Threatened Species Assessment

Abrodictyum caudatum
Jungle Bristle-fern

Taxonomy

Abrodictyum caudatum (Brack.) Ebihara & K. Iwats.

Current conservation status

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

Proposed conservation status

Endangered in Victoria

A2c+3c+4c; B2ab(i,ii,iii,iv,v); C2a(i)

Species Information

Description and Life History

The taxon is a shortly-creeping epiphytic perennial filmy fern. Rhizome sub-erect to shortly creeping, relatively thick, 1-1.5 mm diam., covered with coarse, shiny, red-brown hairs. Fronds tufted or close together, erect, 4-20 cm long, with tiered pinnae. Stipe slender, relatively short, not winged; rachis very narrowly winged. Lamina 2-3-pinnate, finely dissected, triangular to ovate-linear, dark green; ultimate segments very narrow, c. 1 mm wide; margin entire. Sori numerous, immersed in lamina, terminal on lateral segments of pinnae; indusium conical, 1-3 mm long; receptacle relatively robust, projecting 2-10 mm out from indusium at maturity.

Generation Length

The generation length of *Abrodictyum caudatum* is suspected to be 25 to 80 (midpoint 50) years. Most of the known plants are large with a widely creeping underground rhizome; it is assumed that such plants would be at least 20 years old.

Distribution

The taxon is rare and occurs in the Yarra Ranges and Gembrook area, Wilsons Promontory and East Gippsland east from the Goongerah area. It also occurs in NSW and Queensland.

Habitat

The taxon occurs in rainforests in far East Gippsland, the Beenak area and Wilsons Promontory. It grows on the trunks of tree-ferns, particularly *Cyathea australis*.

Threats

The taxon has thought to have undergone a historic decline due to a combination of factors including droughts, bushfires and forestry operations, possibly due to decreases in moisture (Mueck & Peacock 1992). Current threats include extreme temperatures, droughts and climate change. Other threats are an increase in fire frequency and intensity, habitat alteration and severe weather. All of these contribute to the decline in numbers of the treefern hosts. Fires open the habitat, thus permitting drying winds to enter and overgrowth by ephemerals and short-lived shrubs and herbs impedes subsequent occupation by treeferns.

The taxon is also threatened by deer disturbance (direct browsing, antler rubbing and use of wallows).

Spatial analysis of likely habitat for Jungle Bristle-fern on all land tenures indicates that 67% occurs within the Comprehensive, Adequate and Representative (CAR) reserve system, including parks, reserves and special protection zones in State forest. Victorian Code of Practice for Timber Production 2014 prescriptions protect rainforest, old growth forest and waterways from timber harvesting, and there are species-specific protections for two treefern host taxa, *Cyathea cunninghami and C. leichhardtiana.* which afford the species protection from the potential threat of forestry operations.

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 75 to 240 years is estimated to be 30 to 80% (midpoint 50%), based on (b), (c) and (e) above.

Past decreases are due to previous droughts and the effects of the inappropriate fire regimes, including the 1983 and 2020 bushfires; the 2020 fires 2020 are believed to have potentially impacted between 50 to 60% of the taxon's habitat. It is sensitive to fire and is likely to have been significantly impacted. Forestry operations may also have contributed to soil moisture and microclimate changes at some locations.

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 75 to 100 years is projected to be 50 to 85% (midpoint 70%), based on (b), (c) and (e) above.

Most subpopulations are in reserves and in recent years, modified harvesting and forest regeneration practices have been implemented that are designed to further mitigate the potential threat from forestry operations to threatened species and their habitats.

The effects of future droughts and increasing fire frequency and intensity may drive further declines.

Eligible under Criterion A4 as Endangered

The population reduction over any 75 to 240 year period, including both past and future (up to 100 years in the future), is suspected to be 50 to 85% (midpoint 70%), based on (c) 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 40 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the Victorian Biodiversity Atlas.

The taxon is estimated to have 3 locations. It has a continuing decline in (i), (ii), (iii), (iv) and (v) above, as a result of the identified threats, notably droughts and increasing fire frequency and intensity.

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 C2 as Endangered

It is estimated that there are 300 to 1,400 mature individuals. These numbers are based on a density of individuals of 1 plant every 50 x 50 metre grid of rainforest valley east of Mallacoota Inlet, where they are most common, occurring in most if not all rainforest valleys in this area. In other areas subpopulations are assumed to be 1 to 30, based on average population sizes.

The number of mature individuals is estimated to continue to 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 300 to 1,400 individuals.

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

References

DEPI (2014) Advisory list of rare or threatened plants in Victoria - 2014. Department of Environment and Primary Industries, Melbourne. (Retrieved from https://www.environment.vic.gov.au/__data/assets/pdf_file/0021/50448/Advisory-List-of-Rare-or-Threatened-Plants-in-Victoria-2014.pdf)

Mueck, S.G., Peacock, R.J. (1992) Impacts of intensive timber harvesting on the forests of East Gippsland, Victoria. Value Adding and Silvicultural Systems Project. VSP Technical Report 15. Department of Conservation and Natural Resources, Victoria.

VicFlora (2019). Flora of Victoria, Royal Botanic Gardens Victoria: *Abrodictyum caudatum* https://vicflora.rbg.vic.gov.au/flora/taxon/5d7b7eed-f92c-457e-b8be-da1c6e9b8f6b