

Threatened Species Assessment



Synemon jcaria Reddish-orange Sun Moth

Taxonomy

Synemon jcaria R. Felder, 1874

Current conservation status

Categorised as Critically endangered in the 2009 Advisory list of threatened invertebrate fauna in Victoria (DSE 2009).

Proposed conservation status

Endangered in Victoria

Criterion B2ab(iii,v)

Species Information

Description and Life History

Sun-moths are broad-winged, colourful, day-flying moths with clubbed antennae and relatively slender bodies. When Sun-moths rest for short periods they often raise and lower their wings rhythmically, showing their brightly coloured hindwings. However, when resting for longer periods the hindwings are concealed by cryptically coloured forewings that harmonise perfectly with the surrounding debris and soil surface crust. Unlike most moth families, the Sun-moths are unable to fold away their antennae when at rest. The wingspan of *S. jcaria* is about 35 mm for males and 38 mm for females. Adults have brown forewings, each with two white spots. The hindwings are scarlet with brown markings.

The larval food plant is Scented Matt-rush *Lomandra effusa*. This is based on repeated observations (by F. Douglas and others) of larvae in all stages of maturity, plus pupae inside the rhizomes of this plant. Plants that contain larvae or pupae are indicated by dead younger leaves at the centre of some of the growing points where they have been killed by the larvae feeding inside the rhizomes. These dead leaves will always come away freely when gently pulled. After adult emergence the pupal exuviae are left protruding from the formerly occupied rhizomes.

Adults are diurnal and fly rapidly, close to their breeding sites during periods of warm sunny weather. As adults, sun-moths have relatively brief lives of approximately four to ten days (depending on the species). Females are not often observed. However males are easier to find because they usually hold territories near occurrences of the larval food plant. They usually land on vantage points such as dead eucalypt twigs or native grass stems. Territory-holding males will immediately fly out to meet passing conspecifics. If male they are chased away after a brief aerial fight or if female, they are courted by the male closely following the female, which if receptive will land so that mating can take place. Between flights the males are easy to approach and even photograph. At all of the sites where this univoltine species occurs in north-western Victoria, the adult flight period is from mid-late January to early March.

Generation Length

The generation length of the Golden Sun-moth is inferred to be 2 to 3 years, the time that *Synemon* species generally take to complete a generation (DSE 2003).

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Distribution

The taxon occurs in the north-west of the state, in Hattah-Kulkyne and Wyperfeld National Parks, Kiata Flora and Fauna Reserve, Wail State Forest, and in the area of Ouyen and Rupanyup.

Habitat

In the Nowingi, Hattah and Ouyen areas, the taxon occupies mallee and mallee-heath communities on reddish or pale east-west dune systems containing extensive occurrences of Scented Matt-rush in low lying areas between the sand dunes.

In the Kiata, Wail and Rupanyup sites, it occupies open woodland dominated by Buloke (*Allocasuarina luehmannii*) and/or Black Box (*Eucalyptus largiflorens*) and/or Yellow Gum (*E. leucoxydon*) with extensive occurrences of Scented Matt-rush in the ground flora.

Threats

Past threats included habitat loss due to clearing of native vegetation for agriculture (across the range) and forestry plantations (near Wail).

Current threats include inappropriate management of the comparatively small areas where the taxon occurs (e.g. firebreak construction with earth moving vehicles). Soil disturbance due to fire mitigation works would have a very serious impact on populations. However, fire at any time during the life cycle of the species could also seriously affect the population levels at a given breeding site, and may even cause a local extinction, as the larvae are situated within the combustible rhizomes of the food plant. With a drying and warming climate, it is likely that fire frequency and intensity will increase.

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"> (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 Vulnerable

The population reduction over the next 10 years is suspected to be 15 to 30%, based on (c) and (e) above.

There is a possibility of future decline as larvae may be vulnerable to fire because they are situated within the largely combustible rhizomes of their larval food plant.

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 5,574 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the Victorian Biodiversity Atlas (VBA).

The taxon is inferred to be severely fragmented. The adults are active fliers but only live for a few days. Most of the subpopulations are separated by some kilometres, so if a subpopulation was lost, there would be little or no chance of recolonisation.

It is inferred to have 5 to 8 locations, and is inferred to have a continuing decline in (iii) and (v) above. Although the known subpopulations appear to be stable they are very small, and increasing fires could have an increasing impact. The larvae may be vulnerable to fire because they are situated within the largely combustible rhizomes of their larval food plant. In a warming and drying climate, it is likely that the frequency and intensity of wildfires will increase.

Eligible under Criterion B2 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 28 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA. As above, it is severely fragmented, has 5 to 8 locations and has a continuing decline in (iii) (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:

Ineligible under Criterion C

It is inferred that there are 1600 mature individuals, but this qualifier is too weak.

There are eight extant populations (Nowingi, Hattah, Ouyen, Wyperfeld (2), Kiata, Wail and Rupanyup) with about 200 adults in each. All populations (Rupanyup possibly excepted) are either in national parks or other types of crown land.

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:

Ineligible under Criterion D

It is inferred that there are 1600 mature individuals.

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

References

DSE (2009) *Advisory list of threatened invertebrate fauna in Victoria - 2009*. Department of Sustainability and Environment, Melbourne. (Retrieved from



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