

of their time on the cattle it is apparent that with the normal range of movement of these flies, there is sufficient time and opportunity for them to come in contact with the small reservoir of insecticide, hence providing control.

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A Flatid Planthopper, *Metcalfa pruinosa*¹

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ABSTRACT

Observations on the life history of a flatid planthopper, *Metcalfa pruinosa* (Say), were made in the Lower Rio Grande Valley of Texas. Photographs of various stages are included. Eggs were found to hatch during March. Adults were first observed during May. Only one generation each year was found from 1956 through 1960. A dryinid parasite, *Psilodryinus typhlocybae* (Ashmead), was observed throughout this area.

A flatid planthopper, *Metcalfa pruinosa* (Say), has been observed on citrus for several years in the Lower Rio Grande Valley area, but its economic importance has been questionable for some time. Relative abundance of the insect was observed each year and chemical control was applied during years of greatest infestations in only a few cases. Investigations were begun in 1956 to study the life history for the purpose of developing efficient control measures for the insect.

Thomas Say (1830) originally described the species as *Flata pruinosa* from the United States. A comprehensive review of literature relating to this planthopper has been reported by Metcalf (1957). The insect has been reported from New York to Texas and Arizona; its range also includes several foreign countries. Most reports on the species are brief notes relating to host plants, ecology, or abundance.

Information on control has been reported by a few authors. Walden (1922) found fewer individuals the following year after pruning grape vines back to one to two buds possibly owing to the destruction of the eggs. Wene (1950) reported good chemical control with 1.0% parathion dust or with a spray or dust of tetraethyl pyrophosphate.

Published reports were in the form of brief notes on the life history or the relation to other host plants. Howard (1903) reported that eggs were laid in a continuous raised slit in small sassafras twigs. Overwintering eggs hatched in May and nymphal development required three molts. The dirty yellow eggs were laid in September on the side and end to end. Walden (1922) reported the insect laid its eggs in long slits just under the bark of twigs in late summer or early fall.

LIFE HISTORY.—This planthopper overwinters in the egg stage in the area of Weslaco, Texas. Eggs were found in the bark of dead citrus twigs during January 1959. No particular oviposition pattern was evident; the eggs were

found scattered singly in the bark. Measurement of 10 eggs averaged 0.80 mm. long by 0.38 mm. wide; with a range of 0.84 to 0.40 mm. Eggs began to hatch on March 12, 1959, and on March 23, 1960. A longer period of colder weather during the first 3 months of the year may have delayed the hatching during 1960.

First adults in the field were found 69 days after the hatching date during 1960. Dead twigs were removed from trees and placed in small cages covered with 52- \times 52-mesh plastic screen. After hatching from the egg, nymphs failed to complete their development on 4- to 6-inch seedling grapefruit; however, a few adults developed in cages which contained seedling grapefruit 18 to 24 inches in height. Various stages of *M. pruinosa* are shown in figure 1.

The longevity of the adult stage has not been determined under local conditions although Wene (1950) reported the adult activity extending over a period of approximately 10 days. Factors influencing the duration of adult life may include the following: injury while being collected, confinement to cages, or unacceptable host plant growth in cages during confinement. Adults were observed in field trees during July and August 1957-1960, inclusive. Greater numbers were found during June than in the later months. During this period, adults were collected from the same groves week after week without the presence of nymphs. Such observations would indicate that locally adult activity may extend over a period of at least 2 months in this area. Only one generation was observed each year.

HOSTS.—Various hosts plants found in this area are reported because of their possible relation as a source of supply of the insect to infest citrus. It has been found more abundantly on grapefruit than on orange. Preference for grapefruit has been consistent where orange and grapefruit trees were growing adjacent to one another. Hackberry (*Celtis laevigata*) and anaqua (*Ehretia anacua*) trees (apparently the seeds are spread by birds) found beneath citrus served as hosts. One particular grove had an unusual number of these seedlings infested with a large number of planthoppers. Following the removal of these seedlings, the grove had very few planthoppers the following 2 years. Removal of hosts plants was considered

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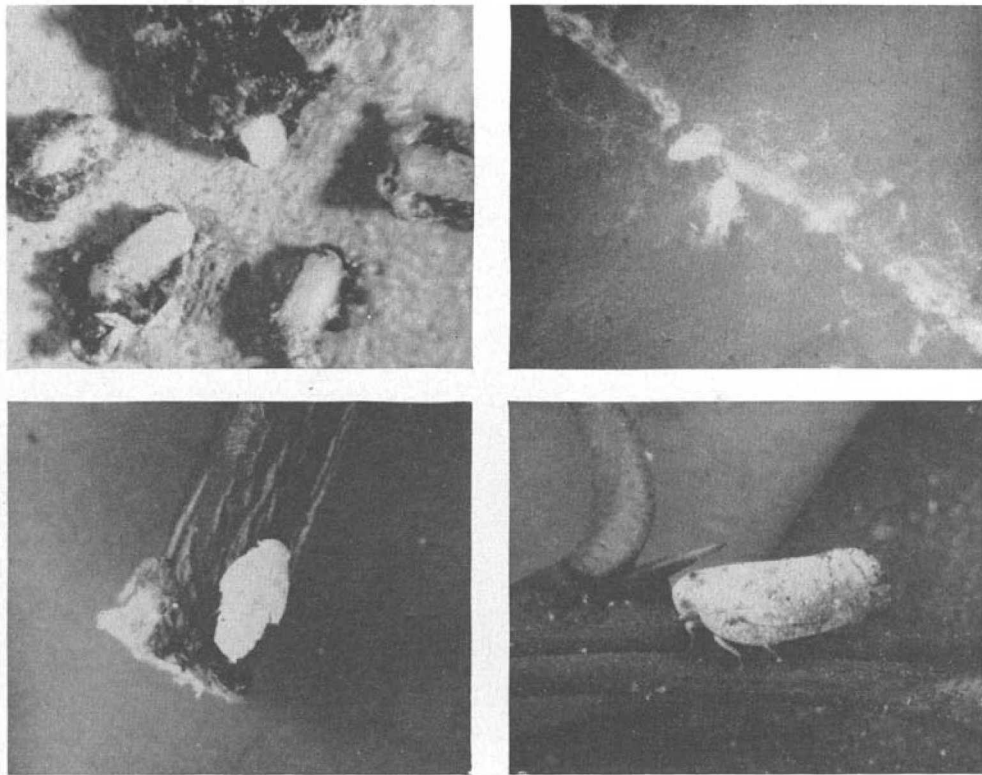


