

# Speed of Red Imported Fire Ant Foraging Suppression Using Spinosad Broadcast Bait

Royalty Pecan Orchard - Burleson County, Texas - 2001

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Contact insecticides can be used to suppress red imported fire ant (*Solenopsis invicta* Buren) foraging activity. These surface applications quickly eliminate foraging for some weeks, but usually fail to eliminate the colonies unless applied repeatedly (Drees et al. 1995). However, these products usually employ larger amounts of more-toxic insecticides than other fire ant control products such as broadcast baits. Baits though, take weeks and often months to fully eliminate colonies. This test was contracted by Dow Agrosiences to evaluate speed of foraging suppression by their new fast-acting bait, Justice<sup>®</sup>. This product, among others, contains the active ingredient spinosad which has been shown to cause rapid feeding cessation in other insects (Dow Agrosiences info. slide presentation).

**Objective:** Determine the speed of fire ant foraging suppression using two fast-acting broadcast baits.

## Materials and methods

The site of this trial was a section of non-bearing pecan trees in the Royalty Pecan orchard in Burleson County, Texas. Fire ant mounds could be found at the base of many trees and ant foraging was observed on most tree trunks. Treatments were applied to the area within blocks of 16 trees (4 x 4) each. Each block (plot) was separated from other plots by an untreated area of one row width, 45 feet. Plots were replicated four times for a total of 16 samples per treatment. The inner four trees were used for sampling. Sampling was conducted using 1 x 1 inch, olive oil-soaked index cards. A card was stapled to each sample tree trunk at roughly chest-high level and left for approximately 45 minutes. The number of ants per card was then estimated. Data were analyzed with each card in a plot being entered as a sample in SAS ANOVA with means separated by Tukey's studentized (HSD) test,  $P < 0.05$ .

Plots were established and pre-counts taken on July 20, 2001 with pre-counts taken on July 24. Treatments (**Table 1**) were applied on July 25 with post-treatment evaluations conducted on July 26, 27 and 30 and August 1 and 8. Baits were applied using an EarthWay<sup>®</sup> Ev-N-Spred hand-held spreader. Chlorpyrifos was applied to the orchard floor using a 12V powered spray cart pulled by a pickup truck. Tree trunks were treated using a Chapin pump-up sprayer and sprayed to runoff from ground level to chest height. Bait cards were placed above the treatment line.

**Table 1.** Treatments applied. Royalty Pecan Orchard, Burleson County, TX. 2001

| Treatment                                    | Rate         | Application |
|--|--------------|-------------|
| 0.015% spinosad bait (Justice <sup>®</sup> ) | 1.5 lbs/acre | broadcast   |
| spinosad bait                                | 2.5 lbs/acre | broadcast   |
| hydramethylnon (Amdro <sup>®</sup> ) bait    | 1.5 lbs/acre | broadcast   |

|                            |  |                       |
|----------------------------|--|-----------------------|
| chlorpyrifos (Lorsban® 4E) | 1.5 qt/100 gal water, 22.4 gal total volume/acre | orchard floor spray   |
| chlorpyrifos               | 1.5 qt/100 gal water                             | trunk spray to runoff |

## Results and Discussion

As can be seen in **Table 2** and **Figure 1**, the spinosad baits produced very erratic and incomplete suppression of fire ants foraging into pecan tree canopies. The orchard floor spray with chlorpyrifos did not control foraging ants well, either. It is likely that mounds at the base of trees were not contacted well by the surface spray because the spray tips could not be gotten close enough for reliable coverage. On the other hand, a trunk spray of chlorpyrifos yielded nearly 100% control overnight and full 100% control by 4 days. It is likely that the few ants detected between day 1 and 4 were “trapped” above the treatment line and foraged on the bait cards until they died or dropped out of the tree.

The most surprising finding was the rapid and consistent suppression of ant foraging by hydramethylnon (Amdro®). Foraging was suppressed by well over 90% within a week and almost totally eliminated by 2 weeks. This finding suggests that, with minimal “lead time,” Amdro could be used to suppress ant foraging rather than the more toxic contact insecticides. Furthermore, Amdro is well known to eliminate colonies after a few weeks while some contact insecticides appear to drive them underground from which they quickly reappear after the toxicant breaks down (Barr and Drees, 1991).

