

Section VII

Insecticide Residues, Regulations, Application and Related Problems

BEE HAZARD OF INSECTICIDES COMBINED WITH CHEMICAL STICKERS

D.F. Mayer, C.A. Johansen, J.D. Lunden and Lora Rathbone

Washington State University-IAREC

Prosser WA 99350

Bee poisoning, the accidental killing of bees through the use of insecticides, has become the number one problem for beekeepers worldwide. Chemical residual plays a major role in the relative safety of pesticides to bees. Sizable differences in toxicity to bees occurs with various pesticides and formulations. Under equivalent conditions of application and dosage, dusts are typically most toxic, wettable powders less toxic, and emulsifiable concentrates least toxic. This sequence of toxicity is probably due to differential pick-up of toxic residues by bees. Pick-up of residues is principally associated with the branched or otherwise modified body hairs of bees, adapted for holding pollen grains. Formulations that stick or otherwise bind insecticides to plant surfaces generally reduce bee hazard. Thus, stickers added to insecticides may greatly decrease their hazard to bees. The present study was designed to determine the bee hazard of different insecticides combined with some sticker chemicals.

Bee bioassays were conducted with twenty-five insecticides on honey bees, seven on alfalfa leafcutting bees and four on alkali bees from 1982 through 1986. Residual toxicities of chemicals with and without chemical stickers were determined through small-scale cage tests. Test materials were applied to alfalfa plots and field weathered samples were collected at two, eight, and twenty-four hours post-application. Bees were caged with samples for twenty-four hours after which mortality counts were done.

Results

Adding a chemical sticker reduced the bee mortality during one or more time treatments of acephate, a-fenvalerate, cyhalothrin, fenvalerate, formetanate, lindane, methomyl, naled, oxamyl, trichlorfon, and thiodicarb. Adding a sticker did not reduce the bee mortality of chlorpyrifos, diazinon, malathion, oxydemetonmethyl, methamidophos, or phosphamidon. As a group, carbamate insecticides were safened more than were synthetic pyrethroids, organophosphates, or organochlorine compounds.