FIG. 1.—Various stages of *Metcalfa pruinosa*. Upper left—eggs. Upper right—young nymphs. Lower left—last nymphal instar. Lower right—adult.

a good cultural practice. Planthoppers were also found developing on purple nightshade growing beneath citrus trees.

Planthoppers were found in the nymphal stages on the following minor host plants: avocado (*Persea americana*), Rio Grande ash (*Fraxinus berlandierana*), fig (*Ficus carica*), pomegranate (*Punica granatum*), guava (*Psidium guajava*), papaya (*Carica papaya*), orchid tree (*Bauhinia variegata*), athel (*Tamarix articulata*), hibiscus (*Hibiscus cannabius*), jasmine (*Jasminum grandiflorum*), fiddle leaf fig (*Ficus lyrta*), ginger (*Albinia speciosa*), bougainvillea (*Bougainvillea spectabilis*), juniper (*Juniperus chinensis*), alamanda (*Allamanda cathartica*), Pyracantha (*Pyracantha crenulata*), Easter lily (*Lilium longiflorum*), corona vine (*Antigonon leptopus*), and devil's ivy (*Scindapus quereus*).

During these investigations a dryinid parasite, *Psilodryinus typhlocybae* (Ashmead), was found in almost every grove. These parasites developed to the prepupal stage during May or shortly thereafter and remained in this stage until the following December-January when pupation took place. In the laboratory, the larva though inactive for a considerable number of months, was found to move at times in the cocoon which was formed beneath the skin of the host. Male *typhlocybae* were smaller than the females. It appeared that the male either attacked younger nymphs or retarded planthopper development. Adults emerged during late December and in January. Figure 2 shows two female and one male *typhlocybae* prepupal larvae. It is not known whether there is a spring

generation of the parasite prior to the generation with the long-cycle larvae.

Psilodryinus typhlocybae was originally described as *Labeo typhlocybae* by Ashmead in 1893 from specimens reared July 23, 1883, from a homopteron on *Celtis* and elm by C. V. Riley at Washington, D. C. Swezey (1903) found the larva encased in a felt-like sack protruding from a spiracle at the base of the abdomen of its host, and as the latter matured, the parasite was partially covered by the wing pads. The larva formed a cocoon beneath the remains of the host on the leaf. Also, it was indicated that in natural situations among the fallen leaves, the larva transformed to a pupa the following spring and the adult would emerge the latter part of the spring or early summer. These observations were reported for the parasite on another flatid planthopper, *Anormonis septentrionalis* (Spin.), in the northern part of the United States.

VIRUS TRANSMISSION TESTS.—Yamada & Sawamura (1953) reported a flatid planthopper, *Geisha distinctissima* (Walker), as a vector of a virus disease of satsuma orange. These authors also reported that *distinctissima* laid its eggs in dead twigs and advised the removal of twigs in order to reduce the population.

The possibility that *M. pruinosa* might serve as a vector of tristeza virus disease was considered during the course of this investigation during 1958. Infected Mexican lime seedlings (severe strain of tristeza virus as reported by Olson, 1956) were placed in 2- × 2- × 3-foot cages covered with 52- × 52-mesh plastic screen. Adult *pruinosa* were collected in 32-mm. diameter lusteroid tubes from



FIG. 2.—Preupal larvae of *Psilodryinus typhlocybae*.

field trees. Each cage received 30 adults on June 13. Most of the adults were dead the following day when noninfected lime seedlings were placed in the cages, probably because of injury while being collected. Subsequently, 30 adults were placed in each cage about every 5 days on four subsequent dates. No positive transmission of the disease was found in six of the cages which held infected plants or in the two cages with noninfected plants. The difficulty experienced in handling the adults from the field suggested the possible use of nymphs instead of adults. Leaves and twigs infested with the planthoppers were pruned and placed in 1-gallon cylindrical cardboard food containers for transporting nymphs to the cages. Plants in these cages also failed to show symptoms of the virus disease. Although no positive transmission was obtained in these tests further tests appear desirable using improved techniques for handling the insect.

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