



## *Abutilon fraseri* Dwarf Lantern-flower

### Taxonomy

*Abutilon fraseri* (Hook.) Walp.

This is a distinctive species, recognized by its glandular indumentum, its quickly dissociating mericarps and by the acuminate calyx lobes in which the midline of each lobe is much darker apically. The size of the flower varies considerably (VicFlora 2018).

Two subspecies are recognised, both in Victoria (where they apparently occur together) but are distinguishable only in fruit.

### Current conservation status

Listed as threatened under the *Flora and Fauna Guarantee Act 1988* (SAC 1991).

### Proposed conservation status

Endangered in Victoria

Criteria A2ce+3ce+4ce; B1ab(i,ii,iii,iv,v)c(iv)+2ab(i,ii,iii,iv,v)c(iv)

### Species Information

#### Description and Life History

The taxon is an upright or spreading perennial shrub, 40-100 cm tall; branchlets velvety, with simple glandular and stellate hairs and occasional longer simple hairs. Leaves ovate, 0.5-7 cm long, 0.8-4 cm wide, not markedly discoloured. Flowers solitary or in cymes; calyx campanulate, 7.5-9 mm long, 5-ribbed,  $\pm$  equal to fruit; lobes acuminate, midline darker at apex; corolla yellow, exceeding calyx; lobes 5-16 mm long, asymmetrically emarginate apically; staminal column 6-9 mm long, pubescent; styles 10-11. Fruit transversely rectangular, green, 6-9 mm high, adjacent mericarps adhering for c. quarter of their surface, soon separating; mericarps 1- or 2-seeded, unawned. The taxon flowers mainly in summer, but at almost any time following suitable rains (VicFlora 2018).

Subspecies *fraseri* is distinguished by its fruits 6-9 mm high, 8-10 mm diameter, densely tomentose with predominantly sessile stellate hairs mixed with fewer simple hairs.

Subspecies *diplotrichum* is distinguished by its fruit 5-6 mm high, 7.5-8.5 mm diameter, glabrous or sparsely pilose with simple multicellular hairs (VicFlora 2018).

#### Generation Length

The generation length of *Abutilon fraseri* is estimated to be 25 to 75 (midpoint 50) years. By analogy with a closely related species of *Abutilon*, it can be inferred that the taxon is a transient species with an estimated longevity of 10-15 years that can be absent from a site for many years before re-appearing (Parsons and Browne 2000). Parsons and Browne (2000) found that a major abiotic determinant of recruitment in Victoria is warm season rainfall. The authors also found that a minimum of 26 mm rainfall between November and March is needed for germination. Favourable rainfall may not occur for up to 8 years in the habitat of the taxon. The taxon appears to be confined to Belah Woodland which was apparently rarely subject to extensive wildfire at the time of European settlement. Generation time may therefore exceed longevity many times over.

## Distribution

The taxon is known in Victoria only between Sunny Cliffs and Red Cliffs, south of Mildura. It was formerly known from Merbein (west of Mildura) but now is apparently extinct there. It also occurs in WA, NT, SA, Qld, NSW (VicFlora 2018).

In 2000 the taxon was recorded at Bumbang Bushland Reserve west of Robinvale Aerodrome, in 2007 from Boundary Point on freehold land in the far north-west corner of the state, and in 2011 from the Border Track north of the Sturt Highway in the Murray Sunset National Park. The two subspecies are apparently co-extensive in Victoria (VicFlora 2018).

## Habitat

The taxon is known in Victoria only from sandy red loam soils (VicFlora 2018). The climate is semi-arid, with a mean annual rainfall of 290 mm at Red Cliffs, the wettest months being from May to October. The rainfall is highly variable, especially in summer when rain usually occurs as heavy downpours during thunderstorms (Parsons and Browne 2000).

At the Red Cliffs Scenic Reserve the habitat is recovering *Casuarina pauper* (Belah) woodland with *Dodonaea viscosa* and *Senna artemisioides*. On Stoeckel's freehold land the habitat is a rocky low cliff overlooking the Murray River in a low shrubland dominated by *Scaevola depauperata*, *Olearia pimeleoides* and *Maireana pyramidata* on a very shallow veneer of soil above a rocky outcrop. Other associates include *Calotis hispidulus*, *Carrichtera annua*, *Dodonaea viscosa*, *Euphorbia tannensis* subsp. *eremophila*, *Lycium australe* and *Maireana sedifolia*. On the Border Track the habitat is very open Chenopod Mallee of the Woorinen Formation reddish brown clay loam with sheet calcrete at around 40 cm depth. The site is in a red swale with Chenopod Mallee dominated by *Eucalyptus gracilis*, *Maireana pentatropis*, *Sclerolaena obliquicuspis*, *Austrostipa eremophila*, *Atriplex stipitata* and *Sida fibulifera*.

