

Thelionema umbellatum Clustered Lily

Taxonomy

Thelionema umbellatum (R. Br.) R.J.F. Hend.

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+4ce; D2

Species Information

Description and Life History

The taxon is a tufted perennial herb, to c. 40 cm high, with fibrous roots. Leaves rather obscurely distichous, narrow linear, flat, or weakly folded, 12-35 cm long, 2-3 mm wide. Inflorescence shorter to barely longer than leaves. Flowers mostly 3-10 per inflorescence; perianth segments spreading, 5-9 mm long, white or cream, longer than stamens; anthers yellow; style 1.5-2.5 mm long. Capsule ovoid to triquetrous, 5-10 mm long. Seeds c. 2.5-3.5 mm long. The taxon flowers from October to December (VicFlora 2019).

Generation Length

The generation length of *Thelionema umbellatum* is estimated to be 25 to 50 years. This is based on a plausible longevity of 25-50 years and an inference from related taxa that the taxon is likely to resprout following all but the most intense fire events. Recruitment is inferred to be nearly continuous with a likely additional episodic recruitment pulse following fire events at an estimated pre-settlement interval of 35-50 years or more. The damp habitat of the taxon, however, is subject to intense fire events at a lower frequency than the surrounding drier lowland forest or woodland. 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 wildfires 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 obligate seed resprouter.

Distribution

The taxon has been recorded from a few widely separated sites in lowland southern Victoria (Portland, Cape Otway, Cranbourne, Cann River, Mallacoota areas), but possibly overlooked as a tenuous form of the more widespread *T. caespitosum*. It also occurs in New South Wales and Tasmania (VicFlora 2019).

Habitat

In Victoria, the taxon is recorded from a few widely separated wet heathland sites at lowland elevations (VicFlora 2019). G. Carr recorded it in Swamp Thicket dominated by *Melaleuca squarrosa* (Scented Paperbark), *Empodisma minus* (Spreading Rope-rush) and *Gleichenia dicarpa* (Pouched Coral-fern) under *Eucalyptus aromaphloia* (Scentbark). Kissane records the taxon in calcareous and siliceous sand. Crisp records the taxon as common in heath with *Allocasuarina nana* (Stunted Sheoak) in sandy peat with clay sub-soil. At the same site Shaw records the taxon associated with *Bauera rubioides* (Wiry Bauera), *Bossiaea obcordata* (Spiny Bossiaea), *Brachyloma*



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daphnoides (Daphne Heath), *Goodenia bellidioides* subsp. *bellidioides* (Daisy Goodenia), *Melaleuca squarrosa* (Scented Paperbark), *Prasophyllu australe* (Austral Leek-orchid), *Pultenaea retusa* (Blunt Bush-pea), *Thelymitra ixioides* (Spotted Sun-orchid) and *Xyris operculata* (Tall Yellow-eye). Beaglehole records the taxon in moist depressions on an open coastal plain.

Neville Walsh recorded the taxon growing in slashed heathland below a power transmission line in seasonally waterlogged peaty soil.

In Nadgee Nature Reserve in New South Wales near the Victorian border, Parris recorded the taxon in heathland dominated by *Allocasuarina nana* (Stunted Sheoak) and *A. paludosa* (Scrub Sheoak) with *Leptospermum trinervium* (Paperbark Tea-tree) and many sedges in gravelly skeletal soil amongst sedimentary rock.

Threats

Historic decline through habitat loss to agriculture or urban development is likely to have been significant in the Portland, Western Otway and Cranbourne districts, but relatively minor in far East Gippsland where the habitat range is of marginal value for grazing or cropping and most 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 imposed fire regimes, particularly the extensive use of planned burning, 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 recruitment following the most intense fire events.

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 peaty wetlands by dryland shrubs and trees.

The taxon may also be susceptible to Sambar Deer, Hog Deer and feral pig activity. Sambar and particularly feral pigs, target the habitat range of the taxon, with Sambar frequently rutting and wallowing in wet sites and pigs frequently excavating wetland and peaty sites.

Given 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><i>based on any of the following:</i></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 Vulnerable

The population reduction over the past 75 to 150 years is estimated to be 25 to 35%, based on (c) and (e) above.

An estimate of past decline is based on habitat loss to agriculture or urbanisation in some districts, most notably in the Portland, Western Otway, and Cranbourne districts where suitable habitat has declined in extent historically. The taxon is likely to be locally extinct at Gorae West where last collected in 1950.

The causes of the reduction may not have ceased, be understood or be reversible.

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.

An estimate of future decline is based on the projected impact of the identified threats.

Eligible under Criterion A4 as Vulnerable

The population reduction over any 75 to 150 year period, including both past and future (up to 100 years in the future), is estimated to be 30 to 45%, 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:

Ineligible under Criterion B

The Extent of Occurrence (EoO) across the taxon's range is estimated to be 19,425 km² and the Area of Occupancy (AoO) is estimated to be 36 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				

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Evidence:

Ineligible under Criterion C as Data Deficient

There is no monitoring data for the taxon to inform a reliable estimate of total population size for Victoria.

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, occurring in 2 locations, such that this restriction makes the taxon capable of becoming Critically Endangered or Extinct within a time frame of one or two generations. This is in response to the impact of the identified long-term threats, notably increasing risk of repeat fire events at intervals below or approaching the tolerable fire interval for the taxon, and climatic warming and drying.

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 (2019). Flora of Victoria, Royal Botanic Gardens Victoria: *Thelionema umbellatum*. Retrieved from: <https://vicflora.rbg.vic.gov.au/flora/taxon/1e9e9a98-fdec-4e5f-b3e1-b33971a6b561>