

Euphrasia crassiuscula subsp. *crassiuscula* Thick Eyebright

Taxonomy

Euphrasia crassiuscula subsp. *crassiuscula* Gand.

Three subspecies of *Euphrasia crassiuscula* have been recognised: subsp. *crassiuscula*, subsp. *glandulifera*, and subsp. *eglandulosa*. All three subspecies are endemic to mountain areas in the Victorian Alps. They are distinguished from other Australian species of *Euphrasia* in having a conspicuous dense long woolly fringe of eglandular hairs, which often lines the leaves, bracts and calyces. *E. c.* subsp. *glandulifera* differs from subsp. *eglandulosa* in having dense hairs surrounding the anther connective, a feature which is shared also by subsp. *crassiuscula*. However, while *E. c.* subsp. *crassiuscula* does not have glandular hairs, except on the corolla, *E. c.* subsp. *glandulifera* has glandular hairs present on axes and leaves of lower parts, sometimes extending to upper leaves. (Barker 1982, 1999).

Apparent intermediates between subsp. *crassiuscula* and subsp. *eglandulosa* occur on Mt Hotham and Mt Loch. These are the only known instances of a breakdown of distinction between the subspecies, and may either reflect hybridism arising from human disturbance or relictual ancestral populations (VicFlora 2020).

Current conservation status

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

Proposed conservation status

Vulnerable in Australia

Criterion D2

Species Information

Description and Life History

The taxon is a perennial herb or subshrub, 6-30 cm high; branches erect, ascending or decumbent, arising from ground-level, unbranched above; glandular hairs sometimes present, but with distinctive dense soft long eglandular hairs lining margins of upper leaves, bracts and calyx teeth. Upper leaves with 1-5 pairs of teeth, base truncate to rounded-cuneate, sometimes shortly attenuate. Calyx 5-8.5 mm long; corolla 9-16 mm long along upper side, white to deep lilac or purple, with yellow blotch on lower lip, lacking purple longitudinal striations on each lobe, or with 3 or 4 and faint to conspicuous striations; anthers 1.5-2.5 mm long, the area about the connectives glabrous to densely hairy. Capsule 5-9.5 mm long, glabrous, rarely setose at apex (VicFlora 2020).

The type subspecies *crassiuscula* can be distinguished from other subspecies, by having glandular hairs lacking on branches, leaves, rachis, bracts and outside of calyces. Corolla white to deep lilac, with purple striations confined to tube and hood or absent; anthers with connectives surrounded by usually dense, sometimes sparse, long eglandular hairs. The type subspecies flowers December to February (VicFlora 2020).

Generation Length

The generation length of the taxon is suspected to be 15 to 50 (midpoint 30) years. Although there is insufficient field observation to support an estimate of generation length with any confidence, by analogy with related taxa the taxon is suspected to recruit continuously to opportunistically in response to localised site disturbance events. Under pre-settlement conditions, fire was a very rare event across the alpine region.

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Distribution

The taxon is confined to the Mt Feathertop-Mt Hotham-The Twins ridge, with an outlier on the southern end of the Mt Buffalo Plateau (VicFlora 2020). It has been recently collected at Carmichael Falls near Dinner Plain at an elevation of 1435 m. It has also been collected on the Dargo High Plains in 1972, at Dargo Road 8 km south of the Mt St Bernard intersection.

Habitat

The taxon occurs in high-subalpine to alpine locations, especially grassy areas, in or near *Eucalyptus pauciflora* woodland, also in low alpine heath (VicFlora 2020).

Threats

The taxon is threatened in the long term by climatic drying and warming, resulting in changes in vegetation structure such as increasing tree and shrub density and potential changes in soil microflora, particularly of mycorrhizal fungi. These impacts are likely to be exacerbated by imposed fire regimes, increasing the risk of repeat fire and recruitment failure. The taxon may also be threatened by weed invasion and site disturbance by Deer (*Rusa unicorn*) or feral horses. A small proportion of the taxon's known range, near The Horn at the southern end of the Buffalo Plateau, at Carmichael Falls near Dinner Plain and possibly also on the Dargo High Plain, may have been burnt in the 2019-2020 wildfires.

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:

Ineligible under Criterion A

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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 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 1,115 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			

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Evidence:

Ineligible under Criterion C as Data Deficient

There is insufficient evidence to support an estimate of the total population size.

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 timeframe of one or two generations. This is in response to the impact of climatic drying and warming, acting synergistically with imposed fire regimes, resulting in changes in vegetation structure such as increasing tree and shrub density and potential changes in soil microflora, particularly of mycorrhizal fungi.

Criterion E (Quantitative Analysis) was not addressed as the taxon does not have a detailed Population Viability Analysis.

References

- Barker, W.R. (1982). Taxonomic studies in *Euphrasia* L. (Scrophulariaceae). A revised infrageneric classification, and a revision of the genus in Australia. *Journal of the Adelaide Botanic Gardens* 5, 1-304.
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