



Caladenia toxochila Bow-lip Spider-orchid

Taxonomy

Caladenia toxochila Tate

Although usually recorded for Victoria, 'true' *C. toxochila* probably does not occur in the state, and the records are here attributed to an undescribed species *Caladenia* 'lowan mallee'. *Caladenia toxochila* has larger flowers with a more bowed labellum, longer, thicker, more crowded lamina calli, a more sharply curved column and usually lacks petal clubs. It is endemic to South Australia, where it occurs west from the Flinders Ranges (Backhouse et al. 2016).

Current conservation status

Listed as threatened under the *Flora and Fauna Guarantee Act 1988* (SAC 2001).

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

Proposed conservation status

Critically Endangered in Victoria

Criteria A2ace+3ce+4ace; C2a(ii)

Species Information

Description and Life History

The taxon is a spring-flowering, deciduous, terrestrial orchid. It has a single basal, lanceolate, hairy leaf to 10 cm long. The flower stem grows to 20 cm tall and bears one or two small red and green flowers. The sepals and petals are about 25 mm long and green with variable maroon streaks, the sepals with indistinct glandular clubs. The labellum is green with short marginal teeth on the lateral lobes, the apex is maroon and the margins are only slightly serrulate, and there is a dense central mass of warty-headed dark maroon calli. The taxon flowers from August to October (SAC 2001).

Generation Length

The generation length of *Caladenia toxochila* 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, individuals are 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 scattered across the State, from Kiata near Nhill. It is apparently confined to a small area of the Wimmera region of western Victoria (e.g. Little Desert, Bealiba, Creswick), on the northern edge of the Little Desert (VicFlora 2015; SAC 2001). The taxon also occurs in South Australia. There is an old record (1890) from north of Stawell, and unconfirmed records from central Victoria (probably misidentifications of related taxa such as *Caladenia parva*). Two subpopulations occur at Kiata South, one around the picnic area in the Little Desert

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National Park (LDNP) and a second located about 1.5 km east around a disused quarry site on council land. A third subpopulation discovered in 2016 occurs at Lawloit in LDNP about 20 km further west.

Habitat

The taxon grows in dry Yellow Gum, heathy or grassy woodland and mallee scrub, especially around Broombush. The taxon seems to favour well-drained sandy loam soils rather than the low-fertility deep sands of much of the Little Desert (SAC 2001; VicFlora 2015).

Threats

Historically, much of the taxon's apparently favoured habitat has been lost to agricultural development. The remaining populations are small and highly fragmented and at least two populations on land outside the reserve system have declined or been lost through recent habitat destruction or degradation. Specifically, within the remaining populations, rabbits were a major problem, but numbers have been much reduced in the last few years, apparently due to the impact of Rabbit Calicivirus Disease (RCD). One population occurred in, while part of another population in a gravel reserve was destroyed in gravel extraction operations (personal observation) (SAC 2001).

The subpopulations at Kiata South have declined, with the quarry site declining to the point of extinction. At least 3 subpopulations have been lost in the last 30 years. A population of unknown size occurred in Lawloit Bushland Reserve and was last seen in 1985. A population of 50-100 plants occurred on degraded remnant habitat on private land at Kiata South about 1990, but has declined greatly or been extirpated as the site has since been cleared and grazed. A single plant was recorded in Little Tottington Nature Reserve near Winjallock but was last seen in 2014. Within the remaining populations, rabbits were a major problem, but numbers have been much reduced in the last few years, apparently due to the impact of Rabbit Calicivirus Disease (RCD).

Ongoing threats including disturbance, predation, weed invasion and drying conditions from declining rainfall. The quality of habitat is also subject to decline due to rabbit and kangaroo grazing. 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> |
|--|---|---|

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Evidence:

Eligible under Criterion A2 as Critically Endangered

The population reduction over the past 60 to 120 years is inferred to be 50 to 90 %, based on (a), (c) and (e) above.

Past decline is based on the observation that at least three subpopulations have been lost in the last 30 years. Additionally, a further two subpopulations have been observed to be in decline, with the quarry site declining to the point of extinction.

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 suspected to be 50 to 90 %, based on (c) and (e) above.

Future decline is projected based on the recent decline and loss of subpopulations and drying habitat due to declining rainfall. Additional current and future threats include disturbance, predation and weed invasion.

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 90 %, based on (a), (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 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) is estimated to be 1,304 km², based on accepted, post-1970 records in the Victorian Biodiversity Atlas (VBA).

The Area of Occupancy (AoO) is estimated to be 12 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the Victorian Biodiversity Atlas (VBA).

Individuals of the taxon are estimated to be severely fragmented, considering the limited dispersal ability of the taxon, the barriers to dispersal, or lack of habitat separating them. There is a reduced probability of recolonisation should subpopulations become extinct.

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It has 1 location and has a continuing decline in (i), (ii), (iii), (iv) and (v) above, based on the recent decline and loss of subpopulations and drying habitat due to declining rainfall. Additional current and future threats include disturbance, predation and weed invasion.

| 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 50 to 110 mature individuals, based on VBA records, sporadic survey and monitoring over 30 years, with the most recent being in 2016.

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

| 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 Endangered

It is estimated that there are 50 to 110 mature individuals.

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

References

- Backhouse, G., and Jeanes, J. (1995). *The Orchids of Victoria*. Melbourne, Victoria: Melbourne University Press.
- 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.
- Entwisle, T.J. (1994). Orchidaceae. In N.G. Walsh and T.J. Entwisle (Eds.), *Flora of Victoria Vol. 2, Ferns and Allied Plants, Conifers and Monocotyledons*. Melbourne: Inkata Press.
- Ross, J.H. (2000). *A census of the vascular plants of Victoria* (6th ed.). Melbourne: Royal Botanic Gardens.
- SAC (2001). Flora and Fauna Guarantee Scientific Advisory Committee: Final Recommendation on a Nomination for Listing. Nomination No. 530 *Caladenia toxochila*.
- VicFlora (2015). Flora of Victoria, Royal Botanic Gardens Victoria: *Caladenia toxochila*. Retrieved from: <https://vicflora.rbg.vic.gov.au/flora/taxon/f7584521-a096-41e9-a90c-adcb78ed74ac>