



Texas Imported Fire Ant Research and Management Project

Progress Report - June 2002

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

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Beekeepers: On file:

Funding amount/2 years:

Summary of work to be done:

This research evaluates several 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 effectiveness of using contact insecticides on support pallets to prevent queen ants from

crossing treated barriers, and 4) Document the success of broadcast-applications of fire ant bait products around apiaries.

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Major accomplishments to date (June 30, 2001 – June 30, 2002):

- (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 five 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) Designed and conducting experiments to determine the effectiveness of treating bee pallets with insecticides to prevent fire ants from moving from fire ant infested materials on pallets across an insecticidal barrier to the ground surface.
- (2001) Designed and conducting experiments to determine the effectiveness of treating support pallets with insecticides to prevent fire ant queens from moving from fire ant infested materials on pallets across an insecticide barrier to the ground surface.

Goals achieved/Milestones/Highlights:

- 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.
- We evaluated geotactic (i.e. gravity-induced movement) behavior of queen (i.e. female alates) red imported fire ants (*Solenopsis invicta* Buren) and methods to prevent flight queens from moving from bee equipment to the ground surface. For this study, we used commercial beekeeping equipment typically used in pollination production systems, but without bees. We evaluated queen geotactic behavior and mortality after being placed on top of bee equipment supported with chemically treated pallets. All bee equipment was clean and free of “bee trash” and bee colony residue. For this study, all trials were completed in prefabricated (5ft x 5ft) ant enclosures (i.e. children swimming pools). Two barrier treatments were evaluated: 1) a support pallet treated with Lorsban-4E® (active ingredient chlorpyrifos) under a beehive with no bees, 2) a support pallet treated with Permethrin® (active ingredient pyrethroid) under a beehive with no bees. Controls comprised bee equipment under an untreated support pallet. Wing tips of female alates were clipped to prevent flight from the equipment. Queen movement and mortality were scored as the number of dead queens found on the equipment above the support pallet and the number of queens found below the support pallet. We used a wetted cardboard sheet to collect queens that crossed support pallets. Results show that 46% of the queens were found below the support pallet compared to 13% above support pallets. However, 41% of queens were unaccounted for in the ant enclosures. Of the queens found below

treated pallets, significantly more were dead than queens found below untreated support pallets (DF = 2,9, F = 10.44, P > F = 0.004). Results show that queens have a strong geotactic drive to migrate off of bee equipment and head down. Chemical barriers may not repel or overcome queen geotactic behavior, however they are effective in killing most, but not all, queens that cross them within 24hrs.

- At the Texas Beekeepers Association Annual Meeting in Kerrville Texas 2000, four beekeepers volunteered to apply and evaluate the use and results of broadcast bait applications of Amdro® in their bee yards. In May 2001, each beekeeper was mailed a handheld seeder and a 1-lb. package of Amdro®, accompanied by an instruction sheet on how, when, and where to apply the bait. The procedure for documenting the effectiveness of ant bait products was simple and fast. Three basic steps were used: 1) estimate and record the number of active fire ant mounds in one to three 1/8-1/4 acre areas within each treated and untreated areas prior to bait applications, 2) apply ant bait product (when ants were active) with hand seeder to one half of each field, 3) record fire ant -honey bee problems and take new estimates of active ant mounds in both treated and untreated areas after 5-7 weeks. Information on beekeeper experience with the seeder, the bait, and previous experiences with other baits were documented. Results, from the three completed questionnaires received, show that the beekeepers were satisfied with the broadcast bait results. All thought that the broadcast bait applications were easier and more effective than previous methods (e.g Diazinon granules placed on mounds).
- We developed a kit to sample for fire ants on flat bed and tractor-trailer rigs carrying agricultural items originating from fire ant infested areas. We asked four volunteer beekeepers to evaluate the kits use and effectiveness in capturing ants on trucks. We mailed beekeepers; pre-cut bait cards, 20ml of olive oil bait, collection tubes, and return postage for the kits after use. We intended to collect used kits from beekeepers for ant identification. Truck sampling consisted of three basic steps. 1) Placement of several (5-6) bait stations in secure areas on the bed of the truck/trailer during transportation. 2) Cap and collect baits at the destination site. 3) After several (4-5) trucks were sampled, the collection kits were mailed back to us for ant identification. This effort addressed several goals. First, by developing an easy and efficient method for sampling for ants, in bee equipment, that is in transit, beekeepers would gain improved knowledge of potential fire ant problems instead of being surprised at state border crossing stations. Secondly, data of this type will help determine and evaluate the effectiveness of current certification methods aimed at ensuring fire ant-free honey bee shipments. To date only two kits have been returned and neither had any ants.

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 2-5, 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 Entomological Society of America, Annual Meeting, Montreal Canada, 2000.

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. Drees, Texas Agricultural Extension Service, The Texas A&M University System.

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. Drees, 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. Drees, Texas Agricultural Extension Service, The Texas A&M University System. Proceedings of the Annual Imported Fire Ant Research Conference, San Antonio Texas, 2001.

Peer-Reviewed Articles

Barrier Treatments for Red Imported Fire Ants *Solenopsis invicta*¹ in Commercial Honey Bee Operations

Ronald D. Weeks, Jr. and Bastiaan M. Drees, Texas Cooperative Extension, Department of Entomology, Texas A&M University, College Station, TX 77843-2475. *In Press* Southwestern Entomologist