



Texas Imported Fire Ant Research and Management Project

Progress Report - June 2002

Integrated Use of Broadcast Baits and Biological Controls (*Pseudacteon tricuspis* and *Thelohania solenopsae*) in Varied Regions of Texas to Control Populations of Red Imported Fire Ants

Principal Investigator:

Charles L. Barr, Extension Program Specialist
Texas Cooperative Extension
P.O. Box 2150
Bryan, TX 77806
979-845-6800, 979-845-6501(fax)
c-barr@tamu.edu

Co-Principal Investigators:

Sanford Porter
USDA-ARS, CMAVE
P.O. Box 14565
Gainesville, FL 32604
352-374-5914
sdp@nersp.nerdc.ufl.edu

Larry Gilbert
Patterson Labs, Dept. of Zoology
University of Texas
Austin, TX 78712
512-471-4705, 512-471-9651 (fax)
lgilbert@mail.utexas.edu

Forrest Mitchell
Texas Agricultural Experiment Station - Stephenville
Route 2, Box 1
Stephenville, TX 76401
254-968-4144, 254-965-3759 (fax)
fmitchell@tamu.edu

Other Personnel: Alejandro Calixto, Extension Assistant
Lisa Brooks, Grad Student Worker

Funding Amount/2 Years: \$83,000

Summary of Work to be done:

The objectives of the project can be summarized as follows:

- Determine the feasibility of establishing biocontrol agents in areas of Texas with varied climate and geography.
- Determine if the biocontrol agents affect the density and/or vigor of fire ant colonies under field

conditions.

- Determine if the biocontrol agents will slow or prevent reinvasion of fire ants into areas treated with broadcast baits.

Pairs of test sites will be established in varied locations around the state to represent some of the different climates, soil types, etc. found in the fire ant infested portion of Texas. Each site will consist of a plot 8 - 10 acres in size plus surrounding area. Both sites will be treated with broadcast bait to provide an initial knockdown of the existing fire ant population. One site of a pair will serve as the biocontrol release/inoculation site where phorid flies (*Pseudacteon tricuspis*) and *Thelohania solenopsae* will be established. The other site will remain untreated so that the activity of the biocontrol organisms can be compared to it. Sites will be monitored for the establishment and spread of the organisms, density and vigor of fire ant colonies and changes within the native arthropod community.

Major Accomplishments to Date:

- Phorid fly release in Waller County (September, 2001) representing middle Coastal Plain geography/climate and monogyne ant population.
- Phorid fly release in Orange County (April, 2001) representing far southeast Texas and a monogyne ant population. Climate and geography most similar to that of Florida, where phorids are well established and expanding their range.
- Phorid fly release in Burleson County (May, 2001) in cooperation with USDA-ARS Area-wide project, representing Central Texas climate/geography and predominately polygyne ant population.
- In collaboration with the University of Texas, addition of bait-treated plot to a long-term phorid release site in Wharton County to take advantage of existing fly population.
- Planned release in fall 2002 of *P. tricuspis* biotype collected in South America from area similar to Central Texas.
- Regular monitoring of all release sites for phorid detection.
- Adaptation of PCR technique and development of specific primer for reliable detection of *T. solenopsae* in Texas fire ants. Technique should be as or more accurate than microscopy and less time consuming.
- Tested methods of archiving *T. solenopsae* DNA. Comparisons with fresh DNA using trichrome stains and microscopy.
- Local surveys of high and low *T. solenopsae* occurrence compared to mound density.
- Developed collection protocol and screening routine for *T. solenopsae* samples.

Goals Achieved:

- Establishment of three of the proposed four release sites. Establishment of fourth site in fall 2002 with newly imported *P. tricuspis* biotype.
- Establishment of test site in area of existing phorid fly population in cooperation with the University of Texas.
- Development of PCR analysis technique for *Thelohania* detection.
- Development of DNA archiving technique.
- Recent detection of first generation flies at the Burleson County site.
- Initiation of a cooperative agreement with USDA-ARS for an area-wide project using an identical experimental concept, but on a much larger scale. This project will serve, to some extent, as within-state replications of that national effort.

According to the proposed time line, the project is on schedule. Considering the funding

reduction and unavailability of Extension funds for salaries, we were forced to reduce the number of sites to four from what was initially proposed. Nevertheless, great strides have been made in developing efficient and reliable methods of *Thelohania* sampling and analysis, as well as more efficient phorid fly release and monitoring techniques. It is far too early in the project to tell if the presence of these organisms affect fire ant colony density and/or vigor or whether they slow or prevent reinvasion of bait-treated areas.

Relevance to the Texas Imported Fire Ant Research And Management Project:

A founding concept of the Texas Red Imported Fire Ant Research and Management Project was to invest in basic research on fire ants and control methods early in the program, carry these advances into the field for practical testing, then into implementation through field research/demonstrations and the Extension network. This project bridges the gap between the laboratory and widespread promotion of a control strategy by testing the feasibility and effectiveness of three combined methods of fire ant control in true Integrated Pest Management (IPM) practice. The project builds on the basic research done with two promising biocontrol agents, the phorid fly (*Pseudacteon tricuspis*) and the microorganism *Thelohania solenopsae*, in addition to proven broadcast bait technology.

The cost of broadcast baits are now roughly \$12 per acre per treatment, unaffordable to most large landowners and agricultural interests. The biocontrol agents, if they cannot reduce fire ant populations themselves, may serve to slow or prevent reinvasion of areas treated with a broadcast bait. In doing so, the cost of the bait can be spread out over several years, or even made a one-time expense. This will particularly benefit ranchers, wildlife managers and others with large tracts of land who cannot currently afford chemical controls. In areas where fire ant pesticides are already applied, frequency of use may be reduced with resulting economic and environmental benefits.

Products:

Since the project's inception in September, 2001, there has not been sufficient time to gather enough data for meaningful reports.