

## *Pellaea nana* Dwarf Sickle-fern

### Taxonomy

*Pellaea nana* (Hook.) Bostock

This taxon closely resembles *P. falcata*, and has previously been regarded as a variety of *P. falcata*. The two species are principally distinguished on pinnae size, *P. nana* with pinnae crowded, 5-18 mm long while pinnae are well spaced, 22-46 mm long in *P. falcata* (VicFlora, 2014).

### Current conservation status

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

### Proposed conservation status

Endangered in Victoria

Criterion B2ab(iii,v)

### Species Information

#### Description and Life History

The taxon is a rhizome short- to medium-creeping; scales narrowly ovate, c. 1.5 mm long, dark brown to black with paler borders. Fronds erect, 20-50 cm long. Stipe 5-20 cm long, densely clustered, c. 2-5 mm apart, stiff, persistent, dark brown; stipe and rachis with dense covering of spreading brown scales and hairs. Lamina 1-pinnate, narrow ovate, with 25-65 crowded pinnae, stiffly herbaceous, ±glabrous aside from a few scales on the mid-vein, dark green above, paler beneath. Pinnae sessile or shortly stalked (stalk < 1 mm long), oblong to linear-oblong, 5-18 mm long, 2.5-7 mm wide; apex obtuse or acute; base truncate to cordate; margins entire, usually undulate, sometimes with minute teeth near apex; veins obscure except mid-vein. Sori in continuous band c. 1 mm wide along margins, reaching almost to apex and base; reflexed margin covering young sori (VicFlora, 2014).

#### Generation Length

The generation length of *Pellaea nana* is inferred to be 35 to 90 (midpoint 50) years. Rhizomes would be likely to suffer very little damage under undisturbed pre-European conditions.

#### Distribution

The taxon occurs on Mitchell River National Park (NP), below the lookout near the mouth of Woolshed Creek, where it is seen in a Dry Rainforest on a north-facing rocky slope.

#### Habitat

The taxon occurs in moist forest and dry Rainforest, often among rocks or on rock faces (VicFlora, 2019).

#### Threats

Long term threats include extreme drought stress, given at least some occurrences in dry rocky skeletal habitats, and browsing and disturbance by Sambar Deer.

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> <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 A3 as Vulnerable**

The population reduction over the next 100 years is projected to be 30 to 50% (midpoint 40%), based on (c) and (e) above.

Reduction in the number of mature individuals may occur due to dry conditions in the future especially in more exposed sites. Sambar browsing is an important threat.

**Eligible under Criterion A4 as Vulnerable**

The population reduction over any 105 to 270 year period, including both past and future (up to 100 years in the future), is estimated to be 30 to 40%, based on (c) and (e) above.

There may have been some past decline based on increased drought, and the presence of Sambar. Future decline is based on the identified threats.

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 B2 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 40 km<sup>2</sup>, based on 2 x 2 km grids derived from accepted, post-1970 records in the Victorian Biodiversity Atlas.

Considering the limited dispersal ability of the taxon, the barriers to dispersal, or lack of habitat separating them, the subpopulations can be considered to be severely fragmented.

It is estimated to have 1 location, as the overriding threat to all subpopulations is increased drought stress, which will also reduce the quality of habitat for this taxon, particularly subpopulations in exposed sites.

It has a continuing decline in (iii), and (v) above, due to increasing drought stress, particularly for subpopulations in exposed sites.

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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

The taxon is estimated to have 300 to 1,000 mature individuals, but other thresholds under this criterion have not been met.

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 D as Vulnerable

The taxon is estimated to have 300 to 1,000 mature individuals. The statewide population size is likely to be less than 1000, although there could be some confusion with *P. falcata* s.l.

### Eligible under Criterion D2 as Vulnerable

The taxon is estimated to be very restricted.



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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 (2014). Flora of Victoria: *Pellaea nana*, Royal Botanic Gardens Victoria. Retrieved from: <https://vicflora.rbg.vic.gov.au/flora/taxon/79997c62-2988-40df-b8fe-a50df7c1b366>