Pesticide Resistance

Baseline Survey of Codling Moth Response to Tebufenozide

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Keywords: codling moth, tebufenozide, apple

Studies were conducted from June to September 1998 to develop a bioassay protocol to measure the response of codling moth to the insect growth regulators tebufenozide and RH2485. Both 6- and 14-day tests were conducted with a laboratory population and with twelve field-collected populations. Assays were conducted with neonates and with third and fourth instars. Assays with laboratory insects tested neonates and three size classes of older larvae. Results from these studies have suggested several improvements in the standard bioassay.

1. Bioassays should be extended from 6 to 14 days to reduce the variability in different replicates due to differences in larval size and the occurrence of moribund larvae in the shorter timed assay.
2. Surviving larvae in the 14-day assay conducted at 25°C may eat their way out of the plastic cup. This can be avoided by assaying neonates or second instars. Other procedures may help: a piece of corrugated cardboard can be hot-glued to the inside lid of the cup for pupation; the top of the cup can be wrapped with Al foil.
3. Only one larva should be placed in each cup due to cannibalism and the difficulty in finding larvae in the diet. I used ten larvae per replicate.
4. Bioassay results of F1 neonates are correlated with similar tests with older larvae. Thus neonate assays may be preferable in some instances.
5. Reasonable estimates of LC_{50}s can be generated if at least ten replicates are run per population plus untreated checks.
6. Field-collected populations from Washington apple orchards expressed a broad range of responses to both chemicals.