Threatened Species Assessment

Diuris behrii
Golden Cowslips

Taxonomy

Diuris behrii Schltdl.

Schlechtendal, D.F.L. von (1847), Sudaustralische Pflanzen. II. Bestimmung und Beschreibung der von Dr Behr in Sudaustralien gesammelten Pflanzen. Linnaea: ein Journal für die Botanik in ihrem ganzen Umfange, oder Beiträge zur Pflanzenkunde 20: 572

Diuris behrii flowers later than *D. chryseopsis* in Victoria, and has larger, more boldly striped flowers (VicFlora, 2019).

Current conservation status

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

Proposed conservation status

Endangered in Victoria

Criterion A2bce+3ce+4bce

Species Information

Description and Life History

Flowering plant to 50 cm tall. Leaves usually 3–6, narrow-linear, grass-like, to 20 cm long, in loose, erect tussock. Flowers 1–4, drooping, bright yellow with an orange labellum, dark streaks present on both sides of labellum and dorsal sepal; pedicel enclosed within bract; dorsal sepal projected forward or obliquely erect, ovate, to 17 mm long, margins sometimes irregular; lateral sepals obliquely defiexed, parallel, linear-lanceolate, to 25 mm long, greenish; petals spreading or drooping, to 25 mm long, claw green, lamina narrow-ovate or elliptic, yellow. Labellum to 28 mm long, orange, often with brownish streaks; lateral lobes small, oblong, with irregularly toothed margins; mid-lobe broadly wedge-shaped, outer margins often irregular, callus of 2 widely separated, pubescent, longitudinal ridges, extending onto base of mid-lobe, uniting and continuing as single ridge nearly to the apex (VicFlora 2018).

The taxon flowers from September to November. Most *Diuris* species can multiply vegetatively, although several rely solely on reproduction from seed. Hot summer fires enhance flowering of many species. Natural hybridisation is common, with some hybrids apparently being fertile and producing a wide range of variation through backcrossing. Pollination is through simple food deception, the yellow-flowered species mimicking the bush-peas of the family Fabaceae, while the purple-flowered species mimic native irises (Backhouse et al., 2016).

Generation Length

The generation length of *Diuris behrii* 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

The taxon is widely distributed across Victoria, particularly in western Victoria. Altitude range 30-350 metres ASL. The taxon also occurs in SA, NSW, ACT (Backhouse et al., 2016; VicFlora, 2018).

Habitat

The taxon grows in a range of habitats including grassland, open grassy woodland and box ironbark forest, usually on clay loam soils (Backhouse et al., 2016; VicFlora, 2018).

Threats

Much of the taxon's grassland and grassy woodland habitat has been greatly reduced but it is still a very plentiful orchid.

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 Endangered

The population reduction over the past 60 to 120 years is estimated to be 70 to 75%, based on (b), (c) and (e) above.

The species is still plentiful though there has probably been anear four-fold reduction in the amount of grasslands and grassy woodland in Victoria in this time frame.

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 estimated to be 20 to 50%, based on (c) and (e) above.

A continued reduction in amount and quality of grassland and grassy woodland habitat in the state is likely, though the rate of reduction is likely to be lower than in the past.

Eligible under Criterion A4 as Endangered

The population reduction over any 60 to 120 year period, including both past and future (up to 100 years in the future), is projected to be 60 to 70%, based on (b), (c) and (e) above.

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:

Ineligible under Criterion B

The Area of Occupancy is estimated to be 304 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 500,000 to 1,000,000 mature individuals, which exceeds the thresholds for criterion C.

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:

Ineligible under Criterion D

It is estimated that there are 500,000 to 1,000,000 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.

DEPI (2014). *Advisory list of rare or threatened plants in Victoria - 2014*. Department of Environment and Primary Industries, Melbourne. Retrieved from: https://www.environment.vic.gov.au/__data/assets/pdf_file/0021/50448/Advisory-List-of-Rare-or-Threatened-Plants-in-Victoria-2014.pdf

VicFlora (2018). Flora of Victoria, Royal Botanic Gardens Victoria: *Diuris behrii.* Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/fc2d65a7-bd14-433b-8db7-4ef5bf1b8466