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Insects Which Attack the Avocado in Florida

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There are a number of insects which attack the avocado in Florida, and their presence in excessive numbers at times may cause considerable concern to growers of this particular fruit. Avocados grown more generally at the present time in Florida are varieties of the West Indian type, although varieties of the Guatemalan type are fast gaining in popularity among growers, due to the fact that they will stand a number of degrees lower temperatures than the West Indian varieties. Up to this time the Guatemalan varieties which are being propagated in nurseries and growing also in groves, have shown, that the same general type of insects which attack the West Indian varieties will adapt themselves to the Guatemalan varieties of avocados as well. It is interesting to note, that the important insects which may at times cause injury to the avocado in Florida, are different species from those which cause concern to the grower of citrus in Florida. Some of the insects which attack the avocado may have been introduced, while others may have already existed in Florida, and have adapted themselves to the avocado as a host.

Like most other fruits which have their particular scale insect pests, the avocado likewise has its particular destructive scale insects. What the San Jose scale is to the. Apple and pear, and the red and purple scale is to the orange and grapefruit, the Dictyospermum scale is to the avocado in Florida. To describe the scale briefly, it varies from light grayish-white to reddish or amber-brown, and is circular or slightly elongated, and is about the size of the red scale which attacks citrus.

The sections where this scale is especially destructive to the avocado is in groves situated on the keys and stretches of land lying between the ocean and bay inlets, along the southern coasts of Florida. The writer has found that the temperature runs more evenly and averages a number of degrees warmer throughout the year in these localities than on the mainland, which, perhaps, accounts for the abundance of the scale in those places. It is, however, often present in groves located on the mainland, doing damage, and is to be found in varying numbers in nearly every place where the avocado is growing in southern Florida. The scale is a pest in avocado nurseries, and especially finds protection where the trees are crowded together in rows and blocks. It has been found by the writer to infest both the West Indian and Guatemalan varieties of avocados.

Where this scale is present in an avocado grove it does not attack the fruit but confines its attacks to the twigs and branches. The twigs and branches attacked are gradually weakened and ultimately become of little use to the tree. Where this scale is present in numbers the branches infested soon become roughened and crack considerably

affording entrance places for various fungi.

This scale may be controlled in the bearing grove and nursery by spraying with oil emulsion at the rate of one part of oil emulsion to seventy parts water during the dormant season of the year. Care, however, should be taken in spraying with an oil emulsion where a "hard" or brakish water is employed to see that no separation takes place during spraying, as a great deal of the efficiency of the spray is lost in this way, and the free oil is liable to cause defoliation. Unfortunately in most sections where avocados are grown, the waters used for spraying purposes come from wells in limestone formation, and are, as a rule, "hard," and from surface wells along the ocean which are as a rule brackish. In spraying, the twigs and branches of the trees should be thoroughly covered.

Another pest of importance is the avocado red spider. On the approach of "dry weather in the fall of the year the avocado red spider becomes very active, and often gives great concern to the grower. Especially is this true where trees are more or less neglected. Usually the injury caused by red spiders shows rather suddenly in a grove, the owner usually realizing the damage when it is too late. It is of great importance that growers of the avocado should not wait until the trees are browned as if scorched by fire, but their presence on the green foliage should give sufficient concern to start spraying.

The red spider is to be found infesting a number of plants in Florida, among them is camphor, and has particularly adapted itself to the avocado. It may be distinguished somewhat from other red spiders which attack various other fruit trees in that it confines its attacks to the upper surface of the foliage entirely. The foliage attacked turns brown and drops prematurely, and frequently there is a heavy denudation as a result of their attacks. The writer has observed that where the red spiders are allowed to have their own way and cause premature defoliation, that the trees so attacked generally bear less fruit than if the red spiders were controlled.

To control the red spider the trees should be sprayed when they become noticeable on the green foliage, by spraying with lime sulphur at strength of 1-50. Subsequent applications will depend upon the judgment of the grower. He will spray as often as is necessary according to the weather conditions and the activities of the pests during the winter season, to keep his trees free of the spiders. Where the red spiders are numerous, usually two sprayings, at a three or four week interval during the dormant season should be sufficient to keep them under control.

A thrips which often attacks the avocado in the open in southern Florida is known as the greenhouse thrips because it attacks various plants under glass in the northern states. This thrips, which is dark brown in color, attacks the foliage of the avocado and is usually present on the trees at the time the red spiders are plentiful. When numerous they may also attack the fruit giving it an unsightly appearance. They work very rapidly on the foliage, and have been observed on a number of occasions to cause excessive defoliation to trees in a short length of time. Where this thrips is present at the time the red spiders are troublesome, they may be controlled by incorporating Black Leaf-40 into the lime sulphur at the rate of 1-900 parts of the diluted lime sulphur solution, or where present alone, may be sprayed with Black Leaf-40 at the rate of 1-900 with two to three pounds of fish oil soap added to the tank to cause the spray to spread more evenly over

the foliage.

Like citrus the avocado also possesses its particular white fly in Florida. It *is* somewhat smaller in size than the citrus white flies and possesses a yellow body with white wings. It is present in nearly every locality where avocados are growing in Florida, but evidently is likewise sensitive to varying changes of temperature as regards its activities and numerical numbers in groves and nurseries in different localities. It also prefers the localities where the trees are protected and the temperature runs quite evenly. The work of this white fly is similar to other white flies which attack citrus, in that it attacks the foliage and produces an abundance of honey dew in which the sooty mold develops on the leaves, fruit and branches.

By spraying with oil emulsion at the rate of 1-70 as is used against the Dictyospermum scale during the dormant season will help considerably to check the ravages of the white fly. In spraying for the white fly it is likewise important that no free oil separation occurs during spraying with oil emulsions. In the case of the white fly the sprays should be so directed as to reach the lower surface of the foliage.

A species of thrips which attacks the avocado during the blossoming period is a species similar to the thrips which attacks citrus in the bloom only it is somewhat lighter in color. The species is known to occur in Mexico and has recently been reported in this country. It is present in southern Florida where it lives on many species of plants during their blossoming periods. As soon as the avocado commences to bloom it appears in the groves. In attacking the bloom it deposits its eggs in great numbers in the spikelets and other parts of the stems supporting the bloom. The thrips often so severely attacks bloom in a grove as to seriously weaken the supporting stems which bear the fruits. Where injury is extensive it may possibly seriously interfere with the setting of the fruit in a grove, and which may be true where the bloom is weak.

Where this thrips is present and doing damage, the trees should be sprayed when the bloom is about one third out with Black Leaf-40 at the rate of 1-900 with from two to three pounds of soap, preferably fish oil soap, added to the tank to cause the spray to spread more evenly. Where red spiders are still present at this time of year the Black Leaf-40 may be incorporated in lime sulphur 1-50.

This in a popular way cites what important insects at the present time may be found in avocado groves in Florida. However, like all fruit industries in which new pests appear and cause concern to the fruit grower, as the avocado industry develops extensively other pests may possibly make their appearance and prove injurious.