August 16, 2001 Draft

MOLE CRICKET STATE PROGRAM - WORKPLAN 2001-2002

OBJECTIVE: To conduct research/demonstration and demonstration projects that will widely distribute the entomopathogenic nematode, *Steinernema scapterisci* Nguyen and Smart, in Florida; determine its establishment, rate of spread and impact on *Scapteriscus* spp. mole crickets, and support its commercialization.

APPROACH: About 20 billion nematodes will be produced and supplied by MicroBio at a cost of $40.00 per billion. They will be applied to pastures, golf courses, sod farms and urban landscapes beginning the third week in September, 2001. The mole cricket state program will be split into two parts with the indicated leadership: 1. Pastures and Sod Farms (Martin Adjei, Herb Harbin, Lockie Gary & Dave Dymond) and 2. Golf Courses and Landscapes (Tom Hinks, Eileen Buss, & Howard Frank). Research may include application rates and patterns in different situations, baseline application parameters for equipment modification, nematode establishment and impact evaluation, correlation of mole cricket trap capture with damage, monitoring techniques to demonstrate mole cricket death (sound and pitfall traps), and rate of dispersal of infected mole crickets. Extension and Education support will be provided within these two program areas. The Mole Cricket State Program Workplan Committee will make programmatic decisions, with periodic direction from the Mole Cricket Task Force. Operational decisions will be made in the two program areas. Funds will be maintained in the Office of the Dean for Research, UF, IFAS and released according to the attached budget.

Mole Cricket State Program Organizational Chart

Overall Program Support

Bill Brown
Norm Leppla

Pasture & Sod Farms

Martin Adjei
Herb Harbin
Lockie Gary
Dave Dymond

Golf Courses & Urban Landscapes

Tom Hinks
Eileen Buss
Howard Frank
County Extension
Clientele

Extension and Education Projects

LOCATIONS AND SITES: The nematodes will be applied on pastures, sod farms, golf courses and urban landscapes. Within these locations, the number and acreage of Research/Demonstration Sites will depend on available resources, location and experimental design.

Estimate of Application Sites for September 2001

Locations	Res/Demonstration[1]	Demonstration[2]	Total[3]
Pastures	8	12	20
Sod Farms	0	5	5
Golf Courses	3	15	18
Urban Landscapes	1	3	4
Total	12	35	47

[1]Research/Demonstration Sites will have more traps and be sampled more frequently than the Demonstration Sites. These sites will be used to determine nematode establishment, rate of spread and the proportion of infected mole crickets. Golf Course Demonstration Sites will be established allied to this project.

[2]Demonstration Sites will have a minimal number of traps and be sampled monthly during the mole cricket adult season. These sites also will be used to determine nematode establishment, rate of spread and the proportion of infected mole crickets.

[3]The number of Research/Demonstration Sites will be reduced and Demonstration Sites increased, if possible. An effort will be made to increase the geographical distribution of the sites.

PASTURES:

Research/Demonstration Sites

1. A. D. Combee Ranch- Initiated September 2000, Polk County.

In September 2000, four billion nematodes were imported from Australia and applied in strips that covered 0, 1/8, 1/4, and ½ of the treated area. The number of mole crickets trapped and rainfall has been recorded every week. This study will continue through June 2002. Preliminary results indicate that infected mole crickets have spread nematodes across the entire 24-acre pasture.

Acreage: 2 acres per treatment, 24 acres total
Treatments: 0, 1/8, ¼, and ½-acre strips
Replicates: 3 per treatment
Number of nematodes: 4 billion
Number of traps per treatment: 6; 72 total
Frequency of sampling: 1 night per month to June 2002 (not in Dec. and Jan.), 6 months total
Number of mole crickets examined: Ave. 5/trap/night sampled, 360 total per night, 2160 total

2. Ranches treated in spring 2001.

In March-May 2001, 16 billion nematodes were donated by MicroBio and applied in strips that covered 0, 1/4 or 1/8 of the treated area. Treatments were applied on a total of 92 acres. Each bahiagrass plot was four acres in size and there were two replicates. The distribution of ranches, counties, acreage, treatments, replicates and application dates is as follows:

