

**Testing of TopChoice® and Firestar® Alone and in Combination
for the Control of Red Imported Fire Ants
Palestine Airport, Anderson Co., Texas - 2002**

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According to Bayer/Aventis representatives, the manufacturer of fipronil products, commercial users of the granular formulations have reported a slight lack of control of red imported fire ant (*Solenopsis invicta* Buren) mounds located near pavement. Some believe that ants needed to come in mouthpart contact with the toxicant layer in order for it to be effective. Next to pavement, most excavated soil is from beneath the pavement surface and not exposed to the toxicant. It was suggested that using a dual application of the granular contact insecticide Top Choice (0.0143% fipronil) plus the bait insecticide Firestar (0.00015% fipronil) might provide complete control of all mounds. This test was undertaken to investigate whether a dual application was more effective.

Objective: Determine if a dual application of Top Choice and Firestar was more effective in controlling fire ant colonies than either application alone.

Materials and Methods

The test site was located at the municipal airport of Palestine, Texas in the central east Texas Piney Woods region. The airport consists of two perpendicular, asphalt runways 4000 and 5000 feet in length arranged at right angles to each other to form a cross. They are connected by several asphalt taxiways. The entire site is mowed at least once per year with strips adjacent to the runways mowed more frequently. Soil at the site is generally sandy. The great majority of red imported fire ant (*Solenopsis invicta* Buren) mounds are located in the somewhat heavier fill soil within 20 feet of the pavement, though few were found in actual contact with the pavement.

Plots were arranged to utilize as many runway lights as possible as plot end markers, thus avoiding disruption by mowing. Plots along unlighted taxiways were measured and marked with small pieces of rope nailed into the ground. These were also fixed with a GPS unit. Plots were 200 feet long (the distance between lights) with a 10 foot untreated buffer at each end. One long edge of every plot was in contact with pavement. Plots were 60.5 feet wide for a total treatment area of 0.25 acres (180 x 60.5 feet). Sample areas consisted of the strip of land 20 feet wide, adjacent to the pavement along one long edge, and 10 feet inside the treatment area at the ends. Therefore total sample area was 3,200 ft.² (160 x 20 feet = 0.073 acres).

Mounds were evaluated using the minimal disturbance technique. Mounds were lightly disturbed with a pointed tool handle and ant reaction observed. A mound was considered active if a sufficient number of ants appeared at the surface, compared to the reaction of mounds in untreated areas, given the prevailing weather conditions. Evaluations were completed before 1:00 p.m. during the summer to avoid false negative readings due to the heat.

Pre-counts were conducted on June 4, 2002 and treatments applied on June 11. Bait treatments were applied by hand using Earth-Way® Ev-N-Spred rotary seeders, while granular products were applied using a Warren's T-7II spreader. Post-treatment counts were taken on June 20 and 27, July 11 and 23, August 12, September 11, October 16 and December 18.

Treatments (**Table 1**) were assigned based on pre-count active mound numbers using the method outlined in Barr et. al (2002) to help compensate for initial mound count variability. Sufficient material was supplied for only three replications of the two treatments using

TopChoice. Additionally, an Amdro and a Firestar plot were paved over during airport renovation. To maintain a balanced data set, the low-density replications of all treatments, which included those mentioned, were eliminated from the analysis. Appropriate raw data were extracted from the larger trial (Palestine Airport, 2002) then analyzed using SAS PROC ANOVA. Means were separated using Duncan's multiple range test ($P < 0.05$) to better separate some substantial numerical differences seen in the data.

Table 1. Broadcast treatments. Palestine, Texas Municipal Airport, 2002. Treated June 11, 2002

Product/carrier	Active ingredient	Formulation	Application Rate
Top Choice [®]	fipronil	0.0143% granular	87 lbs./acre
Firestar [®]	fipronil	0.00015% on Tast-E-Bait	1.5 lbs./acre
Firestar + Top Choice (Top-Fire)	fipronil	0.0143% granular + 0.00015% bait	87 lbs./acre followed by 1.5 lbs./acre
Talstar [®] 2G	bifenthrin	0.2% granular	100 lbs./acre
Amdro [®] Pro	hydramethylnon	0.73% conv. bait ¹	1.5 lbs./acre
Extinguish [™]	s-methoprene	0.5% conv. bait	1.5 lbs/acre
N/A	untreated	N/A	N/A

¹ Conventional bait = soy bean oil formulated on defatted corn grit.

