

# EVALUATION OF DRY-FORMULATED, DRY-APPLIED INDIVIDUAL FIRE ANT MOUND TREATMENTS

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Treatment of red imported fire ant (*Solenopsis invicta* Buren) mounds is a labor intensive process when 1 to 3 gallons of water are required to drench each mound. Products containing acephate (Orthene® Tree, Turf and Ornamental Spray and Orthene® Fire Ant Killer) have gained in popularity because of ease of application, low price and relatively quick results. Recently, chlorpyrifos containing products (Greenlight® Fire Ant Killer II and Greenlight® Double Dursban®) have been marketed with instructions not to apply water after placement of the bran granules on and around the mound. Most other chlorpyrifos products for fire ant mound treatments require one or more gallons of water to drench the insecticide into the mound. Finally, the manufacturer of Amdro® Fire Ant Granules, a bait-formulated insecticide, was interested in the effectiveness of this product applied at 2 Tbsp. rather than 5 Tbsp. around each mound. If effective, this reduced rate would dramatically reduce the cost of individual mound treatments with Amdro®. This trial was conducted to determine the relative effectiveness of dry application of dry-formulated products to individual red imported fire ant mounds.

## Materials and Methods

This trial was conducted on the Texas A&M University Riverside Campus, Brazos County, Texas. On 10 May 1993, a 40-foot wide X 700-foot long strip was established and marked with flags. All active fire ant mounds were located within the strip and marked with flags in groups of ten. The 10-mound plots were measured and sorted into four blocks (replicates) of five treatments by increasing order of plot length. Treatments were then randomly assigned to one plot within each block (Table 1). In this way, each treatment was assigned to a long plot, short plot and two intermediate length plots. Treatments were as follows:

<u>Treatment:</u>	<u>Rate</u>
1. Amdro® (1% hydramethylnon)	2 Tbsp./mound
2. Amdro® (1% hydramethylnon)	5 Tbsp./mound
3. Orthene® Turf, Tree and Ornamental Spray (75% WP acephate)	2 tsp./mound
4. Green Light® Fire Ant Killer II (1% G chlorpyrifos)	4 Tbsp./mound
5. Untreated control	

All treatments were applied on the afternoon of 11 May 1993 according to directions. Evaluations were conducted 3, 6, 15 and 31 days (14, 17, 26 May and 11 June, respectively) after treatment using the minimal disturbance technique. The plots were also surveyed for the presence of new/satellite mounds 6, 15 and 31 days after treatment.

## Results and Discussion

The experimental design employed in this trial provides two types of efficacy data: 1) the effect of a treatment on four uniform sets (plots) of 10 marked red imported fire ant mounds; and 2) the ability of individual mound treatments to reduce the total number of ant mounds in treated areas. By arraying plot length to produce blocks within which treatments are randomly assigned, the mean plot length and total area of plots for each treatment becomes fairly uniform (Table 1). In this way, the probability of fire ant colonies migrating in or out of any given set of treatment plots is roughly equal. Furthermore, differences in the number of 'new' (unmarked) mounds appearing between treatment plots can be inferred to be relocated fire ant colonies, called 'satellite' mounds.

On 17 May, 1993, plots were monitored from 12:00 noon to 1:00 pm. Weather was sunny and temperatures were in the middle 80°F range. Mounds required vigorous disturbance before ants appeared within 15-30 seconds. No rain had occurred since the treatments had been applied. On 26 May, observations were made from 1:30 to 2:30 pm. Weather was cloudy and temperatures were in the middle 70°F range. Mounds required minimal disturbance and ants emerged within 5-10 seconds. These conditions may account for higher numbers of active mounds in some Amdro® treatment plots than in documented on 17 May.

All treatments significantly reduced ant activity in treated mounds by three days after application except the low (2 Tbsp./mound) rate of Amdro® (Table 2). By the sixth day, all treatments were performing equally well, statistically, although Amdro® treatments provided a numerically slower rate of suppression. The maximum levels of suppression achieved by Amdro® treatments occurred 31 days after application. Both rates tested provided similar results.

Statistically, Orthene® Turf, Tree and Ornamental Spray (acephate) and Greenlight® Fire Ant Killer (chlorpyrifos) treatments were similar (Table 2). Orthene® provided a numerically quicker suppression of ant activity in treated mounds. 'Satellite' mound formation was greater following these treatments. On 26 May, 100 percent elimination of ant activity in acephate and chlorpyrifos treated mounds was documented. However, an average of 2.0 and 1.8 "new" mounds appeared in the acephate and chlorpyrifos ant mound treatment plots, respectively. Thus, the actual level of suppression of active ant mounds (percent reduction relative to the pre-treatment active ant mound level of 10) in these treatment plots was 80 percent and 82 percent for acephate and chlorpyrifos ant mound treatment plots, respectively. Satellite mound formation in these treatment plots resulted in performance levels statistically equivalent to Amdro® treatments.

