



Dodonaea rhombifolia Broad-leaf Hop-bush

Taxonomy

Dodonaea rhombifolia N.A. Wakef.

Current conservation status

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

Proposed conservation status

Endangered in Victoria

Criteria A3ce+4bce; B2ab(iii,v)

Species Information

Description and Life History

The taxon is a dioecious, erect shrub to c. 2.5 m high; branchlets angular, ribbed or flattened. Leaves simple, elliptic, rarely obovate, 4.5-9.5 cm long, 1.5-4.0 cm wide, acute, margin revolute, surfaces glabrous, not viscid, usually white-spotted below; petiole 4-10.5 mm long. Flowers in axillary few-flowered cymes, sometimes solitary; pedicels 3.5-8.5 mm long; sepals 4, lanceolate to ovate, 2-3.4 mm long, caducous; stamens 8, longer than sepals; ovary glabrous. Capsule 4-winged, depressed-obovate or transversely elliptic in outline, 10-13 mm long, 15-24 mm wide, glabrous, wings 6-8.5 mm wide, membranous; seeds lenticular, 2.8-3 mm long, black, dull, exarillate. The taxon flowers spring and summer (VicFlora 2017).

Generation Length

The generation length of *Dodonaea rhombifolia* is estimated to be 35 to 70 years. The taxon is a long-lived woody shrub with a longevity of plausibly 40 years or more. This taxon is likely to experience disturbances such as fire, flooding, erosion, and extreme drought at pre-settlement frequencies of 35-70 years. Reproductive maturity would be reached in well under 5 years. The taxon is likely to be fire-sensitive, with episodic recruitment from a soil-stored seedbank at an estimated pre-settlement fire interval of 35-70 years. This may be supplemented by some recruitment in response to outstanding rainfall events or localised site disturbance events.

Distribution

The taxon has a disjunct distribution on rocky ground in eastern Victoria, with populations in the Pine Mountain area and in gorge tracts of the Snowy and Combiénbar Rivers. The taxon also occurs in Queensland and New South Wales (VicFlora 2017).

Habitat

The taxon occurs in open forest, woodland, and heaths, usually on rocky outcrops above streams (VicFlora 2017).

Threats

The taxon is potentially threatened by imposed anthropogenic fire regimes and climatic warming and drying which, synergistically, increase the risk of recruitment failure in response to repeat fire events and extreme drought stress. Small and isolated stands may also be threatened by targeted browsing by deer or rabbits during the early stages of post-fire recruitment.

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The bushfires of 2019/2020 are believed to have impacted around 64% of the taxon's modelled habitat, with a further 80% of modelled habitat projected to be damaged, as of early January 2020. The overall impacts of the fire are yet to be determined. The taxon is likely to be threatened by feral herbivores, notably Sambar Deer (*Rusa unicolor*), and soil and vegetation disturbance as a result of fire recovery activities, such as machinery impacts and removal of hazardous trees. Drought, hot weather, and repeat fires have the potential to damage or destroy recovering plants and/or seedlings. The taxon's recovery depends on the effective control of the impacts of herbivores and by preventing soil disturbance following fire recovery.

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 style="text-align: center;"><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 A3 as Endangered

The population reduction over the next 100 years is projected to be 30 to 80% (midpoint 50%), based on (c) and (e) above.

Whilst the magnitude of future decline in population size is difficult to estimate with confidence, it is likely to be significant in response to the impact of the identified threats.

Eligible under Criterion A4 as Endangered

The population reduction over any 105 to 210 year period, including both past and future (up to 100 years in the future), is estimated to be 20 to 90% (midpoint 60%), based on (b), (c) and (e) above. The causes of reduction may not have ceased, be understood or be reversible.

Past decline is based on the early impacts of climate change, and the explosive increase in Sambar Deer density across the range of the taxon.

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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:

Eligible under Criterion B1 as Vulnerable

The Extent of Occurrence (EoO) across the taxon's range is estimated to be 9,013 km², based on accepted, post-1970 records in the Victorian Biodiversity Atlas (VBA).

The taxon is estimated to be severely fragmented naturally at both the regional and landscape scales. Geographically isolated stands occur at separations typically exceeding the dispersal range of the taxon, which has no specialised mechanism for long-distance dispersal.

It is estimated to have 2 to 3 locations, and has a continuing decline in (iii) and (v) above, based on the current and projected impact of the identified threats.

Eligible under Criterion B2 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 139 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA.

As above, the taxon is severely fragmented, has 2 to 3 locations, and has a continuing decline in (iii) and (v) above.

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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:

Eligible under Criterion C as Vulnerable

It is inferred that there are 7,000 to 14,000 mature individuals, but this qualifier is too weak.

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 (2017). Flora of Victoria, Royal Botanic Gardens Victoria: *Dodonaea rhombifolia*. Retrieved from: <https://vicflora.rbg.vic.gov.au/flora/taxon/4ce01cc6-1938-4aec-a92e-900fa65ccd3c>