night nature really cracks down, the cold mass has completely crowded out the warm air, the temperatures in nearly all sections of Central and South Florida are about the same.

In considering the practicability of raising in Florida some of the more tender tropical fruits, it may be well to compare Florida to the equator. The practical difference between the two sections means that Floridians have to fire on an average of about twice a year to save the most of these fruits. Californians have to fire much more frequently to save their oranges. A very few of the choice fruits, such as the Mangosteen and the Durian are too tender, as they shed their leaves at about 60° and we have too many nights that reach that temperature, or lower, every winter. Growing some of these more tender trees in dooryards is a difficult proposition as the owner would not want to nurse his tree a couple of nights or occasionally four or five nights a year to protect it, whereas, as a commercial crop, where they are planted in orchards, it is not too difficult nor too expensive compared with the high value of the fruit produced.

SOME OBSERVATIONS ON VARIOUS INSECTS FOUND ON FRUIT AND ORNAMENTALS IN THE MIAMI AREA

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While the whole of Florida is generally described as “a low-lying sub-tropical peninsula” (Norton), southern Florida “is distinct from the rest of the (southeastern) region in climate and vegetation” (Lindgren, et al). This south Florida region, exemplified by the Miami area, abounds in a wide variety of various fruit and ornamental plants not commonly found elsewhere in the United States. The different insect forms common to these various plants have not been extensively studied in the area, so the following observations and reports on various forms are of interest as preliminary recordings incidental to more extensive and complete studies.

Of the different fruits common in this area, avocados, mangos, guavas and papayas have had some appreciable commercial production. Other fruits such as lychees, barbados cherries and sapotes have been produced largely as yard or specimen trees with minor exceptions. Accordingly, it is only natural that the common insect pests of the first-named group of fruit trees have been reported rather adequately, while those of the last-named group remain less commonly recognized.

INSECTS ON FRUIT-BEARING PLANTS

On avocado trees, an insect of considerable local interest is the Avocado Tree Girdler, Heilipus squamosis Lec. (Wolfenbarger). Other species of this genus attack avocado seeds in various tropical countries, according to Barber. However, the larvae of this beetle develop as typical wood borers in the cambium of the trunk of the trees near the soil line. The adult beetles feed upon terminal twig growth, and to a lesser extent upon young foliage and fruit. (See Fig. 1).

![Fig. 1.—The Avocado Twig Girdler, Heilipus squamosis Lec. upper, the adult beetle; center, egg within an avocado twig; lower, feeding scars of adult beetle on avocado twig.](image_url)
eggs were almost or completely buried in the surface of the twig within small areas gouged out by the adult beetle. The first eggs from this group hatched on October 12, and the remainder were hatched by noon October 13. In another cage, eggs deposited on October 3 hatched on October 17. Thus the incubation period for these eggs varied from 9 to 14 days at normal laboratory temperatures.

Development of the larvae of this insect has not been observed in detail. However, the length of time required from egg to adult emergence is indicated from the following observations. Three adult beetles collected May 26 were caged with a young avocado plant. Light feeding and oviposition scars were observed intermittently until June 7, after which date the beetles died. The caged plant was retained and watered until October 7, when it appeared to be completely dead. On November 10, a single adult beetle was observed within the cage with complete bright scales characteristic of new emergence. This is an interval of 194 days, or slightly more than six months.

Similarly, a young larva taken from an avocado tree on October 2 was placed in a portion of an avocado twig about one-half inch in diameter. Extensive feeding within the twig required periodic replacement of fresh avocado twig cuttings, until on February 4 an adult beetle emerged. This interval from a young larva to adult emergence is 125 days. Thus it would seem from these experiences that this insect normally completes two broods per year.

Mango trees are commonly attacked by several different insect pests. During the past two seasons our very young seedlings and some of the first flush of growth from budded stock have been very heavily infested by aphids, identified by Dr. A. N. Tissot, of the University of Florida, as Aphis gossypii Glover. In each case, the infestation developed very rapidly from winged migrants, but were confined to the very succulent new plant growth. Under these circumstances, severe damage was avoided only by prompt application of an aphicide. Excellent control, near 100%, was obtained with a parathion spray, using 1 lb. of 15% wettable powder per 100 gallons of water, with no phytotoxicity evident. With the spray applied at 10:00 a.m., live aphids were hard to find by 4:00 p.m. the same day.