Homeowners frequently report disillusionment with fire ant control, often stating that individual mound treatment merely cause ant colonies to move and build new mounds. The experimental design used in this trial addresses their concern, providing both types of data describing the results of these individual mound treatments. In this trial, all treatments were effective. However, the analysis of reduced treated ant mound numbers and treatment-related reduced ant mound numbers per unit area (plot) produced statistically different results.

**Table 1.** Treatment plot length (feet and inches) and dimensions, Brazos Co., Texas 1993.

<u>Treatment</u>	<u>Block</u>				<u>Total area</u>
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	
Amdro® (2 Tbsp./mound)	25' 4"	25' 9"	38' 0"	52' 8"	5,425.2 sq. ft.
Amdro® (5 Tbsp./mound)	21' 0"	31' 2"	43'10"	55' 0"	6,040.4
Orthene® Turf, Tree and Ornamental Spray (2 tsp./mound)	25' 3"	27' 2"	36' 3"	44' 0"	5,306.4
Green Light® Fire Ant Killer II (4 Tbsp./mound)	19' 9"	25' 6"	33' 3"	45' 9"	4,970.0
Untreated control	21'11"	28' 6"	39'11"	45' 4"	5,425.2
Total block area (sq. ft.):	3,519	4,383	6,098	7,880	

**Table 2.** Number of active red imported fire ant mounds following application of dry individual mound treatments, Brazos County, Texas, 11 May 1993.

	Mean no. active fire ant mounds/10*							
	(Percent reduction in parentheses)							
	3 days		6 days		15 Days		31 days	
	<u>14 May</u>	<u>17 May</u>	<u>26 May</u>	<u>11 June</u>				
Amdro® (2 Tbsp.)	6.5ab	(35)	3.5b	(65)	3.5b	(65)	0.8b	(92)
Amdro® (5 Tbsp.)	4.0b	(60)	2.8b	(72)	3.3b	(67)	0.5b	(95)
Orthene® TT&O (2 tsp.)	2.0b	(80)	0.5b	(95)	0.0c	(100)	0.3b	(98)
Greenlight® Fire								
Ant Killer II (4 Tbsp.)	3.3b	(67)	0.3b	(97)	0.0c	(100)	0.0b	(100)
Untreated control	9.5a	(5)	9.3a	(7)	9.0a	(10)	5.3a	(47)
MSE	4.6667		3.5750		1.7333		1.2250	
<i>F</i>	5.14		8.83		18.44		10.01	
<i>P</i>	0.0067		0.0006		0.0001		0.0003	
R-square	0.749		0.837		0.915		0.854	
Min. Sig. Dif.	4.8690		4.2616		2.9674		2.4946	
	(d.f. = 12; Studentized Range = 4.508)							
	Mean no. active fire ant mounds/plot*							
	(Mean no. 'satellite' mounds/plot in parentheses)							
	3 days		6 days		15 Days		31 days	
	<u>14 May</u>	<u>17 May</u>	<u>26 May</u>	<u>11 June</u>				
Amdro® (2 Tbsp.)	6.5ab	(---)	3.5b	(0.0)	4.5b	(1.0)	0.8b	(0.8)
Amdro® (5 Tbsp.)	4.0b	(---)	3.8b	(1.0)	4.5b	(1.0)	1.5b	(1.3)
Orthene® TT&O (2 tsp.)	2.0b	(---)	1.5b	(1.0)	2.0b	(2.0)	1.0b	(0.8)
Greenlight® Fire								
Ant Killer II (4 Tbsp.)	3.3b	(---)	2.0b	(1.8)	1.8b	(1.8)	0.3b	(0.3)
Untreated control	9.5a	(---)	9.3a	(0.0)	9.5a	(0.5)	6.0a	(0.8)
MSE	4.6667		4.4917		3.8667		1.9833	
<i>F</i>	5.14		5.09		6.30		7.00	
<i>P</i>	0.0067		0.0070		0.0029		0.0018	
R-square	0.749		0.748		0.786		0.803	
Min. Sig. Dif.	4.8690		4.7768		4.4320		3.1742	
	(d.f.=12; Studentized Range = 4.508)							

\* Means followed by similar letters are not significantly different according to analysis of variance (ANOVA) and Tukey's Studentized Range Test at  $P \leq 0.05$ .