

Prepona butterflies (Nymphalidae) and *Hoplopyga* beetles (Scarabaeidae) on the same food source during the Neotropical dry season— a case of commensalism?

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Resumen: Existe una asociación comensalista entre un lepidóptero, *Prepona laertes* (Hbn) (Nymphalidae, Charaxinae) y una especie de coleóptero, *Hoplopyga* (= *Gymnetis*) *liturata* Olivier (Scarabaeidae, Cetoniinae) en el Parque Nacional Santa Rosa, Costa Rica. El coleóptero perfora el tallo semileñoso de la enredadera *Gouania polygama* Urban (Rhamnaceae) y la exudación resultante es aprovechada tanto por el coleóptero como por el lepidóptero, simultáneamente.

The statement of Gilbert (1973) that little is known about adult feeding alternatives of most lepidopterans is still valid. According to Jirón and Sancho de Barquero (1983) before 1980 only Young (1972) and DeVries (1978) have published some natural history data from Costa Rica on the brightly coloured *Prepona* butterflies (Nymphalidae, Charaxinae). Since then DeVries (1983) reported that all known species of *Prepona* in Costa Rica are forest dwellers that spend much of their time in the canopy when not feeding on sugar-rich juices of fallen overripe fruits, sap flows or animal carcasses. While on the ground *Prepona* spp. are rather difficult to observe because of the dead leaf mimic colorations on the ventral side of the wings, which are folded closed over their bodies when feeding.

Our observations were carried out on March 10-16, 1984, during the later part of the rain-free dry season (December through April), in the nearly evergreen forest, here called "bosque siempre verde" (Janzen, 1983) in the north-eastern part of the National Park of Santa

Rosa, Guanacaste Province, Costa Rica. This area is in a somewhat disturbed tropical premontane moist forest (Tosi, 1969). To distinguish different individuals of *P. laertes* (Hbn.)*, 105 specimens were caught in traps (baited with crushed bananas) and marked with numbers on the ventral side of the hindwings (using marking pens) before they were released.

Observations on what we interpreted as territorial defence behaviour and/or intraspecific interference competition because of food stress conditions during the dry season, were frequently made. We observed *P. laertes*, *P. antimachegulina* (Hbn.), and closely related *Archaeoprepona* (= *Prepona*) *amphimachus amphiktion* Fruhstorfer and *A. demophoon gulina* Fruhstorfer perching "on guard" on tree trunks and on leaves in light gaps of the forest and frequently chasing each other.

A most interesting observation on the feeding behaviour of *P. laertes* was made at two separate sites, approximately 100 meters apart, on two different occasions. On April 15, between 8:00 - 12:00 a.m., four individuals of the beetle *Hoplopyga* (= *Gymnetis*) *liturata* (Olivier) (Scarabaeidae, Cetoniinae) (Fig. 1) and various numbers of *P. laertes* were observed feeding simultaneously on the same energy

* In the National Park of Santa Rosa, Guanacaste Province, Costa Rica, identified as subspecies *Prepona laertes octavia* Fruhstorfer (DeVries 1983).

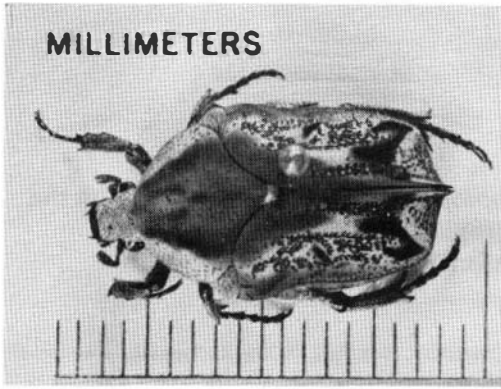


Fig. 1. *Hoplopyga* (= *Gymnetis*) *liturata* (Olivier) (Scarabaeidae, Cetoniinae). Specimen from Costa Rica, Santa Rosa National Park, Guanacaste Province, March 1984.

resource, a 1-2 mm long wound in the stem of the semiwoody vine *Gouania polygama* Urban (Rhamnaceae) (Janzen and Liesner, 1980). The feeding *H. liturata* did not show any indication of being disturbed by the visiting lepidopterans. The observed species of *Haplopyga* (Tristán, 1897) is very common in both the low and highlands in Costa Rica. At least two species of the genus have been seen associated with different plants; feeding on fallen fruits (D. Janzen, 1984 pers. comm.), causing wounds in stems and sapping the outcoming flows (Ballou, 1937; I. Chacón, 1984 pers. comm.). We found that the vine was exuding a foamy sap from the wounds in the bark. By chewing open a thin layer of the bark in the vine, *H. liturata* provided an available carbohydrate source for *P. laertes* and presumably for other charaxine nymphalids as well; *P. antimache gulina* was also seen on the same feeding source. The height of the observed feeding wounds in the vine varied between 2-6 meters above the ground.

The previous day, one individual of *liturata* and one *P. laertes* were simultaneously feeding at the same sap flow. The beetle did not move from the sap flow during the whole morning, from 8:00 till 12:00 a.m., in spite of the presence of various lepidopterans. Obviously the beetle was not disturbed by the other visitors. Observed *P. laertes* at the latter feeding site practised what we think was interference competition during their visit on the same energy resource. Between 8:00 and 9:05 a.m., three marked individuals of *P. laertes* spent

between 6-35 minutes each on the same food source, before being chased off by another individual of the same species. At both observation sites, *P. laertes* was seen actively tapping the outcoming sap with its long, unrolled light red proboscis. According to D. Janzen (1984 pers. comm.) *Prepona* spp. have even been observed injecting their proboscis directly into the anus *H. liturata*. Through this rather exceptional behaviour, the butterflies apparently collect nutrients from the excrement of the beetle.

In conclusion we can say that the observed interactions between the phytophagous *P. laertes* and *H. liturata* on the same tree sap flow suggest the presence of commensalism in which, by definition (Odum, 1959) the former species apparently benefits and the latter seems to be unaffected.

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