

**The Experimental Compound Noviflumuron as a
Broadcast Bait for the Control of Red Imported Fire Ants**
Palestine Airport, Anderson Co., Texas - 2002

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In 2002, Dow Agrosience supplied three samples of a conventionally-formulated broadcast fire ant bait containing the active ingredient noviflumuron, an insect growth regulator (IGR). Noviflumuron is one of a number of novel compounds being tested for use in red imported fire ant (*Solenopsis invicta* Buren) bait.

Objective: Test the effectiveness of the active ingredient noviflumuron as a broadcast bait in controlling fire ants and in comparison to other broadcast products.

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 4,000 and 5,000 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 fire ant 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 (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. Treatments were replicated four times, however an Amdro and a Firestar plot were lost due to construction after week four. Material for only three plots of Top Choice was available, as well. Consequently, the low-density replication was omitted to give a balanced data set. Appropriate raw data were extracted from the larger trial (Palestine Airport, 2002) then analyzed using SAS

ANOVA with means separated using Tukey's studentized (HSD) range test, $P < 0.05$.

Table 1. Broadcast treatments. Palestine Municipal Airport, 2002

Active ingredient	Product/carrier	Formulation	Application Rate
noviflumuron	N/A	0.05% conv. bait ¹	1.5 lbs./acre
noviflumuron	N/A	0.11% conv. bait	1.5 lbs./acre
noviflumuron	N/A	0.22% conv. bait	1.5 lbs./acre
hydramethylnon	Amdro [®]	0.73% conv. bait	1.5 lbs./acre
fenoxycarb	Logic [®]	1.0% conv. bait	1.5 lbs/acre
s-methoprene	Extinguish [™]	0.5% conv. bait	1.5 lbs/acre
pyriproxyfen	Distance [®]	0.5% conv. bait	1.5 lbs/acre
bifenthrin	Talstar [®] 2G	0.2% granular	100 lbs./acre
hydramethylnon + s-methoprene	Amdro + Extinguish	50:50 hopper blend	1.5 lbs./acre total
fipronil	Top Choice [®]	0.0143% granular	87 lbs./acre
fipronil	Firestar [®]	0.00015% on Tast-E-Bait carrier	1.5 lbs./acre
untreated	N/A	N/A	N/A

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

Results and Discussion

As shown in **Table 2**, noviflumuron had statistically similar performance to the other insect growth regulators (IGR) baits Logic, Extinguish and Distance. Decline in active mound numbers was slow followed by a long duration of control. Active mound numbers were significantly ($P < 0.05$) lower than untreated for all 3 rates beginning at two months post-treatment and remaining so for at least one formulation throughout the test. Two rates actually achieved 100% control at 3 months post-treatment and only 2 mounds were found in the 3 plots of the remaining formulation. There were few consistent numerical and no statistical differences between the 3 rates of noviflumuron at any point. At 12 months post-treatment, two noviflumuron formulations maintained significantly ($P < 0.05$) lower mound numbers than the untreated control plots, as did the IGRs Extinguish and Logic, the Extinguish:Amdro hopper blend and TopChoice. Based on these results, noviflumuron shows good promise as a slow-acting, long-duration fire ant control broadcast bait.

Table 2. Results of red imported fire ant mound evaluations: 3,200 ft² plots, 4 replications. Palestine Airport, 2002. 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
nov 22	17.7 a	13.7 abcd	9.0 ab	6.7 a	3.0 b	1.7 b	0.0 b	2.3 b	4.3 ab	6.3 ab
nov 11	17.7 a	16.0 abc	13.7 ab	10.7 a	4.3 ab	1.0 b	0.7 b	3.0 ab	0.7 b	6.0 b
nov 05	18.0 a	14.0 abcd	5.3 ab	4.0 a	4.7 ab	1.3 b	0.0 b	2.0 b	1.7 b	2.0 b
Amdro	16.3 a	5.0 dc	0.7 b	4.0 a	5.7 ab	3.7 ab	7.0 ab	10.0 ab	9.0 ab	12.0 ab
Logic	17.3 a	12.3 abcd	11.0 ab	6.3 a	6.7 ab	1.7 b	0.0 b	2.3 b	2.7 b	3.7 b
Exting.	17.7 a	18.0 ab	9.0 ab	4.3 a	2.0 b	1.0 b	0.0 b	2.0 b	2.3 b	5.3 b
Distance	18.0 a	10.0 abcd	6.7 ab	1.3 a	3.7 b	0.7 b	0.3 b	3.3 ab	4.0 ab	8.0 ab
Talstar	19.3 a	4.3 d	2.0 b	0.3 a	3.3 b	3.7 ab	6.7 ab	11.3 a	8.3 ab	6.3 ab
Amd:Ext	17.3 a	4.7 cd	1.7 b	2.3 a	6.7 ab	5.7 ab	2.7 ab	6.3 ab	8.0 ab	5.7 b
Topchoice	19.3 a	8.0 bcd	2.0 b	1.0 a	0.0 b	0.0 b	0.7 b	1.0 b	0.7 b	1.7 b
Firestar	16.7 a	8.0 bcd	4.0 b	8.7 a	11.0 ab	10.3 ab	2.7 ab	6.3 ab	10.0 ab	8.3 ab
F	0.27*	6.95	4.51	1.59	2.77	3.38	2.76	2.35	2.59	2.82
P	0.9853	0.0001	0.0010	0.1636	0.0169	0.0058	0.0175	0.0371	0.0237	0.0156
R ²	0.8172	0.8042	0.7273	0.4843	0.6211	0.6663	0.6195	0.5817	0.6049	0.6247
MSD	9.8495	11.619	13.127	16.422	14.362	11.511	11.456	16.717	16.454	13.973

Means in the same column with the same letter are not significantly different. Means separated by Tukey's studentized range (HSD) test, $P < 0.05$. $df = 33$.

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

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

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