Threatened Species Assessment

Boerhavia coccinea
Scarlet Spiderling

Taxonomy

Boerhavia coccinea Mill.

Current conservation status

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

Proposed conservation status

Critically Endangered in Victoria

Criteria B1ab(iii); D

Species Information

Description and Life History

The taxon is a perennial herb, prostrate to decumbent; taproot thick and fleshy; stems to c. 80 cm long, usually densely hairy, with long multicellular hairs and scattered glandular hairs. Leaves elliptic to ovate, 0.5-6 cm long, 0.5-4 cm wide, sparsely to moderately hairy on upper surface, lower surface often red-dotted (at least when dry) with viscid exudate, and moderate to dense covering of multicellular hairs; margins sinuate. Inflorescence axillary or terminal, simple or branched; peduncles 0.5-3 cm long; flowers subsessile, in small umbels of 3-10 flowers; petaloid part of perianth c. 2 mm long, c. 2 mm wide, pink, obscurely 5- or 10-lobed; stamens usually 3, c. 1.5 mm long; style longer than stamens. Fruit (anthocarp) fusiform or narrowly clavate, 5-ribbed, 3-4 mm long, covered with glandular hairs. The taxon flowers from November to April (VicFlora 2017).

Generation Length

The generation length of *Boerhavia coccinea* is estimated to be 2 to 8 years. Cunningham et al. (1981) only record *Boerhavia diffusa,* noting that it is summer-growing with a well-developed root system, responds readily to summer rains, relatively drought-resistant, dying back to the base in cold winters, palatable to stock, useful summer forage, and fleshy roots eaten by Indigenous Australians. These observations are likely to apply to *B. coccinea* as well. Recruitment is most likely triggered by favourable rainfall events. Good rainfall events occur every 5-10 years in the habitat of the taxon. The taxon probably has long-persistent soil-stored seeds.

Distribution

The taxon is confined to north-western Victoria at Lake Powell, Hattah Lakes (1970 collection), Mildura and Neds Corner Station. It is also present in WA (native and naturalised), NT, SA, Qld, and NSW (VicFlora 2017).

Habitat

In Victoria, the taxon is confined to sandy rises in north-west of the State. At Neds Corner, it has been collected on a red sandy loam rise, with chenopod shrubland and it is associated with *Abutilon otocarpum, Acacia salicina*, *Centaurea meltensis*, *Crinum flaccidum, Enneagpogon avenaceus, Euphorbia drummondii, Hedypnois rhagadioloides* subsp. *rhagadioloides, Maireana pyramidata, Phyllanthus lacunellus,* and *Sida ammophila*. At a second site at Neds Corner, it was growing on a red brown sandy rise dominated by *Sida ammophila*, and it was associated with *Echium plantagineum, Enneapogon avenaceus, Euphorbia drummondii*, and *Reichardia tingitana*. At Hattah Lakes, it has been collected from sand dunes.

Outside of Victoria, the taxon has a broader habitat range, and also occurs on sandy creek and river beds, in woodland of various types, *Acacia* shrubland, and pebbly soil on floodplains.

Threats

In 2011, the habitat sites at Neds Corner did not appear to be currently at great risk of weed invasion to point of competitive exclusion of the taxon. There is however a plausible future threat of local extinction at some of the sites due to intense and/or prolonged grazing pressure from native or exotic herbivores, and in some sites by weed invasion. Most of the plants at one of the two sites at Neds Corner Station were grazed by rabbits.

Future climatic drying and drought stress as a result of climate change might result in less frequent favourable rainfall events, which might have a negative impact on recruitment and the survival of progeny, especially when a germination event is followed by a drought.

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

There is insufficient evidence to determine whether there has been or will be a reduction in population sufficient to meet any threshold for Criterion A.

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 Critically Endangered

The Extent of Occurrence (EoO) across the taxon's range is estimated to be 35 km², based on accepted, post-1970 records from the Victorian Biodiversity Atlas (VBA).

The taxon is estimated to be severely fragmented. Subpopulations are relatively small and isolated, and they are at risk from ongoing climate change, grazing and potential future weed invasion at least at some of the sites. More than half of the individuals or more than half of the occupied habitat are in small and isolated patches. This means that there is an increased extinction risk and there is little or no probability of recolonisation should subpopulations become extinct.

The taxon can be considered to occur in one location because it occurs in a geographically or ecologically distinct area in which a single threatening event can rapidly affect all individuals of the taxon present, specifically, climatic drying and drought stress.

It has a continuing decline in (iii) above, based on the current and projected impact of the identified threats.

Eligible under Criterion B2 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 35 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA. As above, it is severely fragmented, has 1 location and has a continuing decline in (iii) 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

The taxon is estimated to have 11 to 30 mature individuals, but other thresholds under this criterion have not been met.

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 11 to 30 mature individuals. Of the six Victorian collections, only the recent two collections from Neds Corner Station provide an indication of the number of plants (i.e. 11 plants in total). The estimate given here is very crude, and it is based on the assumption that the other sites have a similar number of plants as each of the two sites at Neds Corner Station, given that they occur in a similar habitat and in the same geographic region.

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., & 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. 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: *Boerhavia coccinea*. Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/4771a6f2-f243-483e-b761-a5511b242059