



Texas Imported Fire Ant Research and Management Project

Progress Report - June 2002

Evaluation of potential imported fire ant quarantine treatments for hay bales.

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Hay producers: On file

Funding amount/2 years: \$20,000

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Summary of work to be done:

In cooperation with hay producers, this research will evaluate several treatments to attempt to prevent and eliminate fire ant infestations in hay bales in the field and in storage areas. In 2000, selected treatments include treating large replicated plots in hay fields (range .9 to 2 hectares) with broadcast applications of registered bait-formulated insecticides and monitoring randomly

selected hay bales produced in treated versus untreated areas for fire ant infestations over time. We conducted another study in 2001 examining a repeated application of broadcast bait applications in hay production systems. We evaluated the efficacy of treating areas around ant-infested bales of hay in storage areas with Amdro® and monitoring for the elimination of ant infestations in stacked hay bales. Lastly, we evaluated the efficacy of using a chemical barrier applied to the soil area under stacked bales of hay to prevent red imported fire ants (*Solenopsis invicta* Buren) from infesting stacked hay.

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

- Completed field studies in 2000 evaluating the efficacy of using broadcast ant bait applications in hay production systems.
- Treated three of the five plots that were used in 2000 with another broadcast bait application of Amdro® to evaluate the efficacy of annually treating areas with fire ant baits in hay production systems.
- Set-up a controlled experiment to evaluate the efficacy of spot treatments of ant bait products (Amdro®) around stored hay bales in the field.
- Set-up controlled experiment to evaluate the efficacy of using a chemical barrier applied to the soil area under stacked bales of hay to prevent imported fire from infesting stacked hay.

Goals achieved/Milestones/Highlights:

- Results in 2002 and 2001 have shown that with a single annual broadcast bait application of Amdro® the number of hay bales infested with fire ants are significantly lower in treated plots compared to untreated plots. However, a second bi-annual application of Amdro® did not significantly reduce ant infestation levels on hay bales compared to the previous years reduction. These results indicate that treated fields were re-infested with *S. invicta* within a single year and there was no detectable additive effects of treating field plots annually with typical broadcast applications of insect metabolic inhibitors (e.g. Amdro®) in this study.
- We evaluated the efficacy of using an insect metabolic inhibitor (Amdro®, hydramethylnon) strategically applied around the base of stacked hay bales to eliminate red imported fire ant (*Solenopsis invicta* Buren) infestations in stacked hay. We set-up 12 stacks of hay bales (six bales per stack) in a fire ant infested field and allowed them to become infested with fire ants. After three months, all twelve stacks became infested with colonies. We randomly selected half of the infested stacks to be treatment stacks and the remaining stacks served as controls for the experiment. Bait treatments consisted of applying 5TBLS of Amdro® around the base of randomly selected treatment stacks. Six weeks after bait applications, treated and control stacks of hay were sampled for ant infestation by visual cues, such as the presence of colonies on the stacks, and bait station were used to collect ants on the second layer of hay of each stack. Of the six treated stacks, two stacks were “clean” of ants six-weeks after bait applications. However, results show that there was no significant difference in mean infestation levels between treated and untreated stacks.
- We evaluated the efficacy of using a chemical barrier applied to the soil area under stacked bales of hay to prevent red imported fire ants (*Solenopsis invicta* Buren) from infesting stacked hay. Chemicals selected as barrier treatments were Lorsban4E®, active ingredient chlorpyrifos, which kills ants on frequent or prolonged contact, and Permethrin®, active ingredient pyrethroid, which acts as a repellent to ants. We established a series of 12ft x 12ft plots, with a 10ft buffer between plots along a fencerow

in a fire ant infested field. Treatments included spraying a 12ftx12ft soil area with a 1-gal solution of each chemical and water formulation. After soil treatments, we placed four square-bales of hay, stacked two a side and interlocking in two layers, in the center of each plot. Stacked bales were sampled for fire ant infestation using 2.5 x 2.5cm olive oil –soaked index cards; one bait card was placed on each side of the top layer of hay in each stack. Results from ANOVA show a significant difference in mean infestation levels among treatments. Stacks of hay sitting in the Lorsban4E® plots had fewer ant infestations compared to the Permethrin® and control plots. Results show that after three weeks all four control stacks, three stacks in the Permethrin® treatment, and two stacks in the Lorsban4E® plots were infested. Results after one week showed that only one stack in the Permethrin®, and two in the control plots were infested with ants, while none in the Lorsban4E® plots were infested. These results indicate that on a short-term basis, such as 1 to 7 days, Lorsban4E® may be an effective short-term treatment option for protecting stacked hay from fire ant infestations.

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

Currently, the only USDA or TDA approved way to have hay or straw approved for shipment from fire ant quarantined counties to non-infested counties is to remove bales from the field immediately after baling and store them in an off ground location. This prevents hay that has been stored in the field in ground contact from being eligible for shipment. There are currently no USDA-APHIS or TDA approved quarantine chemical treatments for assuring that red imported fire ants are not shipped to new locations. This study, in collaboration with hay producers and the Texas Agricultural Extension Service, will develop and evaluate several treatment methods which will reduce or eliminate fire ant infestations in round and/or square bales.

Publication citations, Paper Presentation Citations and other Citable Products:

Poster Presentations

Evaluation of potential imported fire ant quarantine treatments for hay bales. Ronald D. Weeks, Jr., Micheal E. Heimer, Charles L. Barr, and Bastiann "Bart" M. Drees, Texas Agricultural Extension Service, The Texas A&M University System. 12th annual Texas Plant Protection Association Annual Meeting, College Station Texas 2000.

Evaluation of potential imported fire ant quarantine treatments for hay bales. Ronald D. Weeks, Jr., Micheal E. Heimer, Charles L. Barr, and Bastiann "Bart" M. Drees, Texas Agricultural Extension Service, The Texas A&M University System. Entomological Society of America, Annual Meeting, Montreal Canada, 2000.

Evaluation of potential imported fire ant quarantine treatments for hay bale operations. Ronald D. Weeks, Jr., Micheal E. Heimer, Charles L. Barr, and Bastiann "Bart" M. Drees, Texas Agricultural Extension Service, The Texas A&M University System. Annual Imported Fire Ant Research Conference, San Antonio Texas, 2001.

Proceedings Articles

Evaluation of potential imported fire ant quarantine treatments for hay bale operations. Ronald D. Weeks, Jr., Micheal E. Heimer, 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.