

# Parathion Resistant Mites

performance of new acaricides evaluated in trials against strain of mites known to be resistant to phosphate compounds

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**Resistance** of European red mite—*Panonychus ulmi* (Koch)—to phosphate compounds is becoming widespread in the pear and apple growing districts of California.

Most of the new acaricides available for trial in 1958 were phosphates, therefore a series of trials were initiated to evaluate the materials against a strain of mite known to be resistant to phosphate compounds, because the problem of resistance develops after any of the organophosphorus compounds becomes generally available.

## Test Orchard

An apple orchard near Sebastopol was selected for the trials, because the European red mites in that orchard were known to be resistant to parathion and malathion. The trial plots were established in a section of orchard consisting of a mixed stand of Winesap and Red Delicious apples. A thorough examination of the trees during the winter showed a heavy population of European red mite eggs.

Each plot consisted of four trees with three replications in a randomized block design. Materials were applied with a conventional high pressure spray rig and orchard guns. At each application the applied gallonage averaged 450 gallons per acre. The first treatments were applied on May 1, as the mite population had reached an economic level. Counts were taken at intervals throughout the season by picking 100 leaves at random from each treatment. The leaves were run through a mite brushing machine, and the mites counted under a binocular microscope. Spray applications were made on May 1, on May 29, and again on June 24.

Two nonphosphate compounds—Karathane and Tedion—were included in the trials. Karathane, a fungicide, was used in an apple powdery mildew control schedule, and was applied four times at approximately 14 day intervals. Tedion was used only once, on May 29, and was applied to the plot which had been the untreated check.

Following the third spray on June 24, any plot which showed more than five mites per leaf was considered to have an economic level of infestation and was re-

treated with a nonphosphate compound. The table expresses the data in terms of how many days the materials held the mites in check after the last application. If any material failed to hold the mites for a minimum of 30 days following three sprays, it was considered as a failure.

## Effectiveness

All the phosphate compounds—with but a single exception—did not give adequate control of the parathion resistant mites after three treatments. Monsanto 10739, an experimental systemic phosphate, was the only compound which provided good control. Mite populations were heavy on this plot late in the season, however, which indicates that a resistance problem would probably develop with additional treatments. Guthion held the mites in check for a longer period than some of the other materials tested, but still it did not give a satisfactory control.

Karathane required retreatment after four sprays, which indicates the compound either has a short residual effect or does not act against the summer eggs of the mites. Tedion was applied to the check plots when the mite population had reached an injurious level. Although the material was very slow in killing adult mites, as four weeks elapsed before the population declined, the single applica-

tion kept the mites in check for the rest of the season.

The mite count was made 13 days after the last sprays were applied on June 24. The mite counts were very high on some of the plots, indicating that the last treatment had failed to give any measure of control. Although the table indicates that the materials held for 13 days, it was obvious that an economic level of population was reached before that time. In most cases, the postspray count was higher than the count made prior to the last treatment.

These data indicate that although there may be some differences in the action of new phosphate acaricides against a strain of mite already resistant to the commonly used phosphates, there is little hope that resistance will not develop in a short time. With the increase of phosphate resistance in the case of European red mite, it seems necessary to look to other compounds for control.

## The New Materials

On the 1958 plots, there was opportunity to observe the effects of the new materials on the apple aphid—*Aphis pomi* DeG. Aphid counts were made throughout the season and it was possible to evaluate the materials even though the sprays were not timed for aphid control. With a schedule of three treatments, Monsanto 10739 was the only compound that held the aphids at a low population level for the season. Guthion and Trithion gave a good initial kill, and held for about 30 days. Monsanto 10516, Monsanto 12432, ethion, and Phosdrin provided initial kill, but reinfestation took place within 1–2 weeks after application.

The plots were also observed for phytotoxic effects following each application. Phosdrin caused severe cracking around the stem end of the Winesap variety, and the size of the fruit was adversely affected. None of the other compounds caused any observable phytotoxic effect on either Winesap or Delicious, the two varieties involved.

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Trials of New Phosphate Compounds Against Parathion Resistant Mites on Apples, 1958

Material	Dosage/ 100 gals	Applica- tions	Days*
Guthion	3 lbs 12½ WP	3	27
Trithion	1 lb 25% WP	3	13
Trithion	½ pt 50% fl	3	13
Ethion	1 lb 25% WP	3	13
Phosdrin	1½ pts 25% em	3	13
Monsanto 10516	1 pt 25% em	3	13
Monsanto 12432	1 pt 25% em	3	13
Monsanto 10739	1 pt 25% em	3	61
Karathane**	½ lb 25% WP	4	27
Tedion**	1 lb 25% WP	1	87

\* No. of days between last application and economic infestation.

\*\* Nonphosphate compounds.