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Biological Control of Mole Crickets with Nematodes

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Pasture Damage by Mole crickets

Foreign mole crickets cause serious damage to bahiagrass pastures in Florida. The three pest mole crickets in Florida are named Southern, Tawny, and Short-winged, but Tawny is the most damaging of them. In a 1998 survey by the South Florida Beef and Forage Program, 64% of cattle producers each reported about 290 acres of their ranch as damaged by mole cricket infestation. At an estimated cost of $200 per acre for pasture renovation, the reported damage amounts to $3,712,000 for every 100 beef cattle producers in south-central Florida. Additional revenue from hay production is also lost. Chemical control provides only short-term relief and may leave harmful residues in the environment.

Biopesticide Control of Mole crickets

Fortunately, the UF/IFAS patented insecticidal nematodes carry bacteria that kill only pest mole crickets within a few days after infection. These special nematodes provide long-term protection by multiplying in dead mole cricket bodies and reinfecting other mole crickets nearby. The mole cricket nematodes will become commercially available again sometime next year.

Storage and Handling

The insecticidal nematodes are marketed in a moist porous foam (polyether polyurethane or cellulose) formulation. Nematodes are delicate living organisms and must be properly handled, stored and field-applied. The product must be stored in cold refrigeration (39

oF) or at least under air-conditioning after purchase. Since nematodes tend to lose motility with time, storage should not exceed six weeks. On the day of application, the nematode product should be transported to the field under air conditioning or in chest coolers. Product should not be exposed to direct sunlight or prolonged heat inside a truck.

Field Application

A special injection sprayer is required for the inoculation of nematodes 1 to 2 inches below the soil surface. A normal sod-seeder can be modified with a tank, pump, hoses and nozzles into an inoculative sprayer. The nematode product is premixed in a pail of water before adding to a sprayer tank containing water. The sprayer mixture is injected into the ground at the rate of 800 million nematodes in 100 gallons of water per acre. There are on-going studies to evaluate the effectiveness of strip field application of nematodes for mole cricket control. If effective, strip field inoculation will considerably reduce the cost of applying insecticidal nematodes to pastures.

Time of Application

Nematodes enter the body of mole crickets through all natural body openings such as the mouth, anus and spiracles (breathing holes). Therefore, nematodes are more effective on adult mole crickets which have larger openings and less effective on nymphs. This also implies that the best time to apply nematodes to the field in south-central Florida is in the Fall (September to November) or early Spring (February to March) when adult Tawny mole crickets are most abundant. Little surface activity is shown by mole crickets in December and January as they "overwinter" deeper in the soil. Fall field application is preferable because it allows for a longer period of infection before egg laying by Tawny mole crickets from March to May. Following infection with nematodes, mole crickets die within a few days, nematodes reproduce and young nematodes emerge from dead mole cricket bodies in 10 to 14 days. These fresh nematodes will infect other mole crickets to repeat the cycle and provide long-term control.

Release of Infected Mole Crickets:

An easy method of spreading nematodes on small land holdings is to trap, infect and release infected mole crickets during the early spring mating flights. Sound emitters are commercially available that mimic male songs and attract adult mole crickets to traps. Trapped mole crickets are incubated in a nematode solution for two hours and then released on heavily infected areas ‘hot spots' of a pasture to spread the nematode to other pest mole crickets.

Several workshops and a Field Day are planned for 2001 to demonstrate nematode application technology to producers, be on the lookout for announcements.