

Comparison of Different Formulations of Broadcast Fipronil for the Control of Red Imported Fire Ants

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Fipronil is a relatively new insecticide formulated for the control of red imported fire ants (*Solenopsis invicta* Buren). Granular formulations have been shown to provide extremely long residual activity while bait formulations provide control similar to that of some other baits, but at very low active ingredient concentrations (Barr et al., 1999). This test was initiated to provide additional data to support these efficacy findings.

Objective: Test the effectiveness of different concentrations of the active ingredient fipronil as a granular broadcast and broadcast bait.

Materials and Methods

The trial was conducted at Coulter Field, the municipal airport of Bryan (Brazos County), Texas. Soil is a shallow sandy loam over claypan with regularly mowed vegetation. The experimental units in this test were 0.25-acre square plots where active mound numbers ranged from 11 to 70 per plot. To help reduce this five-fold difference in active mound numbers, which could easily mask treatment effects, plots were assigned so that all treatments started with almost exactly the same number of mounds, while still maintaining effective replications (Barr and Best, 2002).

The test was established April 28, 1999. Plot dimensions were 100 x 100 ft. with minimum 20 ft. untreated buffers on all sides (Drees et al. 1992). A 40 ft. radius circle (0.115 ac) in the middle of each plot was used as the sampling area. Pre-treatment counts of active mounds were conducted on April 29 with treatments applied April 30. Granular treatments were applied with a Red Ball electric seeder mounted on a John Deere 4 x 6 Gator utility vehicle. Baits were broadcast using a hand held Cyclone 1C1 spreader. Four rates of 0.0143% active ingredient (a.i.) fipronil granular product and two rates of 0.00015% fipronil bait were tested. Treatments included: fipronil granular, 82.5 kg/ha (14.0g a.i./ha); fipronil bait, 1.68 kg/ha, (0.0023g a.i./ha); Talstar® 2G, (0.2% bifenthrin, FMC, Philadelphia, PA) 183.7 kg/ha (410g a.i./ha); Amdro® Fire Ant Bait, 0.73% hydramethylnon, American Cyanamid, Parsippany, NJ) 1.68 kg/ha (12g a.i./ha). Evaluations were conducted on 8 June, 21 July, 4 November 1999, and 27 April 2000 (5, 12, 17 and 52 weeks post-treatment, respectively). Data were analyzed using SAS ANOVA with means separated by Tukey's studentized range (HSD) test, $P < 0.05$.

Results and Discussion

By 5 weeks post-treatment, all treatments had significantly ($P < 0.05$) fewer active mounds than the untreated control plots (**Table 1**). This trend continued through 27 weeks post-treatment. By the one year evaluation, Amdro and the high-rate fipronil bait had increased numerically over the other treatments and were not significantly different from the untreated plots, $P < 0.05$.

Since this test's completion and based partly on its data, several products have entered the

market: Chipco® Top Choice, 0.143% granular fipronil for commercial use; Over 'N Out®, 0.0103% granular fipronil for consumer use and; Firestar®, 0.00015% fipronil bait with label directions to apply 1.5 - 15 lbs./acre. Results from this test show that fipronil provides extremely long residual activity, though it may take several weeks for full initial mound suppression.

Table 1. Mean Number of Active Red Imported Fire Ant Mounds Per 0.047 ha Sample Area, for Fipronil Granular and Bait Formulations. Coulter Field, Bryan, Texas, treated April 30, 1999..

Treatment	Mean number mounds				
	Pre-count	5 week	12 week	27 week	52 week
untreated	15.75 a	14.50 a	6.75 a	9.25 a	8.25 a
hydramethylnon bait	16.25 a	4.50 b	1.75 b	4.50 ab	5.25 ab
bifenthrin granular	15.25 a	0.00 b	0.00 b	1.75 b	1.25 b
fipronil granular, 0.006 lbs a.i./ac	15.50 a	2.50 b	0.25 b	1.00 b	0.25 b
fipronil granular, 0.0125 lbs a.i./ac	15.50 a	2.00 b	0.25 b	0.75 b	0.50 b
fipronil granular, 0.01875 lbs a.i./ac	15.50 a	1.00 b	0.00 b	0.00 b	0.50 b
fipronil granular, 0.025 lbs a.i./ac	15.50 a	1.75 b	0.25 b	1.25 b	0.25 b
fipronil bait, 1.5 lbs./acre	16.00 a	3.25 b	0.75 b	0.75 b	1.25 b
fipronil bait, 15 lbs./acre	16.00 a	1.25 b	0.75 b	2.00 b	5.25 ab
F	0.04*	11.31	6.54	5.36	4.63
P	1.000	0.0001	0.0001	0.0003	0.0008
R ²	0.8027	0.8382	0.7498	0.7106	0.6800
MSD	8.13	5.4496	3.5017	5.2941	5.6709

Means in the same column followed by different letters are significantly different ($P < 0.05$) using SAS analysis of variance and Tukey's studentized range (HSD) test for mean separation. $df = 24$.

* F and P values are for treatment effects only. Replication $P = 0.0001$ due to stratification of mound densities.

Literature Cited

Barr CL, R L Best, W Summerlin, L Lennon, and N Riggs. 1999. A Long-term Study of the Effects of Granular and Bait Formulations of Fipronil on the Suppression of Fire Ant Colonies. Res. Dem. Handbook 1997-99, Tex. Ag. Extension Serv, Bryan, TX. Also <http://fireant.tamu.edu>

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