Chemical Control/New Products

The Effect of Foliar Season Applications of Horticultural Mineral Oil on Pear Tree Productivity and Fruit Quality

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The use of horticultural mineral oil during the foliar period in pear has been shown to suppress spider mites, pear psylla, and codling moth. These effects, along with the lack of disruptive effects, have led to the development of an arthropod control program for pear based on mating disruption for primary control of codling moth along with three applications of Orchex 796E (a C^{23} narrow range horticultural mineral oil produced by Exxon) at 1% v/v concentration and timed at 200, 400, and 600 degree days following codling moth biofix. Implementation of this program in the codling moth areawide management site in Medford, Oregon, has resulted in significant reductions in pesticide use for control of codling moth and secondary pests. However, growers have expressed concerns over the possible long-term effects of continued use of horticultural mineral oils during the foliar season on pear tree productivity and fruit quality. In order to address those concerns this study was conducted in Medford and Hood River.

Orchex 796E was applied at 1% v/v concentration three times per year during the foliar season to mature pear trees over a three year period (1996-1998). Four pear cultivars were examined: 'Anjou', 'Bartlett', 'Bosc', and 'Comice'. Applications were made with a high pressure handgun sprayer with the spray volume adjusted to apply 400 gpa. Significant responses to repeated treatment with Orchex 796E were observed in a number of fruit characteristics and productivity parameters. Significant effects varied with pear cultivar. The most consistent and economically important effects were seen in 'Anjou' where fruit size and yield efficiency were both reduced. Reduced yields were also seen in 'Comice' and, to a lesser degree, in 'Bartlett'. A consistently significant increase in fruit russet was observed in 'Bartlett' treated with Orchex 796E, but the amount of fruit russet was not increased to economically damaging levels. 'Bosc' exhibited the fewest significant responses of the cultivars tested. In a subsequent study, the handgun application method was compared to the air-carrier sprayer method currently used in commercial orchards, with lower spray volumes used with the air-carrier sprayer. While this subsequent study, initiated in 1997, is still in progress, few significant effects have been observed to date. The inherent difficulties in measuring horticultural effects in tree fruit with specific regard to determining the potential impact of repeated applications of horticultural spray oil over a series of years will be discussed.