

Some of Australia's myrmecophagous Lycaenid butterflies

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The Lycaenidae – blues, coppers and hairstreaks – is the largest butterfly family in Australia, containing small to medium-sized butterflies that are often brilliantly coloured on the upperside.

Many lycaenids have particularly interesting life histories, associating with ants in their larval and pupal stages. Most larvae have special adaptations to encourage this relationship: a dorsal nectary organ or Newcomer's organ on the seventh abdominal segment which produces a liquid secretion that ants feed upon, a pair of eversible tentacular organs on abdominal segment eight which produce volatiles that probably release an alarm reaction in the ants, and various epidermal glands. Some larvae and pupae stridulate, producing vibrations and sounds that may affect behaviour of the attendant ants. From this relationship, the immature stages get some protection from attack by parasitoids, predators, and the ants themselves.

The strength of the butterfly-ant relationship varies among species. Some lycaenids are seen with ants only occasionally, but others have obligate ant relationships, they are always associated with ants and usually a particular species of ant. Most of the latter group feed on plants while being attended by ants but a few species actually eat their ant associates – myrmecophagy. Myrmecophagy is known or believed to occur in four genera of Australian lycaenids.

One of these is the genus *Ogyris*, the Azures. Most of the Azures feed on mistletoe as larvae. However, there are several southern and south-western species that are very different. Their adults lay eggs at or near the entrance to underground nests of *Camponotus* spp. ants; *O. subterrestris* (Arid Bronze Azure) lays eggs at the base of eucalypts while adults of *O. idmo* (Large Bronze Azure) and *O. halmaturia* (Eastern Bronze Azure) lay eggs near or into the nest entrance. Larvae of all three species spend their development underground and are presumably fed by the ants or feed on ant brood, but so far this has not been observed.

The second is the genus *Arhopala*, the Oak-blues. There are three mainland Australian species that feed on a variety of plants while always attended by Green Tree Ants, *Oecophylla smaragdina*. However, the life history of the fourth species, *A. wildei* (White Oak-blue) (Fig. 1), wasn't discovered until the 1990s (King and Ring 1996; Eastwood and King 1998). Females lay eggs on the outside of arboreal nests of the ant *Polyrhachis queenslandica*. These ants aren't inclined to leave the nest during daylight, but instead respond to threats by drumming against the inside of the nest, creating a very audible rattling sound. Ants carry the newly hatched larvae into the nest where they feed on the ant brood (Fig. 2).



Figs 1,2. White Oak-blue, *Arhopala wildei*: (1) adult male; (2) final instar larva with *Polyrhachis queenslandica* ants.

All members of the genus *Acrodipsas*, the Ant-blues, will almost certainly be myrmecophilous. The number of known species of *Acrodipsas* keeps expanding: in the early 1970s there were four named species (originally listed under *Pseudodipsas*) whereas now there are 11 species. *Acrodipsas* are very local and many are only

collected regularly on hilltops, mostly as males. There have been detailed observations of the life history of only three, *A. cuprea* or Copper Ant-blue (Gooding 1971), *A. illidgei* or Mangrove Ant-blue (Samson 1989) (Fig. 3) and *A. myrmecophila* or Small Ant-blue (New and Britton 1997). All develop within ant nests.



Figs 3,4. Mangrove Ant-blue, *Acrodipsas illidgei*: (3) adult male; (4) mature larva with *Crematogaster* sp. (*laeviceps* group) ants.

First instar larvae of the latter two species are carried into nests of their host ants, *Crematogaster* sp. (*laeviceps* group) (Fig. 4) and *Papyrius* sp. (*nitidus* group) respectively, where they complete their development while feeding on immature ants.

The last genus of myrmecophages is *Liphyra* which contains only one species in Australia, *L. brassolis*, the Moth Butterfly. Larvae of *L. brassolis* have been known since the early 1900s to live inside nests of the Green Tree Ant, where they were presumed to be myrmecophagous, but this was not confirmed until photographic evidence was obtained by Johnson and Valentine (1986). The larvae are unlike any other Australian lycaenid, being lozenge-shaped with a leathery dorsal surface and a projecting rim that protects the legs and soft undersurface from ant attacks (Fig. 5). To feed, larvae grasp ant larvae and draw them under the protective rim (Fig. 6). When mature, the larval skin is not shed but instead is retained as a hard puparium that protects the vulnerable pupa inside (Fig. 7). This must be one of our most unusual butterflies. Finally, Figures 8 and 9 illustrate the similar myrmecophagous feeding behaviour of the former two species discussed, *A. wildei* (8) and *A. illidgei* (9).

References

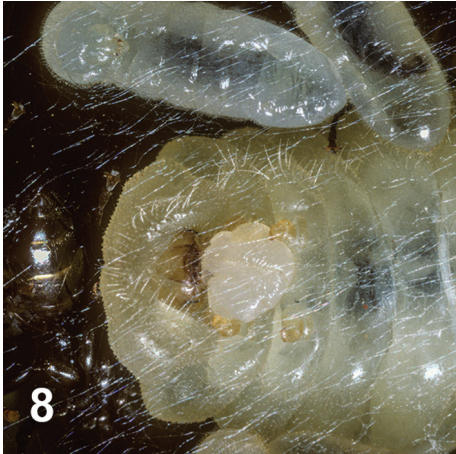
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Figs 5,6. Moth Butterfly, *Liphyra brassolis*: (5) mature larva with Green Tree Ants *Oecophylla smaragdina*; (6) mature larva eating a larva of a Green Tree Ant.



Fig. 7. Adult female *L. brassolis* recently emerged from the pupa and puparium.



Figs 8,9. Predation on ant brood by myrmecophagous lycaenid larvae: (8) White Oak-blue *A. wildei* larva eating a larva of *Polyrhachis queenslandica*; (9) Mangrove Ant-blue *A. illidgei* larva eating a pupa of *Crematogaster* sp. (*laeviceps* group).