

Hibbertia rufa Brown Guinea-flower

Taxonomy

Hibbertia rufa N.A. Wakef.

Current conservation status

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

Proposed conservation status

Vulnerable in Victoria

Criteria A2ce+3ce; D2

Species Information

Description and Life History

The taxon is a weak shrub with prostrate to scrambling, wiry, puberulous branches, sometimes rooting at nodes. Vestiture of appressed tubercle-based simple hairs. Leaves linear-lanceolate, 3.1-8 mm long, 0.8-1.4 mm wide, puberulous to glabrous; apex acute to obtuse with terminal tuft of hairs; petioles 0.2-0.5 mm long; margins narrow, revolute, level with or higher than glabrous broad central ridge below. Flowers on peduncle 3-20 mm long, terminal mainly on short shoots with 3 lanceolate obtuse bracts 0.8-1.2 mm long at the base; sepals 3.1-3.6 mm long, unequal, glabrous; petals obovate, 4-6.4 mm long, bright yellow; stamens 3 or 4; filaments largely connate; carpels 2, glabrous. The taxon flowers from August to December (VicFlora 2018).

Generation Length

The generation length of *Hibbertia rufa* is estimated to be 25 to 50 years. This is based on a plausible longevity of 15-35 years or more and an inference that the taxon is likely to behave as a fire-sensitive, obligate, seed regenerator (OSR) recruiting episodically from a soil-stored seedbank following intense fire events at an estimated pre-settlement interval of 25-50 years or more. The swampy habitat of the taxon is subject to intense fire events at a lower frequency than the surrounding lowland forest. Such fires typically consume all canopy vegetation with the risk of incineration of both rootstocks and peaty substrate, as witnessed at Anglesea after the 1983 Ash Wednesday bushfires which also consumed much of the lowland forests in far East Gippsland. Under such circumstances the taxon is likely to behave as a fire-sensitive OSR. Longevity of the taxon is likely to be limited by the interval between intense fire events within its habitat range. The taxon may be capable of limited resprouting from rootstock following low intensity fire events. It may also recruit opportunistically following localised site disturbance events other than fire which create gaps in the typically low, dense, wet, heath vegetation.

Distribution

In Victoria, the taxon is localized near Genoa in far East Gippsland. Reliable site and specimen records indicate that the taxon occurs eastward from Cann River to Genoa with most records within 10 km of the Princes Highway.

It is also found in NSW and Tasmania (VicFlora 2018). Victorian records are highly disjunct from the closest interstate records at Tuross Head and on the Shoalhaven River in New South Wales.

Habitat

The taxon mainly occurs on swamp margins and in wet heathy vegetation (VicFlora 2018).



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Quadrat data in the Victorian Biodiversity Atlas and specimen records in the Australian Virtual Herbarium indicate that the habitat range of the taxon includes Wet Heath, Button Grass Plains dominated by *Gymnoschoenus sphaerocephalus* (Button Grass) and Grass Tree Plains dominated by *Xanthorrhoea resinosa* (Spear Grass-tree), rarely entering peaty swamps or Melaleuca Swamp Thicket. Associated dominant taxa include *Allocasuarina littoralis* (Black Sheoak), *A. paludosa* (Scrub Sheoak), *Baumea rubiginosa* (Soft Twig-rush), *B. tetragona* (Square Twig-sedge), *Callistemon citrinus* (Crimson Bottlebrush), *Empodisma minus* (Spreading Rope-rush), *Eucalyptus conspicua* (Silver Swamp Stringybark), *Eurychorda complanata* (Flat Cord-rush), *Gahnia clarkei* (Tall Saw-sedge), *G. radula* (Thatch Saw-sedge), *G. sieberiana* (Red-fruit Saw-sedge), *Gleichenia dicarpa* (Pouched Coral-fern), *G. microphylla* (Scrambling Coral-fern), *Gymnoschoenus sphaerocephalus* (Button Grass), *Hakea teretifolia* subsp. *hirsuta* (Dagger Hakea), *H. ulicina* (Furze Hakea), *Kunzea ambigua* (White Kunzea), *Lepidosperma filiforme* (Common Rapier-sedge), *L. limicola* (Razor Sword-sedge), *L. longitudinale* (Pithy Sword-sedge), *Leptocarpus tenax* (Slender Twine-rush), *Leptospermum continentale* (Prickly Tea-tree), *L. lanigerum* (Woolly Tea-tree), *Melaleuca squarrosa* (Scented Paperbark), *Mitrasacme pilosa* var. *stuartii* (Hairy Mitrewort), *Patersonia fragilis* (Short Purple-flag), *P. sericea* var. *sericea* (Silky Purple-flag), *Schoenus brevifolius* (Zig-zag Bog-rush), *Sprengelia incarnata* (Pink Swamp-heath), *Tetraria capillaris* (Hair Sedge), *Thelionema caespitosum* (Tufted Lily), *Xanthorrhoea resinosa* (Spear Grass-tree), *Xanthosia dissecta* (Native Parsley), *Xyris gracilis* (Slender Yellow-eye) and *X. operculata* (Tall Yellow-eye).