## Threats

The taxon has undoubtedly suffered severe historic decline through habitat loss to agriculture and urban development. This can be inferred from the association of the taxon with Belah Woodlands which have been targeted for agricultural clearance on account of their high fertility (Cover and Sluiter 2003). The taxon has also suffered severe habitat degradation through agricultural intensification and a wide range of associated edge effects. A key edge effect is competition by exotic weeds, particularly by annual grasses.

Parsons and Browne (2000) noted that the taxon is palatable to stock and kangaroos. The authors considered browsing to be the most serious threat, with kangaroos preventing seed set. The authors considered the provision of kangaroo-proof fencing to be the most important management recommendation.

Many occurrences are threatened by roadworks, recreational vehicles, utilities maintenance, urban development and agricultural intensification.

Parsons and Browne (2000) found that one of the major abiotic determinants of recruitment success in another species of *Abutilon* in the region, *A. oxycarpum*, is warm season rainfall. The authors also found that a minimum of 26 mm rainfall between November and March is needed for germination. Future climatic drying and drought stress as a result of climate change will result in less favourable rainfall events. A favourable rainfall event followed by a drought will lead to recruitment failure.

## 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"> <li>(a) direct observation [except A3]</li> <li>(b) an index of abundance appropriate to the taxon</li> <li>(c) a decline in area of occupancy, extent of occurrence and/or quality of habitat</li> <li>(d) actual or potential levels of exploitation</li> <li>(e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites</li> </ul>			

## Evidence:

### Eligible under Criterion A2 as Endangered

The population reduction over the past 75 to 225 years is suspected to be 50 to 80% (midpoint 65%), based on (c) and (e) above.

Past decline cannot be estimated with any confidence although it is likely to have been very significant, since the taxon is associated with Belah Woodland which has been highly depleted and often grossly degraded (Cover and Sluiter 2003).

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

### Eligible under Criterion A3 as Endangered

The population reduction over the next 75 to 100 years is suspected to be 50 to 80% (midpoint 65%), based on (c) and (e) above.

Future decline in population size is difficult to estimate with any confidence since the identified threats are likely to act stochastically and with unpredictable intensity.

### Eligible under Criterion A4 as Endangered

The population reduction over any 75 to 225 year period, including both past and future (up to 100 years in the future), is suspected to be 50 to 90% (midpoint 65%), 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 <sup>2</sup>	< 5,000 km <sup>2</sup>	< 20,000 km <sup>2</sup>
B2. Area of occupancy (AOO)	< 10 km <sup>2</sup>	< 500 km <sup>2</sup>	< 2,000 km <sup>2</sup>
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 Endangered

The Extent of Occurrence (EoO) across the taxon's range is estimated to be 4,340 km<sup>2</sup>, based on accepted, post-1970 records from the Victorian Biodiversity Atlas (VBA).

The taxon is estimated to be severely fragmented naturally and anthropogenically at the landscape scale, with most occurrences isolated from each other at distances that greatly exceed the dispersal range of the taxon which is likely to be dispersed by ants (myrmecochory) at the metre scale

It is estimated to have three locations. It has a continuing decline in (i), (ii), (iii), (iv) and (v), based on the current and projected impact of the identified threats, and extreme fluctuations in (iv) above. The taxon is a relatively short-lived perennial with a generation time which may exceed longevity manyfold. Depending on the success or failure of episodic recruitment, successive cohorts may fluctuate significantly in population size and density and may be absent from a site for at least 6 years before re-appearing (Parsons & Browne 2000). The taxon is therefore likely to have been subject to extreme fluctuation in population size under pre-settlement conditions.

### Eligible under Criterion B2 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 28 km<sup>2</sup>, based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA. As above, it is estimated to be severely fragmented, have 3 locations, has a continuing decline in (i), (ii), (iii), (iv) and (v) and extreme fluctuations in (iv) 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:

### Ineligible under Criterion C as Data Deficient

There is no available estimate of current population size. In 1993 approximately 82 plants were known at 5 sites (Cove and Sluiter 2003) but since population size at any one site can fluctuate significantly between successive recruitment events, this is no guide as to current population size.

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 <sup>2</sup> 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

Cover, S. and Sluiter, I. (2003) Flora and Fauna Action Statement No. 48. Dwarf Lantern-bush *Abutilon fraseri*. Department of Sustainability and Environment, East Melbourne.



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Parsons, R.F. and Browne, J.H. (2000). Causes of rarity in *Abutilon oxycarpum* and *Hibiscus brachysiphonius* (Malvaceae) on the River Murray floodplain, South-eastern Australia. *Transactions of the Royal Society of South Australia* 124(1):41-44.

SAC (1991). Flora and Fauna Guarantee Scientific Advisory Committee: Final Recommendation on a Nomination for Listing. Nomination No. 150 *Abutilon fraseri*.

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