

Astrotricha linearis subsp. 1 Narrow-leaf Star-hair

Taxonomy

Astrotricha linearis subsp. 1 sensu Henwood, Makinson & Maling (1999)

Further investigation into Victorian *Astrotricha* is required to confirm the species boundaries in *Astrotricha*, which may alter the circumscription of taxa in the future possibly altering their threatened category.

Current conservation status

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

Proposed conservation status

Endangered in Victoria

Criterion B2ab(i,ii,iii,iv,v)

Species Information

Description and Life History

The taxon has erect to bushy shrubs 0.6-2 m high; stems felted (occasionally glabrescent). Leaves linear; 20-40(-50) mm long, 1-2 mm wide; petiole 2-4 mm long. Inflorescence 30-55 mm long; axis felted to closely subfloccose; bracts triangular; 2.4-3.0 mm long. Pedicels 1.5-3 mm long; petals white, 2-2.2 mm long; anthers 1 mm long. Fruit obloid-ellipsoid, widest at middle, 3.5-4.1 mm long, 3.3-3.5(-4) mm wide. The taxon flowers from (October-) November to January (VicFlora 2017).

Generation Length

The generation length of *Astrotricha linearis* subsp. 1 is estimated to be 10 to 20 years. *Astrotricha* sp. 2 is known to live for between 10 to 20 years and is expected to have a similar lifespan to *Astrotricha linearis* subsp. 1. This age also corresponds to the expected interval between fires which would kill mature plants and assist in germination of the new cohort.

Distribution

In Victoria, the taxon is scattered from around in Castlemaine east to far north-east Victoria around Burrowa-Pine Mountain National Park in the north and around Mitchell River National Park in the south. It is fairly frequent in the Licola-Dargo area. It also occurs in NSW (VicFlora 2017).

Habitat

The taxon grows in dry sclerophyll forest with shaly or sandy-loam soils (VicFlora 2017).

Threats

Astrotricha species regenerate largely in response to fire, and if fire events are too frequent then the plants may not get a chance to reach reproductive maturity before they are burnt and killed. Conversely, if the fires are not frequent enough then regeneration may not be favoured and other competing plants may become too dominant. In addition, clearing due to mining is a threat on Mount Unicorn and Sambar browsing is also a potential threat.

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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%
<p>A1 Population reduction observed, estimated, inferred or suspected in the past and the causes of the reduction are clearly reversible AND understood AND ceased.</p> <p>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.</p> <p>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]</p> <p>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.</p> <p style="text-align: center;"><i>based on any of the following:</i></p> <ul style="list-style-type: none"> (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 A3 as Vulnerable

The population reduction over the last 30 to 60 years is suspected to be 20 to 35%, based on (c) above.

The bushfires of 2019/2020 are believed to have potentially impacted between 50 to 80% of the taxon's habitat. The taxon is generally tolerant of fire, and the overall impacts of the fire are yet to be determined.

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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 km ²	< 5,000 km ²	< 20,000 km ²
B2. Area of occupancy (AOO)	< 10 km ²	< 500 km ²	< 2,000 km ²
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 Vulnerable

The Extent of Occurrence (EoO) across the taxon's range is estimated to be 8,164 km², based on accepted, post-1970 records from the Victorian Biodiversity Atlas (VBA).

The taxon is estimated to be severely fragmented. There are some subpopulations that are likely to be small (e.g. 10 individuals were reported from a subpopulation in the far north-east), and most subpopulations are widely separated from other subpopulations by unsuitable habitat, at a distance that is expected to be beyond the dispersal capabilities of this taxon.

It is estimated to have seven locations. The localities are here considered to comprise: Bendigo and Elphinstone areas; Licola and Mitchell River areas; Mt Unicorn; Burrowa-Pine Mountain and Mount Lawson State Park; and the Mitta Mitta River area. The rate of decline at each of these sites may be different due to the differences in threats present (mining at Mount Unicorn but not the other sites), difference in management (reserves vs outside of reserves) and difference in climate (due to these areas being widely separated) that may affect the frequency of fire.

It has a continuing decline in (i), (ii), (iii), (iv) and (v) above, based on the current and projected impact of the identified threats, including Sambar browsing, inappropriate fire regimes and clearing.

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 VBA, and a further five herbarium records north of Bendigo, not yet included in the VBA.

As above, it is severely fragmented, has seven locations and has a continuing decline in (i), (ii), (iii), (iv) and (v) above.

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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 as Data Deficient

There is insufficient evidence to determine the number of mature individuals. Of the subpopulations that were visited, herbarium collections and observational records lack information on the number of individuals present in the subpopulations to be able to estimate the number of mature individuals in a typical population.

Criterion D. Very small or restricted populations				
		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 km ² or number of locations ≤ 5

Evidence:

Ineligible under Criterion D

There is insufficient evidence to determine the number of mature 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



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VicFlora (2017). Flora of Victoria, Royal Botanic Gardens Victoria: *Astrotricha linearis* subsp. 1. Retrieved from: <https://vicflora.rbg.vic.gov.au/flora/taxon/b5417957-f4f0-4399-bd25-a9ca452296f7>