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Fuller's Rose Weevil in citrus

Fuller's Rose Weevil (*Asynonychus cervinus*) is a major quarantine pest of citrus and a hindrance to exporting fruit into developing markets. Several projects into managing and control of this pest have been run through the South Australian Research and Development Institute.

Various projects have focused on improved monitoring techniques, including the development of a trap for adult FRW, biological control using pathogenic nematodes and fungi and chemical control including the development of a butt spray applicator as well as general orchard management. There has also been work into egg removal from under the calyx of fruit.



Adult Fuller's Rose Weevil (all are female)

Fuller's Rose Weevil are brown, flightless beetles and are all females that reproduce without mating. They have one generation a year and eggs are laid in cracks and crevices of bark, leaves and the calyces of fruit. When they hatch larvae drop to the ground where they live and pupate in soil for

The Fuller rose beetle has one generation a year. Eggs are laid in a mass of several dozen on fruit, especially underneath the button, or in cracks and crevices in the tree. When eggs hatch, larvae drop to the ground and live in the soil for 6 to 10 months before pupation and emergence as adult 6 weeks-2 months later.

OBJECTIVES OF FRW MANAGEMENT - FIELD

Immediate objective is to identify orchards where FRW fall below detection, maintain FRW free status in uninfested orchards and control FRW in orchards with low – medium population densities.

The longer term objective is to eradicate FRW populations from currently infested orchards.

CONTROL OPTIONS

Several control options have been used including canopy sprays; however, issues with costs, residues and secondary pests have arisen. Biological controls have been unavailable due to no known effective predator.

Soil treatments have the same issue as canopy sprays, including cost, residues and secondary pests. Although entomopathogens in soils are effective they do not give required control in short term.

Control on the trunk has had mixed effects. Physical barriers are costly and have been ineffective in the past. With spray banding you can use persistent chemicals with a reduced volume of chemical and not be disruptive to beneficial organisms.

Cultural control has also been shown to be effective and is generally considered good orchard practice and non-disruptive to beneficial insects



Band width for spraying



*Electronic sensor spray
developed with Croplands*

OBJECTIVES OF FRW MANAGEMENT – POSTHARVEST

There are two main objectives to postharvest management of FRW. The first is to remove eggs from under the calyx by a series of washes/treatments meant to dissolve FRW egg adhesive. Combined with high-pressure washing there will likely be further egg removal, increasing with increasing pressure.

The second objective is to kill the remaining eggs so none will hatch.

Both these approaches aim to adapt current citrus packing processes, which will aid rapid adoption, and will reduce the costs and delays associated with equipment modification.



Eggs laid near the calyx of fruit



High pressure washes

CHEMICALS

A previous study identified sodium and calcium hypochlorite as promising candidates to dissolve the egg adhesive and indicated chemicals with solvent properties that could be used against FRW eggs. However, chemicals will also be required to penetrate under the calyx to completely dissolve the egg adhesion.

HIGH PRESSURE WASHING

The combination of a fruit treatment followed by pressure washing could significantly reduce the incidence of FRW eggs occurring on citrus after packing. The augmentation of any treatment, such as postharvest oil treatment, is required and highly desirable to provide commercially acceptable results.

OVICIDAL PROPERTIES

Various common packingshed chemistries showed promise as an ovicide; however, this work needs to be elaborated with further experimentation.