Friends of the Chequered Copper (*Lucia limbaria)* *Butterfly*

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*Lucia limbaria (*L.Hunt)

Herding Caterpillars – the story

Friends of the Chequered Copper (*Lucia limbaria*) Butterfly frequently visit the Grasslands Site in the southern part of Pakapakanthi/Victoria Park/Park 16 and monitor the Chequered Copper (*Lucia limbaria*) butterflies, the butterfly host plant *Oxalis perennans* and the obligate common black ant *Iridomyrmex rufoniger.* This amazing story, a symbiotic relationship between 2 species is a special story.

Each year we do over 300 hours of monitoring, usually in the mornings, especially to study the interaction of the ants and the caterpillars. The amazing relationship between the ants and the caterpillars, hatching from the tiny egg (~0.8mm in diameter) and moving between the protection of the ant hole and the plant, where it is encouraged by the ants to feed, we call 'Herding Caterpillars'. The ants often move an ant-hole to the base of the plant, so there is minimum cross ground travel for the caterpillar, as there are plenty of predators out there, like spiders and wasps, which would take the caterpillar, if the ants weren't there. We also record the location in the grassland site of the male and female butterflies, their territorial and mating rituals, egg-laying and feeding.

We have often come across 'fresh' butterflies that have just emerged from the chrysalis, which is in the ant hole, quite often lying flat on the grass – sunbaking. If there is plenty of the host plant around, Native Sorell (*Oxalis perennans*), the caterpillars will eat well and reach maturity after 2-3 weeks. Metamorphosis in the chrysalis takes nearly 2 weeks and an adult will last for at least a week before it dies. We do see some caterpillars go into dormancy over winter and are then brought up to feed in September, once the plants grow again.

What is so special about this species of butterfly?
Surprisingly there are only 397 species of butterfly recognized in Australia (there are over 22,000 moth species!) and they are classified into 5 Families. Our Chequered Copper (*Lucia limbaria*) is from the LYCAENIDAE – the blues and coppers, and they make up 36% of the Australian butterflies i.e. 142 species in 45 genera. 65 of the species are endemic to Australia.

What makes the lycaenids special is they have an association with ants. There are 3 main associations:

- Larvae are not attended by ants or rarely attended;
- Larvae are frequently attended by ants (myrmecophilous); and
- Larvae that are predacious upon ants or are fed by ants (aphytophagous).

The Chequered Copper (*Lucia limbaria*) is frequently attended by ants (myrmecophilous) and they are always attended by many ants and this is called 'obligate myrmecophily', which is considered a mutualistic symbiosis. Of the 142 species of lycaenid butterflies 123 have an ant association and 59 of these, like the Chequered Copper (*Lucia limbaria*), are myrmecophilous.

We have taken lots of photos and videos and we encourage you to view them or come and see them live in the grassland fenced area in Pakapakanthi/Victoria Park/Park 16.

The life cycle of the Chequered Copper (*Lucia limbaria*) butterfly:
(Selected images (photographer Greg Coote, unless shown otherwise, from Pakapakanthi.)

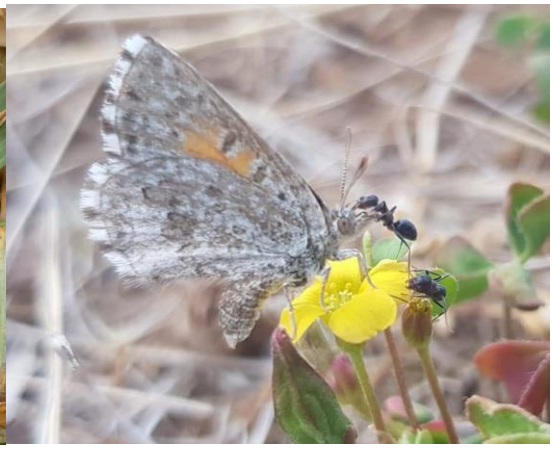
<u>The adult butterflies:</u>
It starts with the adult butterflies, which have a distinctive chequered pattern around the edge of their wings and the distinctive copper scales on the upperwings and cryptic patterns on the underwings. The male wingspan is 23 mm and the female 25mm and the usual flight period in SA is from October to April. When the butterflies emerge from the pupa, which resided in the ant nest, the fresh butterflies will often lie flat on the grass warming their body and wings before taking flight.

