

Gonocarpus serpyllifolius Flat Raspwort

Taxonomy

Gonocarpus serpyllifolius Hook. f.

This taxon is readily characterised by the metallic sheen on its fruits. Victorian plants differ from those in Tasmania in having only the lowermost flowers in opposite pairs (VicFlora 2018).

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; B2ab(i,ii,iii,iv,v)

Species Information

Description and Life History

The taxon is a perennial herb, erect or ascending, 10-25 cm tall; stems reddish, wiry, densely pubescent, hairs appressed. Leaves opposite, lanceolate to ovate-lanceolate, 5-10 mm long, 1-3 mm wide, virtually glabrous, margins thickened, with 2-4 minute teeth; petiole to 1 mm long; bracts opposite, sometimes becoming alternate above, ovate, 2-3 mm long, margins entire; bracteoles narrow-lanceolate, c. 1 mm long, brown, margins entire. Flowers sessile; sepals 0.7-0.8 mm long, margins slightly thickened, basal callus weak; petals red, 2.2-2.5 mm long; stamens 8, anthers 1.8-2 mm long; ovary ovoid, c. 1 mm long, reddish-grey, 8-ribbed, smooth between ribs, glabrous. Fruit 1-1.3 mm long, silver to purplish, usually with a metallic sheen. The taxon flowers from December to February (VicFlora 2018).

Generation Length

The generation length of *G. serpyllifolius* is estimated to be 35 to 50 years. This estimate is based on a plausible longevity of 15-35 years or more, with recruitment from a long-persistent soil-stored seedbank. The taxon has a hard seed like other members of the Haloragaceae, hence the seedbank is likely to persist for several decades. Although the germination cues and their frequency are unclear, it is likely that generation time exceeds longevity. The taxon is likely to recruit episodically following fire, supplemented by sporadic and opportunistic recruitment in response to seasonal conditions and localised site disturbance events. Pre-settlement fire interval is likely to have been 35-70 years or more.

Distribution

In Victoria, it is known with certainty only from near Bidwell on the upper reaches of the Delegate River and the Upper Livingstone Creek near Omeo. (VicFlora 2018). The taxon has also been recorded on the Snowy Range by Cliff Beauglehole and Evan Chesterfield, and collected at Mt Delegate near Bendoc by Cliff Beauglehole. It is also known from Tasmania.

Habitat

Melville records the habitat as open eucalypt forest dominated by *Eucalyptus rubida* (Candlebark) at Bidwell on the Upper Delegate River. William Hunter records the habitat at Bidwell as open rather grassy flats, but on drier soils.

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Neville Walsh records the taxon as the dominant ground layer plant over a few square metres at Cobungra in a grassy subalpine woodland, along a broad gentle drainage line that is rarely wet, at an elevation of 1020 m in association with *Eucalyptus rubida*, *E. stellulata* (Black Sallee), *Veronica subtilis* (Thread Speedwell) and the grasses *Poa labillardierei* (Common Tussock-grass), *Dichelachne rara* (Common Plume-grass) and *Rytidosperma penicillatum* (Weeping Wallaby-grass). Neville Scarlett records the habitat as a wet creek flat dominated by low sedges, grasses and herbs at a site in the headwaters of Livingstone Creek.

Threats

The taxon is likely to have suffered significant historic decline through habitat loss to agriculture in the Bendoc and Omeo districts, and habitat degradation through stock grazing and the impact of feral horses throughout its Victorian range. Some sites may continue to be threatened by habitat loss and degradation through softwood or hardwood plantation establishment (for example at Bidwell) or through agricultural intensification.

The habitat of the taxon is highly susceptible to pugging and targeted browsing by stock, feral horses, and increasingly by Sambar Deer (*Rusa unicolor*), throughout the restricted Victorian range of the taxon, exposing the habitat to weed invasion. The habitat is also susceptible to excavation by feral pigs. In the longer term, the habitat of the taxon is threatened by climatic drying and warming, resulting in a projected incremental contraction in the local extent of suitable habitat. It is unclear whether the projected increase in fire intensity and frequency poses a significant current or future threat to the taxon since, like many species of *Gonocarpus* or *Haloragis*, the taxon is likely to respond favourably to individual fire events which are likely to promote pulse seed recruitment from a long-persistent soil-stored seedbank.

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>	<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>
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Evidence:

Eligible under Criterion A2 as Endangered

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The population reduction over the past 105 to 150 years is estimated to be 25 to 65% (midpoint 45%), based on (c) and (e) above.

The taxon is likely to have suffered significant historic decline through habitat loss to agriculture in the Bendoc and Omeo districts, and habitat degradation through stock grazing and the impact of feral horses throughout its Victorian range.

The causes of the 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 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 B2 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 36 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the Victorian Biodiversity Atlas.

The taxon is estimated to be severely fragmented naturally at the subregional and landscape scales, and anthropogenically at the landscape scale in some districts. Geographically isolated occurrences are separated at spacings which exceed the dispersal range of the taxon, which has no specialised mechanism for long-distance dispersal. The only plausible dispersal agents are ants (the phenomenon of myrmecochory) which operate at the metre scale only. This precludes the opportunity for recolonisation in the event of local extinction.

It is estimated to have 2 locations and has a continuing decline in (i), (ii), (iii), (iv) and (v) above, based on the current and projected impact of the identified threats.

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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 as Data Deficient

In the absence of any longitudinal monitoring data, there is no available estimate of population size for the taxon in Victoria.

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:

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

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

VicFlora (2018) Flora of Victoria, Royal Botanic Gardens Victoria: *Gonocarpus serpyllifolius*. Retrieved from: <https://vicflora.rbg.vic.gov.au/flora/taxon/6af8bf16-859f-4b7f-9d87-79d304413dbe>