

Granular Bifenthrin Applied as Individual Mound Treatments and Broadcast for the Control of Fire Ants

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The Scott's Company (Marysville, OH) introduced a new granular fire ant (*Solenopsis invicta* Buren) control product, Ortho® Fire Ant Killer Granules containing 0.2% bifenthrin on a fast-dissolving carrier. This test was designed to compare the effectiveness of this new product against competing products as both individual mound treatments and broadcast. Scott's has also developed a new bait containing the active ingredient spinosad, which was also tested in this trial.

Objectives: 1) Test the effectiveness of Ortho® Fire Ant Killer Granules as both broadcast and individual mound treatments for the control of fire ants. 2) Test the effectiveness of individual mound treatments of spinosad bait for the control of fire ant colonies.

Materials and methods

The test was located in an ungrazed pasture near Mumford, Robertson County, Texas. Vegetation at the site was somewhat tall, but fire ant mounds were well developed and visible thanks to plentiful rainfall early in the season. Soils were a patchy mix of heavy clay and sandy loam over claypan.

Plots were established during the week of June 25, 2002. Plots were 75 feet square (0.13 acres, roughly 1/8th acre) and were separated by a minimum of 20 feet from the nearest treated plot. Pre-counts were conducted on June 28. Mounds were evaluated using the minimal disturbance technique for all evaluations. Treatments were assigned using the method described in Barr and Best (2002) to reduce variability. Four replications were established for each treatment. Treatments are described in **Table 1**.

Treatments (**Table 1**) were applied on July 8, beginning with baits and ending with the broadcast contact insecticides in the late afternoon. Broadcast treatments were applied using an Earth-Way® Ev-N-Spred hand-held seeder. Individual mound treatments (IMTs) were applied using appropriate measuring cups for application, followed by a one gallon drench using watering cans where indicated by label directions. Evaluations were conducted at 1, 3 and 11 days and 1, 2 and 5 months post-treatment. The entire plot was evaluated for active fire ant mounds.

This test was combined with two other trials (p.81 and p.87) to fully utilize the entire site during a period when suitable sites were very hard to find. Sufficient spinosad was supplied for only three replications so the high-density replication plot was not treated. Preliminary analysis using PROC GLM on the full, unbalanced data set did not allow the appropriate use of Duncan's multiple range test and produced a very difficult to interpret output for Tukey's studentized range (HSD) test. The analysis was repeated using PROC ANOVA after omitting the high-density replications of all treatments. Differences between the two analyses were slight, with analysis of variance being the more conservative of the two. Consequently, data presented here were analyzed using SAS, PROC ANOVA with means separated using both Duncan's multiple range test and Tukey's studentized range (HSD) test, $P < 0.05$.

Results and Discussion

Orthene[®] Fire Ant Killer Dust showed the only significant ($P < 0.05$) decrease in active mound numbers up to 11 days post-treatment, with a maximum suppression of only 66% versus untreated. At 11 days, both broadcast Amdro and Orthene IMT show significant difference compared to untreated using both mean separation tests. Ortho granular as both an IMT and broadcast and Over 'N Out also show significant differences versus untreated using Duncan's.

At the 1 month evaluation, Amdro, Orthene, Ortho granular and Over 'N Out continued to show the best suppression. All significant differences disappear at 2 months, probably due to lack of rainfall in the area. Significant differences reappear at five months. Ortho granular broadcast and Over 'N Out had the greatest suppression, indicating that they both still maintained some residual activity.

The Ortho granular products took several weeks to reach maximum suppression. This is rather surprising considering the fast-acting nature of bifenthrin. It is possible that granules were washed off the surface of the mound, rather than dissolving into the mound by too vigorous a water drench. Full suppression was only obtained after rainfall later in the test. Overall, IMT treatments appear to have not performed well. This is very likely a function of missed mounds during treatment, rather than product performance.

