



Texas Imported Fire Ant Research and Management Project

Final Progress Report - October 2001

Crop and Livestock Production Systems

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Major Accomplishment to Date (Sept 1, 1999 through August 31, 2001)

Because of the diversity of agricultural production in the fire ant infested areas of north and central Texas, it was necessary to focus on several key commodities. The selection of these commodities was based on their importance to the region and on published information suggesting fire ants were economically important in that commodity. As an example, corn is an important commodity throughout the Blacklands region of Texas, yet there was no published information suggesting fire ants were of economic significance to corn producers. Wheat and sorghum are also a major crops in this region, but available information suggests damage is limited to an occasional observation of fire ants reducing stands near field margins and when the lack of rainfall fails to close the seed furrow. Also, the limited economic returns, especially regarding wheat production, suggest growers are not likely to invest solely in fire ant control, especially when the investment in control is prior to a demonstrated need, as with seed treatments. Commodities chosen for study were cotton, bermudagrass hay, soybeans, peanuts and pecans. The problem and accomplishments for each commodity are detailed below.

Cotton:

The red imported fire ant is generally considered to be a beneficial insect in cotton production because it has been shown to feed on boll weevil grubs in fallen squares on the soil and also feeds on eggs of caterpillar pests such as bollworms and budworms. However, the impact of fire ant predation on *suppressing populations* of these key cotton pests has not been demonstrated beyond small research plots. Also, seasonal tillage and use of soil applied insecticides in commercial cotton production may suppress fire ants to levels below which they contribute to pest control in cotton. Conversely, fire ants reportedly tend cotton aphids early in the season, although the relationship between ant tending and aphid densities has not been determined. Replicated, large plot research is needed to verify or contradict the view that fire ants suppress cotton pests.

Accomplishments. Field studies were conducted at the Texas A&M Stiles Foundation Research Farm at Thrall, TX. Results demonstrated that:

1. Fire ants significantly reduced the number of bollworm and beet armyworm eggs surviving in cotton.
2. Cotton aphid densities were greater in the presence of fire ants early in the season, but aphid densities did not exceed treatment thresholds. Aphids also served as a food source for lady beetles, lacewings and other predators, and densities of these predators were greater in the presence of fire ants.
3. Fire ants foraging on the cotton plant were most abundant in the evening, throughout the night and early morning, with numbers declining with increasing temperatures. Field scouts assessing fire ant densities during the day are likely to underestimate the number of fire ants foraging on cotton plants, and therefore their importance as predators.
4. Foraging fire ants were observed carrying aphids and aphid predators (lacewings, syrphid fly larvae, etc) back to the colony. While aphids represented a significant portion of identified prey, aphid predators represented a small proportion of the identified prey items.

Pecans:

As in other crops, the red imported fire ant plays a dual role in pecans both as a nuisance pest and a predator on insect pests of pecan. Survey results indicated nearly 60% of the pecan producers apply insecticide to their orchards for fire ant control, although no firm economic values have been placed on the negative impact of fire ants in pecan production. Predation by the red imported fire ant on green lacewings and other predators was implicated as the cause of outbreaks of yellow pecan aphid and blackmargined aphid in Georgia pecans. Imported fire ants have been reported preying on important pecan insect pests including pecan weevil larvae and hickory shuckworm larvae and pupae. Growers also report that fire ants damage irrigation systems and feed on nut meats of varieties (i.e. 'Choctaw') with shells which tend to split open in the field.

Accomplishments. An informal survey of about 280 Texas pecan growers determined that fire ants impact pecan production by: 1) stinging orchard workers during grafting and harvesting; 2) damaging irrigation systems and electric motors and 3) disrupting biological control of aphids by preying on beneficial insects. Of the 117 commercial growers responding, 57% were willing to spend \$6.00-10 or more per acre for fire ant control. Only 56% of the respondents were somewhat satisfied by their control efforts while 26% were not satisfied. Also, Amdro was the most commonly used insecticide although it is labeled only for non-bearing pecans. Extinguish fire ant bait is not limited to non-bearing pecans and thus offers pecan growers a labeled alternative to Amdro.

Replicated field trials were conducted during 1999-2001 in two commercial pecan orchards in Comanche and Brazos Counties. Results were:

1. Extinguish Fire Ant bait (methoprene), applied once in the spring and once in the fall, significantly reduced the number of fire ant mounds and the number of fire ants foraging on pecan tree trunks and in the canopy.
2. Extinguish Fire Ant bait provided a greater level of reduction and longer period of reduction of foraging ants than did repeated applications of Lorsban 4E sprayed on tree trunks.
3. There were no significant differences in the densities of pecan aphids or aphid predators (spiders, lacewings, lady beetles) between Extinguish treated and untreated plots.
4. Fifteen species of ants were recorded at the study site near College Station while eight species were recorded at the study site in Comanche County. *Dorymrymex* spp., *Pheidole* spp. and *Monomorium minimum* were common native species at both sites. Colony surveys suggested that application of methoprene did not reduce the diversity of native ants one year after application.

Bermudagrass Hay Production:

As summarized in the 1996 Texas Cattle Producer's Survey, 80% of the respondents reported that fire ants were a problem in harvesting and storing hay. Fire ant mounds reduce harvest efficiency, damage equipment, and stinging ants are a problem for field workers. Total losses to hay producers due to fire ants were estimated at \$25.26 per acre based on survey responses. Fire ants infesting hay also represent a significant problem for producers shipping hay from fire ant quarantined counties.

Although several fire ant baits are now labeled for use in hayfields, the practice is uncommon. The lack of adoption is probably due to the need for field trials demonstrating application equipment, optimum timing and cost-benefit of fire ant control in hayfields.

