Threatened Species Assessment

Rytidosperma richardsonii
Straw Wallaby-grass

Taxonomy

Rytidosperma richardsonii (Cashmore) Connor & Edgar

Most earlier records listed for *R. richardsonii* were based on incorrectly identified specimens of the superficially similar *R. bipartitum* (VicFlora 2017). The taxon has apparently been confused by a succession of botanists with *R. bipartitum*, *R. fulvum*, *R. geniculatum*, *R. erianthum*. and *R. fulvum*.

A 1968 Beauglehole collection from rock crevices at the summit of Mt Arapiles was determined by John Jessop in 2005 as *R. richardsonii*. A duplicate of this collection (Beauglehole 29650 dated 20 November 1968) at MEL was determined in 2014 as *R. fulvum*. Another duplicate at LTB previously determined by De Nardi in 1973 as *Danthonia richardsonii* was redetermined by Alison Kellow in 2017 as *R. fulvum* with the comment 'Awn more like *R. bipartitum* but other characteristics match *R. fulvum*.'

A 1968 Beauglehole collection at MEL from Conan Swamp Geological Reserve north of Mitre (Beauglehole 86573 dated 12 November 1986) was determined by Beauglehole as *Danthonia geniculata*, then redetermined by Peter Linder in 1993 as *Danthonia richardsonii* and finally redetermined by Neville Walsh in 2017 as *Rytidosperma erianthum*. At the same time Beauglehole also collected a specimen of *R. geniculatum* and a specimen of *R. bipartitum* at the same site. These specimens clearly suggest that, in the Western Wimmera at least, the taxon has been confused by a succession of botanists with *R. bipartitum*, *R. fulvum*, *R. geniculatum* and *R. erianthum*.

A 1969 Wakefield collection at MEL from Pine Creek at Willis on the NSW border in the Upper Snowy Rainshadow previously assigned to *R. richardsonii* was determined in 2015 as *Austrodanthonia racemosa*, suggesting the taxon can apparently also be confused with *R. racemosum*. Wakefield also collected *R. fulvum* at the site at the time.

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 A2ce+3ce+4ce; B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v)

Species Information

Description and Life History

The taxon is a densely tufted perennial herb. Culms to 80 cm high. Leaves glabrous; blade folded or loosely inrolled, to 35 cm long and 3 mm wide. Panicle compact, lanceolate to ovate in outline, mostly 4-10 cm long. Spikelets often tinged purplish when young, 4-6-flowered; glumes subequal, rather broad, shortly acuminate, 10-15 mm long; lemma obovate to triangular in outline, 4-6 mm long, rather prominently longitudinally veined, densely and more or less evenly covered by hairs commencing c. 1 mm above the callus tuft, increasing slightly in length from lower to upper, the uppermost usually 4-5 mm long and inserted c. 1 mm below the sinus; lateral lobes erect, 4-7 mm long, membranous and rather broad near base, tapering rather abruptly into the 1-2 mm long setiform tips or the setae sometimes absent; central awn pale, exceeding lateral lobes by up to 4 mm, not or loosely once-twisted at base; palea broadly obovate, equal to or exceeding sinus by up to 1 mm. The taxon flowers November to December (VicFlora 2017).

Generation Length

The generation length of *Rytidosperma richardsonii* is estimated to be 10 to 25 years (midpoint 15 years). This is based on a plausible longevity of 10-15 (-25) years and the likelihood that the taxon recruits opportunistically in response to small-scale episodic disturbance events. The taxon is unlikely to be dependent on fire for recruitment although fire events may promote an additional recruitment pulse.

In the absence of any specific event resulting in mortality, longevity is likely to be indefinite but since many events are likely to result in death of adult plants, longevity is likely to be truncated at an average life span of 10-15 years with recruitment from a soil-stored seedbank following the next fire event or optimal season.

Distribution

The taxon has been recorded from a few localities in north-east Victoria, such as Barnawartha, Dookie, Rutherglen, Springhurst, and Yarrawonga. The type specimen was from a plant propagated from wild-collected seed purportedly from Werribee. However, the only specimen of *R. richardsonii* at MEL from southern Victoria is from the grounds of Geelong Grammar School at Corio, where it is possibly cultivated, and is not known from there since 1961. It also occurs in South Australia where it is probably naturalised, and in New South Wales (VicFlora 2017).

