Nematodes
Alternatives to Nemacur for Nematode Management on Golf Course Turf

William T. Crow

In 2002 12 products were evaluated on Florda Dwarf bermudagrass for the ability to decrease nematode population densities higher or lower than the untreated at one sampling date. In 2003 we will be testing these same treatments at a different site. In 2004 we will also be conducting the test on a different bermudagrass cultivar to see if root differences can be better quantified.

John Eric Luc and William T. Crow

Can nematode management have a positive environmental impact? What if managing nematodes could reduce nitrogen use and nitrate leaching into groundwater? Plant-parasitic nematodes damage turf roots, making the turf less efficient at extracting water and nutrients from soil. To keep nematode-damaged turf looking acceptable often requires additional water and nitrogen. Where does the nitrogen go that is not taken up by the turf? These questions are being explored in the following experiments funded by the FGCSA and GCSAA.

Johnna Welch and William T. Crow

Trichodorus proximus and Paratrichodorus minor are the most common species of stubby root nematodes found on turf-grasses in Florida. An experiment funded by the Florida Turfgrass Association compared the reproductive rates and root damage caused by these two stubby root nematode species on bermudagrass and St. Augustine turfgrasses. Twenty pots each of TriEagle bermudagrass and Floratine St. Augustine turfgrass were used for this experiment. Five pots each were inoculated with 400 T. proximus, 400 P. minor, or 100 Belonolaimus longicaudatus (sting nematode), and five pots were uninoculated controls. After inoculation, the plants were left for 100 days in a climate-controlled greenhouse during which all of the plants
Mole Crickets
Interactions between Mole Crickets and Insect-Parasitic Nematodes (Steinernema scapterisci, Nematae S)

Kathryn A. Barbara and Eileen A. Buss

Mole crickets (Scapteriscus spp.) are the most damaging insect pests of managed turfgrass and pastures in the southeastern United States. Although insecticides often provide effective short-term control, long-term suppression of mole cricket numbers is needed. We examined the establishment and spread of the insect-parasitic nematode Steinernema scapterisci on golf courses. We placed 20 linear pitfall traps on two mole cricket hot spots within 10 different fairways on two Gainesville golf courses (40 traps total). Within each fairway, one hot spot (1/10th of an acre) was treated with nematodes and the other was left untreated. The rate was 1 billion nematodes per acre.

The average percentage of infected mole crickets before the fall 2001 nematode application was 16.7 percent at Ironwood Golf Course and 20.4 percent at Gainesville Golf and Country Club. This showed that the nematode had persisted on these golf courses after earlier applications in 1988 and 1989. Pesticides were commonly used on both courses. Post-application infection to date is an average of 33.9 percent at Ironwood and 24.4 percent at Gainesville Golf and Country Club. However, over time, the percentage of infected mole crickets collected varies, often because of weather and mole cricket activity. Data also demonstrate that the nematode is moving into untreated areas of the golf courses.

Thus, use of S. scapterisci against pest mole crickets is a sustainable and low-risk IPM tool for turfgrass managers. The nematodes attack large nymphs and adults, reproduce inside their bodies within several days, and then disperse back out into the soil to infect other mole crickets. Our research, and that of Dr. Martin Adjei and Dr. J. Howard Frank, indicates that these nematodes work well over time where insecticides either cannot be used (e.g., pastures) or where insecticides have failed to control pest mole crickets.

Nematode populations persist for years and kill mole crickets in the soil, before they can lay more eggs in the fall and spring. We are continuing tests to evaluate the effect of these nematodes on mole cricket tunneling behavior and to see if soap flushes, which are currently monitoring methods, accurately indicate infection in mole crickets.

Integrated Pest Management of Pest Mole Crickets with Emphasis on the Southeast

J. Howard Frank and J. Pat Parkman

There are at least 70 species of mole crickets (Orthoptera: Gryllotalpidae). Some are rare, others are innocuous, and a few are important pests. These soil-dwelling pests damage underground parts of a long list of cultivated plants. Although tillage and flooding are used successfully in some situations to bring these pests to the soil surface and expose them to vertebrate and other predators, chemical pesticides are widely used.

Knowledge of their life history is used to time application of chemical treatments to save money, but is not used as widely as it might be. Classical biological control has been used against immigrant mole crickets in Hawaii, Puerto Rico, and the southern USA.

In Florida, three Scapteriscus species from South America cause major damage to pastures and turf and are targets of a classical biological control program. Population levels of two of the pest species have been reduced substantially in Florida by establishment of a tachinid fly (Ormia depleta) and a steinernematid nematode (Steinernema scapterisci) from South America. The nematode also functions as a biopesticide. Managers of pastures and turf in Florida have thus far derived benefits from these classical biological control agents without understanding their function: use of chemicals is reduced when mole cricket populations are low due to action of these organisms.

Future enhancement of the action of O. depleta and of a sphecid wasp (Laurea bicolor), which was also introduced from South America probably will demand deliberate planting of nectar sources for adults of these biological control agents, and the advantage will be to managers who adopt such a strategy.

Chemical pesticide use is strongly promoted by a large chemical industry, whereas biopesticidal use has thus far been little promoted and sales have been few. Even managers who do not change their strategy of pesticide use in response to damage by mole crickets, and have no knowledge of the differing life cycles of the three Scapteriscus species or of the presence and action of the classical biological control agents, will derive benefit as these biological control agents (and a predatory beetle which has not yet been released) increase their distribution.