Threatened Species Assessment

Prasophyllum suaveolens
Fragrant Leek-orchid

Taxonomy

Prasophyllum suaveolens D.L. Jones & R.J. Bates

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* (SAC 1997).

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 taxon is a herbaceous, terrestrial orchid that dies back annually to spherical or ovoid underground tubers. It produces a single, sub-erect, hollow and tapering leaf which is bright green in colour and reddish at the base. It is the smallest leek-orchid found in Victoria. The leaf grows to 20 cm long and the tip is often withered at the time of flowering. The erect flower stem emerges through a slit in the leaf and grows to 20 cm high, producing up to 15 very small, upward facing and greenish to reddish brown flowers. The flowers are fragrant and have a sickly sweet scent. The upper sepal is ~5 mm in length, downward-pointing and angled forward; the lateral sepals are about 6 mm in length and are erect, free, parallel or divergent. The petals are widely spreading (DSE, 2003; TSSC, 2016).

The taxon flowers between September and November. It probably requires periodic fire to reduce accumulation of grasses, especially kangaroo grass, which otherwise may suppress growth and/or flowering. Fire or other disturbance such as slashing is highly likely to promote flowering. Leek-orchids have a dry season dormancy period during the hotter summer and early autumn months, commencing towards the end of spring or early summer. Leek-orchids begin to shoot in response to autumn rains. Leaves are produced first during winter and flower spikes may develop in the spring (TSSC, 2016).

Sexual reproduction is the principle means of reproduction in many leek-orchid species. Pollination mainly occurs by native bees and wasps that are attracted to the flowers' strong perfumes and rewards of nectar. Many other types of insects visit and may contribute to pollination. Syrphiid flies, in particular, are frequent visitors to leek-orchids. Little is known of the habitat requirements of pollinators of leek-orchids. Leek-orchids propagate mainly from seed, although several have been observed to develop into small clumps, presumably by vegetative means.The leek-orchid species are obligate mycotrophic plants that rely on mycorrhizal fungi to initiate seed germination, and supply some nutrients for the orchid. Type and degree of dependence upon the fungus is unknown (TSSC, 2016).

Most terrestrial orchids have evolved under conditions of hot summer fires, generally when the plants are dormant. The best time for fire is during late summer or early autumn, after seed dispersal but prior to new shoot growth. Rainfall and temperature also influences flowering. The variation in seasonal climatic conditions, most notably rainfall and temperature also influences flowering. Flowering is often restricted following periods of sustained hot, dry weather follow flower opening (TSSC, 2016).

Generation Length

The generation length of *Prasophyllum suaveolens* 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 (OSRs) reliant on seed-based recruitment for population maintenance.

Distribution

The taxon is endemic to the basalt plains of south-western Victoria, where it is mostly found from inland areas, but with some records from near Port Phillip Bay. Historic records indicate that the taxon may once have been widespread across the western basalt plains, with records from west and southwest of Melbourne at Werribee, St Albans, Albion, Laverton, Lara, Tottenham and Merri Creek, and from near Creswick (TSSC, 2016).

Habitat

Much of the present habitat of the taxon is in areas such as rail and road reserves. These orchid populations occur in habitat that forms part of the Natural Temperate Grassland of the Victorian Volcanic Plain ecological community and the Western (Basalt) Plains Grasslands ecological community (TSSC, 2016).

The taxon grows primarily in grasslands, but is also found in open grassy woodland, on poorly drained red-brown soil derived from basalt, often with embedded basalt boulders. These native grasslands are usually dominated by kangaroo grass with perennial herbs and lilies. The habitat is dominated by a ground layer of tussock-forming perennial grasses, with a wide variety of wildflowers and herbs growing among the tussocks (TSSC, 2016).

Threats

The taxon has suffered a historic catastrophic decline due to almost total loss of habitat in the region, largely for agriculture but also for urban expansion and industrial development. At least five subpopulations, all to the west and south-west of Melbourne, have become extinct in the last 100 years. Another subpopulation at Penshurst has not been seen since 1995 and is almost certainly extinct.

Remaining subpopulations occur in tiny degraded habitat remnants such as on roadsides and in cemeteries, and are all declining. Habitat at all localities is declining through impacts of disturbance, weed invasion and increasingly dry conditions from reducing rainfall, which will most likely lead to further decline in and loss of subpopulations. Very small subpopulations are highly susceptible to stochastic events causing major decline or local extinction within a very short time frame.

Weeds directly out-compete orchids for resources and change the vegetation type and structure of the habitat (TSSC, 2016). As well as altering microhabitats which may have an indirect negative impact. Problematic weeds include Phalaris (*Phalaris aquatica*), Onion-grass (*Romulea rosea*), *Cuscuta dubia*, wild Watsonia (*Watsonia meriana* var. *bulbillifera*) and English Broom (*Cystisus scoparius*). These occur particularly at sites suffering soil disturbance, such as those on road and/or rail reserves, where accidental destruction caused by road and/or rail maintenance activities is also a threat.

Accumulation of grasses, as a result or infrequent burning or other inadequate biomass reduction, may suppress growth and/or flowering. Too frequent fire may pose a threat by altering the habitat, removing organic surface materials and negatively impacting pollinators and mycorrhizal agents. Grazing by herbivores, including rabbits and cattle, can be devastating. Additionally, the impact of cattle can be exacerbated by trampling and the introduction of weed seed in their faeces (TSSC, 2016).

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.

Past decline is based on extensive historic loss of habitat and subpopulations.

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

Future decline is based on the recent loss of subpopulations and ongoing habitat degradation.

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.

Past decline is based on extensive historic loss of habitat and subpopulations.

Future decline is based on the recent loss of subpopulations and ongoing habitat degradation.

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 4,855 km², based on accepted, post-1970 records in the Victorian Biodiversity Atlas (VBA).

The Area of Occupancy (AoO) is estimated to be 36 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
(a) (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 Endangered

It is estimated that there are 450 to 1100 mature individuals. There is estimated to be a continuing decline of 60 to 80% within two generations.

Eligible under Criterion C2 as Endangered

It is estimated that there are 450 to 1100 mature individuals. There is an estimated continuing decline, and the number of mature individuals in each subpopulation is fewer than 250.

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 450 to 1100 mature individuals.

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

References

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