# Spider Mites on Walnuts

## continued experiments in northern California groves indicate insect control program to keep mites in check

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**Spider mite** injury has increased during the past several years in northern California walnut groves.

The destructive species are the Pacific mite and—to a lesser extent—the European red spider. The increase of the mites may be due in part to natural environmental conditions being more favorable or to some of the control programs directed against the codling moth and the walnut aphid.

Past experiments with DDT demonstrated that heavy applications resulted in an increase in the mite population. Levels were determined where the DDT dosage was effective against the codling moth without resulting in a mite problem. This is accomplished by one single application with conventional rig of one-half pound—approximately 4.5 pounds per acre—of 50% DDT wettable powder to the 100 gallons of spray to which two or three pounds of standard lead arsenate are added to insure control of the second brood of the codling moth. Where an air carrier type sprayer is used, excellent control of both broods of the codling moth is obtained with a single application of 50% DDT wettable powder at a rate of seven to eight pounds per acre without resulting in a mite problem. It therefore appears that the use of DDT as recommended in the walnut insect control program is not responsible for the increase in injury caused by mites.

### Aphids and Mites

Benzene hexachloride—used in aphid control—will result in an increase in the mite population if a sufficiently high dosage is applied. The dosage needed for aphid control is much below the danger level. However, where it is incorporated in a codling moth spray containing DDT, there is an additive effect of the two materials which approaches a point where a slight increase in the mite population might be expected under environmental conditions highly favorable to the pest. This, while a factor, does not account for serious increases in the mite population.

In the walnut insect investigations every effort has been made to develop a program which will not result in a serious increase in the mite population. In experimental plots, recommended treatments performed well, both with conventional and with air carrier type sprayers. Success in part was due to thorough application resulting in effective control and reducing to two or three the number of applications necessary to control walnut insects for the entire season.

During the 1951 season mites never approached a destructive level in any of the experimental treatments. Light infestations of the Pacific mite appeared after the middle of August but the mites were completely checked by natural enemies of which the lady bird beetle, *Stethorus*, appeared to be the most important.

Besides the codling moth spray, part of the experimental area received one and the rest two treatments of parathion applied with an air carrier sprayer at the rate per acre of one pound of 25% wettable powder in 50 gallons of water. Where the second application was applied on August 17, the treatment resulted in a kill of what few motile mites were present. This suppression of the mite population probably aided in checking the pest and substantiated the findings of previous years. In one block where EPN 300 was used at four times the concentration of parathion, the controlling influence was definitely better than that obtained with parathion.

### Few Treatments Needed

Probably the most outstanding feature of the insect control program was its effectiveness, which made few treatments necessary. The fewer the number of applications in an insect control program, the less is the impact upon natural enemies. In many cases where effective control is obtained, natural enemies are able to re-establish themselves in the orchard again before the pest population becomes destructive. Sometimes they may even be present in sufficient numbers to prevent the pest population from rising to a destructive level.

Poor control, on the other hand, makes frequent applications necessary. The new aphicides are very destructive to natural enemies, and repeated treatments may nearly eliminate natural enemies from an area. Both parathion and TEPP at proper dosages are effective against active mites but not the eggs. It is almost certain that treatments with these materials that result in poor aphid control will also be ineffective against mites. If this is the case, increases in the mite as well as the aphid population can be expected.

### Thorough Control Essential

Treatments for aphid control with benzene hexachloride, parathion or TEPP should not be applied unless a grower is certain that the population will all but be eliminated. One of the greatest offenders in ineffective control are smoke machines using TEPP. They should be used only when weather conditions are nearly perfect and the smoke is largely confined to the orchard being treated. A dense drift of smoke through a nearby orchard might adversely influence the natural enemy-mite balance. Such a disturbance might result in an increase in the mite population and support the statement that the mite infestation in the treated orchard is no worse than that in an adjacent untreated orchard. The fact is that an orchard subjected one to several times to a dense smoke drift can not be considered untreated. The treatment probably was ineffective, but present knowledge indicates that this is the kind which is likely to result in serious harm. However, not all increases in mites are associated with insecticidal treatments, for destructive mite populations develop in many areas where little or no control is applied.

The dust deposit from frequent applications of insecticidal dusts used in aphid control—such as nicotine dusts—can result in serious mite infestations. However, there is no reason why insecticidal dusts should not be used so long as the treatment results in effective control so that frequent and repeated applications are not necessary.

Occasionally serious mite infestations occur where walnuts are planted next to a crop heavily infested with mites.

Where serious mite infestations threatened several commercial plantings control was obtained by using a 15% aramite wettable powder at the rate of 1½ pounds to 100 gallons of water. Good control with aramite is dependent upon thorough coverage. Further study with this acaricide—as with others—is needed for more information on dosage, formulation, and effectiveness of different means of application.

Continued on page 15