

Mole Cricket State Project Update September 2002

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The Mole Cricket Task Force initiated a regional project in June 1999 that successfully reestablished commercial production of the entomopathogenic nematode, *Steinernema scapterisci*, for mole cricket control in the southeastern United States and Puerto Rico. Stakeholders are benefiting by significantly reducing a major source of environmental pollution and permanently controlling an invasive pest of agricultural and natural resources. During the past three years, the Task Force accomplished the following:

1. Obtained \$25,000 for a University of Florida, Institute of Food and Agriculture Sciences, Florida FIRST Initiative Project to Import laboratory reared nematodes from Australia and conduct field tests in central Florida. Four billion nematodes were applied to a 24-acre pasture in 1/8-acre strips to demonstrate that they will rapidly move to cover the entire area.
2. Established commercial production of the mole cricket nematode by Micro Bio (United Kingdom) for distribution by Becker Underwood (United States). Suppliers were provided for pastures and sod farms, golf courses and athletic fields, and homeowners. At a cost of \$200 per acre for full coverage, the 1/8-acre applications reduced the cost to about \$25 per acre, making the nematodes cost effective for use by farmers and cattlemen.
3. Secured a \$300,000 Florida State legislative appropriation from the Florida Legislature to expand demonstration projects throughout the state. Fifty billion nematodes were applied at 44 sites in 20 counties in 2001 and 12 more counties were added in 2002. Additionally, there were numerous commercial applications across the Southeast.
4. Distributed educational materials and conducted field days throughout the state to provide training in how to apply and evaluate the nematodes. A diagnostic capability was developed to determine nematode establishment and levels of infection in the mole crickets. This capability was extended with an \$85,000 Tropical/Subtropical Agricultural Research grant for surveying entomopathogenic nematodes in the Southeast and Puerto Rico.
5. Obtained a \$75,000 Tropical/Subtropical Agricultural Research grant to determine how to efficiently release, establish, distribute and evaluate the mole cricket nematode. For the first time, the beneficial nematode has been established in Puerto Rico on the pest mole crickets.

Cattlemen, golf course managers, turf producers and others whose livelihood depends on healthy grass, as well as those who care for public parks, playgrounds and home lawns,

have suffered millions of dollars in damage and control costs for more than a century due to a foreign invader, the mole cricket. The recurring cost of controlling pest mole crickets with chemical insecticides is astronomical, particularly if non-target effects are considered. In south central Florida alone, about 300,000 acres of bahiagrass pastures have been destroyed since 1996 and at least 200,000 acres of golf courses and lawns are infested throughout the Southeast. Mole cricket damage to the turfgrass industry exceeds \$100 million per year in this region. In 1998, the UF, IFAS South Florida Beef and Forage Program estimated that south Florida cattle producers lose about \$44 million in revenue yearly due to reduced forage and hay production. Mole cricket infestations cost an additional \$10 million for the renovation of destroyed pastures.

To pursue a cost-effective means of controlling the mole cricket plague, the University of Florida, Institute of Food and Agriculture Sciences provided leadership in establishing a partnership among the affected agricultural industries, urban clientele, Florida Department of Agriculture and Consumer Services, and pest management organizations in the private sector. This partnership evolved into the Mole Cricket Task Force and cooperators. During the past three years, the partners have exhibited exceptional teamwork in establishing commercial production of the mole cricket nematode.

Members of the Mole Cricket Task Force and cooperators conducted a critical and highly successful research project to test the effectiveness of the mole cricket nematode at different rates of application in pastures. The objective was to reduce the number of nematodes applied per acre. The cost of the nematode product at the full application rate of one billion per acre is too expensive for use by farmers and ranchers. The nematodes were strip-applied to cover $\frac{1}{2}$, $\frac{1}{4}$, or $\frac{1}{8}$ of the treated land area. The number of trapped mole crickets was counted weekly and samples were analyzed for nematode infection every month. The percentage infection ranged from a high of 71% for the $\frac{1}{2}$ area treatment to 35% for the control. These rates of infection and spread clearly indicated that the nematode has become established across the pastures and is recycling to kill mole crickets

Due to the efforts of the Mole Cricket Task Force and cooperators, MicroBio, a company in the U.K. owned by Becker Underwood, Ames, Iowa, is mass-producing and distributing the mole cricket nematode. Cattlemen, turf farmers, golf course superintendents, municipal landscapers, homeowners and allied industries in Florida are benefiting greatly by having the cost-effective nematode for mole cricket control. The nematodes can be used at a fraction of the long-term cost of using insecticides, an option that is too expensive for most cattlemen. Moreover, nematodes are safe to apply and are not subject to registration by the Environmental Protection Agency.

Research at the University of Florida has proven under operational conditions that *Scapteriscus* spp. mole crickets die within a few days after being infected with the nematode and that it persists for years in areas where it has been applied. Unfortunately, however, the nematode reproduces and spreads slowly on its own. The overall objective of the Mole Cricket Task Force and cooperators has been to establish the nematode

rapidly throughout Florida and Puerto Rico, thereby virtually eliminating mole crickets as agricultural and urban pests.

The diverse and highly integrated Mole Cricket team has divided the mole cricket research and extension effort into discrete projects classified as demonstration, Extension, and research. Demonstration projects are being conducted in pastures, golf courses, sod farms and municipal landscapes. Educational programs include Extension in-service training, private and public applicator training, clientele workshops and field days, and pertinent information for lawn care services, mail-order stores, and homeowners. Research has been both general and specifically in support of Becker Underwood's commercial product.

The Mole Cricket Task Force and cooperators have exhibited an exceptionally high level of creativity and innovation in assembling key partners to accomplish the goal of establishing commercial production of the mole cricket nematode. The team also has accomplished the necessary research to make the nematode cost effective for a wide range of clientele. They have provided Extension support in the use and evaluation of the nematode. The effort is a model for other fast track Integrated Pest Management projects in Florida, the Southeast and nation. The benefit is cost effective, long-term, safe biological control of non-indigenous mole crickets and other invasive pest species.