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Some Notes on Empoasca flavescens Fabricius (Homoptera, Cicadellidae)

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SOME NOTES ON *EMPOASCA FLAVESCENS* FABRICIUS

(*HOMOPTERA, CICADELLIDAE*)

R. L. WEBSTER

In the fall of 1910 my attention was called to the abundance of this leaf-hopper on certain trees of *Ptelea trifoliata* on the Iowa State College campus at Ames. Some notes on the insect were made that fall and also in the two years following. Practically nothing has been known concerning the life history of this insect; hence this paper. The notes are from the files of the entomological section of the Iowa Agricultural Experiment Station.

In order to obtain an authoritative identification, adults were submitted to Professor C. P. Gillette, Colorado Agricultural College, who kindly determined these as *Empoasca flavescens* Fabr.

LIFE HISTORY

Hibernation. — This insect evidently hibernates as the adult, as indicated by Forbes (1900). October 29, 1910, I found adults among dead leaves around trees that previously were badly infested. Adults were not found in the early spring at Ames; Forbes, however, records them as early as April 20, in Illinois. Hawley (1918) reports adults in May in New York state, indicating hibernation.

April 21, 1911, a twig of *Ptelea trifoliata* from a tree badly infested the year before, was placed in water in the insectary to determine whether nymphs might hatch from possible eggs in the bark. Neither eggs nor nymphs were found. It was thought that eggs may be placed in the bark, as with *Empoa rosae* on apple.

Generations. — The earliest date I have seen the insect on the hop-tree in spring is June 5. Young nymphs and a few adults were found to be rather common on that date, but no eggs. During the summer eggs were found commonly, deposited in the tissue of the leaves. July 10, all stages were present, eggs, nymphs, and adults. Considerable injury was evident. An observation July 25, 1911, seems to indicate that a new generation was then coming on. The species was present mostly in the egg

stage, although an occasional adult and a few young nymphs were seen. Again September 7, 1910, all stages were present. They were abundant throughout September and on October 1 most of the insects were in the older nymphal stages. By October 24, practically only the adults were present.

These notes were taken at random and no very definite statement can be made regarding the number of generations. How-

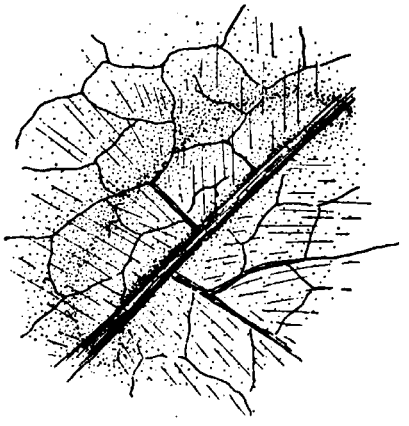

Fig. 1. Surface of leaf, showing egg beneath.

ever, there are at least two generations in the latitude of central Iowa. Hawley (1918) reports that in New York state two generations occur, with a probable third generation in dry seasons.

The egg. — The eggs were found in the leaves of the hop-tree and their location was readily observed on the lower surface, apparently having been deposited from that side. The outline of the egg, as seen from the exterior, resembles that of the oyster shell scale, *Lepidosaphes ulmi* L. The eggs themselves are elliptico-cylindrical; white in color. A single egg exposed from the

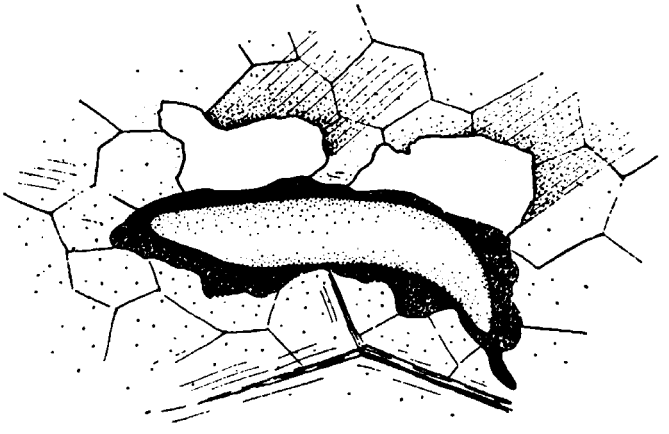

Fig. 2. Leaf tissue cut away exposing the egg.

pouch measured .83 mm. by .18 mm. Ten egg pouches averaged .93 mm. by .27 mm.

Nymphal stages. — No descriptions were made of the nymphal stages, although these were measured. The following lengths were taken: Stage I, 1.13 mm.; II, 1.62 mm.; III, 1.98 mm.; IV, 2.4 mm.; V, 3.2 mm.

THE INJURY

The injury to the hop-trees consisted in the extraction of sap from the foliage. The upper surface of the leaves was irregularly mottled with many fine areas, paler in color than the rest of the leaf, indicating the necrosis of groups of cells within. There was no curling of the leaves as in the case of injury to apple foliage by *Empoasca mali.* The injury was similar to that caused by *Empoa rosae* to apple foliage. During every year for a period of eight years these leaf-hoppers were abundant on the hop-trees mentioned. By late summer they became so common that they would rise in veritable clouds when one passed by the infested trees.

FOOD PLANTS

Dr. Goding (1890) in describing *Empoasca birdii* (often considered as a variety of *flavescens*) found that species on apple, hop, walnut, beans and "weeds" in Illinois. Van Duzee (1917) lists *birdii* as a distinct species. Forbes (1900) recorded *Empoasca flavescens* from sugar beet. Hawley (1918) collected specimens on plum in New York state. The present record on hop-tree (*Ptelea trifoliata*) is therefore new. At Ames the leaf-hoppers have been literally swarming over the foliage of several of these trees during the summer and fall. A hop-tree at La-Fayette, Indiana, was found well infested with these leaf-hoppers, August 12, 1917, by the writer.

AN EGG PARASITE

In July, 1911, at Ames many parasitized eggs were found. These appeared darker in color than the others. Occasionally the form of a parasitic pupa was determined within an egg pouch and many leaf-hopper eggs had tiny circular holes in them, indicating that a parasite had already emerged. Some of these eggs were cut from the leaves and placed in vials to rear the parasites. Adults emerged during July and these were sent to A. A. Girault, for determination. Mr. Girault identified the species as *Anagrus spiritus* Girault. This species has also been reared from the San

Jose scale, *Aspidiotus perniciosus*, Comstock. Similar parasitized eggs were found by the writer at LaFayette, Indiana.

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