Pome Fruits—Chemical Control

Differential Mortality of Stages of Twospotted Spider Mites from Agri-Mek Residues on Apple

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Field-aged residues of avermectin were bioassayed with twospotted spider mite *(Tetranychus urticae)* to determine if mortality varied among different age classes of mites. Four apple trees (cv. Delicious) were sprayed on 17 July 1992 with a tank mixture of avermectin B_1 (Agri-Mek 0.15EC) and superior spray oil (Volck Supreme Oil) at a rate of 39 ml and 236 ml per 25 gallons water, or 0.025 lb ai/acre avermectin and 0.25% oil. At the same time, four trees of the same cultivar were tagged, but left as unsprayed checks.

Ten mid-shoot leaves were collected from the trees at 14, 21, and 28 days after treatment. A 2-cm disk was punched from each leaf and floated bottom side up in a jelly cup of distilled water. A piece of cellucotton was placed in the bottom of the cup helped to stabilize the leaf disk and prevent it from touching the sides of the jelly cup. Ten mites of the appropriate age class were transferred from a *T. urticae* colony reared on bean plants to the underside of the leaf disks. The age classes were: eggs; larvae; protonymphs and deutonymphs; and adults. The mites were held at ca. 22°C for 72 h, at which time mortality was evaluated, with the exception of eggs, which were evaluated after 7 days. Mites in the jelly cups were classed on the basis of their response to gentle prodding with a camel hair brush. The first three classes applied only to mites found on the leaf at the time of evaluation, viz., *alive* (able to move one or more body lengths); *moribund* (capable of moving legs or very localized movement only); *dead* (no movement). The fourth classification was *run-off,* which applied to mites not found on the leaf disk. These mites were not included in data analyses.

Each age class put on avermectin-treated leaves was duplicated on a set of ten untreated leaves. The mortality on these leaves was used to calculate the corrected percentage mortality using Abbott's formula (Abbott, W. S. 1925. J. Econ. Entomol. 18: 266-267):

$$\text{Corr. \% mort.} = (X-Y)/X))*100$$

where X = % living in the check, Y = the % living in the treated plot, and X-Y = the % killed by the treatment.

At 14 days post-treatment, mortality of all age classes was below 75% (Fig. 1). The level of mortality was highest for larvae and adults and lowest for nymphs and eggs. Eggs are known not to be very susceptible to avermectin, and this is confirmed by these data. However, the high mortality among adults and larvae is more difficult to explain. Unless there are physiological differences among the motile age classes, it is expected that susceptibility would decrease with age or size, thus adults should be the least susceptible to avermectin. However, in this test, adults and larvae were consistently the most susceptible to avermectin, and nymphs appeared to be the least susceptible of the motile stages.

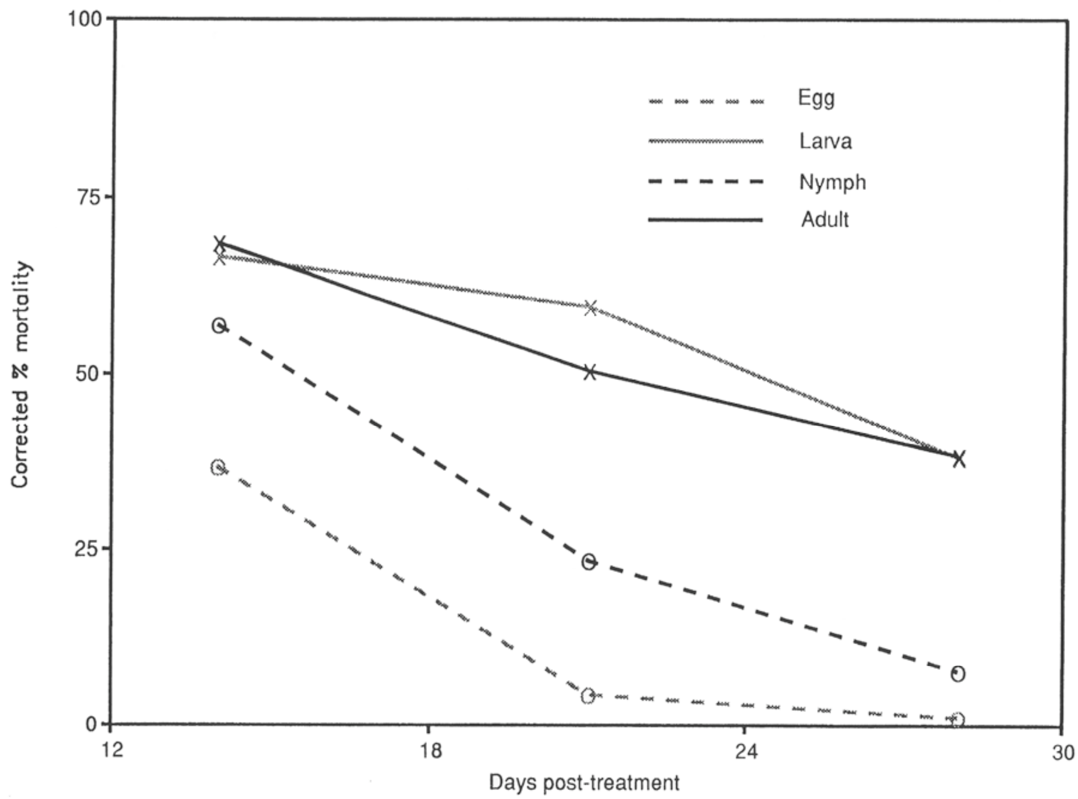

Figure 1. Mortality of various stages of twospotted spider mite when challenged with residues of Agri-Mek on apple, 1992.