurrence (EoO) across the taxon's range is estimated to be 4 km² and the Area of Occupancy (AoO) is estimated to be 4 km², 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 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

It is estimated that there are 40 to 100 mature individuals, but other thresholds under this criterion have not been met.

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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 ² or number of locations ≤ 5 [Ⓜ]

Evidence:

Eligible under Criterion D as Endangered

The taxon is estimated to have 40 to 100 mature individuals. The taxon is known from just a single location and subpopulation of fewer than 100 plants.

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., and 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.

VicFlora (2018). Flora of Victoria, Royal Botanic Gardens Victoria: *Caladenia bicalliata* subsp. *bicalliata*. Retrieved from: <https://vicflora.rbg.vic.gov.au/flora/taxon/2708528a-85d6-476e-ae86-13729733d26c>