Red Scale On Citrus

use of DDT for control studied

G. E. Carman

DDT-kerosene sprays for control of red scale on citrus are not recommended beyond very limited field trials because of disadvantages and hazards associated with their use.

The most effective use of DDT has resulted when the compound is dissolved in kerosene with the aid of a mutual solvent. The residual DDT deposit apparently prevents scale crawlers from settling on the sprayed surfaces, or prevents them from developing.

DDT is not strictly stable, particularly when exposed to direct sunlight and certain other conditions of weathering, and adult scale not affected by the initial spray continue to produce crawlers for a period exceeding that during which the DDT residue remains toxic to crawlers. A second spray application is necessary approximately six weeks after the first spray to replenish the DDT deposit. The second application can be somewhat less complete than the first spray, generally requiring from two thirds to three fourths as much gallonage with particular emphasis on very complete outside coverage.

The degree of control obtained from DDT-kerosene spray schedules is not apparent shortly after treatment. A significant proportion of the scale population on the trees at the time of the initial spray, particularly the older stages, will remain on the various parts of the tree, ostensibly until they die of natural causes. A year or longer after treatment, counts made on the outer fruit, leaves, and green wood usually show less than 10% of the scale population that was present on these units of the trees prior to treatment.

Advantages

The use of a DDT-kerosene spray program eliminates some of the disadvantages associated with the use of conventional oil sprays. Postapplication fruit drop and leaf drop which have often characterized the oil-sprayed plots have not usually been a factor in the comparable DDT-kerosene-sprayed plots. Additionally, DDT-kerosene-sprayed fruits have been consistently higher in total soluble solids than oil-sprayed fruits.

DDT-kerosene spray schedules have given satisfactory results when started as early in the year as February and as late as November.

If the application is properly timed, the use of DDT-kerosene in the manner suggested as necessary for red scale control also will control such citrus pests as yellow scale, purple scale, black scale, citricola scale, citrus thrips and others. Good control of the citrus bud mite on lemons will be provided by applications made in the early spring or fall.

As yet there is no evidence that DDT residues on citrus fruit following this treatment will exceed established tolerances or that personnel making spray applications will be endangered if ordinary safety precautions are observed. Individual cases of hypersensitivity to either DDT or kerosene may be encountered and may necessitate shifting of affected individuals to other work.

Disadvantages

At the present time the minimum cost of materials for the DDT-kerosene two-spray schedule is more than twice the cost of materials for a single oil spray. Added to this is the labor cost for the second application. Hence materials and application will cost approximately two times as much as the cost of a single oil spray. The cost is further increased by the need for separate control of the citrus red mite—red spider—which consistently builds up to damaging levels in DDT-kerosene-treated groves.

On the basis of the necessarily limited observations made thus far, it is not possible to predict the extent to which cottony cushion scale or other economic pests might become serious problems if extensive use is made of DDT-kerosene for red scale control.

Tree Injury

Instances of acute tree injury have been encountered during the course of the experimental studies. The extent of the injury has not been prohibitive in most cases and the following of certain precautions will minimize the chances of tree injury. Established cases of chronic injury have been limited to the girdling of several small trees just below the surface of the soil. It is expected that other cases will be observed with certain combinations of circumstances which as yet are not fully understood.

In general, groves in the interior areas have been less susceptible to injury from DDT-kerosene sprays than groves in the coastal areas.

In closely planted groves the extra movement of equipment through the grove necessitated by the second spray and the subsequent red spider treatments may be objectionable. In similar groves or contour-planted groves in which it is impractical to dust or spray-dust, additional expense will be encountered in making spray applications for red spider.

Strict adherence to established procedures will minimize the danger of achieving inadequate red scale control or encountering damaging tree effects.

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of dry bark but in general the preliminary results are discouraging.

Scarification is also being used on an experimental basis.

Although certain trees have shown some response to severe pruning others have not. The recommended practice is to remove dry-bark trees as soon as they become unprofitable.

Budwood

The time to prevent dry bark is the time at which budwood is selected. Nothing can be done to control the disease if trees are grown from buds from parents susceptible to dry bark.

The practice of selecting buds from young trees of unknown parentage is an open invitation to trouble.

The occurrence of forms of bark disease intermediate between ordinary shell bark and dry bark, and the fact that some of the worst dry-bark trees near the coast were budded in inland nurseries—apparently from parents which never developed dry bark although they did develop shell bark—suggests the advisability of selecting local parent trees which are free from both shell bark and dry bark for a period of more than 20 years for the Eureka variety and 30 years for the Lisbon.

Certain lemon strain selections being grown experimentally show considerable promise of resistance to dry bark and shell bark. New clones have not yet been adequately tested, but may possibly be resistant.

