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University of Arizona, College of Agriculture

THE CITRUS THRIPS

BY A. W. MORRILL
CONSULTING ENTOMOLOGIST, UNIVERSITY OF ARIZONA

The Citrus Thrips (*Scirtothrips citri Moul*) adult female enlarged 65 times.

Extension Service, E. P. Taylor, Director, Tucson, Arizona
Cooperative Extension Work in Agriculture and Home Economics, University of Arizona College of Agriculture and U. S. Department of Agriculture, Cooperating.

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THE CITRUS THRIPS

By A. W. Morrill, consulting entomologist.

The citrus thrips is an orange-yellow insect only about a thirtieth of an inch in length. It causes a characteristic scarring of citrus fruits resulting principally from attack when the fruits are very small. The most characteristic form consists in a ring surrounding the stem end of the fruit with irregular streaks running down from this ring. Irregular scars on the sides and blossom end are ordinarily present, but are not as characteristic as the ring mentioned. After the fruit is a few weeks old the feeding of the citrus thrips causes only a slight silvering of portions of the surface. The thrips also causes a characteristic thickening and crinkling of the citrus foliage which materially checks the growth. This injury is done when the leaves are very young and tender, beginning just as the buds are unfolded.

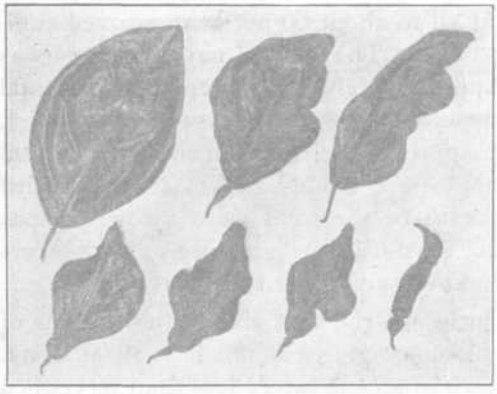

Fig. 1. Orange leaves showing different degrees of injury by the citrus thrips.

EXTENT OF DAMAGE

The scarring of fruit is usually considered the most important feature of damage by the citrus thrips to old bearing trees. Nursery stock and young planted trees, however, are frequently severely injured by the checking and stunting of their growth. In the Salt River Valley it is difficult successfully to fill in vacant spaces in old bearing groves, owing to this injury. Even where the thrips are not plentiful enough to cause a considerable amount of scarring of the fruit, the minute pests seem to concentrate on replanted trees and retard the growth to the extent of one-third or one-half, and frequently prevent any development thruout an entire season. In the San Joaquin district of California a few years ago nursery stock was severely damaged. An increase of fall growth of from one to

two feet resulted in one case from the control of the thrips by spraying. In the Salt River Valley the scarring of the leaves of the citrus nursery stock has not been very noticeable, in most years in fact being practically absent.

In order to furnish definite advice to the citrus growers of the Salt River Valley the writer made extensive examinations a few years ago of fruit in the different groves before picking, and later examinations at the packing houses after the fruit was graded In the field it was found that the injury to navel oranges ranged in different groves from none at all to about 60 per cent, scarred sufficiently to affect the market value. The crop of navel oranges was packed in three grades. Approximately 28 per cent of the total number of oranges, which would otherwise have graded as No. 1, were graded as No. 2, while approximately 25 per cent of the total number which would otherwise have graded as No. 2 were graded as No. 3 Less than 1 per cent of the total were thrown out as culls entirely, or partly, on account of thrips' scarring Thrips' scarring affected the grading of more than 50 per cent of the fruit.

The difference in the returns for the first and second grades of Salt River Valley oranges has amounted to as much as $2.00 a box The difference between the two grades is rarely less than 80 cents a box. In Tulare County a few years ago it was recorded that 30 per cent of the fruit was passed from first to second grade and 5 per cent passed as culls owing to thrips scarring. The difference in the market returns for the different grades of packed fruit does not include the entire loss in the selling value. An examination of the fruit in the packing house at Phoenix a few years ago showed that from 10 to 12 per cent of more or less noticeably scarred fruit was overlooked by the graders and passed as first grade. This reduces the value of the first grade. Practically speaking, therefore, there is not only a reduction in the amount of fruit which can be sold as first grade, but a reduction in the value of that which is passed as first. Contrary to general opinion, the pomelo or grapefruit is subject to much damage by the orange thrips. In one instance, to the knowledge of the writer, a grower lost one dollar per box for his entire crop, owing to the prevalence of thrips' scarring.

Aside from the few fruits which are misshapen and otherwise poorly developed, owing to excessive scarring of the orange thrips, the edible quality of the injured fruits is not affected by the scarring on the rinds. Nevertheless, citrus growers in affected districts are compelled to heed the demands of the markets or else suffer losses in the returns for their citrus crops, amounting as a rule to between

one and three dollars per tree. Fortunately most of this loss is preventable at a moderate expense.