Habitat

The taxon is recorded in Victoria in small, isolated, and typically highly degraded remnant stands of native grassy woodland dominated, at the time of European settlement, by *Eucalyptus microcarpa* (Grey Box), *E. melliodora* (Yellow Box), *E. albens* (White Box), *E. camaldulensis* (River Red-gum), or *Allocauarina luehmannii* (Buloke). Associated understorey taxa include *Acacia pycnantha* (Golden Wattle), *Austrostipa* taxa (Spear Grass), *Bothriochloa macra* (Red-leg Grass), *Dichanthium sericeum* (Silky Blue-grass), *Goodenia hederacea* subsp. *hederacea* (Ivy Goodenia), *Microlaena stipoides* (Weeping Grass), and *Themeda triandra* (Kangaroo Grass).

Threats

On the assumption that the taxon is strictly indigenous in the north-east of the state, the taxon has undoubtedly undergone significant historic decline through habitat loss to agriculture and particularly, habitat modification through land use practices such as grazing of unimproved pasture and agistment of stock in areas of remnant vegetation. The taxon was described by Vickery (1956) as 'probably one of the most useful species as a fodder grass. It produces large leafy tufts which are readily consumed by stock. However, it does not appear to be very abundant in many natural pastures at the present time.' This suggests the taxon may have been preferentially targeted by stock in the early stages of European settlement with catastrophic declines in local abundance. Cunningham *et al*. (1992) also noted that the taxon 'is regarded as being one of the more useful native grasses.'

The greatest current and future threat is weed invasion by aggressive exotic grasses such as *Nassella neesiana* (Chilean Needle-grass) and *Phalaris aquatica* (Toowoomba Canary-grass). The taxon continues to be threatened by intensification of agriculture on private land, changing farming practices, incremental habitat loss, and herbivory by sheep, cattle, macropods, and rabbits.

A submission from Trust for Nature (D. Robinson pers. comm. Dec .2020) noted that there may be only one extant population north of Dookie on a road reserve, which has in recent years been bulldozed and herbicided.

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

The taxon has undergone significant historic decline through habitat loss to agriculture and, particularly, habitat modification through land use practices such as grazing of unimproved pasture and agistment of stock on road reserves and remnant native vegetation. The proportion of this decline which has occurred in the last three generations is difficult to estimate with confidence, since it is unclear whether the taxon was naturally rare or fragmented in the North East region at the time of European settlement.

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

Future decline is based on the current and projected impact of the identified threats.

Eligible under Criterion A4 as Endangered

The population reduction over any 30 to 75 year period, including both past and future, is estimated to be 30 to 80% (midpoint 50%), 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 B1 as Endangered

The Extent of Occurrence (EoO) across the taxon's range is estimated to be 1,090 km², based on accepted, post-1970 records from the Victorian Biodiversity Atlas (VBA).

The taxon is estimated to be severely fragmented anthropogenically at the landscape scale. It is unclear whether the taxon was naturally severely fragmented at the landscape scale at the time of European settlement or whether the current distribution is an artefact of habitat loss and fragmentation. Geographically isolated occurrences are separated by distances greatly exceeding the dispersal range of the taxon, which has no specialised mechanism for long-distance dispersal.

It is estimated to have 1 location, and has a continuing decline in (i), (ii), (iii), (iv) and (v) above based on the current and projected impact of the identified threats, such as weed invasion, intensification of agriculture, changing farming practices, incremental habitat loss, and herbivory.

Eligible under Criterion B2 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 32 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA.

As above, the taxon is estimated to be severely fragmented, to have 1 location, and has a continuing decline in (i), (ii), (iii), (iv) and (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, but a December 2020 submission from Trust for Nature (D. Robinson pers. comm.) noted that there may be only one extant population north of Dookie on a road reserve, with fewer than 100 individual plants found in 2020.

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

Cunningham, G.M., Mulham, W.E., Milthorpe, P.L. and Leigh, J.H. (1992). *Plants of Western New South Wales*. Inkata Press.

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: *Rytidosperma richardsonii*. Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/2c72594d-f281-49ff-8694-6a421fd9d539

Vickery, J.W. (1956). A revision of the Australian species of *Danthonia* DC. *Contributions from the New South Wales National Herbarium* 2: 281.