Quadrat data indicates that projective foliage cover of the taxon ranges from less than 1% at the quadrat scale to occasionally exceeding 5%.

Threats

Historic decline through habitat loss to agriculture is likely to have been relatively insignificant, since the habitat range is of marginal value for grazing or cropping and all Victorian records are within national parks or state forest.

A key threat to the taxon is the increasing risk of repeat fire events at intervals below or approaching the tolerable fire interval for the taxon. Such events may result in high mortality of adults with some risk of seedbank depletion and complete mortality of the last cohort of episodic post-fire recruits.

Climatic drying and warming and inappropriate fire regimes, particularly the extensive use of planned burning across the region, operate synergistically to increase the risk of repeat fire events affecting the habitat of the taxon. Extreme drought events increase the risk of recruitment failure and, potentially, seedbank exhaustion since the taxon is assumed to be dependent on seed-banking, particularly for post-fire recruitment. In the longer term, climatic drying is projected to lower the water table, resulting in a contraction in the local extent of the habitat range of the taxon and the invasion of wetland sites by dryland shrubs and trees.

The taxon may also be susceptible to Sambar Deer (*Rusa unicolor*), Hog Deer (*Axis porcinus*), and feral pig activity. Sambar Deer and feral pigs in particular target the habitat range of the taxon, Sambar frequently rutting and wallowing in wet sites and pigs frequently excavating wetland and peaty sites.

On account of its low nutrient status, the habitat of the taxon is not considered susceptible to invasion by exotic weeds.

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>(a) direct observation [except A3]</p> <p>(b) an index of abundance appropriate to the taxon</p> <p>(c) a decline in area of occupancy, extent of occurrence and/or quality of habitat</p> <p>(d) actual or potential levels of exploitation</p> <p>(e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites</p> <p><i>based on any of the following:</i></p>			

Evidence:

Eligible under Criterion A2 as Vulnerable

The population reduction over the last 75 to 150 years is suspected to be 10 to 30%, based on (c) and (e) above.

While there is insufficient evidence to indicate whether the taxon has suffered significant past decline in response to the impact of the identified threats, it is likely that the 2019/20 bushfires contributed to a further decline.

Eligible under Criterion A3 as Vulnerable

The population reduction over the next 75 to 100 years is projected to be 30 to 45%, based on (c) and (e) above.

Future decline is based on the projected impact of the identified threats, notably repeat fire events and climatic drying and warming.

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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:

Ineligible under Criterion B

The Extent of Occurrence (EOO) across the taxon's range is estimated to be 350 km² and the Area of Occupancy (AOO) is estimated to be 56 km², but other thresholds under this criterion have not been met.

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 <u>C1</u> or <u>C2</u>				
<u>C1</u>	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)
<u>C2</u>	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 no available estimate of population size since there is no monitoring data for the taxon to inform a reliable estimate of total population size for Victoria.

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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 km ² or number of locations < 5

Evidence:

Eligible under Criterion D2 as Vulnerable

The taxon is estimated to be very restricted. It has a restricted distribution, with a single location, such that this restriction makes the taxon capable of becoming CR or EX within a time frame of one or two generations in response to the impact of the identified threats.

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 (2018). Flora of Victoria, Royal Botanic Gardens Victoria: *Hibbertia rufa*. Retrieved from: <https://vicflora.rbg.vic.gov.au/flora/taxon/7812e18f-e0d5-4788-9098-8a7041a5372e>