Comparison of individual mound treatments for red imported fire ants, *Solenopsis invicta* Buren (Hymenoptera: Formicidae)

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Red imported fire ants, *Solenopsis invicta* Buren, are nuisance insects that interfere with outdoor activities and their sting can cause serious medical problems. The problems they cause in urban areas make them a desirable pest to control (Drees et al. 2002). Treating individual fire ant mounds is the fastest way to kill fire ant colonies. There are numerous products on the market labeled to decrease fire ant populations from fire ant baits to mound drenches. Fire ant baits are an effective way to control fire ants, since baits are delivered into the mounds by the worker ants, so small amounts of baits are needed to eliminate the entire colony. This makes fire ant baits to be considered an environmentally friendly option for control. There are several fire ant baits on the market that range from fast acting baits, such as those containing indoxacarb to slower acting baits, such as those containing insect growth regulators (Merchant and Drees 2006). Also, there is a growing interest in using naturally derived insecticides for controlling all insects, including red imported fire ants. These products are termed "organic" (Drees and Lennon 1998). Current organic recommendations for control of other landscape insects include insecticidal soaps and orange oil, for such pests as scales, aphids, leafhoppers, and thrips. However, these products are not currently labeled for use on fire ant mounds.

This trial was established to determine the efficacy of fire ant populations with individual mound treatments of fire ant baits compared to an organic mound drench treatment.

Materials and Methods

On June 3, 2008, twenty-four plots were established at the Texas AgriLife Research and Extension Center in Dallas, TX (Figure 1). We began measuring plots at 11:00pm with temperatures at 88° F. Flags were inserted into the ground to denote the beginning and end of each plot. Within each plot, 6 active fire ant mounds were flagged. Red imported fire ant mounds were counted within each plot by disturbing suspected mound sites with a stick to determine activity. Mounds were considered active if many (dozens of) worker ants were observed within 15 seconds.

The width of the plots was 108 feet, but the length varied between the plots. Plot lengths were arrayed from shortest to longest, then divided into 4 blocks containing 4 treatment plots each. This allowed the total length of plots for all the treatment plots to be roughly equal, so colony migration into and out of the plot areas was similar for all treatments. Within each block, treatments were assigned to plots at random and to minimize pre-treatment differences in total plot length (Table 1).

The treatments included:

1) Amdro® (0.73% hydramethylnon)- 2 tablespoons per mound
2)Amdro® Bait Block™ (0.88% hydramethylnon)- 1 oz per mound

3) Amdro® Fire Strike™ (0.365% methoprene and 0.250% hydramethylnon)- 2 tablespoons per mound
4) Spectracide® Once N Done!™ Insect Killer (0.5% lambda-cyhalothrin) – 2 tablespoons per mound
5) 1.5 fl oz Citrex® Orange Oil and 3 fl oz Dawn® Soap/ gal water per mound
6) Untreated Control

Treatments were applied beginning at 7:00 am on June 4, 2008 with temperatures at 82° F. Evaluation of mound activity was conducted prior to application and at 3, 7, 14 and 28 days post treatment. For the evaluation process, red imported fire ant mounds were determined to be active within each plot by disturbing suspected mound sites with a stick to determine activity. Mounds were considered active if many (dozens of) worker ants were observed within 15 seconds. Data were analyzed using Analysis of Variance (ANOVA) test with means separated using Duncan's Multiple Range Test at $P \leq 0.05$ (SPSS for Windows, Lead Technologies, Version 13.0).

Results and Discussion

At 3 days, there were no significant differences in fire ant mound activity between the treatments and the control (**Table 2**). After 7 and 14 days following application, the number of active mounds in the Spectricide® (lambda-cyhalothrin, a pyrethroid insecticide) and Orange Oil/Soap (home remedy) treatment plots were significantly less than the other treatments and the control. At 28 days, the same two treatments had significantly reduced mean (average) active ant mounds per plot. However,Amdro® (hydramethylnon) and Amdro® Firestrike™ (hydramethylnon plus methoprene) bait treatments had reduced but non-significant reduction in mound numbers, and in the Amdro® Ant Block™ (hydramethylnon in a sucrose-added conventional bait formulation) treated plots, active ant mound numbers were significantly higher than in the untreated mound plots.

Overall, the Spectricide® and Orange Oil/Soap combination had numerically less active fire ant mounds compared to the other treatments. Further tests should be conducted to test the same fire ant control products in the spring or fall to compare results to this study.

The average daytime temperature throughout the study was 100°F with a total of 5 inches of rain. The high temperatures and low rainfall could have impacted this study.

Table 1. Treatment block assignments based upon plot length.

Treatment	Plot Number	Plot Length (ft)
Amdro®	4, 10, 13, 19	72, 165, 183, 57
Amdro® Ant Block™	1, 9, 18, 22	114, 237, 87, 174
Amdro® Firestrike™	5, 7, 14, 21	234, 267, 75, 144
Spectracide® Once N Done!™	3, 11, 17, 24	75, 57, 57, 93
Orange Oil and Dawn® Soap	6, 8, 15, 23	177, 150, 51, 147
Untreated Control	2, 12, 16, 20	129, 162, 111, 126

Table 2. Number of active red imported fire ant mounds in individual mound test observed at Texas AgriLife Research and Extension Center, Dallas, TX. Six mounds were initially in each plot prior to application of treatment.

Treatment	3 Days	7 Days	14 Days	28 Days
Amdro®	4.75a	4.50b	4.50b	2.50b
Amdro® Ant Block™	6.00b	6.00c	5.75b	5.25**c**
Amdro® Firestrike™	6.00b	5.00bc	4.50b	1.50ab
Spectracide® Once N Done!™	4.75a	0.75**a**	0.25**a**	0.25a
Orange Oil and Dawn® Soap	5.00ab	0.50**a**	0.00**a**	0.00a
Untreated Control	5.00ab	5.00bc	4.50b	2.75b

[a]Means followed by the same letter within the same column were not significantly different using Analysis of Variance (ANOVA) and means separated using Duncan's Multiple Range Test at $p \leq 0.05$ (SPSS, Windows 11.5).

Figure 1. Testing site for the individual fire ant mound trial on 45 acres at the Texas AgriLife Research and Extension Center, Dallas, TX.

Figure 2. Treating individual mound with Amdro® Bait Block™ (0.88% hydramethylnon) at the Texas AgriLife Research and Extension Center, Dallas, TX.

Literature Cited

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