

The ant, the butterfly and the bulldozer



Female Arid Bronze Azure butterfly. (Photo Geoff Walker)

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Summary

Early baseline results demonstrate that proximity to disturbance and the presence of eucalypts, principally Gimlet trees *Eucalyptus salubris*, were critical to the presence of the 'pale form' of the sugar ant *Camponotus terebrans*. This ant is associated with the only extant population of the critically endangered Arid Bronze Azure butterfly *Ogyris subterrestris petrina*.

Introduction

The only extant population of the critically endangered Arid Bronze Azure butterfly *Ogyris subterrestris petrina* is restricted to a small remnant (nature reserve) in the north-eastern wheatbelt of Western Australia. The butterfly has an obligate association with 'pale form' of the sugar ant *Camponotus terebrans* and hence its survival depends on the existence of large ant colonies.

Extinct?

Until the rediscovery in 2006, it was unknown whether this subspecies was extinct, given that it had not been seen despite numerous surveys over the previous 13 years. A clearing application within this remnant, currently under review, poses a significant threat to the butterfly and was the incentive for the monitoring program. The impact has the potential to disrupt the breeding cycle of the butterfly and cause extinction of the colony.

Aim

The aim of this monitoring program is to better understand the habitat required for *C. terebrans* persistence and to detect any signs of decline of the ant colonies or the butterfly.

Results

C. terebrans ant colonies were present at 54 (32%) of the 168 DCPs in the reserve (Fig 3).

Disturbance

The majority (85%) of DCPs with ants present were grouped within 250 metres of the railway and road. Only 2 DCPs with ants present were recorded outside of the area of this disturbance, and not associated with other obvious disturbances such as tracks, firebreaks or internal roads (Fig 3).

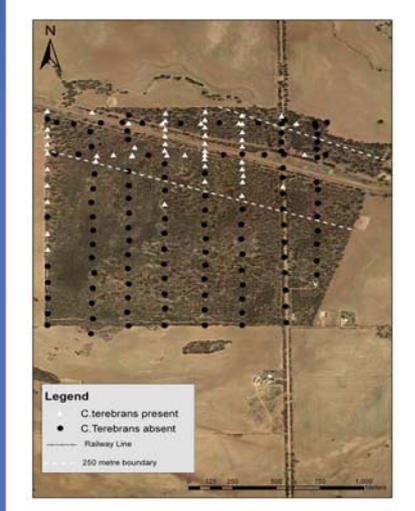


Figure 3. Occurrence of *C. terebrans* in Barbalin Nature Reserve. The area between the dashed lines is considered the 'area of disturbance' around the road and railway line.

Vegetation

Where eucalypts were absent, there was a corresponding absence of *C. terebrans* ants. Nests of the ant were only found at the base of eucalypts: predominantly (83%) Gimlet *Eucalyptus salubris*, occasionally (9%) Wheatbelt Wandoo *E. capillosa capillosa* and rarely (4%) Salmon Gum *E. salmonophloia* (Fig 4).

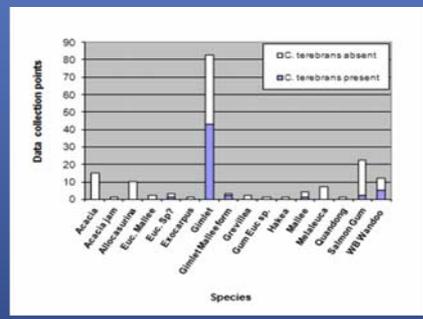


Figure 4. Presence of *C. terebrans* and associated flora recorded at 168 data collection points in Barbalin Nature Reserve.

Discussion

The majority of *C. terebrans* colonies were found in the presence of disturbance and were exclusively associated with 3 eucalypts in BNR, principally Gimlet *Eucalyptus salubris*. The reason for this association with Gimlet could be due to more favorable root architecture for their nests or related to variation in the invertebrate fauna present on Gimlet that may be absent or in lower numbers on other eucalypts. Perhaps there is an energetic advantage through predation and/or farming of 'host specific' insect herbivores to Gimlet (such as scale) over those on other eucalypts?

Do the ants prefer smaller eucalypts ?

From observations and a small sample, *C. terebrans* nests were most commonly associated with smaller eucalypts (Fig7 -Gimlet).

In a few areas of dense ant colonies close to disturbance it was observed that a number of large Salmon Gums, Wandoo and Gimlet were without ant nests while ants were present on all of the smaller trees.

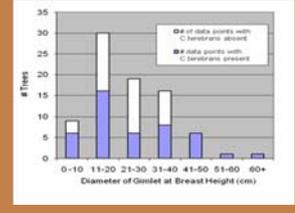


Figure 7. Presence of *C. terebrans* and diameter of Gimlet species at breast height.

If the ant does have a preference for younger (smaller) eucalypts, this could be for reasons of foraging energetics. That is, taller trees require longer foraging distances, incurring higher energy costs, especially if they also carry their symbiotic associates. It can also be expected that younger trees would be more likely associated with disturbance and perhaps *C. terebrans* may decline when the stand increases in height and maturity?



Figure 8. Vegetation under application for clearing in Barbalin Nature reserve, with dense populations of *C. terebrans*. (Photo Tim Gamblin).

Breaking News

The vegetation clearing application for a road realignment which would have resulted in the clearing of vegetation considered to be at the centre of the breeding colony in BNR (Fig 8) has been rejected. Instead an alternate route which will minimise impact on the butterfly yet still increase safety for road users, has been proposed.

Recovery Actions – where to from here ?

- Ongoing surveys for new populations of *C. terebrans* and *O. s. petrina*
- Continued monitoring of known population to detect signs of decline
- Translocations
- Road signs to slow traffic and lower the incidence of road kill in BNR

Acknowledgements

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The Butterfly/Ant Connection

The immature stages of many species of lycaenid butterflies have a close relationship with ants. The ants protect the butterfly larvae from predators, while the ants are usually rewarded with secretions produced by the larvae.

Unlike some species of azure butterfly the Arid Bronze Azure butterfly's larvae do not eat vegetation, have an entirely subterranean life cycle and are fed by and/or predate the ants.



Figure 1. Mature larva of The Mallee Bronze Azure butterfly (likely to be very similar to the Arid Bronze Azure) attended by *C. terebrans* ants. (Photo L. Hunt).

Methods

Barbalin NR (182ha) is situated in the semi-arid northern wheatbelt of Western Australia, approximately 11 km west of Mukinbudin and 260km north-east of Perth. The average annual winter rainfall is less than 350mm. Remnant vegetation in this region is dominated by eucalypt woodland.



Figure 2. Location of Mukinbudin within the Avon Catchment (green) and specimens of the Arid Bronze Azure butterfly. Female (top) Wingspan = 36 mm. (Photo S. Brown).

A subset of the *C. terebrans* ant nests were sampled using transects traversing the reserve. Data collection points (DCP) along the transects measured the species of tree, diameter at breast height (dbh) of the largest stem and the presence or absence of the ants.



Figure 5. DEC Senior and Junior officers Andy Williams and Tim Gamblin, record ant data in Gimlet dominated eucalypt woodland in Barbalin NR. (Photo Matt Williams).



Figure 6. Members of the Mukinbudin Conservation Group and Senior DEC officer Andy Williams. Photographing the butterfly at close quarters. (Photo Clare Smith).