Threatened Species Assessment

Diuris punctata
Purple Diuris

Taxonomy

Diuris punctata Sm.

Current conservation status

Listed as threatened under the *Flora and Fauna Guarantee Act 1988*. (SAC 1991).

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

Proposed conservation status

Endangered in Victoria

Criteria A2bce+4bce

Species Information

Description and Life History

Purple Diuris is a deciduous, geophytic herb, growing up to 50 cm in height. Plants are erect, with 1 to 3 linear green leaves up to 25 cm in length. Flowers number one to 10 per plant, are mauve to purple, often with darker purplish blotches, and yellow at the base of the labellum. Lateral sepals are greenish brown, narrow and up to 60 cm in length. The flowering season is from October to November.

Purple Diuris survives the dry summer period as a dormant underground tuber. Reproduction is vegetative from tuberoids, or from seed. With the onset of autumn rains, daughter tuberoids commence growing, with early leaf shoots emerging as early as March or April, depending on seasonal conditions. Growth continues until flowering, usually in October or November. Most plants produce flowers in their second or third year and individual plants may live for 15-20 years

Generation Length

The generation length of *Diuris punctata* is estimated to be 20 to 40 (midpoint 30) years. The close relative *D. fragrantissima* is known to survive for over 9 years in the wild and over 20 years in cultivation (Murphy et al. 2008; Duncan and Moloney 2018). 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

In Victoria the taxon is widespread from the Grampians to the east but is absent from higher altitude areas and the north west. It also occurs in Queensland, New South Wales and the ACT.

Habitat

The taxon occurs in open forests, woodlands and grasslands of lowland areas.

Threats

Although numerically abundant in Victoria, Purple Diuris has undergone a dramatic decline in both extent and numbers (DSE 2004). The main threats to the taxon are competition for resources from weeds and other native plants, including grasses, shrubs or trees; grazing by native and introduced herbivores, (including mice); change in fire regimes (particularly lack of fire that could promote too much competing grass and shrub growth); and soil disturbance associated with road/rail maintenance, or with agricultural practices such as cropping, trampling, grazing, ploughing, fertiliser application.

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 50 to 80% (with an interval of 70%), based on (b), (c) and (e) above.

The taxon has suffered significant declines as a result of clearing of native grasslands and grassy woodlands. The causes of the reduction may not have ceased, be understood or be reversible.

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 estimated to be 50 to 60%, based on (b), (c) and (e) above. The causes of reduction may not have ceased, be understood or be reversible.

The lack of knowledge of population size over time for *Diuris punctata* in Victoria makes it difficult to discern possible future population reductions over time.

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 B as Vulnerable

The Area of Occupancy (AoO) is estimated to be 452 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the Victorian Biodiversity Atlas. Any two of (a), (b) or (c) above are also satisfied.

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 15,650 to 16,400 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 15,650 to 16,400 mature individuals.

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

References

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

DSE (2004). Action Statement - *Diuris punctata* Purple Diuris (No. 200). Department of Sustainability and Environment, East Melbourne. Retrieved from: https://www.environment.vic.gov.au/__data/assets/pdf_file/0022/32656/Purple_Diuris_Diuris_punctata_var._punctata.pdf

Duncan, M. and Moloney, P.D. (2018). Comparing wild and reintroduced populations of the threatened orchid *Diuris fragrantissima* (Orchidaceae) in south-eastern Australia. *Australian Journal of Botany* 66: 459-467.

Murphy, A.H., Webster, A., Knight, C. and Lester, K. (2008). *National Recovery Plan for the Sunshine Diuris Diuris fragrantissima*. Department of Sustainability and Environment, Melbourne.

SAC (1991. Flora and Fauna Guarantee Scientific Advisory Committee: Final Recommendation on a Nomination for Listing. Nomination No. 163 *Diuris punctata*