

Rutidosia leptorrhynchoides Button Wrinklewort

Taxonomy

Rutidosia leptorrhynchoides F. Muell.

Current conservation status

Listed as Endangered under the *Environment Protection and Biodiversity Conservation Act 1999*.

Listed as threatened under the *Flora and Fauna Guarantee Act 1988* as *Rutidosia leptorrhynchoides* (SAC 1991).

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

Proposed conservation status

Endangered in Victoria

Criteria A2ce+3ce+4ce; B2ab(i,ii,iii,iv,v)

Species Information

Description and Life History

Button Wrinklewort is a perennial forb which produces multiple flowering stems 15 to 30 cm high during spring and summer. These stems die back in late summer or autumn and a new basal rosette of leaves is evident by early winter. Stems are hairless in the upper part, becoming woolly towards the base. The stems arise from a woody rootstock. Leaves are mostly stem-clasping at their base, linear, usually 1.5-3.5 cm long, 0.5-1.5 mm wide, hairless, and have their edges slightly rolled under. Yellow spherical flower-heads 8-15 mm in diameter are borne near the ends of the flowering stems. Each flower-head is on an individual short stalk and is comprised of numerous very small clustered yellow flowers. Flowering in NSW and the ACT occurs between December and April. In Victoria the taxon flowers from October to February (Scarlett and Parsons 1990). The time from recruitment to first flowering is usually two or three years (ACT Government 1998; Young et al. 2000) and the lifespan of wild plants is believed to be well in excess of 10 years (Wells and Young 2002).

Pollination is probably performed by a variety of insects, however the exact vectors are unknown (Wells and Young 2002). The seed is predominantly dispersed by wind, but mostly falls within 0.5 metres of the parent (Wells and Young 2002). The seeds do not persist in the soil for long periods and the majority of recruitment is generated from seeds of the previous year (Morgan 1995a; 1995b). The taxon exhibits sporophytic self-incompatibility, which prevents self-pollination or pollination among related individuals that share self-incompatibility alleles (these are known as S-alleles) (Young et al 2000). The characteristic of limited seed dispersal results in an increasingly high probability of relatedness within a radius of about 1 m from any plant, with the majority being half or full-sibs. The implications of this for seed collection for translocation projects are that, where possible, seed should be collected from a selection of plants each located several metres apart to minimise the relatedness of progeny.

Seed set appears to be influenced by population density rather than population size. Morgan and Scacco (2006) stated that "The low seed set observed may occur because pollinator visitation rates decline in sparse populations or, alternatively, because pollinators are less efficient at pollen transfer when individuals are at low density."

Two chromosomal races of Button Wrinklewort exist, comprising diploid populations that are spread across the whole range of the taxon, and tetraploids that are confined to the south-west of the taxon's range in Victoria. As a whole it exhibits unusually high levels of cytological diversity (Murray and Young 2001).



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Generation Length

The generation length of Button Wrinklewort is inferred to be 15 to 30 years (midpoint 18 years). This is based on a longevity from 10 to 30 years, and possibly 18 as a best guess. Recruitment events may occur with good rainfall and open habitat conditions, but few seedlings survive hot summers, so replacement rate is low.

Distribution

Button Wrinklewort occurs in south-eastern Australia, from Goulburn in the Southern Tablelands of NSW, to Wickliffe on the plains west of Melbourne, Victoria. The NSW and ACT populations are markedly disjunct from the Victorian populations. Evidence suggests that the taxon was formerly widespread in south-eastern NSW from near Michelago to near Goulburn.

In Victoria the taxon occurred across the Victorian Volcanic Plain (VVP), north to Casterton and as far east as Newry in Gippsland, but is now restricted to tiny refugia in the south-west, occurring on the outskirts of Melbourne, Bannockburn, Rokewood, Wickliffe, and between Beaufort and Ararat. It is not known to occur naturally in any conservation reserve in Victoria, although it is sympathetically managed at the Yalla-Y-Poora Recreation Reserve.

Habitat

The taxon is restricted to open stands of plains grassland and grassy woodlands on fertile clays to clay loams, usually in areas where the grass cover is more open either as a result of recurrent fires or grazing by native macropods or stock. It also occurs on low rises with shallow, stony soils at less than 100 m above sea level.

Threats

Button Wrinklewort occurs in undisturbed native grassland, and lowland grassland communities need intermittent burning to maintain floristic diversity (McDougall 1987, Lunt 1990). Where frequent burning is prevented, dense swards of grass taxa out-compete the taxon, which vanishes. In heavily grazed areas, the taxon is also rapidly removed because it is palatable to stock, although light grazing by sheep, particularly after peak flowering, appears to be tolerated.

Other identified threats to the taxon are urban development, physical disturbance of sites, weeds, competition from native grasses, heavy grazing, unsuitable fire regimes, demographics of small populations, reproductive limitations resulting from the self-incompatibility system, genetic incompatibility between chromosomal races, and climate change. Of these, physical disturbance and weed invasion are probably the most immediate threats to most populations.

Disturbance at sites with high fertility can lead to invasion by weedy grass taxa such as *Dactylis glomerata* (Cocksfoot) and *Phalaris* spp., whilst persistently low ground cover makes sites vulnerable to *Eragrostis curvula* (African Love Grass) and *Nassella trichotoma* (Serrated Tussock) invasion. Other weed taxa that are known to impact sites include *Hypericum perforatum* (St Johns Wort), *Nassella neesiana* (Chilean Needle Grass), and *Paspalum dilatatum*.

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>based on any of the following:</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 Endangered

The population reduction over the past 45 to 90 years is inferred to be 20 to 60% (midpoint 50%), based on (e) above.

Past reduction is based on known habitat losses, and best guess about whether there were large populations that were not documented. But given its wide distribution across the VVP, albeit in small remnant strips with a history of regular burning, it was probably relatively common across the grasslands prior to European settlement, and its reduction can be tied to ongoing habitat loss.

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 45 to 90 years is projected to be 10 to 50%, based on (c) and (e) above.

Future reduction could be as much as 50% because of weather conditions such as droughts and high summer temperatures, genetics, weed invasion, and accidental removal by human activities such as driving over plants, dumping soil etc.

Eligible under Criterion A4 as Endangered

The population reduction over any 45 to 90 year period, including both past and future, is suspected to be 20 to 50%, based on (c) and (e) above. The causes of reduction may not have ceased, be understood or be reversible.

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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 13,430 km², based accepted, post-1970 records in the Victorian Biodiversity Atlas (VBA).

The taxon is estimated to be severely fragmented, as most individuals are in small and relatively isolated populations, such that they are sensitive to habitat loss and accidental damage. These small populations may go extinct with a negligible probability of re-colonisation.

It is inferred to have a continuing decline in (i), (ii), (iii), (iv) and (v) above based on the impacts of the identified threats, notably weed invasion and soil disturbance.

Eligible under Criterion B2 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 192 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA.

As above, the taxon is severely fragmented 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

It is inferred that there are 10,000 to 11,000 mature individuals, which exceeds the thresholds for criterion C.

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

It is inferred that there are 10,000 to 11,000 mature individuals, which exceeds the thresholds for criterion D.

Criterion E (Quantitative Analysis) was not addressed as the taxon does not have a detailed Population Viability Analysis.

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