Threatened Species Assessment

Pterostylis agrestis
Sutton Grange Greenhood

Taxonomy

Pterostylis agrestis (D.L. Jones) G.N. Backh.

This was previously known as *Pterostylis* sp. aff. *bicolor* (Sutton Grange).

Pterostylis sp. aff. *bicolor* (Woorndoo) sensu Ross (2000) was listed as threatened under the *Flora and Fauna Guarantee Act 1988* (SAC 2005) but it is no longer accepted by VicFlora (no date) and is considered to be a synonym of *Pterostylis agrestis*.

P. agrestis is easily confused with *Pterostylis bicolor*, but that species favours woodlands and coastal scrub, is generally more robust with widely spaced non-overlapping flowers. The closely related *P. clivicola* is a montane species that has an elliptical labellum and a more elevated central ridge on the labellum appendage.

A record from Woondoo on the Victorian Volcanic Plain (previously *Pterostylis* sp. aff. *bicolor* (Woorndoo) may be referable to this taxon (VicFlora 2019).

Current conservation status

Listed as threatened under the *Flora and Fauna Guarantee Act 1988* as *Pterostylis* sp. aff. *bicolor* (Woorndoo

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

Proposed conservation status

Critically Endangered in Australia

Criteria A2ace+3ce+4ace

Species Information

Description and Life History

The taxon is a flowering plant 5-12 cm tall, stem leaves 4-6, closely sheathing to spreading. Rosette leaves 5-8, ovate to elliptic, 0.6-2 cm long, 3-8 mm wide, shortly petiolate, crowded, margins entire. Flowers 3-14, 8-10 mm long, translucent green with darker green lines; galea porrect at base, shallowly curved for most of its length, abruptly decurved near the apex; dorsal sepal acute; lateral sepals deflexed, conjoined part broadly ovate in outline when flattened, 5-6 mm long, 6-7 mm wide, margins incurved, concave, free points broadly triangular, c. 3 mm long, spreading; petals asymmetrical, ovate, broadest towards the middle. Labellum green with a greenish black basal appendage; lamina oblong to obovate, 2-2.2 mm long, c. 2 mm wide; appendage c. 2 mm long, c. 1.3 mm wide, 3-ridged, central ridge hardly higher than marginal ridges. The taxon flowers from September to October (VicFlora 2019).

Generation Length

The generation length of *Pterostylis agrestis* 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 reliant on seed-based recruitment for population maintenance.

Distribution

The taxon is endemic to Victoria where it occurs in the vicinity of Bacchus Marsh, Maldon, Sutton Grange, Taradale and possibly Woorndoo (VicFlora 2019).

Habitat

The taxon is confined to basalt plains grasslands (VicFlora 2019).

Threats

Historically the taxon has suffered a very significant decline, in response to habitat loss and degradation caused by agricultural clearance and associated settlement activities. Several subpopulations are very small and occur on private land, roadsides or a cemetery and are unlikely to survive without active management intervention. Almost all subpopulations and habitat are considered at risk from disturbance, weed invasion and increasingly dry conditions from declining rainfall.

The taxon is threatened by weed invasion at both sites, particularly introduced annuals. Weeds include *Phalaris* sp. (Canary Grass), *Vulpia* sp. (Fescue), *Briza* sp. (Quaking Grass), *Avena* sp. (Wild Oat), and *Nassella trichotoma* (Serrated Tussock Grass).

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 Critically Endangered

The population reduction over the past 60 to 120 years is estimated to be 50 to 80%, based on (a), (c) and (e) above.

An estimate of past decline is based on an extensive historic loss of habitat in the region due to widespread clearing for agriculture.

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 projected to be 50 to 85%, based on (c) and (e) above.

An estimate of future decline is based on the projected impact of ongoing habitat loss and degradation, especially on private land.

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 estimated to be 50 to 85%, 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 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 B1 as Endangered

The Extent of Occurrence (EoO) across the taxon's range is estimated to be 862 km², based on accepted, post-1970 records from the Victorian Biodiversity Atlas.

The taxon is estimated to be severely fragmented anthropogenically at the landscape scale with most occurrences separated at distances exceeding the dispersal range of the taxon. Despite seed being wind-dispersed, the effective dispersal range is likely to be greatly restricted by the lack of available habitat within an extensively alienated agricultural landscape.

It is estimated to have one location, as the Central Victorian Goldfields region, where all confirmed subpopulations occur, is identified as a single location due to the uniform impacts of the identified threats.

It has a continuing decline in (i), (ii), (iii), (iv) and (v) above.

Eligible under Criterion B2 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 36 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the VVBA. As above, it is severely fragmented, has one location and has a continuing decline in (i), (ii), (iii), (iv) and (v) above, based on the current and projected impact of the identified threats including the impact of disturbance, weed invasion and increasingly dry conditions from reducing rainfall. There is a high risk of local extinction of small and isolated subpopulations, particularly those on private land, roadsides or a cemetery.

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 C1 as Vulnerable

It is estimated that there are 9,200 to 10,300 mature individuals. There is an estimated continuing decline of 50 to 85% within three generations.

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 D2 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., 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.

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