Research/Demonstration Sites March-May 2001

Ranch	County	Acreage	Treatments	Replicates	Date
Helen Keller	Hardee	16	0, 1/8 & 1/4	2	3/08/01
Peace River	Hardee	16	0, 1/8 & 1/4	2	4/19/ 01
Luther Bryan	Hardee	16	0, 1/8 & 1/4	2	5/29/01
William Wise	Desoto	16	0, 1/8 & 1/4	2	3/15/01
Al Bar	Pasco	8	0, 1/8	2	3/29/01
Mary Nutts	Pasco	4	0, 1/4	1	3/29/01
Hughes Combee	Polk	16	0, 1/8 & 1/4	2	5/23/01

Number of nematodes: 16 billion
Number of traps per treatment: 3;108 total
Frequency of sampling: 1 night per month to end of 2001, 6 months total
Number of mole crickets examined: 5/trap/night sampled, 540 per night, 3240 total

3. Demonstration Sites.

In September-October 2001, 12 billion nematodes will be applied to 12 ranches, one 8-acre site per ranch. The nematodes will be applied in 1/8-acre strips; thus, 96 acres will be treated. Additional Demonstration Sites will be added as the project develops.

Demonstration Sites September-October 2001

Ranch	County
E & E Cattle, Hooker Browning	Desoto
Turner Cattle Co. Phil Turner	Desoto
Bill Keating	Hardee
John Smoak	Highlands
John Payne	Highlands
To Be Determined (TBD)	Hillsborough
TBD	Manatee
TBD	Manatee
Deseret Cattle & Citrus	Orange
TBD	Osceola
TBD	Pasco
TBD	Osceola

Number of Ranches: 12
Number of Demonstration Sites: 12
Acreage: 8 acres/site, 96 acres total
Treatments: 1/8-acre strips
Replicates: 1 site per ranch & county
Number of Nematodes: 12 billion
Number of traps per site: 8; 96 traps total
Frequency of sampling: monthly, 10 months (not December and January)
Additional data: (damage to grass, tunneling, stages of mole crickets)
Number of mole crickets examined: 5/trap/night sampled, 4800 total

SOD FARMS: Nematode applications will be made on at least five sod farms located in Marion, Manatee, Okeechobee and other counties. The applications will be made by surface spray or injection, depending on efficacy and available equipment. Sod farm owners have been contacted.

August 16, 2001 Draft

1. Demonstration Sites.

Number of sod farms: 5
Number of Demonstration Sites: 1 per farm
Acreage: 1/2 acre per site, 2.5 acres total
Treatments: ½ billion per acre broadcast
Replicates: 1 per site
Number of nematodes: 2.5 billion
Number of traps per treatment: 2; 10 traps total
Frequency of sampling: monthly, 10 months (not December and January)
Number of mole crickets examined: 5/trap/night sampled, 500 total

GOLF COURSES: Research/Demonstration Sites on golf courses will be used to determine nematode establishment and spread across the fairways and their effect on the turf. Two mole cricket-infested fairways with damage in the roughs will be used on each of five golf courses. A rough on one side of each fairway will be sprayed with the nematodes (ca. 1/2 acre). The nematodes will be spray on approx. ½ acre of each treated rough by golf course personnel. Pitfall traps will be placed in the treated rough and untreated rough on the opposite side of each fairway, four traps per rough, eight traps total. Additionally, injection and spray nematode applications will be tested for their effectiveness at Demonstration Sites. Golf course superintendents have been contacted and Palatka Municipal Golf Club will be one of the sites.