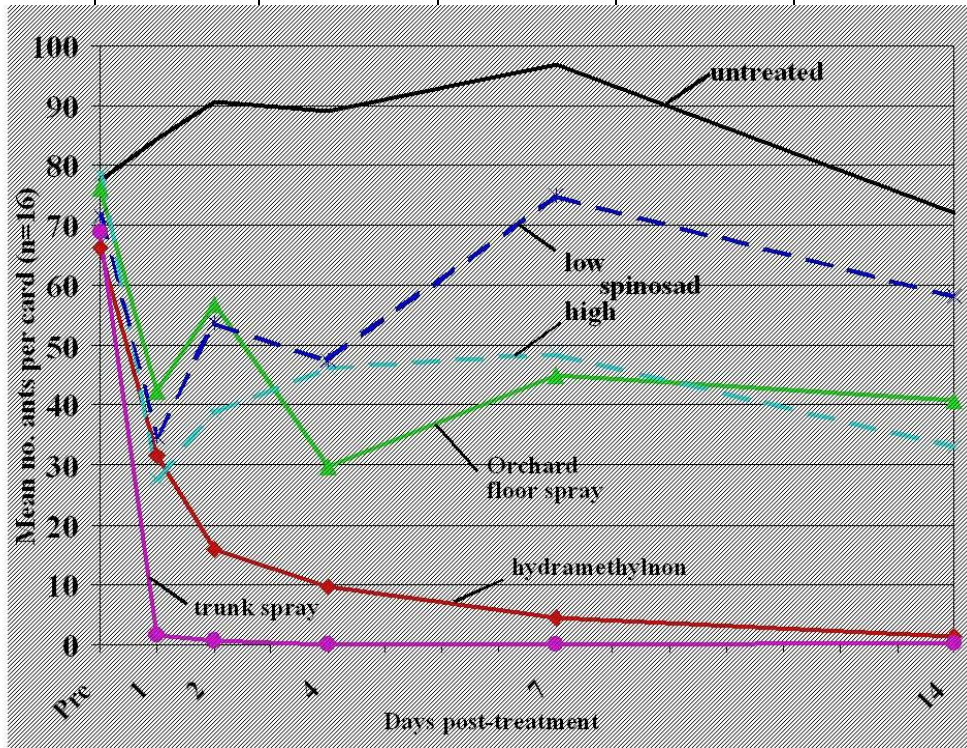
In a study conducted in 2002 (see Indoxacarb Bait Effects on Mound Activity and Foraging by Red Imported Fire Ants, p.1), similar results were documented for Amdro.

**Table 2.** Red imported fire ant foraging/recruitment results - 1 x 1-inch olive oil-soaked index card (n=16). Burlleson, Co., Texas. Treated July 25, 2001.

| Treatment      | Mean number of ants per card |          |          |          |          |          |
|----------------|------------------------------|----------|----------|----------|----------|----------|
|                | Pre-count                    | Day 1    | Day 2    | Day 4    | Day 7    | Day 14   |
| untreated      | 77.50 a                      | 84.38 a  | 90.63 a  | 89.06 a  | 96.88 a  | 72.06 a  |
| spino. high    | 78.44 a                      | 27.50 bc | 38.75 bc | 46.25 b  | 48.44 b  | 33.13 bc |
| spino. low     | 71.56 a                      | 34.69 bc | 53.75 ab | 47.50 b  | 75.00 ab | 58.13 ab |
| hydrameth.     | 66.25 a                      | 31.56 bc | 15.94 cd | 9.69 c   | 4.50 c   | 1.25 c   |
| chlor. trunk   | 68.81 a                      | 1.56 c   | 0.63 d   | 0.00 c   | 0.00 c   | 0.31 c   |
| chlor. floor   | 76.25 a                      | 42.19 b  | 56.88 ab | 29.69 bc | 45.00 b  | 40.63 ab |
| F              | 0.26                         | 10.24    | 14.97    | 14.97    | 23.1     | 12.35    |
| P              | 0.9352                       | 0.0001   | 0.0001   | 0.0001   | 0.0001   | 0.0001   |
| R <sup>2</sup> | 0.0141                       | 0.3626   | 0.454    | 0.454    | 0.5621   | 0.407    |

MS  
D

34.293



|        |        |        |       |        |
|--------|--------|--------|-------|--------|
| 40.688 | 34.785 | 34.068 | 33.91 | 32.668 |
|--------|--------|--------|-------|--------|

Means in different columns are significantly different ( $P < 0.05$ ) using SAS ANOVA. Means separated by Tukey's studentized (HSD) range test. ANOVA df = 5, Tukey df = 90.

**Figure 1.** Speed of suppression of contact insecticides and fast-acting baits. Burleson County, Texas, 2001

### **Literature Cited**

Barr, CL and BM Drees. 1991. Red Imported Fire Ant Treatment Program Evaluation. Result Demo. Handbook 1990-1991. Tex. Ag. Extension Serv. Bryan, TX. Also <http://fireant.tamu.edu>

Drees, BM, CL Barr and DE Reue. 1995. Evaluation of Chlorpyrifos Surface Applications to a Pecan Orchard Floor for Suppression of the Red Imported Fire Ant. Result Demo. Handbook 1994-1995. Tex. Ag. Extension Serv. Bryan, TX. Also <http://fireant.tamu.edu>

### **Acknowledgment**

The author would like to thank Mr. Andy Sherrod, manager of Royalty Pecans for the use of his orchard and Jeff Nelson, Technical Field Representative, Dow Agrosiences, for sponsoring this test.