Threatened Species Assessment

Radyera farragei
Desert Rose Mallow

Taxonomy

Radyera farragei (F. Muell.) Fryxell & S.H. Hashmi

Current conservation status

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

Proposed conservation status

Critically Endangered in Victoria

Criteria C1+2a(i); D

Species Information

Description and Life History

Short-lived perennial to c. 1 m high. Leaves broadly ovate to orbicular, c. 4-15 cm long and wide, often shallowly 3-lobed, cordate at base, margins irregularly dentate, both surfaces densely stellate-pubescent. Flowers subsessile, usually 3-10 together in axillary cymes or racemes, usually only 1 open at a time; epicalyx c. 1 cm, densely stellate-pubescent, the lower half cup-like, the narrow, apically thickened lobes somewhat recurved; calyx shortly exceeding epicalyx and of similar form, both often purplish; petals purplish with a darker basal blotch, 2.5-3.5 cm long, widely spreading. Capsule globular, c. 15 mm diam., exceeding the calyx; seeds c. obovoid, 3-4 mm long. Flowers Nov.-Jan (VicFlora 2019).

Growth commences from the somewhat woody rootstock each autumn. The taxon is stimulated by fire, and is generally more common in recently burnt sites (Cunningham et al. 1981).

Generation Length

The generation length of *Radyera farragei* is estimated to be 5 to 50 years. This is interpreted as the mean natural frequency of recruitment events - either fire followed by good rains or possibly soil disturbance at some sites. A 30-70 year fire interval is suggested for vegetation on low-lying calcareous loams, with a suggested interval of 30-50 years, invoking some recruitment in the inter-fire interval, in response to soil disturbance alone. Recruitment is from long-persistent soil-stored seed.

Distribution

The taxon is very rare in Victoria, known from a few sites from in the far north-west (Bolton, Annuello, Merbein, Hattah, Millewa, Nowingi areas). It also occurs in WA, NT, SA and NSW.

Habitat

Plants occur on low-lying, calcareous loams. On the Raak Plain the taxon has been collected from open grassland with gypseous loamy soil. It is associated with taxa such as *Austrostipa scabra, A. drummondii, Bromus rubens, Zygophyllum aurantiacum* and *Tecticornia pterygosperma*. On the north-west side of the Raak Plain it grows on red loam under *Eucalyptus oleosa*, with *Sclerolaena* spp. In western NSW the taxon occurs almost exclude on sandy, often calcareous soils in open mallee communities. The taxon is widespread, but rarely common, usually occurring as single plants or in small groups (Cunningham et al. 1981).

Threats

VicFlora (2019) noted that the taxon was first collected in Victoria in 1921, and that there was a historic decline to cereal cropping. There were also losses presumably due to vineyards, but less likely due to citrus growing, which is mostly on sandy ridges in proximity to *R. farragei* populations but not directly impinging on calcareous loam sites. It is now likely to be threatened by almond production, especially in the Annuello district near Wemen and Bannerton.

Other ongoing threats are changed disturbance regimes in small remnant stands in largely alienated landscapes. Future climatic drying and drought stress might impact recruitment and survival of progeny. Establishment from seed appears to require some disturbance (e.g. fire) followed by good rains (VicFlora 2019).

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 A3 as Vulnerable

The population reduction over the next 15 to 100 years is suspected to be 10 to 30%, based on (c) above.

This is based on the impact of the identified threats.

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 B as Endangered

The Extent of Occurrence (EoO) is estimated to be 3,471 km², based on accepted, post-1970 records in the Victorian Biodiversity Atlas (VBA).

The Area of Occupancy (AoO) is estimated to be 24 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the Victorian Biodiversity Atlas (VBA).

Any two of (a), (b) or (c) above are also satisfied.

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:

Eligible under Criterion C1 as Critically Endangered

It is estimated that there are 10 to 40 mature individuals. There are only 4 post-1970 collections from Victoria held at MEL. Of these four collections, only the collection from Raak Plain provides any information about population size. Given that the taxon is rarely common even in western NSW, and where it occurs it is usually as single plants or in small groups (Cunningham et al. 1981), and estimate of 10 plants per each 4 sites seems plausible, and unlikely to exceed 50 plants in total.

A continuing decline of 10 to 30% is estimated to occur within 1 generation.

Eligible under Criterion C2 as Critically Endangered

It is estimated that there are 10 to 40 mature individuals.

The number of mature individuals is estimated to continue to decline, and the number of mature individuals in each subpopulation is 50 or fewer.

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 D as Critically Endangered

The taxon is estimated to have 10 to 40 mature individuals.

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. (1981). *Plants of western New South Wales.* Soil Conservation Service of N.S.W.

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

VicFlora (2019). Flora of Victoria, Royal Botanic Gardens Victoria: *Radyera farragei*. Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/7b95da3e-8cda-48b2-b8e7-fd1e2873c4f1