1. Research/Demonstration Sites.

Number of golf courses: 5
Number of Research/Demonstration Sites: 2 per golf course
Acreage: 10, approx. ½ acre sites
Treatments: ½-acre strips
Replicates: 2 per golf course
Number of nematodes: 5 billion
Number of traps: 4 pitfall traps per rough, 8 per rough/fairway, 16 per golf course, 80 total
Frequency of sampling: Monthly, 10 months (not December and January)
Additional data: soil type, grass quality/color,
Number of mole crickets examined: 5/trap/night sampled, 4000 total

2. Demonstration Sites (allied to this project)

Number of golf courses: 15
Number of Demonstration Sites: 1 per golf course, 15 total
Acreage: 1/2 acre plus per site
Treatments: 1/2 acre plus
Replicates: 1site (fairway) per golf course
Number of nematodes: 7.5 billion
Number of traps per treatment: none
Frequency of sampling: none
Additional data: none
Number of mole crickets examined: none

August 16, 2001 Draft

URBAN LANDSCAPES: Initially, 3 3/8 billion nematodes will be applied at four landscape locations in Alachua, Sarasota, Orange, and Bradford counties. Other Demonstration Sites will be added to expand the geographical area and utilize five billion nematodes.

1. Research/Demonstration Sites.

Number of landscape locations: 1
Number of Research/Demonstration Sites: 3
Acreage: ½ acre per site, 1.5 acres total
Treatments: ½ billion per acre broadcast
Replicates: 3 sites per location
Number of nematodes: 1.5 billion
Number of traps per treatment: 4; 12 traps total
Frequency of sampling: monthly, 10 months (not December and January)
Additional data: damage to grass, tunneling, stages of mole crickets
Number of mole crickets examined: 5/trap/night sampled, 600 total

2. Demonstration Sites.

Number of landscape locations: 3
Number of Demonstration Sites: 1 per location, 3 total
Acreage: 1/2 acre per site, 1.5 acres total
Treatments: ½ billion broadcast
Replicates: 1 site per location
Number of nematodes: 1.5 billion
Number of traps per site: 2; 6 traps total
Frequency of sampling: monthly, 10 months (not December and January)
Additional data: damage to grass, tunneling, stages of mole crickets
Number of mole crickets examined: 5/trap/night sampled, 300 total

Mole Cricket State Program Workplan Structure:

Location	Site Type	No. Nematodes	No. Traps	MC Samples
Pastures	Research 1	Completed	72	2160
	Research 2	Completed	108	3240
	Demonstration	12	96	4800
Sod Farms	Demonstration	2.5	10	500
Golf Courses	Research	5 Diff.Batch	80	4000
	Demonstration	7.5 Diff. Batch	0	0
Landscape	Research	1.5	12	600
	Demonstration	1.5	6	300
Total	8 Types	30 Billion	384 Traps	15,600 Samples

August 16, 2001 Draft

Extension and Education:

1. Clientele.

A field day/workshop will be conducted for each county or multi-county to coincide with the date of nematode application (September-October, 2001) and again a year after application to discuss the results.

The south Florida Beef/Forage Program booth at the 2002 FCA Annual convention will showcase nematode application technology. Displayed items will include but not be limited to a video of infected versus healthy bahiagrass sod, packages of the Nematac product, video of the custom nematode application rig in operation, sound and pitfall traps, species of pest mole crickets, microscopic viewing of nematode-infected mole crickets, and microscopic projection of live and vibrant *Ss* nematodes.

2. County Faculty.

Martin Adjei and Eileen Buss will conduct in-service training on nematode application for mole cricket control. Participating county faculty will earn CEUs as determined by FDACS. Tentatively, subjects to be covered at the training will include: 1. Biology of mole crickets and *Ss* nematodes (Grover Smart, Billy Crow), 2. Sources and use of *Ss* nematodes (Norm Leppla, Tom Hinks), 3. Pest mole cricket research and alternative biological control strategies (Howard Frank), 4. Application and evaluation of *Ss* nematodes on golf courses and urban landscapes (Tom Hinks, Eileen Buss, Howard Frank, Extension), 5. Application and evaluation of *Ss* nematodes on pastures and sod farms (Martin Adjei), and 6. Mole cricket Task Force update (Bill Brown, Norm Leppla).

Division of Plant Industry Support:

Support from DPI will be coordinated directly by the project leaders and may include:

1. Preparation of trap components, i.e., cutting slots in PVC pipes
2. Loaning excess property vehicles
3. Assistance with nematode applications and evaluations, i.e., installing pitfall traps and collecting mole crickets
4. Analysis of mole cricket samples for nematodes
5. Assistance with developing educational materials

Participation in Extension activities, i.e., workshops and field days