Threatened Species Assessment

Corunastylis arrecta
Erect Midge-orchid

Taxonomy

Corunastylis arrecta (D.L. Jones) D.L. Jones & M.A. Clem.

Basionym: *Genoplesium arrectum* 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

Criteria A2ce+3ce+4ce; B2ab(i,iii,v)

Species Information

Description and Life History

The taxon flowers from October to February (Backhouse et al. 2016), and flowering may be enhanced by fires during the previous summer (VicFlora 2019).

Recent research by Dr Colin Bower has shown that the genus is preferentially pollinated by tiny flies belonging to the Family *Chloropidae* that are apparently attracted to the flowers by scent. Some species of chloropid flies are parasitic on a wide range of animals including insects, molluscs and frogs. The chloropid flies attracted to *Corunastylis* spp. apparently feed on leaking blood and fluid from injured or dead insects. It seems likely that the scent emitted by the orchids mimics that of the injured/dead insect, thus *Corunastylis* spp. appear to be pollinated by insect prey deception, the first time this type of pollination syndrome has been reported in Australia. The flies seem to be attracted to the orchids only on very warm days, when many flies may be seen crawling over the flower spike of a single plant. It seems that most of the attracted flies are females, with the few males detected on the flowers probably waiting to mate with the females (Backhouse et al. 2016).

Generation Length

The generation length of *Corunastylis arrecta* is estimated to be 20 to 40 (midpoint 30) years. The 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 that are likely to result in replacement at intervals of several decades only. Such orchids are classed as obligate seed regenerators, meaning they are reliant on seed-based recruitment for population maintenance.

Distribution

The taxon occurs in the montane and subalpine areas of eastern Victoria from Licola to the NSW border. The altitude ranges from 550-1,400 metres above sea level (Backhouse et al. 2016; VicFlora 2015).

Habitat

The taxon grows on slopes and ridges in dry woodland and forest, on clay loam, often gravelly soils, and in grassland and Snow Gum woodland (Backhouse et al. 2016; VicFlora 2015).

Threats

Many of the areas where the taxon occurs have been subject to past forestry operations, grazing, and disturbance by brumbies in grassy areas. Increasingly dry conditions from declining rainfall and a consequent increase in the severity and intensity of bushfires are likely to be detrimental to this species. Cattle have been removed from much of the taxon's range in east Victoria, but feral species remain a threat, particularly rabbits, feral ungulates (i.e. horses), and deer, of which Sambar (*Rusa unicolor*) are by far the most abundant.

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 inferred to be 30 to 50%, based on (c) and (e) above. The causes of the reduction may not have ceased, be understood or be reversible.

The taxon is characteristic of subalpine areas of eastern Victoria. Many of the areas where it occurs have been subject to habitat loss and disturbance.

Eligible under Criterion A3 as Endangered

The population reduction over the next 60 to 100 years is suspected to be 30 to 50%, based on (c) and (e) above.

This is based on the impacts of the identified threats.

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 30 to 50%, based on (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 80 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the Victorian Biodiversity Atlas (VBA).

The taxon is suspected to be severely fragmented, since it occurs in fragmented landscapes that are subject to impacts of brumbies and deer. Although orchids have fine wind-blown seed, it would be very hard for western populations to recolonise if lost, as a result of generally westerly winds.

It is estimated to have a continuing decline in (i), (iii) and (v) 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 40,000 to 80,000 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 40,000 to 80,000 mature individuals.

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., & Turner, J. (2016). *Bush Gems: A Guide to the Wild Orchids of Victoria, Australia*. Melbourne, Victoria: EBook.

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