

Mites on Citrus

two chemicals show exceptional control possibilities in tests

L. R. Jeppson and G. E. Carman

Two of the newer chemicals show outstanding possibilities for the commercial grower's use to control mites injurious to citrus in California. The materials are specific acaricides—mite-killers—and therefore they are relatively nontoxic to beneficial insects, so treatments result in a minimal effect on insect parasites and predators as well as bees. Nor does their application effectively reduce populations of injurious insects.

One of these materials—*p*-chlorophenyl *p*-chlorobenzene sulfonate—is known by the trade names, Ovotran, Estomite, Genite 883, Kloromul, Orthotran, and Stauffertran. For brevity it is called Ovotran in this report.

The second material—2-(*p*-*tert*-butylphenoxy) isopropyl 2-chloroethyl sulfite—is known as Aramite. Other manufacturers' labels state that the active ingredient is Aramite.

Ovotran—*p*-chlorophenyl *p*-chlorobenzene sulfonate—is formulated as a 50% wettable powder, or as an emulsifiable solution containing two pounds of active ingredient per gallon.

In field tests for the control of citrus red mite and the Lewis mite, applications were made when mites first became evident in the orchard and before injury typical of mite feeding was obvious or generally distributed over the trees.

When applied at the rate of 1,000 gallons or more per acre, good control was achieved with a minimum of $\frac{3}{4}$ pound of 50% wettable powder, or $1\frac{1}{2}$ pints of the 25% emulsifiable solution per 100 gallons of spray.

When less than 1,000 gallons were applied per acre, eight pounds 50% wettable powder or two gallons 25% emulsifiable solution per acre were found effective.

Where a rapid reduction of adult mites was necessary to check feeding injury initial kill was improved by adding one of the following to the Ovotran treatment at indicated dosages per acre—regardless of volume of spray used:

Neotran, $1\frac{1}{2}$ pounds
DN-111, $1\frac{1}{2}$ pounds
Aramite, 15% wettable powder, 4 pounds
TEPP, 1 pint
Parathion, 25% wettable powder, 2 pounds or equivalent amounts of actual parathion when using liquid formulations.

Applications of sprays containing Ovotran may be made with conventional

equipment, employing manually operated spray guns, by mechanically oscillated boom equipment, or by spray duster or other types of air blast equipment.

It is essential to distribute the spray thoroughly over the trees. In the tests adequate distribution was not generally achieved when less than 800 gallons of spray per acre were applied with boom equipment, or when less than 200 gallons per acre were applied with air blast equipment. Where minimum volume was applied by air blast equipment, the spray was most effective in the form of a mist. This was accomplished with the spray duster by distributing the spray through No. 3 disks using 300 or more pounds pump pressure.

To control the six-spotted mite, treatments were made as soon as mites appeared on lower leaves. Border rows adjoining windbreaks indicated initial infestation.

Best results were achieved with $\frac{3}{4}$ pound of wettable powder or $1\frac{1}{2}$ pints of the emulsifiable solution per 100 gallons as a complete coverage spray. Thorough coverage of the under sides of the lower leaves was essential for control.

Aramite—2-(*p*-*tert*-butylphenoxy) isopropyl 2-chloroethyl sulfite—is formulated as a 15% wettable powder or as an emulsifiable solution containing two pounds active ingredient per gallon.

In the control of the citrus red mite and the Lewis mite, applications were made when mites became evident in the orchard and before the typical mite-feeding injury was obvious or generally distributed over the trees.

When applied at the rate of 1,000 gallons or more per acre, at least two pounds of 15% wettable powder or $1\frac{1}{4}$ pints of the 25% emulsifiable solution per 100 gallons of spray gave control.

When less than 1,000 gallons were applied per acre, 20 pounds wettable powder or $1\frac{1}{2}$ gallons emulsifiable solution per acre were effective.

Applications were made by the same methods as described for applying Ovotran.

To control the six-spotted mite, treatments were made as soon as mites appeared on lower leaves. Effective treatments consisted of two pounds of wettable powder or $1\frac{1}{4}$ pints of emulsifiable

solution per 100 gallons as a complete coverage spray.

A 3% dust applied by a conventional citrus duster or helicopter resulted in effective control in limited trials.

To control the citrus bud mite, two pounds of wettable powder of $1\frac{1}{4}$ pints of emulsifiable solution per 100 gallons were applied as a thorough coverage spray. Applications were made in September or October, and in the spring when 10% to 20% of the buds were infested.

Aramite—at dosages given for the control of the citrus bud mite—was used to temporarily reduce summer populations of the citrus rust mite, under conditions when it was inadvisable to apply sulfur. A sulfur treatment was made the following winter or spring to keep this mite under control.

Ovotran was applied in combination with parathion, DDT, sulfur, nicotine, sulfate, 2,4-D, compounds of zinc, manganese, or copper without measurably influencing effectiveness of either material.

Aramite was compatible with parathion, DDT, zinc oxide, and neutral copper sprays. It was not compatible with sulfur, zinc sulfate, or alkaline materials.

In groves of the interior areas where parathion is used to control the California red scale, Ovotran or Aramite may be used against the citrus red mite, either in combination with parathion, or preferably in a sequence of treatments.

When mites appear prior to bloom in groves that can be treated with air blast or boom equipment, a separate acaricide treatment may be made as mites appear, followed by the parathion treatment after harvest or bloom.

When the mite population is light in groves that can be treated with low volume spray equipment, parathion—without the addition of an acaricide—often provides adequate mite control for the spring. The groves should be treated, if mite reinfestation occurs.

In groves that can not be treated with low volume spray equipment, the acaricide can be combined with parathion. Time of fruit harvest, blossoming period, and degree of mite infestation should be considered in timing this application.

Limited experimental experience indicates that two applications of Aramite or Ovotran, made three to four weeks apart with half the suggested dosage, are more effective than single full-dosage treatments.

L. R. Jeppson is Assistant Entomologist, University of California College of Agriculture, Riverside.

G. E. Carman is Associate Entomologist, University of California College of Agriculture, Riverside.

The above progress report is based on Research Projects Nos. 1078 and 1213.