Late in June, 1951, some of our mango nursery stock suffered from a heavy infestation of leaf-hoppers. Their feeding on the succulent new flush of growth produced a conspicuous injury, characterized by a severe wrinkling and stunting of the foliage. These leaf-hoppers have been identified as Empoasca fabae Harris, the potato leafhopper, by Dr. R. H. Beamer, University of Kansas, with the observation that these specimens “are not quite typical.” This species has not previously been reported on mango according to Poos and Wheeler, and other available literature.

Various insects attack guava leaves and fruit, and usually require control procedures under commercial production of this fruit. One of the most injurious and persistent forms encountered in our area is a small lepidopteron leaf-tier, identified by Mr. J. F. Gates Clark, of the U. S. National Museum, as a species of the genus Strepsicrates. He notes that the specimens forwarded to him may “represent a tropical American species that has not previously been identified from Florida.” Wolcott reports S. smithiana Walker as common on the tender leaves of guava in Puerto Rico, where “the little green caterpillar . . . folds over and webs together with silk a portion of a leaf or several smaller leaves.” The feeding activities of these small caterpillars also cause irregular holes in the leaves, which become quite conspicuous as the leaves open out and become mature. Walker refers to an unidentified leaf roller which could well be this form, and indicates that in addition to leaf injury, this form may “contribute to excessive dropping of small fruit.” Our observations would support this suggestion.

Lychee trees at the University Experimental Farm have developed minor infestations of various insect forms. Light infestations of the tender leaves of guava in Puerto Rico, where “the little green caterpillar . . . folds over and webs together with silk a portion of a leaf or several smaller leaves.” The feeding activities of these small caterpillars also cause irregular holes in the leaves, which become quite conspicuous as the leaves open out and become mature. Walker refers to an unidentified leaf roller which could well be this form, and indicates that in addition to leaf injury, this form may “contribute to excessive dropping of small fruit.” Our observations would support this suggestion.

Lychee trees at the University Experimental Farm have developed minor infestations of various insect forms. Light infestations of an undetermined soft scale have been noted on a few trees, but have not required control procedures. An armored scale, determined by G. B. Merrill of the State Plant Board as the white peach scale, Pseudaulacaspis pentagona (Targ.), developed on young potted plants late this summer, and caused serious defoliation on the more heavily infested plants. It has been readily controlled with parathion.

Our most serious lychee pest has been a red spider mite, which developed in February of this year. This form caused a severe leafrussetting characteristic of the feeding injury
of this group. Specimens were submitted to Dr. A. Earl Pritchard of the University of California for identification. He reported that it was not the lychee mite *Paratetranychus hawaiiensis*, recently described by McGregor (1950), but appeared entirely distinct and quite similar to an un-named form found on *Melaleuca* trees.

Before these mites became serious enough to warrant general control procedures, a very small coccinellid predator appeared and rather quickly controlled them. Dr. E. A. Chapin of the U. S. National Museum identified these beetles as *Stethorus utilis* (Horn), a species previously reported as feeding on citrus aphids (Quayle).

On barbados cherry (*Malpighia glabra* L.) a caterpillar feeding within webbed leaves caused considerable injury last spring. The adult butterflies reared from these caterpillars were identified by W. D. Field of the U. S. National Museum as *Ephyriades brunnea floridensis* Bell and Comstock, a skipper of the sub family Pyrginae (Hesperiidae) not reported as an economic form in available entomological literature.

The eggs of this form are deposited singly on the leaves and twigs of the host plant. The young larva soon ties the edges of two or more leaves together, and continues its development within such protected areas. Pupation occurs within the folded-leaf area. The pupal stage requires one week, since adults emerged May 5 from pupae completed on April 29, and on August 14 from pupae completed on August 7.

