



# Texas Imported Fire Ant Research and Management Project

*Final Progress Report - October 2001*

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## **Microgeographical surveys of fire ants, native ants and phorid flies**

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### **Other Participants:**

Post doctoral fellow: R. Patrock; Graduate students: A. Himler, N. Mehdiabadi, M. Kronforst;  
Technicians: S. Bramblett, R. Adams, N. Plowes; Undergraduate: A. Green

**Funding Amount/2 years:** \$50,635

### **Summary of Work to be Done:**

A. Field surveys for new field sites for biological control release and related field experiments.

B. Training of Texas high school and college teachers to incorporate the collection, identification and study of local native ant faunas as a routine part of the organismal and ecological sections of biology courses, in order to add students to the workforce locating important inholdings of native ant diversity and communicating the importance of native ants in the suppression of imported fire ants.

C. Assessment of genetic diversity and relatedness of our phorid stocks, of field established flies and field-captured flies from South America using AFLP genotyping, an ideal molecular method for rapid screening of genetic diversity, to establish 1) how much genetic diversity is available in our stocks relative to parental and progeny lines 2) whether selected "small" fly lines are changed from parental stocks in genetic diversity, and if particular genotypes have better likelihood of establishment in field releases.

### **Major accomplishments to date (Sept. 1, 1999 through Aug. 31, 2001):**

We have:

- Established new county records for RIFA in five (5) counties in Central Texas (A).
- Established new county records for native fire ants (*S. geminata*, *S. aurea* and *S. xyloni*) in five (5), one and one counties, respectively) (A).
- Incorporated our survey information into the FASIMS database (A).
- Identified and/or gained permission for access to an additional fourteen (14) site locations in Central, South and Southeast Texas for the release of, and the monitoring of phorid flies (A)

- Developed an ant biology format with associated lectures, field problems, collection protocols and identification keys aimed at high school and college teachers (**B**).
- Organized and carried out an initial ant biology workshop at Brackenridge Field Laboratory May 30-31, 2000, involving a select group of Austin area teachers (LBJ Science Academy, Bowie HS, Southwestern University, and UT Austin) (**B**)
- Received feedback from the first workshop participants concerning ways to improve and expand the effort involved in secondary school outreach with respect to ant community surveys (**B**).
- Established a web site (see below) which reports on these workshops, publicizes the program for prospective participants (**B**).
- Completed the training for technical personnel who will conduct AFLP study (**C**).
- Successfully extracted DNA from individual phorid flies (**C**).
- Completed U. Mueller's laboratory renovations and installed the automated DNA sequencer needed for the AFLP studies and put it into use (**C**).
- Obtained initial data on genetic diversity of laboratory stocks of *P. tricuspis*. (**C**).

**Goals achieved:**

- Further clarified our geographic view of the imported fire ant's range along its frontal edge.
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Continued phorid releases, monitoring and relevant ecological studies at a number of localities across a wide breadth of the state.

- By initiating the ant workshop for teachers, we have taken a first step toward the ultimate goal of this project, that of increasing knowledge and understanding of native Texas ant biodiversity among students of science in Texas.
- Initiated genetic characterization of laboratory and naturalized populations of *P. tricuspis* using Amplified Fragment Length Polymorphism.

**Relevance to the Texas Imported Fire Ant Research Ant Management Project**

**Subproject A** indirectly promotes the long-term goal of establishing phorid parasitoids in Texas as RIFA biological control agents. We seek numerous replicate field sites around the state to assess ecological conditions important for establishment of the flies. Multiple sites with contrasting ant communities will also give us measures of possible variation in phorid effectiveness in mediating fire ant competition based on the interaction of local ant community structure and dynamics with abiotic factors.

**Subproject B** is based on the premise that long-term and sustainable biological suppression of imported fire ant below pest status will necessarily involve the presence of a healthy native ant community. For the general public to accept and participate in control efforts that require awareness and/or responsible stewardship of native ant resources, an increase in knowledge about and appreciation for ants in our ecosystem is required. Thus this sub-project will be important in helping the general public achieve that understanding through education of those who teach children.

**Subproject C** addresses the fact that it will be important to know the degree to which genetically different lines of *Pseudacteon* phorids have differential establishment probabilities and/or different levels of impact on imported fire ant. The only sure way to monitor such details during the release program will be to track the DNA genotypes of lab stocks, released populations and later, populations established outdoors in Texas. Feedback from AFLP analysis of DNA will allow midcourse corrections in release tactics, and minimize waste of effort.

**Publications submitted/published; presentations/posters presented at national technical meetings/conferences:** All combined in first project report.

**Proceedings Articles:** All combined in first project report.

**Presentations:** All combined in first project report.