Overall, results for the broadcast products in this test were inexplicably disappointing. As shown by several trials just in this publication (citations), broadcast Amdro and Over N Out (or Top Choice) would be expected to reach 90% control or better within a month, with Over N Out maintaining that level of control for several months, at least. Though the area was dry in the latter part of the summer, untreated plot numbers dropped to 60% of their pre-count levels, relatively high compared to other tests 1999-2001. There was an overabundance of rain in the fall, however. The five month count was conducted while stepping through patches of standing water in most plots. Given the products involved and the weather, we can think of no viable reason for such poor performance of these broadcast treatments.

On a more positive note, Ortho Fire Ant Killer Granules applied as a broadcast provided significant control versus untreated plots at five months post-treatment and similar control to Over 'N Out throughout the test.

Table 1. Treatments included. Holmes Pecan Orchard, Robertson Co. Texas, 2002.

Treatment (abbrev.)	Formulation	Rate	Application
Orthene [®] Fire Ant Killer dust (Orthene)	acephate 50% dust	1 Tablespoon per mound	IMT, dry
Ortho [®] Fire Ant Killer Granules (OG IMT)	0.2% bifenthrin granule		IMT, with one gallon water drench
Amdro (Amd IMT)	0.73% hydramethylnon bait	5 Tablespoons per mound	IMT, scatter around mound
Spinosad bait	0.015% spinosad	4 Tablespoons per mound	IMT, dry

Ortho Fire Ant Killer Granules (OG broad)	0.02% bifenthrin		broadcast, then 50 gallons water irrig.
Over 'N Out™	0.0103% fipronil	2 lbs/1000 ft. ²	broadcast, dry
Amdro® (Amd broad)	0.73% hydramethylnon bait	1.5 lbs/acre	broadcast, dry
untreated	N/A	N/A	N/A

Table 2. Results of imported fire ant mound evaluations - 0.125-acre plots, 4 replications. Mumford, TX. Treated July 8, 2002

Treatment	Mean number of active mounds per plot						
	Pre	1 day	3 days	11 days	1 month	2 months	5 months
untreated	16.7 a	10.7 a/ab	9.7 ab/a	14.3 a/a	13.3 a/a	11.7 a/a	19.3 ab/ab
OG IMT	18.3 a	9.0 ab/ab	9.3 ab/a	6.7 bc/ab	3.3 c/b	3.0 a/a	11.7 bc/ab
Orthene IMT	17.7 a	4.3 b/b	3.3 b/a	4.0 c/b	5.3 bc/ab	5.3 a/a	21.7 a/a
Amd IMT	19.0 a	14.7 a/a	16.7 a/a	8.3 abc/ab	6.0 bc/ab	8.7 a/a	14.7 abc/ab
spinosad IMT	17.7 a	12.0 a/ab	17.0 a/a	11.7 ab/ab	10.0 ab/ab	6.0 a/a	19.0 ab/ab
OG broad	15.0 a	11.7 a/ab	11.7 ab/a	7.3 bc/ab	5.0 bc/ab	4.0 a/a	6.7 c/b
Amd broad	18.3 a	11.7 a/ab	10.7 ab/a	3.0 c/b	4.0 c/b	4.3 a/a	16.7 ab/ab
Over N Out	18.3 a	12.7 a/ab	9.7 ab/a	7.0 bc/ab	5.0 bc/b	3.7 a/a	7.0 c/b
F	1.64	5.48	3.07	5.39	4.33	1.08	4.41
P	0.2038	0.0025	0.0294	0.0027	0.0073	0.4305	0.0068
R ²	0.8632	0.7788	0.6639	0.7759	0.7359	0.4107	0.7392
MSE	2.929	10.672	23.815	11.419	9.357	29.018	21.976

Means in the same column with the same letter are not significantly different. Means separated by Duncan's multiple range test/Tukey's studentized range (HSD) test, $P < 0.05$. $df = 14$

Literature Cited

Barr, CL and RL Best. 2002. Product evaluations, field research and new products resulting from applied research. SW Ento. Supplement 25:47-52