Threatened Species Assessment

Austrostipa nullanulla
Club Spear-grass

Taxonomy

Austrostipa nullanulla (J. Everett & S.W.L. Jacobs) S.W.L. Jaco

The taxon is distinctive on account of the very large heavy floret, presumably locally dispersed to maintain populations within a highly specific habitat, and the copiously woolly summit of the leaf sheath.

Current conservation status

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

Proposed conservation status

Endangered in Victoria

Criteria A2bce+3ce+4ce; B2ab(iii,v)

Species Information

Description and Life History

The taxon is a tufted perennial, culms erect, to 50 cm high, nodes glabrous. Leaves smooth and glabrous or scabrous (sheath of lower leaves sometimes scabrous or pubescent); blade rigid, sharp-pointed, tightly involute, to 30 cm long and to 1 mm diam.; sheath of upper leaves broadly dilated around culms; ligule membranous, to 5 mm long, the margin with copious woolly hairs to 9 mm long. Inflorescence a moderately dense, narrow panicle 10-20 cm long, hardly exserted from the sheath. Glumes 9-14 mm long, green or slightly purplish, acute to acuminate, membranous, the lower 1-4 mm longer than upper; lemma 5-6 mm long, maturing to dark brown, smooth except for the scabrous neck, sparsely covered with semi-appressed golden hairs; coma erect, 0.5-1.5 mm long, in 2 tufts, the hairs hardly longer than those of the body of the lemma; callus 2.2-2.7 mm long; awn twice bent, 50-80 mm long, 10-17 mm to the first bend, minutely pubescent; palea about equal to lemma, glabrous. The taxon flowers from December to January (VicFlora 2017).

Generation Length

The generation length of *Austrostipa nullanulla* is estimated to be 100 years. This is based on the undisturbed pre-European settlement conditions, when the turnover rate of the taxon is likely to have been at the century scale, with individual plants being very long-lived.

Distribution

The Victorian stronghold of the taxon is the north-west sector of the Murray-Sunset National Park, west and south-south-west of Morkalla. Disjunct occurrences are found at: Towan Plains east of Chinkapook, Trinita south of Hattah, Duddo north-north-east of Murrayville, and the Raak Plain west of Nowingi. The taxon also occurs in New South Wales and South Australia (VicFlora 2017).

Habitat

The taxon is a habitat specialist found consistently on lichen encrusted Copi rises or gypseous dunes, typically on north to north-west aspects (VicFlora 2017).

Copi rises are defined as a relatively treeless ridge, formed by dust blown from lake beds thousands of years ago. They currently support a distinctive plant community, dominated by species of *Tecticornia* and *Zygophyllum*. Copi is the indigenous word for gypsum (calcium sulphate).

Threats

The taxon is palatable to stock and is probably reduced from much of its former range (VicFlora 2017). The taxon is threatened universally by rabbit grazing and, historically in Victoria and still in NSW, by stock. This is illustrated by the observation that plants at the type location in NSW are doing well when fenced, and very poorly when unfenced.

The taxon is a habitat specialist found consistently on lichen encrusted Copi rises or gypseous dunes, a highly localised and fragile landscape element easily damaged by agricultural activity. Historically, there has been a large and demonstrable loss of Copi rises in the far North West, from which it is inferred that the taxon has suffered significant historic decline through habitat loss and modification in response to agricultural activity.

The taxon is also threatened by weed invasion by the exotics *Reichardia tingitana*, *Hordeum marinum*, *Sisymbrium erysimoides* and *Mesembryanthemum nodiflorum*.

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 300 years is inferred to be 30 to 50%, based on (b), (c) and (e) above.

Past decline is based on the demonstrable historic loss of Copi rises in response to agricultural activity, the historic impact of stock grazing and the continuing impact of rabbit grazing.

Eligible under Criterion A3 as Endangered

The population reduction over the next 100 years is projected to be 50 to 80 (midpoint 65%), based on (c) and (e) above.

Future decline is based on the projected impact of rabbit grazing, which has the demonstrated capacity to eliminate the taxon in the absence of effective rabbit control. Currently, only 5% of Victorian occurrences are protected by rabbit exclusion (and less than 1% of NSW occurrences).

Eligible under Criterion A4 as Endangered

The population reduction over any 300 year period, including both past and future (up to 100 years in the future), is estimated to be 50 to 75% (midpoint 60%), 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) is estimated to be 60 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the Victorian Biodiversity Atlas.

The taxon is severely fragmented naturally at the subregional and landscape scales, and also anthropogenically at the landscape scale in some districts. Geographically isolated stands occur at spacings greatly exceeding the highly localised dispersal range of the taxon and, therefore, the probability of recolonisation, in the event of local extinction, is remote. The taxon has very large heavy florets, which are presumably locally dispersed to maintain populations within a highly specific habitat.

It has a continuing decline in (i), (ii), (iii), (iv) an (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 as Data Deficient

There is insufficient evidence to determine the number of mature individuals. No reliable estimate of the total population size for the taxon is available.

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 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. 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 (2017). Flora of Victoria, Royal Botanic Gardens Victoria: *Austrostipa nullanulla*. Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/b2affa13-cd60-41c9-b17c-296ab57a0249