This form has persisted thru-out the summer on our barbados cherry planting, but has not developed into any serious problem. A DDT spray (2 lbs. of 50% wettable per 100 gallons) markedly reduced the infestation, but it was re-established after about one month. The species is attacked by at least one parasite, as two specimens of an Ichneumonid wasp emerged from chrysalids of the butterfly. This parasite has been identified by Luella M. Walkley, of the U. S. National Museum, as *Trogomorpha trogiformis* (Cress.). She advises that this is the first host record for any species of the genus *Trogomorpha*.

A few of our barbados cherries have become infested with a soft scale identified by G. B. Merrill as *Pulvinaria urbicola* Ckll. He advises that this species has been taken from a number of different hosts along the east coast and the Keys. However, in our area, I have not observed this scale on any other plants, and apparently it has not spread to any other nearby hosts during the past year from this localized infestation. This form is quite striking in appearance, in this instance occurring almost exclusively on under-leaf surfaces and along smaller twigs. The ovisac is quite elongate and curved, with parallel sides and longitudinal ridges, and is conspicuously white colored. (Fig. 2).

A very common insect pest on Bougainvillea in the area is a leaf-tying caterpillar. This form caused extensive defoliation on a few plants at our Experimental Farm, and adult moths were reared from them. They have been identified by H. W. Capps of the U. S. National Museum as *Asciodes gordialis* Guen., of the family Pyraustidae. Altho Dodge and Rickett...
report this host plant free of insect pests, this species was previously reported by Grossbeck (1917) on Bougainvillea and on Pisonia aculeata, another subtropical plant of the same family. The insect has been controlled satisfactorily with DDT and other types of chlorinated hydrocarbon sprays.

Leaf specimens from a Geiger tree (Cordia sp.) in Miami had a heavy infestation of a blister mite, with the typical blister-like gall growth on the under surfaces. Specimens of the mites have been identified by Dr. H. H. Keifer of the California State Dept. of Agriculture as Eriophyes cordiae Cook. (Fig. 3).

Fig. 3.—Blister mite injury on leaf of Geiger tree.

At the suggestion of Mr. O. D. Link of the State Plant Board, small fruits of the “whitewood tree” (Schoepfia chrysophylloides) were collected and examined for larvae of a fruit fly. These fruits were readily found infested with the typical fruit fly larvae, and adult flies reared from them. Specimens submitted to Dr. Alan Stone of the U. S. National Museum were identified as Anastrepha interrupta, a species he described in 1942. It is known from Florida and Cuba, and host plants other than white wood are not known.

First puparia from these larvae were obtained on January 3, 1951, when a larva completed the transformation that morning. An adult female emerged from this puparium the morning of February 3, just 31 days later. Nine puparia formed January 5 yielded seven adult flies February 5 and 6, and 20 puparia completed January 6 produced 12 adults on February 7 and 8. Attempts to secure oviposition from these flies in cages on various hosts, including whitewood fruits, were not successful, altho the insects were maintained alive in the laboratory for nearly three weeks. Hence the duration of the egg and larval stages of this fruit fly remain unknown.

LITERATURE CITED

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AUTHOR’S ABSTRACT

Observations herein reported discuss the following fruit insects: on avocado, egg disposition habits, incubation and total life cycle of the avocado tree girdler, Heilpus squamosis Lec.; on mango, the occurrence of Aphis gossypii Glover, and Empoasca fabae Harris; on guava, a Steneisicaires leaf-tier; on lychee, the white peach scale Pseudaulacaspis pentagona (Targ.), and an unknown spider mite, with its associated predatism by the coccinellid Stethorus utilis (Horn); on barbados cherry, the skipper Ephyriades brunnea floridensis Bell and Comstock, with its parasitism by and first host record of the ichneumonid Trogomorpha trogiformis (Cress.), and the soft scale Pulvinaria urbicola Chcl. Insects on ornamentals discussed include, on bougainvillea, the pyraustid Asciodes gordialis Guen.; on Geiger tree, the mite Eriophyes cordiae Cook; on whitewood, the fruit fly Anastrepha interrupta Stone.