

Caladenia grampiana Grampians Spider-orchid

Taxonomy

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

The orchid is a poorly known, recently described taxon that was previously included in *Caladenia oenochila*. It also grows with *Caladenia reticulata* and hybrids between the two have been recorded. Another scientific name for the taxon is *Arachnorchis grampiana* (Backhouse et al. 2016).

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

Criterion C2a(i); D

Species Information

Description and Life History

The taxon is a deciduous terrestrial orchid with a single, lanceolate hairy leaf and a slender. Flowering plant 15-26 cm tall. Leaf 5-10 cm long, 5-8 mm wide, reddish at base. Flowers 1 or 2, fragrance resembling hot metal or plastic; perianth segments 3.2-5.5 cm long, pale tawny yellow or pinkish, sometimes suffused with light brown; lateral sepals and petals drooping; sepals flattened at base, 2.5-4 mm wide, distal half to two-thirds with ellipsoid cells in chains of 2-3; petals shorter than sepals but otherwise similar. Labellum curved forward with apex recurved and lateral lobes erect, lamina ovate-lanceolate, obscurely 3-lobed, 13-17 mm long and 7-9 mm wide (when flattened), cream to red, often with darker reddish lines; margins of lateral lobes fringed with reddish linear calli mostly 1-2 mm long, margins of mid-lobe with shorter calli becoming asymmetric and merging near tip; lamina calli in 4 or 6 rows, extending nearly to base of mid-lobe, narrow, linear to foot-shaped, c. 1.5 mm long at base of lamina, decreasing in size towards apex (VicFlora 2018).

Flowering occurs from late August to early October and is sporadic in most years. This taxon flowers in abundance in the year or two after a summer bushfire (and providing there are favourable environmental conditions in the following autumn and winter to stimulate flowering), when many tens to hundreds of flowering plants have been seen. These events are very infrequent, occurring once every few decades or more. In most years substantially fewer than 100 flowering plants across all subpopulations are seen, with some subpopulations not flowering in some years. Therefore, the number of flowering plants seen in a 'non-fire' year is here used as the subpopulation size (Backhouse et al. 2016).

In almost all of its range, the taxon is the only long-tailed spider-orchid occurring there. At the southern end of the Grampians it grows with *Caladenia venusta*, but the two are readily told apart (Backhouse et al. 2016).

Generation Length

The generation length of *Caladenia grampiana* is estimated to be 20 to 40 (midpoint 30) years. This is based on the generation time for non-colonial terrestrial orchids, that is estimated to be a nominal 30 years based on the annual replacement of the mother tuber by daughter tubers. Whilst somatically immortal, individuals are susceptible to



Caladenia grampiana Grampians Spider-orchid

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, confined to the Grampians in western Victoria, mostly in the Serra Range (Jones 2006). Prior to 2006, it was known from a few plants at a couple of locations in the Grampians (Backhouse et al. 2016). Then, in early 2006, a bushfire burnt through large areas of the Grampians ranges. During the spring of that year, hundreds of *C. grampiana* flowered in the burnt woodland, the highest number of plants ever seen. Numbers of flowering plants have been declining since as the dense heathy woodland regenerates (Backhouse et al. 2016). Large areas of apparently suitable habitat were searched without success, so the species does appear to be patchily distributed within the Grampians (Jones 2006).

Habitat

The taxon grows in heathy woodland on yellow to grey sandy loam and light clay loam and sometimes gravelly, soils (Backhouse et al. 2016). It is found in heathy open forests only from the Grampians region at an altitude of 270-500 metres ASL.

Threats

There are probably few immediate threats, as virtually all of its habitat is within the Grampians National Park. Managing future fire regimes is likely to be very important for this orchid, as virtually all of its habitat was burnt during 2006 and will regenerate as an even aged community. Progressively fewer flowering plants are likely in coming years as the heathy woodland regenerates and thickens.

There is likely to be some future decline due to habitat damage from feral deer and declining habitat conditions due to increased drying from reducing rainfall. 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%

<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>	<p>(a) direct observation [except A3]</p> <p>(b) an index of abundance appropriate to the taxon</p> <p>(c) a decline in area of occupancy, extent of occurrence and/or quality of habitat</p> <p>(d) actual or potential levels of exploitation</p> <p>(e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites</p>
--	---------------------------------------	---

Evidence:

Eligible under Criterion A2 as Endangered

The population reduction over the past 60 to 120 years is inferred to be 55 to 85 (midpoint 65) %, based on (c) and (e) above.

Past decline is based on the suspected historic loss of two subpopulations and some loss and decline in habitat, although substantial habitat occurs within the Grampians National Park.

Eligible under Criterion A3 as Endangered

The population reduction over the next 60 to 100 years is projected to be 30 to 60 (midpoint 50) % based on (c) and (e) above.

Past decline is based on the suspected historic loss of two subpopulations and some loss and decline in habitat, although substantial habitat occurs within the Grampians National Park.

Eligible under Criterion A4 as Endangered

The population reduction over any 60 to 120 years period, including both past and future (up to 100 years in the future), is estimated to be 50 to 60%, based on (c) and (e) above.

Caladenia grampiana

Grampians Spider-orchid

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:

Eligible under Criterion B as Endangered

The Extent of Occurrence (EoO) across the taxon's range is estimated to be 618 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 and lack of habitat between subpopulations, with a reduced probability of recolonisation should subpopulations become extinct, resulting in an increased extinction risk to the taxon.

It is estimated to have 1 location. It has a continuing decline in (i), (ii), (iii), (iv) and (v) above due to habitat damage from feral deer and declining habitat conditions from increased drying due to declining rainfall.

Eligible under Criterion B2 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 28 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA. As above, it is severely fragmented, has 1 location and has a continuing decline in (i), (ii), (iii), (iv) and (v) above.

Caladenia grampiana

Grampians Spider-orchid

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 21 to 65 mature individuals. The taxon is known from at least 8 subpopulations, with fewer than 100 mature plants known.

There is a continuing decline, and each subpopulation has 50 or fewer individuals.

Criterion D. Very small or restricted populations		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 Critically Endangered

The taxon is estimated to have 21 to 65 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., and Turner, J. (2016). *Bush Gems: A Guide to the Wild Orchids of Victoria, Australia*. Melbourne, Victoria: EBook.



Caladenia grampiana Grampians Spider-orchid

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

Jeanes, J., and Backhouse, G. (2006). *Wild Orchids of Victoria Australia*. Melbourne: Aquatic Photographics.

Jones, D.L. (2006). Miscellaneous New Species of Australian Orchidaceae. *Australian Orchid Research*, 5(51), 45-111.

SAC (2007). Flora and Fauna Guarantee Scientific Advisory Committee: Final Recommendation on a Nomination for Listing. Nomination No. 775 *Caladenia grampiana*.

VicFlora (2015). Flora of Victoria, Royal Botanic Gardens Victoria: *Caladenia grampiana* Retrieved from: <https://vicflora.rbg.vic.gov.au/flora/taxon/d984527f-f1a7-408e-9871-f62f3d03267d>