Threatened Species Assessment

Pterostylis truncata
Brittle Greenhood

Taxonomy

Pterostylis truncata Fitzg.

Current conservation status

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

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

Proposed conservation status

Critically Endangered in Victoria

Criteria A2ace+3ce+4ace

Species Information

Description and Life History

The number of individual plants is much higher than the estimates used in this assessment, with the You Yangs subpopulation alone estimated to have up to 10,000 individual plants. However, many of these plants have arisen through clonal reproduction, and even in years of good rainfall only about 10% of the total subpopulation size will flower. In dry years the percentage of flowering plants drops well below 10% and in very dry years no individual plants will flower. Therefore, the number of mature individuals capable of reproduction in any year has been assessed as 10% of the total subpopulation size.

The taxon is a flowering plant to 15 cm tall, stem leaves 2-5, closely sheathing. Rosette leaves 2-6, ovate to lanceolate, 1.5-3 cm long. 0.8-1.8 cm wide, petiolate, entire. Flower 3.5-4.5 cm long, semi-erect, white with green and brown stripes and suffusions; dorsal sepal acuminate, decurved near the apex; petal margins decurved; lateral sepals erect, tightly embracing the galea, sinus deeply v-shaped, slightly mounded to nearly flat when viewed from the side, free points 2.5-3 cm long, filiform, widely divergent, held obliquely forwards. Labellum narrowly ovate-lanceolate, 14-18 mm long, 3.5-4 mm wide, apex acute to subacute, red-brown, shallowly curved, distal quarter to third protruding from the sinus in the set position. The taxon flowers from February to July (VicFlora, 2018).

The taxon is a ground-dwelling orchid which emerges in autumn from an underground tuberoid and dies back in early winter. Individuals may emerge as solitary flowers (rarely two) with stem leaves or as rosettes with two to six leaves. The majority of Brittle Greenhoods, however, emerge as non-flowering plants several weeks after the flowering individuals appear. The percentage of individuals that flower is influenced by climatic conditions. Flowering is enhanced by cool summers followed by a wet autumn. It can reproduce vegetatively. Depending on the season, apart from producing a replacement tuberoid, an individual may give rise to several other daughter tuberoids. These daughter tuberoids may then go through three or more cycles of emergence and dormancy, i.e. three years, before they are able to flower. Daughter tuberoids may develop on the end of runners (stolons) near the parent and so form clusters or may form several centimetres away. The end result is often a patch (colony) consisting of one or several clones which cannot be distinguished morphologically. Populations consist of one or more patches of orchids ranging from several square decimetres up to several square metres. The size of a patch can be correlated to the age of a clone. Variation in flower morphology has been observed between populations from basaltic and granitic sites (DSE, 1995).

Generation Length

The generation length of *Pterostylis truncata* is suspected 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 restricted to south central Victoria, within 100 km of Melbourne (VicFlora, 2015). It is limited to an area within a 65 km radius of Melbourne. Six sites were reported (1970): the Brisbane Ranges, You Yangs, Coimadai district, Tottenham-Sunshine region, Belgrave South (Mount Morton) and Beaumaris. Three further sites were found, at Point Wilson, Lara and Black Hills (between Gisborne and Toolern Vale). It is currently known to survive in only three of these nine sites (You Yangs, Black Hills and the Long Forest Mallee area near Bacchus Marsh). The Long Forest Mallee populations occur in the Long Forest Flora and Fauna Reserve, and on private property, Black Hills populations are on private land and the You Yangs population is within the Regional Park (DSE, 1995).

Habitat

Backhouse and Jeanes (1995) noted that the taxon grows in grasslands, open scrublands, woodlands and open forests on well-drained sand and clay loams, which may be stony or gravelly. It is found among basalt and granite outcrops and also on Tertiary sediments. The annual rainfall is between 400 and 800 mm. It mostly occurs in open grassland communities on the basalt plains dominated by *Themeda triandra*, *Austrostipa* and *Rytidosperma* spp., or exotic grasses. It also grows amongst grasses in the chenopod-dominated understorey to *Eucalyptus behriana* (SAC 2001).

Threats

There has been a substantial historic and recent decline in distribution and abundance, with the taxon having disappeared from many former localities to the west and east of Melbourne. The subpopulations at Long Forest and the You Yangs were once quite large and more or less continuous over extensive areas, but have become increasingly fragmented in recent decades as the subpopulations decline.

There are ongoing declines in the remaining subpopulations, which face a wide range of threats including disturbance, predation, weed invasion and drying conditions from declining rainfall, impacting habitat as well as directly on plants. Very small subpopulations are at high risk of sudden decline and extinction from stochastic events in a very short time frame.

The taxon is threatened to varying degrees at its three remaining sites. Previous You Yangs population decreases has been attributed to feral goats and road maintenance. Remaining You Yangs populations are threatened by European Rabbits *(Oryctolagus cuniculus)*, feral Goats *(Capra hircus)* and Eastern Grey Kangaroos *(Macropus giganteus)*. Major cause of decline and threat is competition from Boneseed *(Chrysanthemoides monilifera)*. Potential threats to the Long Forest Mallee populations include trampling by enthusiasts, weed invasion, and possibly consumption by White-winged Choughs *(Corcorax melanorthampos)*. At Black Hills the orchid is potentially threatened by the large numbers of rabbits and kangaroos (DSE, 1995).

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

The taxon was previously much more widespread and abundant. It has disappeared from most of its former range, and remaining subpopulations are still declining.

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 75 to 95%, based on (c) and (e) above.

Future decline is based on a wide range of threats affecting the remaining occurrences, including disturbance, predation, weed invasion and drying conditions from declining rainfall.

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 (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 B as Endangered

The Extent of Occurrence (EoO) is estimated to be 309 km², based on accepted, post-1970 records in the Victorian Biodiversity Atlas (VBA).

The Area of Occupancy (AoO) is estimated to be 16 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the Victorian Biodiversity Atlas (VBA).

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:

Eligible under Criterion C as Endangered

It is estimated that there are 670 to 1,150 mature individuals, based on sporadic surveys and VBA records.

There is estimated to be a continuing decline of 30 to 60% within two 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 D as Vulnerable

It is estimated that there are 670 to 1,150 individuals, and 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

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