Results and Discussion

As shown in Table 2, fipronil-containing products showed significant ($P < 0.05$) differences in active mound numbers from the first week through the end of the test, compared to untreated control plots. There were no statistical and only small numerical differences between the Top Choice only and Top Choice + Firestar treatments. By 4 weeks post-treatment, they had both virtually eliminated all colonies and did, in fact, reach 100% control from 6 weeks through 3 months. They outperformed all the other treatments in the test with the exception of Extinguish in terms of maximum mound suppression, but reached maximum much faster than Extinguish. By 12 months, both Top Choice treatments and Extinguish still maintained significantly lower ($P < 0.05$) mound counts than the untreated plots.

Firestar, on the other hand, proved somewhat disappointing. Though it did show significantly ($P < 0.05$) lower reductions than untreated plots, it never achieved better than 78% control. All the other treatments (including those actually applied in the test, but not analyzed here) reached or very nearly reached 100% control at some point. Past tests with fipronil formulated on soy bean oil-based bait (see Barr et al., 1999 and Fipronil Application Trial - Hallettsville Municipal Airport 2002 in this publication) showed that it performed much the same as Amdro in terms of speed and maximum suppression. This test, however, was the first conducted by this laboratory in which the commercial formulation of Firestar was used. Rather than soy bean oil and corn cob grit, the carrier was a granular product called Tast-E-Bait. Given that the numerous other baits in this test performed exceptionally well and conventionally-formulated fipronil bait has performed well in other tests, it can only be concluded that the carrier

was not picked up as well by the ants.

One possible problem was that the low rate, 1.5 lbs/acre, was used to: a) keep application amounts consistent with other products and, b) apply it as it would most likely be applied by purchasers (rather than 15 lbs/acre as allowed by label directions). Test results from “Comparison of Different Formulations of Broadcast Fipronil for the Control of Red Imported Fire Ants” (p.51) show that a 1.5 lbs/acre rate with a conventional formulation performed as well or better than a 15 lb/acre rate. Though far from conclusive, it is felt that the acceptability of the Tast-E-Bait granule and/or increased application rates using it should be further investigated.

Finally, there appeared to be no advantage to using the dual application of Top Choice and Firestar. At every evaluation but one, Top Choice alone had either fewer mounds than the combination or they both showed 100% control. However, very few mounds were found adjacent to pavement, so this issue could not be addressed at this site.

Table 2. Results of red imported fire ant mound evaluations: 3,200 ft² plots, 4 replications. Palestine, TX. Treated June 11, 2002.

Treatment	Mean number of active mounds									
	Pre	1 wk	2 wk	4 wk	6 wk	2 mo	3 mo	4 mo	6 mo	12 mo
untreated	19.3 a	20.0 a	17.3 a	13.0 a	18.7 a	14.7 a	12.7 a	19.3 a	19.3 a	20.0 a
Amdro	16.3 a	5.0 c	0.7 c	4.0 a	5.7 bc	3.7 bc	7.0 ab	10.0 ab	9.0 ab	12.0 a
Exting.	17.7 a	18.0 ab	9.0 b	4.3 a	2.0 bc	1.0 c	0.0 b	2.0 b	2.3 b	5.3 b
Talstar	19.3 a	4.3 c	2.0 bc	0.3 a	3.3 bc	3.7 bc	6.7 ab	11.3 ab	8.3 ab	6.3 ab
Top-Fire	19.0 a	9.3 bc	3.3 bc	0.7 a	0.0 c	0.0 c	0.0 b	2.3 b	2.7 b	2.3 b
Topchoice	19.3 a	8.0 c	2.0 bc	1.0 a	0.0 c	0.0 c	0.7 b	1.0 b	0.7 b	1.7 b
Firestar	16.7 a	8.0 c	4.0 bc	8.7 a	11.0 ab	10.3 ab	2.7 b	6.3 b	10.0 ab	8.3 ab
F	8.97*	5.17	4.90	1.33	4.11	4.35	2.43	2.37	2.45	4.01
P	0.0005	0.0057	0.0071	0.3148	0.0141	0.0114	0.0804	0.0860	0.0788	0.0155
R ²	0.8567	0.7752	0.7658	0.4707	0.7328	0.7437	0.6183	0.6125	0.6199	0.7279
MSE	13.44	24.484	17.397	44.246	26.659	16.738	22.071	43.5	40.389	23.944

Means in the same column with the same letter are not significantly different. Means separated by Tukey's studentized range (HSD) test, $P < 0.05$. $df = 18$.

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

Literature Cited

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- 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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