Generally the butterflies are rather inconspicuous as they fly close to the ground, but they will frequently land on rocks, leaves or flowers and then bask in the sunlight revealing the stunning iridescent copper on the upperwings. The males will establish small territories and fiercely defend them from other males and other species of butterflies that venture closeby. The males vigorously court the females and will land close by a female and vigorously vibrate their wings in short bursts.

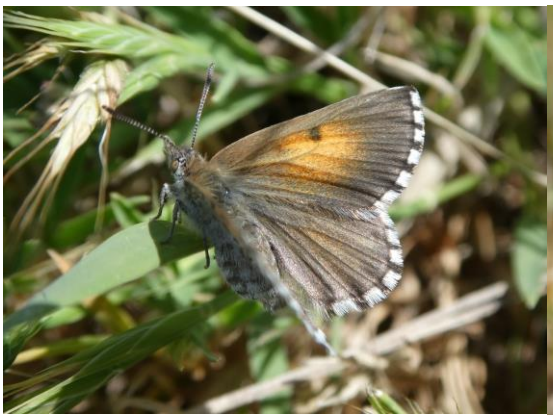
The females will lay their eggs on the surface of the *Oxalis perennans* leaf, usually on the upperside of lower leaves but they have also been found on the underside of leaves.

After all the flying around and being buffeted by the wind and predators the butterflies die after about 7 days.

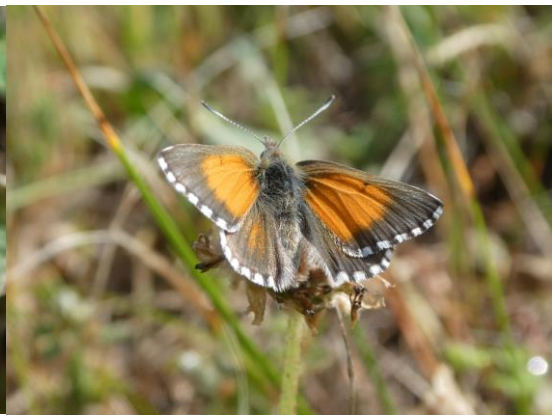
CCB freshly emerged from the pupa being inspected by Greg 26/02/20



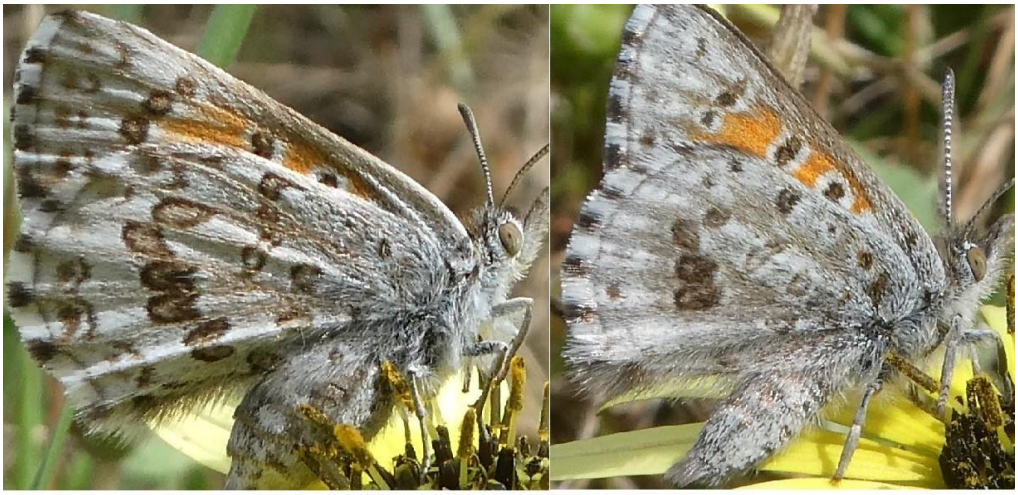
CCB being inspected by an obligate ant *Iridomyrmex rufoniger (Photo by Peter Raine) 15/03/20*



