

The Trend of Avocado Pests and Their Control

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Until a few years ago, avocado insects were of no very great importance, aside from occasional limited infestations of well known native insects. With the increased planting of any crop, conditions are made more favorable for the development of insects already in the territory as well as to furnish an attractive field for such new insects as may happen to come in from the same plant in other sections or in other states. Under the latter category may be mentioned one species of mite, one or two scale insects, and one of the leaf-eating insects. Thus the evolution of the attacks of insects on the avocado in California is in line with what has happened in a similar way with many newly established plant industries. We may, therefore, expect that the general trend, with reference to insect attack on the avocado, will be to increase as the areas of contiguous plantings increase.

The Citrus Experiment Station is just now expecting to undertake a serious study of the insects attacking the avocado. Until rather recently the study of avocado insects was much less urgent, with the funds and force that have been at our disposal, than other insect problems. However, because of the developments of the past two or three years, we now appreciate, as you do, the importance of work on the problem.

The most conspicuous of the insects of the avocado that has come into prominence recently is the latania scale, ***Aspidiotus lataniae***. According to the report made by D. B. Mackie, of the State Department of Agriculture, this insect is the most widely distributed of all of the scale insects attacking the avocado. As it appears on the plant the latania scale looks very much like our common greedy scale and a microscopic study is often necessary to distinguish the two. Heavy infestations of this scale occur in widely separated localities and it appears to be increasing rapidly.

We have tried oil and other sorts of sprays on this scale but thus far the results on the scale have not been satisfactory and many of the sprays have injured the avocado tree. Fumigation with hydrocyanic acid, however, has proved to be quite satisfactory in controlling this scale. The only serious limit to this process of control that has, as yet, appeared is the large size of some of the trees and their closeness in some of the plantings. The latania scale is readily killed with an 18 cc. schedule, as is used in citrus fumigation. It succumbs more readily to fumigation than does the red scale on citrus.

Avocado-tree fumigation presents a number of points of difference as compared with citrus-tree fumigation. One of the most important of these differences is the greater

danger of breaking the branches as the tent is pulled over the tree. But this danger is largely overcome by the use of lighter tents and the greater appreciation of the necessity of exercising care in pulling the tent over an avocado tree as compared with a citrus tree.

The economics of avocado fumigation is also influenced by the smaller holdings. Small holdings make it possible for the owner to purchase a few tents and do the work with little assistance, and extended over a considerable period. To do home fumigation work it is desirable to use powdered calcium cyanide because of its ease and safety in handling and keeping. The required amount for each tree is measured by different sized cups and the powder is shaken on the ground through a perforated can suspended by a bamboo handle. To date satisfactory results have been obtained with the use of two ounces of powdered cyanide for each unit called for in the regular citrus fumigation schedule.

Since most of the other important scales attacking the avocado (such as the red, dictyospermum, and greedy) are armored scales, these, like the latania, will yield to fumigation better than to spray.

The avocado brown mite **Paratetranychus yothersii** is another new insect on the avocado in California. It is similar to the citrus red spider excepting that it is distinctly brown rather than red. It feeds on the upper side of the leaves and the first effect of feeding is a brown color along the midrib and larger veins, which color may finally extend over the entire leaf. It is controlled by dusting with finely divided sulphur.

The thrips, **Heliothrips haemorrhoidalis**, is the commonest of the species attacking the avocado. Very severe injury may be done by this insect although such injury is usually restricted to a few trees or a few plantings instead of occurring generally over a district.

At first the thrips feed largely on the leaves and later, after the fruit is about one-half grown, much damage is done to the fruit. Thrips have mouth parts fitted for rasping and sucking and the action of such mouth parts results in a gray scabbing of the fruit and leaves, which areas later become brown in color. From Mr. Palmer's experience at Carlsbad, the spray that has best controlled the thrips consists of 1 pint of nicotine and 1 to 2 pounds of casein spreader to 100 gallons of water. Usually two sprayings (at an interval of 2 or 3 weeks) are necessary because this spray does not kill the eggs.

The succulent avocado leaf attracts a number of leaf-feeding insects, the most important groups being represented by moths and beetles. Of the moths, the omnivorous looper, **Sabulodes caberate**, and the amorbia, **Amorbia essigana**, are very common in certain of the avocado sections. The larvae of these moths eat out portions of the leaf and in the case of the amorbia sometimes only the epidermis is eaten. The larvae fold a leaf over, or one leaf on another, and sew them together with strands of silk. They then feed between the leaves, which serve as a protection. A cocoon of loose silk is spun where the feeding has occurred and the pupa which later transforms to the moth develops in this position.

The larva of the amorbia is dark green and about one inch long when full grown. The larva of the looper is light brown and 1½ inches long. Legs occur on each end of the

body and when the ends are brought together in traveling the body forms a loop, hence the name for this group of moths. Pupation of this species also occurs between the leaves, the silken cocoon being larger and lighter in color than the amorbia.

Of the beetles the May beetle, **Serica** sp., and Fuller's rose beetle are the most common. In occasional years, May beetles appear in large numbers over a restricted area. Fuller's rose beetle occurs most abundantly in plantings where there is more or less vegetation, particularly bermuda grass.

Barium fluosilicate and cryolite dusted on the trees are probably the most desirable materials for all of the leaf-eating insects, whether they be beetles or the larvae of moths. Where the brown mite is present these materials may be combined with sulphur, used in the proportions of about 75 per cent sulphur. Where the mite is not a problem the cryolite or barium fluosilicate should be combined with talc, diatomaceous earth, or other insect carrier.