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## **Protection of Bahiagrass Pasture From Mole Crickets with Insecticidal Nematodes**

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Mole crickets cause serious damage to pasture grasses in Florida. Estimates show that \$10 million are spent annually on pasture renovation and \$40 million revenue is lost in hay and forage production because of mole cricket damage. An insecticidal nematode for mole cricket control will become commercially available next spring from Becker Underwood, Ames, Iowa. A Florida mole cricket project is currently under way to provide educational programs and information, including field demonstrations, workshops, video programs, and factsheets, to producers on the appropriate use of the insecticidal nematodes in mole cricket management.

The mole cricket insecticidal nematode belongs to a group of eels or thread worms called *Steinernema*. It can be seen clearly only under 50 to 100x magnification. This group of nematodes have developed a mutual (symbiotic) association with a group of bacteria called *Xenorhabdus*. The bacteria cells are housed in the intestine of the infective young (juvenile) nematode. This juvenile is the only free-living, non-feeding stage of the nematode and its sole function is to search for new hosts in the soil and initiate an infection. In nature, the infective juvenile ambushes a mole cricket host in the soil, enters through all natural openings (mouth, anus, and spiracles) of the host, penetrates into the insect's body cavity (hemocoel), and releases the bacterial cells. The bacteria multiply rapidly killing the host within 2 days. The nematode feeds on bacteria cells and degrading host tissue. It matures, mates and completes its life cycle within the dead mole cricket. Up to 50,000 new young juveniles emerge from each infected dead mole crickets within 6-12 days to search for new host and repeat the cycle.

Because, the infective juveniles are susceptible to a variety of physical and biological factors, the end user of an insecticidal nematode product needs to exercise proper precaution for an effective mole cricket control program. Physical factors in the soil environment including extremes of temperature, rapid drying, lack of aeration as occurs under water saturation, and ultra violet light can reduce nematode survival. Yet adequate moisture is central to infective juvenile survival. **The nematodes will die from desiccation or ultraviolet light. Extended exposure to temperatures below freezing (32 °F) and above 104 °F is also deadly to the nematodes.** In general, infective juveniles survive best between 50 and 60 °F. From a practical viewpoint, **application of insecticidal nematodes is recommended early in the morning or late in the afternoon or on a cloudy day to minimize detrimental effects of dessication, ultraviolet light and extreme temperatures. Alternatively, nematodes can be inoculated at 1 inch below the soil surface.** Soil pH values between 4 and 8 have little or no effect on nematode survival. Soil salinity also seems to have limited negative effect on nematodes. Although direct placement of infective juveniles nematodes into chemical pesticides can be detrimental, in the soil environment pesticides are sufficiently 'diluted' and effects are minimal.

Nematode product must be stored in a refrigerator at 40 to 50 °F and transported on ice. To reduce cost of application, we recommend that insecticidal nematodes be strip-applied to cover 1/8 of the general pasture area and 1/4-1/2 of the heavily, mole cricket-infested areas or hot spots. For a schedule of on-going mole cricket workshops, contact your county livestock agent. Mole cricket insecticidal nematode product (**Nematac S**) and purchase information may be obtained directly from Becker Underwood at 1-800-232-5907.