

Butterflies deceive ants using chemical strategies

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Photo of a 4th instar larvae of *Arhopala zylta* and *Crematogaster* ant workers on a *Macaranga beccariana* tree. Credit: Yoko Inui, Lambir Hills National Park, Malaysia

Oakblue butterflies may use a variety of chemical strategies to deceive ants and avoid their attack, according to a study published April 8, 2015 in the open-access journal *PLOS ONE* by Yoko Inui from Osaka Kyoiku University, Japan and colleagues.

Certain plants have a mutualistic association with ants and are generally well-protected from herbivore attacks by the ant. However, larvae of Oakblue butterflies survive and develop on specific plant, *Macaranga*, or ant-plant species (the host), without being attacked by the ants living on the plant (known as plant-ant species). The authors of this study hypothesized that the butterfly larvae may chemically mimic or camouflage themselves and be accepted by the plant-ants on their host plant, and therefore would not be accepted by other plant-ant species living on [plants](#) that are not their normal host species.

To understand this process, the scientists collected butterfly larvae for three *Arhopala* species in Malaysia and then analyzed the plant-ant species behavioral and chemical responses to the experimental introduction of butterfly larvae, as well as larval dummies treated with cuticular hydrocarbon extract, to the leaves of *Macaranga* species. Cuticular hydrocarbons are chemicals that play an important role in insect communication.

The experiments revealed that although the responses of the plant-ants to the [butterfly larvae](#) varied considerably depending on the butterfly

species, attacks by plant-ant [species](#) on the normal plant host were infrequent. Chemically speaking, however, *A. dajagaka* matched well the host plant-ants, *A. amphimuta* did not match, and unexpectedly, *A. zylda* lacked hydrocarbons. Behaviorally, the larvae and dummies coated with cuticular chemicals of *A. dajagaka* were well attended by host and non-host plant-ants, *A. amphimuta* were often attacked by non-[host plant](#)-ants, and *A. zylda* were ignored by all [ants](#). The study authors suggest that variations exist in the chemical strategies used by the gossamer-winged butterflies that allow them to avoid ant attack and be accepted by the plant-ant colonies.

More information: Inui Y, Shimizu-kaya U, Okubo T, Yamsaki E, Itioka T (2015) Various Chemical Strategies to Deceive Ants in Three Arhopala Species (Lepidoptera: Lycaenidae) Exploiting Macaranga Myrmecophytes. *PLOS ONE* 10(4): e0120652. [DOI: 10.1371/journal.pone.0120652](#)

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