Threatened Species Assessment

Caladenia flavovirens
Christmas Spider-orchid

Taxonomy

Caladenia flavovirens G.W. Carr

A revision of East Gippsland's Clubbed Spider Caladenia is being undertaken by orchid expert Bill Kosky, who notes "As part of that I conclude that *Caladenia aestiva* is the same as, and thus a synonym of *C. flavovirens* it being named by Geoff Carr 25 days before David Jones named *C. aestiva.* This is because populations of plants that have been determined as, or considered to be, *Caladenia aestiva* cannot be distinguished from *C. flavovirens* by reference to flower size, clubbed or tailed sepals, labellum teeth shape, or altitude. In particular clubbed forms occur at lower altitudes, and tailed forms at high. In all populations simitar tipped labellum side lobe teeth vary from serrate to somewhat linear.

Current conservation status

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

Proposed conservation status

Critically Endangered in Victoria

Criteria A2ace+3cde+4acde; B2ab(i,ii,iii,iv,v); C1+2a(i,ii); D

Species Information

Description and Life History

Flowering plant 20-60 cm tall. Leaf 15-30 cm long, 8-20 mm wide. Flowers 1 or 2; perianth segments 5-10 cm long, pale greenish-yellow, lateral sepals divergent, spreading to drooping, flattened at base, 5-10 mm wide, abruptly tapered to a filiform tail (not distinctly clubbed) with relatively widely spaced, sessile glands; petals spreading to drooping, shorter than sepals, flattened at base, tapered to long acuminate apex, sometimes glandular. Labellum curved forward with apex recurved and lateral lobes erect, lamina ovate to ovate-lanceolate, obscurely 3-lobed, 14-23 mm long and 10-12 mm wide (when flattened), greenish-yellow to pale yellow, rarely maroon in distal half; marginal calli on lateral lobes linear, to 3.5 mm long, those on mid-lobe shorter and more tooth-like; lamina calli in 4 or 6 rows, extending onto base of mid-lobe, narrow, foot-shaped, to c. 2 mm long at base of lamina, decreasing in size towards apex. Flowers Dec.-Jan.

Populations may require periodic fire to stimulate flowering, although searches of likely habitat after the extensive bushfires of the past decade have been unsuccessful in locating new populations. The taxon forms a rare hybrid with *Caladenia parva*.

Generation Length

The generation length of *Caladenia flavovirens* is suspected 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 is endemic to Victoria. It was once apparently widely distributed across southern Victoria between Cann River in Portland and possibly also occurred in north-eastern Victoria. There were old records from near Garfield North, Mt Buller and Goongerah, but it is suspected that the mountain sites are misidentifications of *Caladenia aestiva*. There are several records from the Portland district prior to 1950, indicating it once may have been locally common there, but none have been seen since. It has been seen at only two sites, Healesville and Montrose, in the past 60 years. The distribution of *C. flavovirens* is somewhat obscure due to confusion with *C. aestiva.*

Habitat

Backhouse et al. (2016) noted that the taxon grows in grassy open forest on skeletal clay loam soils, formerly also in heathy woodland on sandy loam soils. VicFlora (2018) noted that it grows among shrubs in stunted coastal scrub, often in sandy soils, or in open montane forest with a grassy understorey.

Threats

One of the main threats to the plants on private properties are land clearing and construction. The Healesville private land population is in peril because of clearing and continued development, and plants are caged each year in spring. Some cages are removed, and some left to protect them from deer and dogs. Without cages, dogs dig up plants and deer disturb the soil by trampling and scraping. The single plant in the Dandenong Ranges National Park is caged, but is at risk from people wanting to see it or even collect it.

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.

There have been extreme past declines as a result of land clearing, leading to a current tiny population size. The taxon was once apparently widely distributed across southern Victoria between Cann River in Portland and possibly also occurred in north-eastern Victoria. There are several records from the Portland district prior to 1950, indicating it once may have been locally common there, but none have been seen since.

The population at Healesville has shrunk. Plants previously observed in the early 2000s on Donn Road at Healesville have disappeared. Existing plants are still subject to threats. Plants on other private properties also seem to have gone, due to land clearing and construction.

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 50 to 100% (midpoint 70%), based on (c), (d) and (e) above.

There is a strong likelihood of extinction because of small numbers, but recovery efforts may maintain some plants. Seed has been collected, and if recovery efforts (subject to funding) continue, plant numbers may stabilise or increase.

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 inferred to be 50 to 100% (midpoint 99%), based on (c) and (e) above. The causes of reduction may not have ceased, be understood or be reversible.

There are high levels of past declines and likely future declines, in the absence of intensive management.

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 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 Victorian Biodiversity Atlas.

The taxon is estimated to be severely fragmented, considering the poor dispersal ability of the taxon, the barriers to dispersal or the lack of habitat between the two small isolated populations.

It is estimated to have a continuing decline in (i), (ii), (iii), (iv) and (v) above. Existing plants are still subject to threats. Plants on other private properties also seem to have gone, due to land clearing and construction. These threats are likely to continue, and only intensive management will conserve the last few individuals. Plants are caged but without caging the plants and their habitat will be damaged by the impacts of deer and pet dogs.

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 8 to 10 mature individuals. In 2016, 7-8 plants were identified at Healesville and one in the Dandenong Ranges National Park. Fewer were identified in 2017. Habitat searches were undertaken after an ecological burn was conducted on suitable habitat on adjacent public land in 2017, but no plants were found.

There is an estimated continuing decline of 30 to 60% within one generation.

Eligible under Criterion C2 as Critically Endangered

It is estimated that there are 8 to 10 mature individuals.

The number of mature individuals is estimated to continue to decline, the number of mature individuals in each subpopulation is 50 or fewer and the percentage of mature individuals in one subpopulation is 90-100 %.

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 8 to 10 mature individuals.

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

References

Carr, G.W. (1991), New taxa in *Caladenia* R.Br., *Chiloglottis* R.Br. and *Gastrodia* R.Br. (Orchidaceae) from south eastern Australia. *Indigenous Flora and Fauna Association Miscellaneous Pape*r 1: 5

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 flavovirens*. Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/25e62f44-e901-4534-9148-98083b5b1b92