

## *Phebalium festivum* Dainty Phebalium

### Taxonomy

*Phebalium festivum* Paul G. Wilson

The taxon was formerly included in *P. obcordatum* Benth. which is endemic in New South Wales (VicFlora 2016).

### Current conservation status

Listed as threatened under the *Flora and Fauna Guarantee Act 1988* (SAC 1996).

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

### Proposed conservation status

Endangered in Australia

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

### Species Information

#### Description and Life History

The taxon is a shrub to 1.5 m high; branchlets smooth or rarely slightly glandular-verrucose, densely ferruginous-lepidote. Leaves broadly obovate, 2-3.5 mm long, 1.5-2.5 mm wide, apex rounded to truncate and retuse or obcordate, base cuneate, upper surface slightly convex and glandular-punctate, glabrous, midrib hardly impressed, lower surface densely silvery-lepidote, margin entire; petiole to 1 mm long. Inflorescence a 3-10-flowered umbel-like cluster, often on short lateral branches; peduncle absent; pedicels 2-3 mm long. Calyx hemispherical, 0.5-1 mm high, densely silvery- to ferruginous-lepidote, smooth; petals imbricate, elliptic, c. 2.5 mm long, white to pale yellow, silvery to ferruginous outside; stamens exerted, anthers yellow; disc not apparent; ovary silvery-lepidote. Follicles erect to spreading, lepidote, c. 3 mm long. The taxon flowers in spring and summer (VicFlora 2016).

#### Generation Length

The generation length of *Phebalium festivum* is estimated to be 20 to 35 years. The taxon is a long-lived shrub and is sexually mature at approximately five years.

#### Distribution

The taxon is a Victorian endemic, which has only been recorded from five areas across central Victoria: Rushworth, Bendigo, Inglewood, Wedderburn and a population at Tarnagulla which has not been located for over 20 years and could be extinct. It only occurs in the Goldfield region and is only recorded within the public reserve system.

#### Habitat

The taxon occurs in mallee and broombrush communities on shallow, shaley ground (VicFlora 2016). Specifically, it occurs in Box Ironbark forest and Sandstone Ridge Shrubland under a canopy of Red Ironbark, Yellow Gum, Red Box, Green Mallee, Bull Mallee and Blue Mallee.

#### Threats

Past threats include harmful land use practices such as the clearance of Mallee vegetation for Eucalyptus oil production, gold extraction, intensive grazing and historic forestry operations.

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*P. festivum* is a highly palatable taxon; all populations show evidence of severe browsing pressure by wallabies and are in danger of becoming extinct. The taxon also occurs in areas that are frequently included in planned burn operations and are at risk of inappropriate fire management. These two threats are currently operating together at all sites.

## 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"> <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 60 to 105 years is estimated to be 30 to 50%, based on (c) and (e) above.

Past land use practices, such as vegetation clearance, gold extraction, grazing and historic forestry operations, have most likely contributed to the decline in the taxon.

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 60 to 100 years is projected to be 50%, based on (c) and (e) above.

Continuous browsing pressure, inappropriate fire regimes and continuous dry conditions are likely to increase the rate of extinction for this taxon.

### Eligible under Criterion A4 as Endangered

The population reduction over any 60 to 105 year period, including both past and future (up to 100 years in the future), is estimated to be 30 to 50%, 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 3,370 km<sup>2</sup>, based on accepted, post-1970 records from the Victorian Biodiversity Atlas (VBA).

The taxon is estimated to be severely fragmented. There are multiple, small isolated subpopulations that are all at risk from intense browsing pressure, inappropriate fire regimes and climate change, such that there is increased extinction risk and little or no probability of recolonisation should subpopulations become extinct.

It is estimated to have 5 locations. It has a continuing decline in (i), (ii), (iii), (iv) and (v) above, due to repetitive browsing and other identified threats.

#### Eligible under Criterion B2 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 104 km<sup>2</sup>, based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA. As above, it is severely fragmented, has 5 locations and has a continuing decline in (i), (ii), (iii), (iv) 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 C1 as Vulnerable

It is estimated that there are 5,320 to 6,600 mature individuals, based on population monitoring and searches over the past 20 years,

There is an estimated continuing decline of 50% within three generations.

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

DSE (2010). Dainty Phebalium Fact Sheet.

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



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SAC (1996). Flora and Fauna Guarantee Scientific Advisory Committee: Final Recommendation on a Nomination for Listing. Nomination No. 396 *Phebalium obcordatum*

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Wilson, P. G. (1998). New species and nomenclatural changes in *Phebalium* and related genera (Rutaceae). *Nuytsia*, 12(2), 267-288.