The measurements of the different structures of ten individuals are as follows: length, 1.40-1.72 mm., width of head, .408-.462 mm., length of antennal segments, III, .598-.653 mm., IV, .544-.612 mm., V, 503-.586 mm., VI, base, .122-.136 mm., unguis, .843-.966 mm., length of cornicles, .408-.499 mm., third segment of the antenna with 14-23 sensoria, fourth segment with 0-3 sensoria.

Records: *Crataegus uniflora*, Gainesville, Feb. 15, 1929 (F 470-29).

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**INSECT PARASITES OF CITRUS IN CENTRAL AMERICA**

By Marston Bates


(Continued from Vol. XVII, No. 2, p. 32)

**LEPIDOPTERA**

*Papilio thoas* L. mm. (Papilionidae)

Both this species and *cresphontes* are common on the Caribbean coast, and larvae were frequently found on Citrus.

*Papilio anchisiades* Esp. (Papilionidae)

This species belongs to a large group of tropical American Papilios whose larvae, as far as known, are all Citrus feeders. The life-history of *anchisiades* has been described several times; the larvae look much like our orange dogs, but live in large colonies of forty or fifty caterpillars, capable of defoliating a small tree in a very short time. The insect is generally distributed in the region.

*Eantis pallida* K'elder (Hesperidae)

Like other Hesperidias, the larva of this species is a leaf-roller. It was found in all parts of the region, but never commonly. Another species of the genus (*Eantis thraso*) has been recorded as feeding on Citrus in Porto Rico (Walcott, 1923).

*Ecpantheria icasia* Cramer (Arctiidae)

Larvae of this species were several times found on Citrus at Tela, Honduras. As other species of the genus are known to be general feeders, it is likely that *icasia* also has a wide range of hosts.

**DIPTERA**

*Anastrepha ludens* Loew (Trypetidae)

Fruit flies were my primary study during the three years that I spent in Honduras and Guatemala; but of the five species of *Anastrepha* bred from cultivated fruits, only *ludens* was found
in Citrus. It occurs on the Pacific slope of Guatemala from sea level to five thousand feet, but apparently does not extend above the line of occasional frosts. On the Atlantic side it was found down the Motagua river valley as far as Zacapa (600 ft.), but never on the Caribbean coast, although a special search was made for it there. It is difficult to understand this limit of distribution, unless it be due to some environmental factor, as there is no natural barrier between Zacapa and the coast. The Zacapa region is typically xerophytic, and the entire Pacific coast is characterized by a pronounced dry season, even though in some places where ludens occurs the annual rainfall may be much higher (200 inches) than on the Caribbean coast (150 inches) where it does not occur. A careful study of the southern limits of the insect would probably be instructive.

Ludens is typically a pest of the sour orange, occurring rather rarely in sweet oranges. It is found also in matasanos (Cassimiroa edulis, Rutaceae, indigenous), and in mangos (Anacardiaceae, introduced). It was not found in other Anacardiaceous fruits, typically the hosts of a quite different Anastrepha, apparently as yet undescribed.

The Federal Horticultural Board has recently published a report of fruit fly surveys on the Caribbean coast of Central America, made by Dr. Mann and Mr. Kostal (Anon., 1926). It is notable that no larvae of Anastrepha were found in Citrus fruits, although adults of various species were collected, and larvae were found in other kinds of fruit. Larvae of Euexesia sp. (Ortalidae) were found in oranges, but as these have previously been found only in injured fruit, further investigation must be made before these flies can be listed as pests. We have 10 native species of Euexesia in Florida (Johnson, 1913, p. 82).

HYMENOPTERA

Solenopsis geminata Fab. (Formicidae)

These fierce little ants are widely distributed and always a nuisance, and there are a few references to them as enemies of Citrus in the literature. In widely varying environments in Central America (Tela, Honduras: low, very tropical; Antigua, Guatemala: high, somewhat arid, and temperate) they were the principal enemies of young Citrus trees. The nests were generally located at the base of the tree, and extensive sand-covered galleries were built up over the trunk, under which the tree would sometimes be completely girdled. Not satisfied with this, the ants would chew off the terminal shoots, severely check-
ing growth. Tower, 1911, has described this habit of *Solenopsis* in Porto Rico.

**Atta spp.** (Formicidae)

The leaf-cutting ants, wherever they occur, cause severe damage to Citrus, the trees of this genus being among the plants most subject to attack. Three species of economic importance were found in Central America: *Atta mexicana* Smith (Salvador), *Atta sexdens* Linn. (highlands of Guatemala, det. Mann), and *Atta cephalotes* Linn. (Honduras, Mann, 1922: "comparatively little damage to Citrus").

**Trigona spp.** (Meliponidae)

Small black stingless bees of the genus *Trigona* are perhaps the most striking pest of Citrus in the lowlands of Honduras. Two species are commonly involved: *Trigona amalthea* Oliv., and *Trigona silvestriana* Vachal (det. Schwarz). They are especially abundant on young trees, and seem to show a preference for grapefruit. They strip the bark from the main trunks of the trees and chew up the terminal leaflets, apparently in an effort to collect the sticky sap, probably for use in the construction of their nests.

I do not know of any record of these insects heretofore as pests of Citrus, although they have been frequently observed on bananas, where they cause scars along the ridges of the fruit, made in an effort to collect the latex. The list of plants subject to attack is, in fact, large, and their only common characteristic seems to be the possession of a sticky sap or latex. In Tela the bees were especially damaging to species of *Garcinia*, to breadfruit, and to bananas. They were frequently observed on forest trees that had been injured, so that the sap was flowing.

**LITERATURE CITED**


