SW94-23

Abstract

either fungicide class are not applied more than 3 times per season. Presented in this poster are examples of fungicide spray programs that provide excellent mildew control while ensuring product longevity. Several DMI resistance management strategies are described: a DMI: strobilurin fungicide alternation and a lime sulfur: DMI alternation both of which provide apple mildew control equal to a program that utilizes DMI fungicides exclusively. Also described is a cherry mildew DMI, strobilurin, and oil fungicide spray program that provides excellent mildew control and minimizes oil-induced fruit phytotoxicity. All programs keep the number of applications of systemic, resistance-prone compounds to 3 or fewer applications per season.

Effects Of Fall Urea And CuEDTA Application On Defoliation, Reserve Nitrogen And Spring Regrowth Of 'Fuji' Apple Nursery Stock

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Bench-grafted 'Fuji'/M26 were sprayed with 1% CuEDTA as a defoliant in late-October 1997. Fourteen days before CuEDTA treatment, foliar urea at 3% was applied twice at a 5-day interval. The effects of foliar urea and CuEDTA on defoliation, reserve nitrogen and regrowth in the following spring were determined. CuEDTA resulted in >80% defoliation within 5 days of application. Reserve nitrogen content of CuEDTA-defoliated plants was lower than the naturally defoliated controls but higher than the hand defoliated controls. Foliar urea application prior to either hand-defoliation or CuEDTA treatment significantly increased reserve nitrogen level in all parts of the tree, with the CuEDTA treatment containing the highest reserve nitrogen levels among all treatments. The urea pretreatment did not affect the efficacy of CuEDTA on defoliation. The extent of spring regrowth was proportional to the reserve nitrogen level of the tree. Therefore, urea-treated plants, whether hand- or CuEDTA defoliated, showed a significantly higher degree of the spring growth than hand- or naturally defoliated controls. It is concluded that CuEDTA, as combined with foliar urea, may be used to effectively defoliate apple nursery stock, and increase reserve nitrogen level and improve regrowth performance during establishment.

Apple Pest Control Without Organophosphate Or Carbamate Insecticides: SARE Project Final Report

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The economics and ecology of Delicious apple orchards managed without using neuroactive-based insecticides were investigated for three years. Conventional (CONV) and non-neuroactive (NNA) insecticide management programs were directly compared at six locations in the Pacific Northwest. Pheromones alone or pheromone plus either mineral oil or the insect growth regulator, tebufenozide, were used as the primary control for codling moth in the NNA orchards. These selective tactics were as effective as conventional azinphosmethyl sprays at three sites in 1995, five in 1996 and all six in 1997. In 1996, poor control of codling moth occurred in the NNA block, with at least 4% fruit injury recorded at harvest. However, six applications of azinphosmethyl also did not prevent significant crop loss to codling moth, ca. 1% at harvest, in the CONV block at this site. In general codling moth control without the input of azinphosmethyl was successful with the exception of border areas in high pressure areas. Greater than 1% leafroller fruit injury occurred in 4 of 6 NNA orchards in 1995, while extremely low levels of damage were recorded in all NNA orchards in 1996 and 1997. Much of the success of the NNA management program can be attributed to the use of tebufenozide rather that *Bacillus thuringiensis* for leafroller control. Other arthropod pests were generally at low levels in the NNA orchards. Natural enemies contributed to the suppression of mites, aphids and leafminer in most NNA orchards. Three pest species, white apple leafhopper, green apple aphid and western tentiform leafminer, reached population densities that required intervention with insecticides in at least one of the CONV orchards. Three methods were used to document changes in arthropod community biodiversity. Sweep net samples of the orchard ground cover and soil samples were taken once in August of 1994 and three times each of the following years. For both soil and sweep net samples, no clear patterns of change in biodiversity were evident. Pit fall traps were used to sample biodiversity in 1996. Results of pit fall trapping revealed some consistent differences in biodiversity between NNA and CONV orchards. Of greatest interest was the significantly higher numbers of carabid beetles in the NNA orchards compared to the CONV orchards.

The Systems Approach To Quarantine Security For Northwest Tree Fruits

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International quarantine regulations impact the export of tree fruits from the Pacific Northwest. Some countries require specific postharvest treatments. The level of quarantine security for these treatments has been 99.9968% pest mortality, which must be demonstrated on an experimental treatment population of 30,000 or greater. This process is time consuming, labor intensive, and expensive. Yet, current government fruit inspection records reveal an extremely low infestation rate on exported fruits. There must be a better way to obtain quarantine security.

One method is the *Systems Approach*, which is the integration of commercial practices used in production, harvest, packing, storage, and distribution that cumulatively meet quarantine security. Each component need not be efficacious by itself, but that the effect is additive. In most cases, compliance can be obtained with no or little modification to current commercial operations. Federal, state, and international inspectors verify that the final product is pest-free. Fruit lots that fail to meet the standards are excluded from the export program.

The advantages are obvious. The Systems Approach can be easily integrated into existing postharvest operations using current or slightly modified facilities. Additional capital and labor costs for specific postharvest treatments are eliminated. Furthermore, safety and environmental concerns can be avoided by not requiring specific postharvest treatments. Finally, a high quality product can be assured, a necessity for export.

Studies Of Overwintering Codling Moth Infestation Of Harvest Bins

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Codling moth (Cydia pomonella) have long been suspected of emerging from stacks of harvest bins in the Spring and causing damage to nearby apple and pear orchards. With increased use of mating disruption for codling moth control, outside sources of infestation have become more of a concern for growers using pheromone confusion systems. Studies were designed to provide information on the source of codling moth larvae infesting bins (what proportion from infested fruit placed in bins vs. larvae entering bins before fruit is picked) and the pattern of codling moth emergence from bin piles.

In these studies, codling moth (CM) larvae colonized wood harvest bins at a much higher