

Pesticide Resistance

Resistance of San Jose Scale to Chlorpyrifos

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Laboratory trials initiated at the Kearney Agricultural Center in 1994 to evaluate resistance of San Jose scale to chlorpyrifos (Lorsban) were continued in the fall of 1995 and spring of 1996. Procedures included collection of scale crawlers from grower and untreated orchards, establishment of scale mother colonies on banana squash, and treatment of small gourds infested with first instar scale using various rates of chlorpyrifos.

Continued replication of chlorpyrifos dosage rates in 1995-96 confirmed earlier data that the populations of San Jose scale from two mature commercial nectarine orchards in the Reedley-Parlier area had developed a strong tolerance or resistance to the insecticide chlorpyrifos. Figure 1 shows that San Jose scale in the two commercial orchards are 40-100 times more tolerant of chlorpyrifos at the 90% mortality level than the laboratory colony, and there are some scale in the KAC Field 32 population that are equally resistant. The untreated research orchard population of scale from Kearney (Field 32, nectarines) is intermediate in its susceptibility to chlorpyrifos compared to an untreated or unselected laboratory colony from Kearney. These data conclusively show what had been suspected, that San Jose scale field populations do in fact have resistance to organophosphate insecticides, which has contributed to control failures in several tree fruit commodities over the past several years. As a result of these findings, it is apparent that growers, pest control advisors, and applicators must now pay much greater attention to the details of proper spray application and coverage in order to achieve economic control of San Jose scale when using organophosphate insecticides, either in dormant or post-bloom sprays.

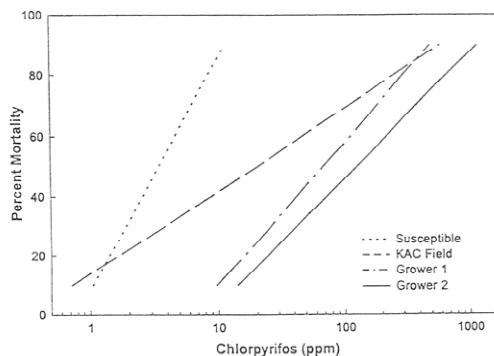


Figure 1. Comparison of an organophosphate-susceptible laboratory population of San Jose scale to scale collected from three nectarine orchards. KAC Field 32 unsprayed; Grower 1 and 2 orchards treated annually with dormant organophosphate and oil sprays.