Accomplishments. A large bermudagrass hayfield at Texas A&M at Commerce was divided into 2.3 acre plots and treated with Amdro, Extinguish or left untreated on May 26, 2000. Two additional study sites were established and treated near Commerce and Sulphur Springs. Mound building by fire ants did not occur due to the extended summer drought conditions during the summer of 2000. The lack of mounds and the poor growing conditions for hay production due to the lack of rain prevented efforts to evaluate treatment effects.

Extension agents in Kaufman, Hopkins and Red River Counties were contacted in the spring of 2001 to identify hay producers experiencing problems with fire ants. Interviews with these Extension Agents and several commercial hay producers in these counties revealed that fire ants were not currently a significant problem across most of north central Texas. Growers cited the lack of mounds in hayfields in recent years, probably due to dry summer weather, and the adoption of disk cutters as reasons for the decline of fire ants as a significant concern.

Soybeans:

Growers in north Texas growers report that rains late in the summer can result in large fire ant mounds in soybean fields which can jam harvest machinery. However, during dry summer and fall weather, as occurred during the years of this study, fire ants do not build large mounds and as a result present little hazard at harvest. As in cotton, red imported fire ants feed on insect pests of soybeans including soybean loopers, velveteen caterpillars and southern green stinkbugs and thus may be of some benefit. However, fire ants have also been shown to reduce densities of carabid beetles and other beneficial predators in soybeans.

Accomplishments. A field study was initiated in a 20 acre commercial field of soybeans near Beaumont, TX, on June 12, 2000. Treatments were methoprene treated and an untreated check and each treatment was replicated four times in plots of 2 acres each. Sampling throughout the season found that:

1. Results of sampling with food-baited vials and pit-fall traps suggested that the single treatment of methoprene in June had not achieved the degree of fire ant suppression that may be

necessary to detect the effects of this ant on other arthropods.

2. Densities of insect pests and predatory insects and spiders sampled with the sweep net were not significantly different between methoprene and untreated treatments. The study field was treated with Dimilin 2L which further reduced caterpillar numbers and may have masked treatment effects.

3. The numbers of crickets, and two families of beetles (Trogossitidae and Alleculidae), in pit-fall traps were not significantly different between treatments. The methoprene treated plots had significantly more spiders and tiger beetles (Cicindelidae) in pit-fall traps on one of the four sampling dates.

Peanuts:

Approximately 40,000 acres of peanuts are grown annually in Central Texas. Peanut producers in this region report that fire ants can feed on peanut nuts just before harvest, resulting in quality/grade discounts and significant economic losses. However, these effects of fire ants on peanut production have not been documented. Granular insecticides applied at planting time do not provide sufficient residual control to protect peanuts from late season feeding by fire ants. Extinguish fire ant baits is an option but information is needed to determine if control is rapid enough to protect peanuts within the same production season.

Accomplishments. Two commercial peanut fields in Comanche County, each with a history of fire ant damage, were divided into two acre plots and treated with methoprene fire ant bait or left untreated in early June, 200, in a replicated study. Sampling with food-baited vials found 86-98% fewer foraging fire ants in the Extinguish treated plot on August 3. Peanuts will be sampled at harvest to determine fire ant damage and grade.

Goals achieved: Information developed by this project will aid pecan producers in using Extinguish fire ant bait to alleviate the economic losses and stinging hazard associated with fire ants in pecan production. This project has educated growers about the impact and management of fire ants through numerous Extension presentations and publications in trade magazines and newspapers. As grower surveys indicate that an alternative bait was commonly used off-label, the awareness of Extinguish should minimize the use of illegal products for fire ant control in pecans and increase grower satisfaction with their control efforts. Preliminary results to date suggest that fire ants do not interfere with biological control of pecan aphids, but additional data has not yet been evaluated.

Project results have provided a better understanding of the impact of fire ants on the populations of several key cotton pests. Fire ants were demonstrated to significantly reduce numbers of eggs of pest caterpillars in cotton, and although fire ants were associated with increased numbers of aphids, aphids did not exceed the treatment threshold and soon declined. Fire ants were also the most abundant natural enemy in cotton and readily searched the cotton plant, especially during the night. These results suggest that fire ants can reduce densities of some important cotton pests and that management practices that increase fire ant numbers, such as conservation tillage, could be important in integrated pest management programs for cotton.

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

The accomplishments listed above under “goals achieved” for pecans are relevant to the project’s goal to eliminate red imported fire ants as a pest of major health and economic significance. Texas ranks first or second in annual production of pecans and much of this production occurs in the fire ant infested areas, especially the highly productive orchards of central Texas. Grower surveys have identified the economic importance of fire ants and their stinging hazard to pecan production. The use of methoprene fire ant bait was demonstrated in this project to provide season long reduction of fire ant densities. This approach should provide

a safe, convenient and effective means of fire ant suppression in pecan production.

The demonstrated beneficial role of fire ants in suppressing insect pests of cotton has relevance to the project as related to the consideration of area-wide management approaches to fire ant suppression in Texas. Area-wide programs, such as the release of biological control agents, which result in a significant reduction of fire ant numbers in cotton could potentially disrupt biological control by fire ants of key cotton pests. In this event, practices to augment fire ant populations in cotton, such as conservation tillage, may be even more valuable to counter the impact of area-wide control practices.

Publications.

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Presentations:

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Ree, B. Controlling fire ants in pecans. 2001. Presentation at the Annual Conference of the Texas Pecan Growers Association. Seguin, TX

Knutson, A. Fire ants and peanuts. 2001. Presentation at the Central Texas Peanut Tour. Comanche, TX.

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