

Notothixos subaureus Golden Mistletoe

Taxonomy

Notothixos subaureus Oliv.

Current conservation status

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

Proposed conservation status

Critically Endangered in Victoria

Criteria A2bc

Species Information

Description and Life History

The taxon is erect or spreading shrubs to 60 cm diam., with a bright golden tomentum, rarely greyish. Prophylls and cataphylls linear to triangular, to c. 1 mm long. Leaves trullate, rhombic or elliptic, 1-5 cm long, 10-20 mm wide, apex rounded, obtuse or acuminate, mucronate, upper surface greenish, sometimes shiny, glabrescent, lower surface golden-tomentose; petiole 3-5 mm long. Inflorescence of 1 terminal and 2 lateral 5-11-flowered cymules, central 1-5 flowers usually male; bracts narrow-triangular, to c. 1 mm long. Male flowers c. 1 mm diam., pedicel c. 0.5 mm long; female flowers c. 2 mm long, subsessile. Fruit ellipsoid to subglobose, c. 7 mm long. Flowers throughout the year (VicFlora 2019).

Generation Length

The generation length of *Notothixos subaureus* is estimated to be 10 to 30 years (midpoint 25 years). Given that *Notothixos* is parasitic on other mistletoe taxa, it is expected that its lifespan will be shorter than those taxa as it will take time to disperse to the host, and the host will need to be already suitably established. The taxon will almost inevitably die with the host.

Distribution

In Victoria the taxon mostly occurs around Mallacoota Inlet with a disjunct occurrence near Wingan Inlet. It is also found in Queensland and New South Wales.

Habitat

The taxon occurs on other mistletoes, probably exclusively *Dendrothoe vitellina* in Victoria, in the canopy of eucalypt forests.

Threats

The main threats to the taxon in Victoria are widespread fires around Mallacoota. Mistletoe taxa are killed by fire, and their occurrence after fire is reliant on recolonisation by seed from plants of nearby areas that were not affected by the fire. The long-term persistence of *N. subaureus* in Victoria relies on some plants escaping fire that can produce fruit that birds (predominantly Mistletoe birds) can disperse to areas affected by fires. Increased frequency of fire is expected with climate change and may affect the survival of host trees and host mistletoe, as

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well as the abundance and extent of mistletoe plants. As the taxon has been recorded from trees in the Mallacoota township, the clearing of these trees may be a localised threat.

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 A2 as Critically Endangered

Population reduction over the last 30 to 90 years is inferred to be 70 to 90%, based on (b) and (c) above.

Past reduction is based on the impact of the 2019/20 fires within the taxon's habitat, which makes it almost certain that there has been more than a 70% decline in population size and area of occupancy.

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 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 Endangered

The Extent of Occurrence (EoO) across the taxon's range is estimated to be 418 km², based on accepted, post-1970 records from the Victorian Biodiversity Atlas (VBA).

The taxon is estimated to be severely fragmented as it is unlikely that subpopulations would get recolonised from other subpopulations following extinction, because they are too well separated to allow for the usual amount of movement of bird vectors, such as the mistletoe bird which typically have home ranges of only 20 hectares (Ward and Paton 2007). The Wingan Inlet subpopulation is 24 km from its closest subpopulation.

The taxon is considered to occur in one location as all key identified threats apply across its range and can rapidly affect all individuals of the taxon present. These threats include widespread fires and increase in frequency of fires.

It has a continuing decline in (i), (ii) and (iii) above, based on the impacts of the identified threats.

Eligible under Criterion B2 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 36 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA.

As above, the taxon is severely fragmented, has 1 location, and has a continuing decline in (i), (ii) and (iii) above.

Notothixos subaureus Golden Mistletoe

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.

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:

Eligible under criterion D2 as Vulnerable

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

DEPI (2014). *Advisory list of rare or threatened plants in Victoria - 2014*. Department of Environment and Primary Industries, Melbourne.

Hartigan, D. (1960). The Australian mistletoe. *Journal of Forestry* 58: 211-216.



Notothixos subaureus Golden Mistletoe

VicFlora (2019). Flora of Victoria, Royal Botanic Gardens Victoria: *Notothixos subaureus*. Retrieved from: <https://vicflora.rbg.vic.gov.au/flora/taxon/9225ccdd-7847-4fc5-9c40-4f1ad88b33ae>

Ward, M.J. and Paton, D.C. (2007). Predicting mistletoe seed shadow and patterns of seed rain from movements of the mistletoe bird, *Dicaeum hirundinaceum*. *Austral Ecology* 32: 113-121.