Threatened Species Assessment

Tetrarrhena turfosa
Smooth Rice-grass

Taxonomy

Tetrarrhena turfosa N.G. Walsh

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 is a mat-forming, tufted or rhizomatous, ascending perennial, 0.2-1.3 m high. Leaves erect, smooth and glabrous; blade tightly involute, 2-7 cm long, 0.3-0.8 mm diam., terminating in a blunt, sometimes slightly swollen tip; ligule a ciliate rim less than 0.5 mm long, sometimes with a few marginal hairs to 1 mm long. Inflorescence an erect, spike-like raceme 1-3 cm long. Spikelets 3-10 per raceme, 4.8-6.8 mm long, subsessile, often purplish; glumes subequal, 1.1-2 mm long, smooth and glabrous; lower sterile lemma about two-thirds as long as upper, both oblong, blunt, hardly keeled, the 5-7 nerves prominently raised and scabrous; fertile lemma subequal to upper sterile lemma, dorsally keeled, uniformly scabrous, sometimes obscurely 5-7-nerved; palea about as long as lower lemma; stamens 4. Flowers mostly November-March (VicFlora 2019).

Generation Length

The generation length of *Tetrarrhena turfosa* is projected to be 5 to 15 years. The taxon develops an extensive wiry rhizome/root system that appears long-lived. It is often inconspicuous unless the surrounding vegetation is reduced by fire or mechanical disturbance, where it may lie semi-dormant in the intervening periods. In some situations (e.g. alpine seeps) it is likely to be considerably longer-lived than 15 years, but data are lacking on true longevity.

Distribution

The taxon occurs in Victoria patchily from the Grampians through to the subalps on the Nunniong Plain, and lowland far east Gippsland near Genoa. Intervening areas include Tonimbuk, Buxton, Mt Buffalo, and the Bogong High Plains (BHP), although its precise locality on BHP is unknown. The taxon also occurs in New South Wales.

Habitat

The taxon grows in permanently damp, peaty soils from near sea-level to c. 1,300 m on Mt Buffalo and the Nunniong Plateau. Associated vegetation includes taxa characteristic of lowland wet heath and heathy woodland and subalpine wet heath communities. *Empodisma minus* is a likely associate in both these situations, and others include *Epacris* spp., *Melaleuca squarrosa, Gahnia sieberiana,* and *Gleichenia* spp. etc.

Threats

The taxon is probably most susceptible to loss of habitat because of long-term drying of the wet peaty sites to which it is obligately associated. It has been observed to respond well after fires (e.g. Mt Buffalo, post 2002 fires -

2005, 2006, N. Walsh pers. obs.). Grazing is not likely to be a substantial threat as it generally occurs within dense heathy vegetation where it is often present as rather stringy, few-leaved aerial stems.

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:

Ineligible under Criterion A

The past population reduction does not meet the threshold for eligibility under criterion A2, and the future population reduction does not meet the threshold for eligibility under criterion A3.

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 304 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the Victorian Biodiversity Atlas.

The taxon is projected to be severely fragmented, as the capacity for the taxon to recolonise following local extinction is negligible with no known vectors for long-distance dispersal.

Locations have been selected on general areas of occurrence: the Grampians, where the species occupies similar habitats in more or less contiguous sites between lowlands and Major Mitchell Plateau; Victorian Alps (Nunniong, Buffalo Plateaus) where the species seems to be wholly at higher altitudes; Gippsland Plains (includes Buxton) where the species is a component of lowland wet heathland communities. Different ecologies and threats are assumed to be operating at each of these 'locations'.

It is estimated to have 3 locations, and has a continuing decline in (i), (ii), (iii), (iv) and (v) above based on the impacts of the identified threats, such as higher temperatures and lower rainfall through climate change.

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 as there are no known attempts to document the numbers of plants in any areas of occurrence. Furthermore, the rhizomatous nature of the plants would make identifying individuals difficult.

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

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

VicFlora (2019). Flora of Victoria, Royal Botanic Gardens Victoria: *Tetrarrhena turfosa*. Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/abc128ae-d0ba-4963-92bb-ca5c9e3a30a3