

Pest management of *Diaprepes* and to a lesser extent, other citrus root weevils, must begin with control of different life stages, particularly adult weevils using the following options: 1) foliar sprays for egg and adult suppression, 2) chemical barrier for larval control, and 3) biological control of all subterranean stages with nematodes. The application of these control tactics is timed according to monitoring of adult emergence and the onset of leaf flushing in the spring/summer period. Any of these tactics should reduce root injury and sustain root health from grove to grove. For many groves, however, pest management might differ according to: 1) rootstock susceptibility to soil-borne diseases (i.e. *Phytophthora* spp.) and 2) root stress caused by excessive flooding and poor drainage of sandy loam soils. In certain grove situations, a soil fungicide for control of *Phytophthora* spp. should be advised.

Newly-planted resets and groves, less than 5 years old, with an established *Diaprepes* infestation on a susceptible rootstock can decline within 2 years without adult and/or larval control. A similar grove situation involving a resistant rootstock will have lesser tree decline, but will require adult suppression. Remember, groves planted on deep, sandy soils will often require no supplemental control and can rely on biological control agents.

Foliar sprays of different contact (knockdown) insecticides that include petroleum oil, to improve residual effect, are used to target adult weevils in the tree canopy. Although foliar sprays have been used by growers to suppress adults anytime of the year, recent research in central Florida has shown conclusively, that root injury is less and overall tree health improved when two foliar sprays are used 4 weeks apart during peak summer flush in late-May through June along with an egg-sterilant in the last application. The purpose of adult suppression with foliar sprays is to limit the number of gravid females and egg deposition, thereby reducing the number of larvae entering the soil. An egg-sterilant such as Micromite 80WGS has a 6-week residual effect where females lay sterile eggs and eggs contacting the leaf surface are nonviable. Note that the addition of petroleum oil to the spray mixture affects the bonding characteristics of the substance bonding the egg mass to the leaf.

Multiple applications of most foliar sprays within a season can incite abnormal increase in spider mite populations; and any pesticide, when used frequently, might cause secondary pest outbreaks or lead

to resistance.

A chemical barrier applied as a band to the soil surface beneath the tree using a herbicide applicator provides a treated surface that will kill newly hatched invasive larvae before they reach the root system. Chemical must be uniformly applied from the trunk to the dripline of the tree to a moistened soil surface devoid of litter. Greater spray volume (~40 gal/A) should insure greater uniformity of coverage. Disturbance of the soil beneath the trees should be minimized to protect the soil barrier. Since neonates are killed upon exposure to treated soil as they pass through the barrier, it would appear that this control tactic should be best used for resets and young plantings infested with *Phytophthora* and where root injury by larvae must be minimal.

Timing chemical application to the time of the year when larval entry into the soil is highest, requires monitoring of adult weevils in the tree. Since highest larva recruitment occurs just after peak adult emergence, growers should apply soil treatment in early July, about 2 weeks after peak adult emergence in central Florida. Peak adult emergence is generally 2 to 3 weeks earlier in coastal groves.

Currently, Brigade WSB, a synthetic pyrethroid, is the only chemical registered for neonatal larvae control and applied as a soil barrier. Brigade has about 3 weeks residual in the soil and will suppress ants foraging on the soil surface. Generally, ant predators will recover after 30 days.

Parasitic nematodes that specifically attack insects are infectious to all larval stages of citrus root weevils. They are found in citrus soils naturally where they inflict mortality to all weevil life stages that are contacted. Nematodes are also sold to growers as biopesticides to control citrus root weevil larvae. They should be applied during months when soil surface temperatures are expected to exceed 70°F. Weevil larvae are generally highest in the soil during the summer (mid-July through September); therefore, one or more nematode applications are recommended at this time of the year if soil moisture via natural causes and/or irrigation is adequate. Nematodes should not be applied within 4 weeks of nematicide use. Properly modified herbicide applicators or microsprinkler irrigation systems are used to

deliver nematodes into pre-moistened soil. Application of approximately one acre inch of water should also be applied to the irrigated acre immediately following application. Application late in the day or on cloudy days is encouraged to reduce nematode desiccation and exposure to lethal UV radiation.

Current nematode products are most effective when applied in sandy ridge type soils with more coarse soil texture, but are less effective in fine-textured soils at recommended rates. Higher rates can be applied to fine-textured soils.

A fungicide for control of *Phytophthora* spp. may be recommended under the following conditions as a supplemental strategy to larval and adult weevil control: 1) the soils are fine textured, poorly-drained or high in pH and calcium carbonate, 2) the trees are on rootstocks susceptible to *Phytophthora* spp., and 3) populations are above the damaging levels (20 and 40 propagules per cm³ soil) for *P. nicotianae* and *P. palmivora*, respectively. Remember, larval and/or adult weevil control must be effective before fungicide treatment is justified.