Threatened Species Assessment

Darwinia micropetala
Small Darwinia

Taxonomy

Darwinia micropetala (F. Muell.) Benth.

Current conservation status

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

Proposed conservation status

Critically Endangered in Victoria

Criteria A3bc+4bc

Species Information

Description and Life History

Erect shrub 30-50 cm high, wiry, open. Leaves grey-green, linear and triquetrous to obovate and concavo-convex, 2-3 mm long, c. 0.5 mm wide; apex obtuse to mucronate; margins entire to minutely fimbriate. Flowers in compound corymbose heads, 2-4 in each partial head, borne in upper leaf axils; bracteoles white to pink, obovate, 2.5-3 mm long, keeled, mucronate, often early caducous; hypanthium 2-3 mm long, c. 1 mm diam., papillose between ribs; sepals and petals white, ovate-oblong, c. 1 mm long, entire; style 2-4 mm long, gently curved. Flowers mainly October-December (VicFlora 2019). It is slow-growing, consistent with most shrub taxa in these nutrient-low sandy soils.

Generation Length

The generation length of *Darwinia micropetala* is suspected to be 25 to 70 years (midpoint 40 years). The life history is largely unknown, but the taxon is speculated to be reliant on occasional damper years, especially in the cooler seasons, enabling seed germination and establishment. Consistent with other small shrubby, paper-fruited Myrtaceae, this taxon is expected to take advantage of the benign conditions after bushfires, and regenerates from seed relatively prolifically afterwards. It is likely to be able to regenerate and maintain itself in unburnt heathland and heathy woodland utilizing occasional gaps in the vegetation from other sources, e.g. disease, frost, and windthrow. Individual longevities of mature shrubs are unknown, but it is speculated to be relatively long-lived. The existence of any soil seed store is unknown and there is unlikely to be any elevated long-term soil seed store; elevated viable seed is expected to be replaced annually.

Distribution

In Victoria, this taxon is restricted to the Little Desert National Park.

Habitat

This shrub is restricted to deep sandy, nutrient-poor soils in a winter dominant rainfall zone, with notable seasonal summer droughts. Its specific habitat is often low in the catena, associated with open taller shrubs of *Melaleuca brevifolia* in the outer margin of small evaporative basins, such as salt lakes (but well above the hyper-saline zone). This is interpreted as the taxon requiring and utilizing the seasonal lens of fresh water that sits above the local saline water table, either for regeneration or during the summer droughts.

Threats

Threats to the taxon include an imposed unfavourable regime of planned burning. The nature of its precise habitat is for fuel discontinuity, suggesting it was subject to a regime of less frequent fires when compared with the surrounding heathlands prior to European settlement. Planned burning now imposes a more frequent fire regime on the landscape of the Little Desert.

The taxon seems to be reliant on seasonal soil moisture for germination and establishment, and as such, climate change is a threat if it leads to reduced rainfall overall and notably to reduced cool season rainfall. The taxon only occurs in small populations, such that capricious occurrences, such as inappropriate recreational use or weed invasion, become notable threats.

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:

Eligible under Criterion A2 as Endangered

The population reduction over the last 75 to 210 years is suspected to be 50 to 75% (midpoint 65%), based on (b) and (c) above.

Past decline is based on land clearance of nearby suitable habitat, and the institution of a likely inappropriate planned burning regime.

Eligible under Criterion A3 as Critically Endangered

The population reduction over the next 75 to 100 years is suspected to be 50 to 100% (likely 65%), based on (b) and (c) above.

Future decline is based on land clearance of nearby suitable habitat, and the institution of a likely inappropriate planned burning regime.

Eligible under Criterion A4 as Critically Endangered

The population reduction over any 75 to 210 year period, including both past and future (up to 100 years in the future), is suspected to be 60 to 100% (midpoint 75%), based on (b) and (c) above. The causes of 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 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:

Ineligible under Criterion B

The Extent of Occurrence (EoO) across the taxon's range is estimated to be 260 km² and the Area of Occupancy (AoO) is estimated to be 32 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 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

It is suspected that there are 800 to 3,000 (midpoint 1,500) 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 D2 as Vulnerable

The taxon is inferred to be very restricted.

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

References

ALA online (2020) Atlas of Living Australia. *Darwinia micropetala.* Retrieved from: https://bie.ala.org.au/species/https://id.biodiversity.org.au/node/apni/2904131

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

Seeds of SA online (2020) Seeds of South Australia: *Darwinia micropetala.* Retrieved from: https://spapps.environment.sa.gov.au/SeedsOfSA/speciesinformation.html?rid=1389

eFloraSA (2020) Flora of South Australia, State Herbarium of South Australia: *Darwinia micropetala.* Retrieved from: http://www.flora.sa.gov.au/cgi-bin/speciesfacts_display.cgi?genus=Darwinia&species=micropetala

VicFlora (2017). Flora of Victoria, Royal Botanic Gardens Victoria: *Darwinia micropetala.* Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/63610d89-80d7-4711-89b6-3a00e37a3a25