CCB female showing upperwing pattern 14/10/20



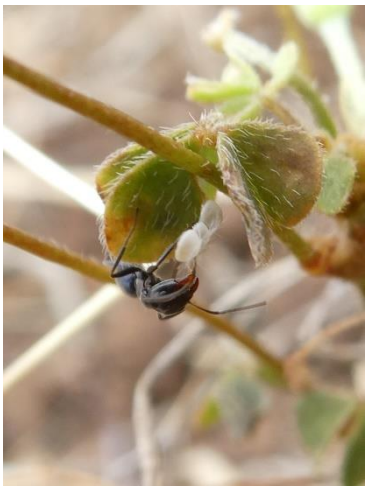
CCB male showing upperwing pattern 14/10/20

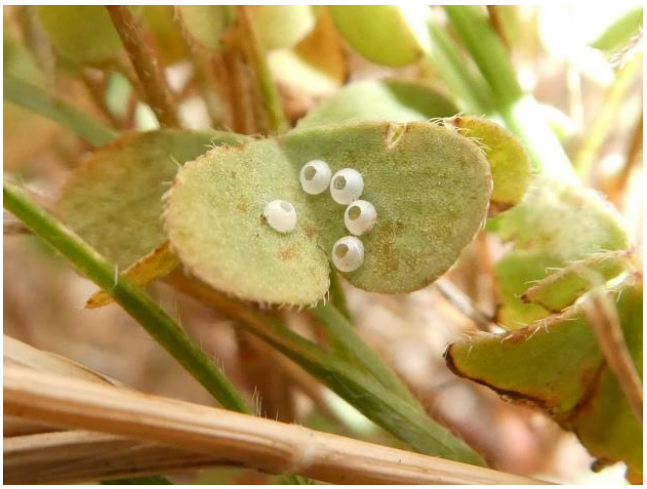


Comparison of CCB underwing between female (left) and male (right) showing distinctive pattern (14/10/20)

The eggs:

The eggs are 0.78mm diameter (half the size of a pinhead) and they are often in groups of 5-6 on the surface of the host plant, Native Sorell (*Oxalis perennans*). The attendant ants, which are about 3mm in length, can often be seen checking the eggs to see if they are ready to hatch. Eggs have been known to hatch in about 14 days, but may hatch earlier.



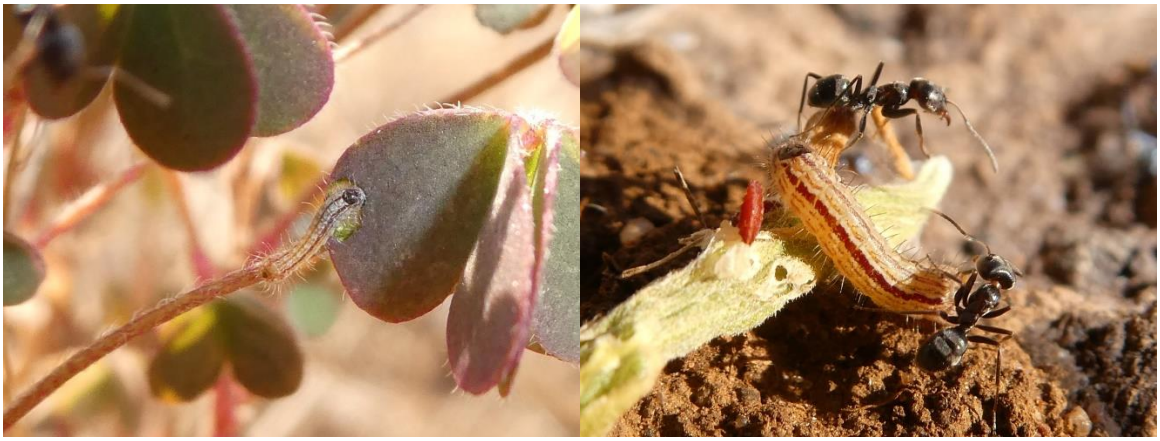


Fresh unhatched eggs of the CCB being inspected by an obligate ant *Iridomyrmex rufoniger* and hatched eggs on the *Oxalis perennans* 22/12/19

