PROJECT NO: 1742 (**Termination Report**)

TITLE: Insecticides and Honey Bees

PERSONNEL:
Project Leader: D.F. Mayer, Entomologist, WSU-Prosser
Cooperator: E.H. Beers, Entomologist, WSU-Wenatchee

REPORTING PERIOD: 1988-1995

ACCOMPLISHMENTS:

In a large-scale test, Admire applied to blooming apples did not repel or kill honey bees. In a large-scale test, TD-2344-1 applied to blooming apples did not repel or kill honey bees. In two large-scale tests, one on apples and one on clover, applying S-71639 did not repel or kill honey bees. In a feeding study, S-71639 fed to honey bee colonies (50 g/A) resulted in significant mortality of immature honey bees. In a large-scale test on blooming pears, Comply® caused some mortality of immature honey bees, however this mortality was rather insignificant. These results are significant to the industry and to science to define the use of insecticides with minimal risk to honey bees.

The direct toxicity of endothall (a possible apple bloom thinner), ICIA- 5504 (a new fungicide) and S-71639 (a new insecticide for pear psylla) were evaluated using a microsprayer. They were not toxic to honey bees. Using a microsprayer, the LC_{50} for Decis®, Larvin®, Stalker®, and Sterling® was calculated for honey bees.

Twelve chemicals were evaluated for honey bee repellency and effects on fruit set in small-scale replicated plots on blooming apples. None of the materials, except for BS EXP 194, repelled bees for more than a few hours. BS EXP 194 burned all the flowers off the trees. Also, none of the others caused reduced fruit set. In a set of fairly large-scale experiments, Crockers® fish oil and Alaska® fish oil were evaluated at several different timings and rates for effects on bees and apple fruit set. Neither significantly reduced the number of foraging honey bees. Also, there were no significant reductions of fruit set, although in some cases there was some slight reduction of fruit set. Although none of the materials repelled bees, the results, though negative, are significant to the industry and science.

The reduced fruit set caused by the oil materials probably needs further study, especially with the loss of elgetol.

Nine chemicals were evaluated for honey bee repellency on blooming white dutch clover. None of the materials gave long-term repellency. Though negative, these results are significant to the industry and science.

The insecticides, Stalker® (2 rates), Admire®, Naturalis-L®, S-71639 (two rates), TD 2342, TD 2344 (3 rates), TD 2345 (2 rates), TD 2348 (two rates), XDE # (two rates), Adios® (three rates), Demize® and YI #, and the fungicide ICIA-5504 were evaluated for honey bee hazard in residue bioassays. Stalker® (high rate), TD 2342, TD 2344 (high rate), TD 2345, TD 2348, and XDE # were highly hazardous.

The insecticides, Penncap M®, Carzol®, Supracide®, Vydate®, Ambush®, Imidan®, Danitol®, BAS-30011, Monitor®, Ammo®, Dylox®, Larvin®, Decis®, and Furadan® were evaluated for bumble bee hazard in residue bioassays. Carzol®, Vydate®, Danitol®, and Ammo® were highly hazardous.

PUBLICATIONS:

Mayer, D.F., K.D. Patten, R. P. Macfarlane and C.H. Shanks. 1994. Differences between susceptibility of four pollinator species (Hymenoptera: Apoidea) to field weathered insecticide residues. Melanderia 50:24-27.

Mayer, D.F. and J.D. Lunden. 1994. Effects of the adjuvant Sylgard® on the hazard of selected insecticides to honey bees. BeeScience 3:135-138.

Mayer, D.F., J.D. Lunden and M.R. Jasso. 1994. Residual bee poisoning bioassay. Res. Rept. PNW Insect Mgt. Conf. 53: 115-117.

Mayer, D.F. 1994. 1995 crop protection guide for tree fruits in Washington. Wash. St. Coop. Ext. EB 0419

Mayer, D.F., J.D. Lunden and M.R. Jasso. 1994. Effects of different chemicals on honey bee forging of white dutch clover. Res. Rept. PNW Insect Mgt. Conf. 53: 113-114.

Mayer, D.F., J.D. Lunden and M.R. Jasso. 1995. Residue bee poisoning bioassay. Res. Rept. PNW Insect Mgmt. Conf. 54: (In press).

Stark, J.D., P.C. Jepson and D.F. Mayer. 1995. Risk assessment of selective insecticides to beneficial arthropods: Can laboratory results predict effects in the field? J. Econ. Entomol. (In press).

In 1994, I gave twenty-two different presentations to growers, consultants, beekeepers and others using data generated from this project.