It is suggested that, until various strains and new clones have been thoroughly tested, new lemon plantings in regions where dry bark is a problem should be made only from buds taken from trees or strains which have shown satisfactory dry bark resistance.

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PEACHES

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190° F. Fruit must not remain in the tunnel more than 40 to 60 minutes before it comes out at the cool end.

After predrying, the fruit is cooled 10 to 15 minutes before being sulfured to increase sulfur dioxide absorption. A fan may be used to cool the peaches quickly. It takes 3½ hours to sulfur blanched peaches, burning 5½ pounds of sulfur per single car of fruit containing about 25 trays.

The cars of sulfured peaches should be placed in the cool end of the dehydrater and kept there until the moisture content is reduced to 25%–28% unless the weather is cool and humid.

Under ordinary weather conditions, in the central valleys of California, peaches will continue to lose moisture after they are removed from the tunnel until they reach a final moisture content of about 20%.

Dehydrater

Any type of fruit dehydrater can be used successfully, providing the humidity does not reach a point where sulfur is lost.

Whatever heating method is used in the dehydrater, equipment must eliminate soot and smoke.

Each dehydrater should have one wet bulb and two dry-bulb thermometers to measure temperature and humidity.

The dry-bulb thermometers should be at opposite ends of the air current, one at the hot—dry—finishing end, and the other at the cool—wet—entering end. The wet-bulb thermometer may be placed wherever convenient but in the direct air flow.

The dry-bulb at the hot end of the dehydrater will give the finishing temperature. When it rises too high there is danger of scorching or otherwise damaging the fruit, shortening its storage life.

If the peaches are taken from the dehydrater with as much as 25% to 30% moisture content, they should remain on the trays for about 24 hours to permit drying to approximately 20%, or to the moisture content required by the packing house before delivery.

In foggy climates this procedure does not apply, since the dehydrated fruit may actually pick up more moisture if allowed to stand on the cars after removal from the dehydrater. In such cases, the hot air temperature in the dehydrater is lowered to about 140° F, and the fruit is then dried to the required low moisture content before being taken from the tunnel for storage.

The dry-bulb, at the cool end, used in conjunction with the wet-bulb, gives data to determine the humidity. The difference between the cool-end dry-bulb and the wet-bulb thermometer should always be more than 15 degrees. When it is less, sulfur is being lost.

If the tunnel is loaded with too many cars or if they are introduced in too rapid succession during dehydration, the humidity will become excessive, the drying rate will be greatly reduced and sulfur lost.

The best method of determining moisture content is with an electric moisture tester which is recommended for any operator whose volume justifies the initial cost.

After the fruit has reached the desired moisture content and has cooled sufficiently for easy handling, it should be scraped from the trays and stored.

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Detailed recommendations and detachable temperature charts are available in California Experiment Station Circular 381 "Dehydrating Freestone Peaches" which may be obtained without cost from the office of the Farm Advisor or by addressing a request to Publications Office, University of California College of Agriculture, Berkeley 4, California.

EQUIPMENT

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discharge nozzles are used by some manufacturers for the very fine nozzles, greater uniformity of discharge being the reason for this practice.

Nozzles may be arranged all on one side of the boom; or as is frequently done, alternate nozzles are placed on opposite sides of the boom and slanted toward one another; and double coverage is obtained with the same gallonage.

Pumps, booms and nozzles all have a bearing on the capacity of the sprayer. The capacity and adaptability of the sprayer must be considered carefully.

Spray booms will vary with the job to be done. The length of the boom and the consequent size of the rig will be limited by the increased bulk and expense of tank, pump and supporting members for the long boom.

When large acreages are to be sprayed with high volumes—over 100 gallons per acre—it may be found practical to have several small rigs instead of one very large machine.

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NEW PUBLICATIONS

A copy of the publications listed here may be obtained without charge from the local office of the Farm Advisor or by addressing a request to Publications Office, College of Agriculture, University of California, Berkeley 4, California.

CALIF. CLINGSTONE PEACHES—ECONOMIC STATUS, 1948, by Sidney Hoos and H. Fisk Phelps. Cir. 385, June, 1948 (27 pages).

CATERPILLARS ATTACKING TOMATO, by A. E. Michelbacher, W. W. Middlekauff, and N. B. Akesson. Bul. 707, June, 1948.

SOILS OF COLUSA COUNTY, by Frank F. Harradine. Lithoprinted, June, 1948.

HYDROLOGIC STUDIES IN COACHELLA VALLEY, by M. R. Huberty, A. F. Pillsbury, and V. P. Sokoloff. Lithoprinted, June, 1948.

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