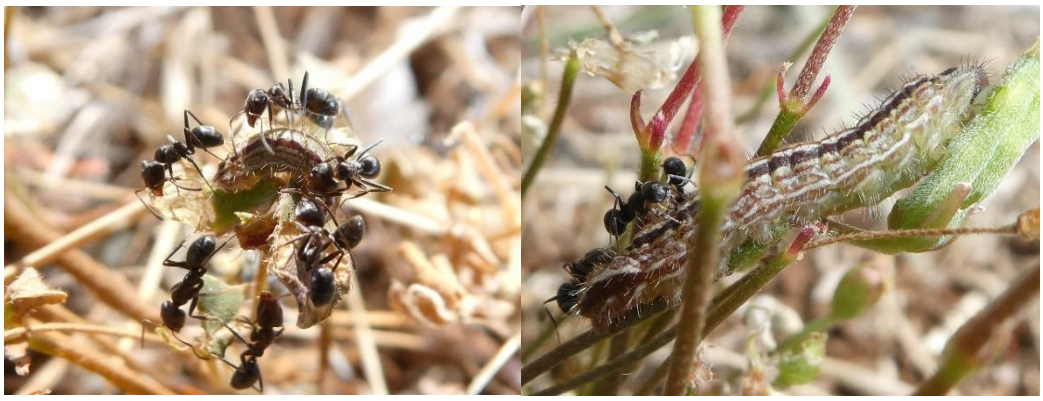
Caterpillars of the Chequered Copper (*Lucia limbaria*):

The young caterpillars eat the surface of the *Oxalis perennans,* but as the caterpillar gets bigger it can eat leaves, flower buds and stems of the host plant depending on what is available. The attendant ants bring the caterpillars up from the ant nest across ground up into the host plant to feed. The first hatching of caterpillars, has access to spring growth and will grow rapidly through the 7 larval stages. Whereas the caterpillars that hatch in mid summer, when there is less food, may take 2-4 ½ months to mature.

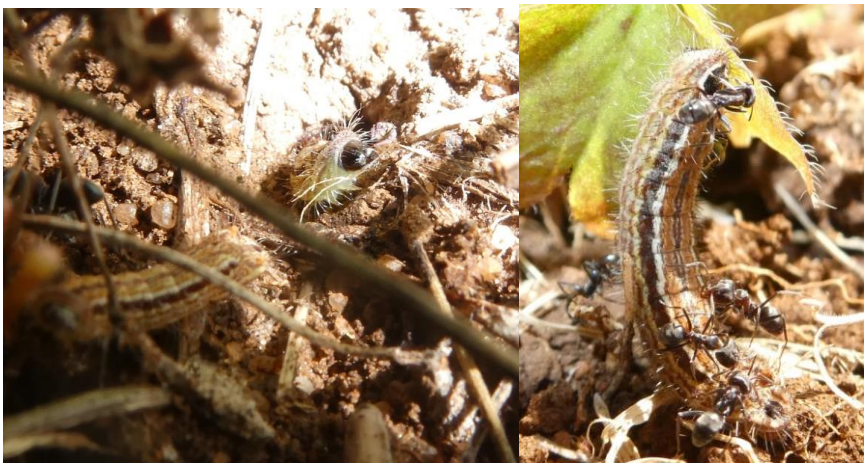
Researchers have found that when the caterpillars are not feeding, they reside in chambers in the ant nest, 3 to 8 cms below ground.



CCB caterpillar (~1.5mm long) on *Oxalis perennans* (17/12/19) being watched by the obligate ant *Iridomyrmex rufoniger* and on the ground 24/12/19



CCB caterpillars being attended by the obligate ant *Iridomyrmex rufoniger* on *Oxalis perennans* 24/12/19



CCB caterpillars on ground emerging from the ant nest and being attended by the obligate ant *Iridomyrmex rufoniger*

<u>The pupae of the CCB:</u>

Researchers have found that the pupae reside in chambers in the ant nest, 3 to 8 cms below ground, and are rather delicate and lie loose in the chamber. The pupa is 10-12 mm long, greenish-buff to pale yellowish-brown and has pale wings and is smooth and shiny. The metamorphisis in the pupa takes about 12 days and then the butterfly lifecycle starts again.