

## **Red Imported Fire Ant Treatment Program Evaluation**

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Suppression of the red imported fire ant, *Solenopsis invicta* Buren, in ornamental turf can be accomplished using a periodic application of a single product or by using a sequence of different insecticide products over time to achieve a given management objective. This trial was conducted to compare the results of a broadcast application of two bait-formulated products, Logic<sup>®</sup> (fenoxycarb) and Amdro<sup>®</sup> (hydramethylnon). In addition, results from a surface spray of Triumph<sup>®</sup> 4E, a contact insecticide, applied at the suggested rate of 1.0 pound active ingredient (AI) per acre and a sequential application program of Logic<sup>®</sup> followed 4 to 7 days later by a surface application of Triumph applied at a half rate were also evaluated. Because the application of Logic<sup>®</sup>, which performs as an insect growth regulator, results in a slow decline (5 weeks to 9 months) of fire ant colonies in a treated area, the addition of a low rate application of Triumph<sup>®</sup> to eliminate foraging worker ants was applied to increase the rate of colony decline.

### **Materials and Methods**

This trial was conducted on the Wittig Grass Farm, Wharton County, Texas, located just off of FM 1301 approximately 9 miles southeast of Wharton. The site consisted of approximately 12 acres measuring 450 by 1150 feet. Although it had been used for turf production for some years, it had been abandoned for at least the last four prior to establishment of this trial. The turfgrass consisted primarily of St. Augustine with scattered areas of Dallis Grass and Bermuda Grass. No insecticide treatments had been applied to the area within several years. This site was fertilized in the spring of 1991. A rolling irrigation system was set up and operated during the second week of the test, and the area was mowed approximately weekly.

The test plots were established in adjoining columns, three plots wide and six plots long. Plots were 150 feet square, approximately 0.5 acre. Treatments were applied to the entire plot and mound numbers were determined by counting all active fire ant mounds within a 0.25 circle at the center of each plot. A string, approximately 58 feet long and anchored at the center, was used to circumscribe the circle. An active mound was defined when numerous ants rose to the surface within 5-30 seconds of light disturbance with a pointed tool handle.

The following treatments and application rates, replicated three times, were included in the test:

- 1) Untreated check

- 2) Logic<sup>®</sup> (fenoxycarb), 1.5 lbs. per acre
- 3) Amdro<sup>®</sup> (hydramethylnon), 1.5 lbs. per acre
- 4) Triumph<sup>®</sup> 4E (isozophos), 0.5 lbs. AI per acre
- 5) Triumph 4E, 1.0 lbs. AI per acre
- 6) Logic, 1.5 lbs. per acre + Triumph 4E, 0.5 lbs. per acre 4-7 days after Logic

Plots were established and treated on 13 August 1991. The bait treatments, Amdro and Logic, were applied by hand using a Cyclone Model 1C1 hand seeder between 6:00 and 8:30 p.m. when the weather was dry, slightly breezy and with a temperature of 80-85 degrees Fahrenheit. No rain occurred within 24 hours of application. Plots were monitored again on 20 August 1991 (one-week evaluation for Triumph). At that time, Triumph plots were treated between 5:00 and 7:00 p.m. soon after the plots had been mowed. The chemical was applied in 20 gallons of water per acre using a tractor mounted spray boom with a 38-foot spray swath. The area received approximately .15 inches of rain 48 hours later.

Plots were monitored again on 27 August, 3 and 24 September and 13 November 1991. Due to little rainfall, the plots were irrigated regularly. Thereafter, rainfall was sufficient until early, unseasonably cool weather rendered the grass dormant. By the three month evaluation, the grass was largely brown with only the low, sheltered leaves remaining green. One interesting note was that the grass surrounding active fire ant mounds, and, curiously, the marker plates, was considerably greener in almost every plot.

Data were analyzed using analysis of variance (ANOVA) and means were separated using the Duncan's Multiple Range Test (DMRT) at P # 0.05. Due to the high variability of mound numbers between plots, percent reduction values were calculated for each plot using Henderson's Formula (Henderson & Tilton 1955):

$$\text{Percent reduction} = 100 \times \left[ 1 - \frac{T_A \times C_B}{T_B \times C_A} \right]$$

where  $C_B$  and  $T_B$  are the number of mounds before treatment in the control and treatment plots, respectively. Pre-count data obtained 13 August were used for bait-treated plots while 20 August pre-count data were used to calculate percent reduction for plots treated with Triumph. These values were then transformed to arcsine before analysis using ANOVA and DMRT.

