Threatened Species Assessment

Diuris basaltica
Small Golden Moths

Taxonomy

Diuris basaltica D.L. Jones

The taxon was previously known as *Diuris* sp. aff. *lanceolata* (SAC 1996), then renamed to *Diuris* sp. aff. *chryseopsis* (Basalt Plains). Plants that were previously in that taxon have been attributed to *D. basaltica* and *D. gregaria.*

Current conservation status

Listed as Endangered under the *Environment Protection and Biodiversity Conservation Act 1999*.

Listed as threatened under the *Flora and Fauna Guarantee Act 1988* as *Diuris* sp. aff. *lanceolata* (SAC 1996).

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

Proposed conservation status

Critically Endangered in Australia

Criteria A2ce+4ce; B2ab(i,ii,iii,iv,v)

Species Information

Description and Life History

The Small Golden Moths orchid is a deciduous, perennial, terrestrial orchid which emerges annually from an underground tuber. When it emerges, it develops 3-7 linear leaves around a basal tuft and an erect, green flower stem, to 15 cm tall. The flower stem bears one or two smalls, nodding, narrowly opening, bright golden yellow to orange yellow flowers to 20 mm wide (Backhouse and Lester 2010).

The orchid emerges from the underground tuber in late autumn, following the onset of seasonal rains (Backhouse and Lester 2010). Flowering occurs between September and October (Backhouse and Jeanes 1995). By late spring, the leaves shrivel and (if pollination has occurred) the seed capsule is ripening (usually dispersed within 8 weeks of flowering) (Jeanes pers. comm. 2001). The taxon occurs only as a tuber during summer and early autumn. It may reproduce from seed or via vegetative multiplication of tubers (Backhouse and Lester 2010). Pollination is known to be occurring naturally and is likely to be due to the action of Halictid bees (Backhouse and Lester 2010).

Regular fire or light grazing is probably essential for long-term survival of this taxon, in order to maintain the inter-tussock spaces in which it grows.

Generation Length

The generation length of *Diuris basaltica* is inferred 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 and restricted to the areas between Laverton and Caroline Springs. It is thought that all populations are restricted to road and rail reserves, cemeteries and private land, with apparently none in nature conservation reserves.

Habitat

Small Golden-Moths grows in herb-rich native grasslands dominated by Kangaroo Grass (*Themeda triandra*) on heavy basalt soils, often with embedded basalt boulders. This vegetation is dominated by a ground layer of tussock-forming perennial grasses, with a wide variety of wildflowers and herbs growing among the tussocks. Other species present include Wallaby-grasses (*Austrodanthonia* species), Spear-grasses (*Austrostipa* species), Tussock-grasses (*Poa* species), *Dianella longifolia, D. revoluta, Tricoryne elatior, Pimelea humilis* and *Dichanthium sericeum* subsp. *sericeum*. All sites form part of the EPBC-listed community 'Natural Temperate Grassland of the Victorian Volcanic Plain'.

Threats

All subpopulations are threatened by weed invasion. Many are threatened by soil disturbance associated with road and rail maintenance, vehicle movement, fire management, private and public land management practices including stock grazing and agistment, cultivation, cropping, fertilizer application, resulting in direct habitat degradation.

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 90 to 99%, based on (c) and (e) above.

The extensive reduction in population over the last 100 or more years is due to rural, residential and industrial expansion of Melbourne. This expansion caused land use changes, such as de-rocking, moving from grazing to cropping and consequently changed fire regimes.

Eligible under Criterion A3 as Endangered

The population reduction over the next 60 to 100 years is projected to be between 0 and 100%, midpoint 50%, based on (c) and (e) above.

There is likely to be ongoing future loss due primarily to habitat loss and weed invasion. Few plants are left at Rockbank due to site disturbance, 4WD driving, and weed invasion. But if a good translocation site is found, if the Rockbank site is purchased and managed and more plants introduced, numbers could 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 90 to 99%, based on (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 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 28 to 32 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the Victorian Biodiversity Atlas. The upper limit is based on inclusion of the Rockbank record.

Considering the limited dispersal ability of the taxon, the barriers to dispersal and lack of habitat separating them, the subpopulations can be considered to be severely fragmented.

It is estimated to have 1 location. It has a continuing decline in (i), (ii), (iii), (iv) and (v) above.

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 as Data Deficient

There is insufficient evidence to determine the number of mature individuals.

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

There is insufficient evidence to determine the number of mature individuals.

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

References

Backhouse G. and Lester K. (2010) *National Recovery Plan for the Small Golden Moths Orchid Diuris basaltica* Department of Sustainability and Environment, East Melbourne, Victoria

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SAC (1996). Flora and Fauna Guarantee Scientific Advisory Committee: Final Recommendation on a Nomination for Listing. Nomination No. 394 *Diuris* sp. aff. *lanceolata.*

VicFlora (2018). Flora of Victoria, Royal Botanic Gardens Victoria: *Diuris basaltica*. Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/348a8376-6eb4-414b-af36-2d165b0cf3d4

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