CONTROL OF THE CITRUS THRIPS

Excessive injury by the citrus thrips may be prevented by spraying with lime-sulphur solution as shown by the results of the investigations of the U. S. Department of Agriculture, and also those conducted in Arizona by the writer. In one experiment with three applications of spray they secured 74.5 per cent of unscarred fruit as compared with only 14.5 per cent of unscarred fruit in an adjoining block of unsprayed trees. In a second experiment they secured

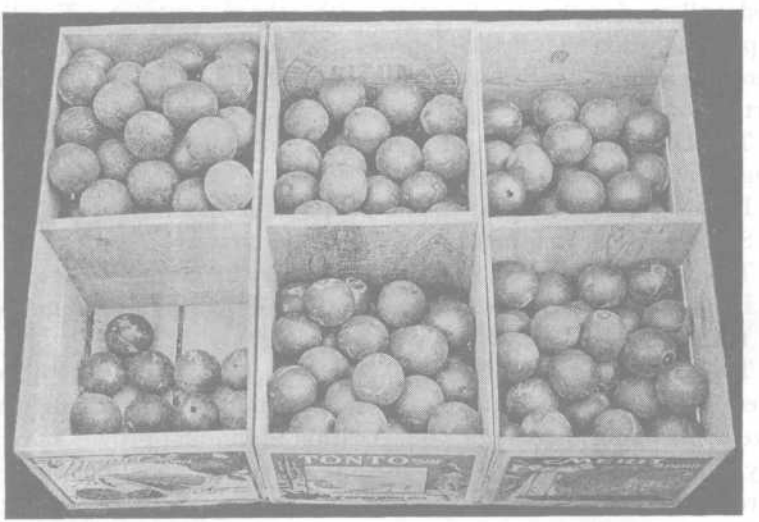

Fig. 2. Damage by the citrus thrips. One hundred navel oranges of first (Desert), second (Tonto) and third (Merit) grades Salt River Valley fruit. Thrips scarred fruit in lower sections of boxes. The scarred specimens (13%) which the graders failed to cull out of the first grade acted against top selling prices. Except for scarring 50% of second grade would have been as good as average firsts and 53% of thirds would have been as good as average seconds.

59 per cent unscarred fruit as compared with 29.3 per cent unscarred fruit on an adjoining unsprayed block. Similar results have been secured by the writer in the Salt River Valley. In one experiment two applications of spray to a block of navel oranges consisting of about one acre produced 80 per cent unscarred fruit as compared with 27 per cent unscarred for the entire grove outside of the sprayed block. It is evident from the foregoing results that from 30 to 60 per cent of the total crop of navel oranges in groves where the citrus thrips is very injurious can be saved from the losses

which result from the reduction in the grade of scarred fruit. Much better results may be expected in districts where regular spraying is adopted as a practice in all groves.

The writer in two experiments secured fully as good results with lime sulphur solution 36 degrees (Baume) diluted at the rate of one part to 85 parts of water as with lime-sulphur (1-85) and tobacco extract (40 per cent nicotine, 1-1800), the combination which was once used in California. This result is corroborated by the results secured during 1911 in Tulare County, according to information received by letter from Mr. J. R. Horton of the Bureau of Entomology In Arizona the diluted lime-sulphur spray normally costs about 45 cents per hundred gallons as compared with about $1.00 per hundred gallons for the combination with tobacco extract. For lime-sulphur solution testing 33 degrees, the usual strength of the commercial product, the dilution should be at the rate of 1 part to 78 parts of water.

The U. S. Department of Agriculture recommends four applications per season, timed as follows:

First. Just after most of the petals have fallen.

Second. Ten to fourteen days after the first.

Third. From three to four weeks after the second.

Fourth. In August or September (when thrips are numerous) for the protection of late growths of foliage.

The foregoing schedule is applicable to localities or groves where the insects are excessively abundant. In many cases which have come under the writer's observation individual groves show injury extensive enough to warrant one or two applications, but not more. Under such circumstances one or two applications may be as effective as three or four in groves with less favorable surroundings. Citrus fruit growers in affected sections should learn to recognize a threatening condition of infestation and arrange their schedule of spraying accordingly.

In spraying for the citrus thrips the most modern high power equipment is very desirable. Such an outfit will cost about $335.00 not including freight. Striking results have been secured with pressures of 140 to 160 pounds, but for the greatest economy and efficiency 200 to 250 pounds pressure is preferable. The outfit should include two 50-foot leads of hose, two 10-foot bamboo extension rods, and two driving spray nozzles. Angle nozzles or elbow joints for straight nozzles are necessary in order to reach both upper and lower surfaces of the leaves with the spray. Care should be used to avoid insufficient spraying. Thoro drenching, especially of

the outer portions of the trees, is essential for the best results. While it is frequently practicable for the owners of two or more orchards to cooperate in the ownership of a spraying outfit, it is inadvisable to plan to spray more than 40 acres with one outfit.

The amount of damage done by the citrus thrips varies greatly from year to year. An instance has been observed by the writer in the Salt River Valley where an orchard which suffered the most extensive damage one season was practically free from injury the season following. On the other hand orchards comparatively free from injury one season are sometimes severely attacked by the citrus thrips the next season. It is the writer's opinion that in a series of years it will pay for citrus fruit growers in the Salt River Valley to spray for the citrus thrips.