



Texas Imported Fire Ant Research and Management Project

Final Progress Report - October 2001

Evaluation of potential imported fire ant quarantine treatments for migratory honey bee colonies

Principal investigator(s):

Dr. John G. Thomas
Executive Secretary, Texas Beekeepers' Assn.
805 Vine St.
Bryan, TX 77802
Phone: 409/846-5068

Co-Investigator(s):

Ronald D. Weeks, Jr.
Graduate Research Assistant
Extension Entomology
Texas Imported Fire Ant Research
and Management Project
Texas A&M University
College Station, TX 77843-2475
Phone: 409/458-3353; Fax: 409/845-7029
Email: rweeks@tamu.edu

Dr. Bastiaan "Bart" Drees
Fire Ant Project Coordinator
Department of Entomology
Texas A&M University
College Station, TX 77843-2475
Phone: 979/845-5895
Fax: 979/845-7029
Email: b-drees@tamu.edu

Dr. Charles L. Barr
Extension Program Specialist
Fire Ant Project - IPM Research
P.O. Box 2150
Bryan, Texas 77806
Phone: 409/845-6800; Fax: 409/845-6501
Email: c-barr@tamu.edu

Beekeepers: On file:

Funding amount/2 years: \$30,000

Summary of work to be done:

This research will evaluate three efforts to manage fire ants in conjunction with honey bee production practices: 1) Evaluate the success of historic and current beekeeping practices on preventing the movement of red imported fire ants from quarantined counties to non-quarantined counties in Texas; 2) Document the effectiveness of using contact insecticides carefully applied to the base and/or to the ground around bee hives in preventing fire ant survival; 3) Document the success of broadcast-applications of fire ant bait products around apiaries.

Progress Report

Major accomplishments to date (September 1, 1999 through October 31, 2001):

- (2000) Completed survey of commercial beekeepers asking detailed questions on historical and current beekeeping practices.
- (2000) Completed field sampling for fire ant infestations in several honey bee pollination yards in Lubbock, Lynn, Hale, Floyd, and Crosby counties.
- (2000) Completed field experiments to determine the effectiveness of treating support pallets or the surrounding soil area with insecticides where beehives are stored. We evaluated the ability of the insecticide Lorsban 4E[®], active ingredient Chlorpyrifos, to eliminate or reduce imported fire ant foraging on commercial beekeeping equipment.
- (2001) Set-up pilot program to get beekeepers to apply and evaluate broadcast bait applications of Amdro[®] in a controlled experimental plot design in their bee yards. We mailed out 5 ant fire treatment kits to 5 beekeepers including detailed instructions and evaluation sheets. This has been a cooperative effort with County Extension Agents Mickey Bouche in Fort Bend County and Thomas Leroy in Montgomery County.
- (2001) Developed and initiated a sampling protocol and materials necessary for commercial beekeepers to evaluate fire ant infestation levels on their trucks when moving bee equipment from fire ant infested areas, and to evaluate currently used control techniques in eliminating fire ant infestations from bee equipment prior to leaving infested areas. Truck sampling kits were mailed to several beekeepers along with detailed sampling instructions
- (2001) Completed experiments to evaluate queen geotactic (ground orienting) behavior and determine the effectiveness of treating hive support pallets with insecticides to prevent reproductive fire ants from moving off of fire ant infested materials across an insecticide barrier to the ground surface.
- (2001) Designed and conducting experiments in Lubbock County to examine the effects of broadcast bait applications on native ants in commercial bee yards in Lubbock County. This is a cooperative effort with Dr. Richard Deslippe at Texas

Goals achieved/Milestones/Highlights:

- To date we have received 31% of our mailed questionnaires on historical and current beekeeping practices. Preliminary data indicates that most honey bee operators think that current types of chemical fire ant control have been necessary and effective. Most operators indicated that they store honey bee colonies off the ground on structures (i.e. pallets). However, despite the majority of operators reporting finding ants under or on pallets, 50% of the operators surveyed indicated that they did not sweep or remove dirt from pallets or hives.
- Completed field sampling for fire ant infestations in several honey bee pollination yards in Lubbock, Lynn, Hale, Floyd, and Crosby counties. Although several ant species were collected at each site there were no red imported fire ants collected in any of the pollination locations. However, red imported fire ants were collected at two locations within the city limits of Lubbock, one site was a horticulture nursery, the other a highway landscaping planter-box.
- Results from our field experiments on pallet and soil treatments shows that soil and/or pallet applications of Lorsban 4E[®] are reasonable and effective techniques for preventing fire ant infestation or ant foraging on bee equipment for at least 6 weeks post insecticide. Foraging bees are protected from direct contact with treated soil or pallets since most beehives are kept on bee pallets and not in direct contact with the soil surface, or a second treated (support) pallet. Also, our field experiments show that it is necessary to monitor and remove any bridges that may form across treated areas between the soil surface and the bee equipment, such as over-grown vegetation or fallen tree leaves and limbs.

- Several beekeepers have returned the sampling kits that were developed to evaluate fire ant infestation levels on trucks when moving bee equipment from fire ant infested areas. However, no ants were collected in the sampling vials. There is not enough samples returned to make any evaluations at this time.
- Initial results from a program where beekeepers applied and evaluated broadcast bait applications of Amdro® in their bee yards indicate that beekeepers were very satisfied with the results. Several beekeepers report that the results of broadcast applications of Amdro® were better than previous control efforts and easier to implement. In two bee yards, a resurgence of fire ants in treated areas was attributed to heavy rains in June requiring an additional broadcast application of Amdro®.
- Results from our experiment to determine the effectiveness of treating bee pallets with insecticides (permethrin, Lorsban) to prevent reproductive fire ants from moving down from bee equipment across an insecticide barrier to the ground surface show that 46% of the queens moved down from the bee equipment, 13% remained on the bee equipment, and 41% were unaccounted for. The average number of queens alive in the bottom of the experimental design was 10.25 for the control, 1.5 in the permethrin, and .5 in the Lorsban treatment. The average number of dead ants collected in the bottom of the experimental design was 1.25 for the control, 11.25 in the permethrin, and 9.75 in the Lorsban treatment. These results show that some ants do cross the treated pallets and initially survive, however most ants die after crossing the insecticide barrier (n = 100/treatment).

Relevance to the Texas Imported Fire Ant Research and Management Plan:

Honey bee hives used for transcontinental transport have recently become of interest as an USDA regulated item. However, there are currently no established quarantine treatments approved for assuring that transported hives are free from fire ant infestation. This research will provide information on several treatment approaches to prevent the spread of imported fire ants from quarantined to unquarantined counties in Texas and evaluate survey/detection methods for assessing bee hives for imported fire ant infestations.

Publication citations, Paper Presentation Citations and other Citable Products:

Poster and Oral Presentations

Oral presentation at the Texas Beekeepers Association, Annual Convention, November 2-3, Texas A&M University, TX. Ants in Apiculture.

Oral presentation at the Texas Beekeepers Association, Annual Convention, November 2-5, 2000, Kerrville, TX. Evaluation of potential imported fire ant quarantine treatments for migratory honey bee colonies. Ronald D. Weeks, Jr. Department of Entomology, Texas A&M University, College Station, TX.

Poster Presentation at the Annual Imported Fire Ant Research Conference, San Antonio Texas, 2001.

Evaluation of potential imported fire ant quarantine treatments for commercial Honey Bee operations. Ronald D. Weeks, Jr., John G. Thomas, Charles L. Barr, and Bastiann "Bart" M. Dress, Texas Agricultural Extension Service, The Texas A&M University System.

Proceedings Articles

Evaluation of potential imported fire ant quarantine treatments for commercial Honey Bee operations. Ronald D. Weeks, Jr., John G. Thomas, Charles L. Barr, and Bastiann "Bart" M. Dress, Texas Agricultural Extension Service, The Texas A&M University System. Proceedings of the Annual Imported Fire Ant Research Conference, San Antonio Texas, 2001 *In Press*.

Peer Reviewed Articles

Ronald D. Weeks, Jr., John G. Thomas, Charles L. Barr and Bastiaan M. Drees. 2001. Potential quarantine treatment for red imported fire ants *Solenopsis invicta* Buren (Hymenoptera: Formicidae) in commercial honey bee operations. *Submitted to* Journal of Economic Entomology