## Results and Discussion

Numbers of fire ant active mounds varied greatly between treatment plots in this site despite its uniform appearance. Apparently, soil type across the test site may have had some influence on mound densities. Untreated plots contained significantly higher numbers of mounds throughout the trial. Few statistical differences were documented between treatment regimes (Table 2). However, maximum levels of suppression were achieved at different post-treatment intervals.

Maximum suppression in Triumph-treated plots occurred 2 weeks following application. Thereafter ant activity increased or resumed. The broadcast application of Amdro provided

surprisingly quick results, producing a maximum level of suppression two weeks following treatment. Thereafter, active mound numbers increased. Logic applications provided fire ant suppression more slowly, with maximum suppression occurring three to seven months following application. March 1992 values are suspect since sod in several of the treatment plots had been harvested, causing this trial to be terminated.

Percent reduction values more clearly illustrate the relatively rapid effect of Amdro versus the slower decline of fire ant active mound numbers in Logic-treated areas. The additional application of 0.5 lb. AI Triumph following the Logic treatment significantly improved the rate of suppression two weeks following treatment as compared with a single Logic application. The 0.5 lb. AI treatment resulted in numerically less suppression of activity than did the 1.0 lb. AI treatment and ant activity resumed in these plots by the three month post-treatment evaluation date. Irrigation soon after Triumph treatment would have surely increased the rate of reduction for the 1 week post-treatment evaluation.

### **Literature cited**

Henderson, C. F. and E. W. Tilton. 1955. Test with acaricides against the brown wheat mite. J. Econ. Entomol. 48:157-161.

**Table 1.** Mean number of active red imported fire ant mounds per 0.25-acre circular subplots, replicated three times each, before and following treatment regimes, Wittig Turf Farm, Wharton County, Texas, 1991-1992.

-----Mean no. mounds-0.25 acre\*-----

Treatment	13 Aug. pre-treat **	20 Aug. 1 week pre-treat	27 Aug. 2 weeks 1 week	3 Sept. 3 weeks 2 weeks	24 Sept. 6 weeks 5 weeks	13 Nov. 3 months	16 Mar. 7 months
Amdro®	18.3 c	2.7 d	1.7 b	4.3 b	5.3 b	9.7 b	9.3 b
Logic	20.3 c	19.0 cd	8.3 b	12.7 b	5.7 b	3.7 c	6.7 b
untreated	68.3	88.7 a	56.3 a	87.7 a	54.3 a	56.3 a	44.0 a
Logic® +							
0.5 Triumph®	45.0 b	65.3 ab	21.3 b	5.3 b	6.0 b	4.6 c	3.0 b
1.0 Triumph	33.0 bc	45.6 bc	12.0 b	3.7 b	11.3 B	19.3 bc	12.0 b
0.5 Triumph	21.0 c	31.7 bcd	7.7 b	6.0 b	12.7 b	20.7 b	20.3 b
<i>f</i>	9.837	7.904	8.463	31.651	11.199	18.606	5.840

\* Means followed by the same letter are not significantly different according to ANOVA and the Duncan's Multiple Range Test (P #0.05).

\*\* Amdro and Logic were applied 13 Aug. while Triumph treatments were made 20 Aug.

**Table 2.** Percent reduction of fire ant active mound numbers calculated using Henderson's Formula (Henderson & Tilton 1955), Wittig Turf Farm, Wharton County, Texas, 1991-1992.

-----Percent reduction\*-----

Treatment	<b>13 Aug. pre-treat **</b>	<b>20 Aug. 1 week pre-treat</b>	<b>27 Aug. 2 weeks 1 week</b>	<b>3 Sept. 3 weeks 2 weeks</b>	<b>24 Sept. 6 weeks 5 weeks</b>	<b>13 Nov. 3 months</b>	<b>16 Mar. 7 months</b>
Amdro®	--	65.1 a	83.5 a	83.5 abc	65.1	47.8 abc	43.1
Logic	--	17.2 a	37.6 b	48.1 d	51.5	68.9 ab	62.6
Logic® +							
0.5 Triumph®	--	--	48.3 b	91.6 ab	76.5	83.6 a	89.6
1.0 Triumph	--	--	59.3 b	91.7 a	60.5	36.2 abc	54.3
0.5 Triumph	--	--	48.3 b	69.5 abc	54.2	5.6 c	33.3
<i>f</i>	--	3.720	3.540	2.336	NS	3.0930	NS

\* Means followed by the same letter are not significantly different according to ANOVA and the Duncan's Multiple Range Test (P #0.05) on arcsine-transformed data.

\*\* Amdro and Logic were applied 13 Aug. while Triumph treatments were made 20 Aug.