Threatened Species Assessment

Dipodium pardalinum
Spotted Hyacinth-orchid

Taxonomy

Dipodium pardalinum D.L. Jones

Current conservation status

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

Proposed conservation status

Endangered in Victoria

Criterion A2bce+3ce+4bce; B2ab(i,ii,iii)

Species Information

Description and Life History

Leafless myco-heterotrophic seasonal terrestrial orchid growing to 90 cm tall, with up to 50 small widely opening flowers to 35 mm across, white with small magenta spots and blotches and a white hair tuft on labellum, sepals and petals to 20 mm long, narrowly ovate, widely spreading with recurved tips, labellum tri-lobed, with tiny lateral lobes and ovate flattened to slightly folded mid-lobe with a small hair tuft at apex. Plants emerge in early spring and commence flowering in mid-December and flower over summer into early autumn. Flowers open sequentially up the stem, with the upper flowers still in bud as the lowest flowers collapse. The pollinator vector is unknown but is presumed to be small insects attracted to flowers through food deception, as flowers have no nectar or pollen reward for visiting insects (VicFlora 2018).

Generation Length

The generation length of *Dipodium pardalinum* is estimated to be 50 to 100 years. Generation time for non-colonial terrestrial orchids is estimated 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 but very sporadically distributed across southern Victoria between Kentbruck in the far south-west and Kalmina West in East Gippsland, extending inland to near Kyneton. Within this extensive distribution 6 subpopulations have been identified, with records from a region and in close proximity to one another aggregated into subpopulations. The altitude is 25-700 metres ASL. It also occurs in South Australia.

Habitat

The taxon grows in heathy woodland on yellow to grey sandy loam and light clay loam, sometimes gravelly, soils (Backhouse et al. 2016). Plants grow in close association with *Eucalyptus* species in heathy woodland and open forest.

Threats

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. The taxon is likely to be adversely affected by bushfires, as the plants flower over summer when bushfires are most likely to occur. Progressively fewer flowering plants are likely in coming years as the heathy woodland regenerates and thickens up.

Most plants occur on public land and some occur in protected reserves. Others occur on roadsides and on private land where disturbance is a major risk.

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%

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 150 to 300 years is estimated to be 50 to 75%, based on (b), (c) and (e) above.

This is based on the wide distribution of subpopulations, and the extensive loss of and decline in habitat across this distribution There has been a likely historical loss of subpopulations, although there is no direct evidence of this.

The causes of the reduction may not have ceased, be understood or be reversible.

Eligible under Criterion A3 as Endangered

The population reduction over the next 100 years is suspected to be 40 to 70%, based on (c) and (e) above.

There is likely to be some future decline in numbers from declining habitat conditions due to increased drying from declining rainfall and subsequent increase in frequency and intensity of bushfires, which is probably the major risk to this summer-flowering species.

Eligible under Criterion A4 as Endangered

The population reduction over any 150 to 300 year period, including both past and future (up to 100 years in the future), is suspected to be 50 to 75%, based on (b), (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 Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 208 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the Victorian Biodiversity Atlas.

The taxon is known from at least 6 subpopulations occurring in 4 locations. Four subpopulations are very isolated by loss of habitat and could be considered 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. The remaining two subpopulations occur in reasonable areas of forested habitat and additional records of plants could be expected in the regions.

Four locations have been determined based on geography and the likely suite of distinct threats operating on subpopulations in each location. Locations are identified as follows: far south-western Victoria (one subpopulation), Anglesea (one subpopulation), central ranges (three subpopulations), East Gippsland (one subpopulation).

It has a continuing decline in (i), (ii) and (iii) 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

It is estimated that there are 1,340 to 5,790 mature individuals, based on monitoring and field observations, but other thresholds under this criterion have not been met.

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:

Eligible under criterion D as Vulnerable

The taxon is estimated to be very restricted.

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

References

Backhouse, G. and Cameron, D. (2005). Application of IUCN 2001 Red List Categories in Determining the Conservation Status of Native Orchids of Victoria, Australia. *Selbyana* 26(1,2): 58-74.

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