Project No. 93-C16 - Insect & Mite Research

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Objectives:

1. Purchase pheromone traps and lures, and other monitoring supplies for Farm Advisors as part of their ongoing monitoring efforts.

2. Conduct large field trials to refine and validate prior research results which strongly suggest that Bacillus thuringiensis (Bt) applied during bloom can control peach twig borer, and document the impact of eliminating dormant sprays of oil and organophosphates on other pest and beneficial insects.

3. Conduct field trials to validate the potential of tree banding or some other early season exclusion method as a control for spider mites.

Results:

In my absence, IPM Farm Advisor Carolyn Pickel purchased and distributed pheromone traps, lures and other monitoring supplies for Farm Advisors and distributed them for use this past season. Data from 1992 were collected, and data from 1993 are requested from cooperators. These will become part of an ongoing database of trapping information.

Seven large field trials were conducted in the same orchards as in the past two years. The trials include four orchards in the Sacramento Valley and three in the San Joaquin Valley. The primary treatments each orchard were: the standard organophosphate and oil dormant spray, oil without an organophosphate insecticide applied at the time dormant treatments are applied to the remainder of the

orchard, *Bt* treatments at popcorn and between full bloom and the beginning of petal fall, and no treatment. Over the three years of the study, some of the treatments have been dropped in some of the orchards. This year we observed no or very few shoot strikes in all of the orchards and strike counts were only taken in one of the orchards. It is possible that the wet conditions experienced during twig borer overwintering emergence caused significant mortality of the exposed larvae. Harvest samples were taken from all of the orchards. The samples were hand-cracked and counted for peach twig borer and navel orangeworm both in the hull and damaging meats. Peach twig borer damage never exceeded 0.1% in the checks, and total infested nuts (meats and hulls) 2.1%. No significant difference was observed between any of the treatments in any of the orchards.

Small plot trials were conducted in Colusa County to provide more specific information on *Bt* timing and efficacy. The results showed no difference between two (popcorn and petal fall) or three (popcorn, petal fall, and late petal fall) applications of Biobit or Dipel compared to a Supracide dormant spray. All applications provided significant control compared to the untreated check trees. There was no significant difference between two applications of Dipel ES, Dipel 2X, MVP or Cutlass WP and the Supracide dormant spray. *Bt* appears to be somewhat compatible with fungicides when tank mixed at popcorn and petal fall. No significant differences were observed between Biobit alone, Biobit plus copper, or Biobit plus Benlate, and Ziram and the Supracide treatment; however, efficacy was 92%, 63%, 79% and 92%, respectively, for these treatments indicating more work should be done to demonstrate no effect.

Large field trials were conducted by Walt Bentley in Kern County to determine the effect of limiting Pacific mite movement on the trees in the very early season on mite density later in the season. Trees were banded with sticky bands on the trunk or on scaffolds in two orchards. In one of the orchards, applications of lime sulfur (late in the dormant season) or Apollo (an acaricide applied at leafout following the start of mite movement) were made to the trunk and the soil immediately surrounding the base of each tree. Weekly leaf sampling will be initiated soon. From each tree, twenty leaves were sampled at each of three heights. Sampling was continued through the fall. Number of Pacific mites, beneficial mites, red mites and other beneficials were counted. Results indicated that all treatments significantly reduced Pacific mites relative to untreated trees through the peak of mite abundance. No significant differences were observed between treatments for the predator mite *Metaseiulus occidentalis* or for European red mites. Results of the treatments on Pacific mite abundance are given in the following table.

Mean (± SEM) cumulative spider mite days per leaf to peak from trees treated to prevent Pacific Mite movement. Data are from 2 Kern County orchards, 1993.

Treatment [1/]	Orchard 1 mean±SEM [2/]		Orchard 2 mean±SEM [2/]	
No band	187.0 ± 30.1	a	24.8 ± 6.8	a
Trunk band	131.9 ± 21.8	b	12.7 ± 4.3	b
Scaffold band	86.0 ± 15.0	c	11.2 ± 2.3	b
Lime sulfur	78.8 ± 18.5	c		
Apollo	56.6 ± 9.4	c		

[1/] Treatments significantly different by ANOV.
Orchard 1 (F=20.319; df=4; P<0.0001)
Orchard 2 (F=4.436; df=2; P<0.0190)

[2/] Means followed by the same letter are not significantly different (P>0.05) by Fishers Protected LSD.