

## Speed of Suppression of Different Carrier Formulations of Fipronil

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The purpose of this test was to evaluate fire ant control using various formulations of the active ingredient fipronil. The primary concern was speed of mound suppression, with a lesser emphasis on re-invasion control. Fipronil has consistently shown long-duration control, but its speed of red imported fire ant (*Solenopsis invicta* Buren) suppression is relatively slow compared to most contact insecticides. It usually takes about a month to reach maximum control, comparable to that of Amdro<sup>®</sup>. This slow control is seen as a major drawback by consumers when using bait, so the sponsor of this test, Aventis, was trying to speed activity by formulating the active ingredient on different carriers.

**Objective:** Compare the speed of fire ant mound elimination using the active ingredient fipronil formulated on various carrier granules.

### Materials and methods

The test site was located at the Eagle Lake Airport, a 4,300 ft. asphalt airstrip with shallow drainage ditches 45 - 50 feet from the runway edges. Soil consisted of heavy black clay and vegetation was native bermudagrass and bunchgrasses. Fire ants were scattered across the wide buffer areas surrounding the runway, but were concentrated in a strip between the runway lights, where the vegetation line started, and the drainage ditches.

To avoid problems with plot mark destruction encountered at other airport test sites, runway lights, spaced at 190 feet, were used as plot edge markers. Due to limited test product, plots were very long and thin. Plots began five feet either side of the runway lights (parallel to the runway) and were 35 feet wide, roughly to the edge of the drainage ditch for a total treated and sampling area of 6300 ft<sup>2</sup>, plus a 10 foot untreated buffer at the end of each plot.

Plots were pre-counted on October 25, 2000 and treatments made November 6. Treatments were applied using a Warren's T-7 II "belly-bumper" hand-held spreader, which gave exceptionally smooth flow and pattern evenness for all the granular products. Weather at the time of application was approximately 75°F, clear skies with a strong cross-wind. Soil was saturated due to heavy rains the previous night.

All fipronil materials were applied at rate equivalent to 0.0125 lb active ingredient per acre (12.64 lbs/plot). All formulations except Chipco Choice (0.1%) were 0.0143% fipronil. Notes were also taken on carrier characteristics such as appearance, smell, flow through the spreader and throw pattern in the wind. Carrier formulations, and accompanying characteristics, were as follows:

TADS 24 - brown granules with coffee-like smell, good throw pattern

TADS 25 and 26 - ammonium sulfate, large chunks, slower flowing, good throw pattern

TADS 39, Choice, and 61748A - white granules with strong latex smell, pattern shifted almost completely to one side by even a light cross-wind

Talstar<sup>®</sup> 2G (0.2% bifenthrin) - sand base, flowed rapidly, produced dust and had some pattern shifting by wind.

### Results and Discussion

Results (**Table 1**) indicate the relatively slow decline of active mound numbers typical of fipronil. Differences between fipronil formulations were slight, inconsistent from date to date and not statistically different at any time. The Talstar standard (0.2% bifenthrin) was, numerically, the

fastest-acting product tested. These results suggest that even if fipronil is released almost immediately, such as with the ammonium sulfate granules, there is little increase in speed of activity. However, results also suggest that the length of residual control, fipronil's strong point, is also not affected.

Generally speaking, weather conditions from month 5 through month 12 (October 2001) were dry. Mound formation was poor, though a few rain events did cause mating flights in the region. Finally, during November 2001, the area received sufficient rains to cause an "explosion" of fire ant mounds. As can be seen, between November 6, 2001 and December 7, 2001, 12 and 13 months respectively, untreated plot mound numbers more than doubled. Talstar-treated plot mound numbers increased by an order of magnitude.

Field observations at the 13 month count indicated a considerable number of very small mounds (less than 3" in diameter) in the Talstar-treated plots. Few mounds of this size were found in any other treatment or the untreated plots. These mounds may have been indicative of colonies founded during queen mating flights or budding a few months prior to evaluation. This, in turn, indicated that the bifenthrin was no longer active, whereas the fipronil appeared to be providing some residual control.

The final evaluation was made on December 8, 2002, two years and two days after application. Remarkably, the Choice formulation still showed almost 96% control versus untreated plots. TADS 24 and 26 showed 78% control with the other formulations having somewhat higher numbers. Talstar had returned to a level similar to that of the untreated plots.

This test showed that the speed of activity of fipronil against fire ants is evidently fixed, regardless of how fast the active ingredient is released into the soil. It also illustrates the extremely long and thorough duration of control that can be expected from granular fipronil products.

**Table 1.** Results of active red imported fire ant mound evaluations: 6,300 ft.<sup>2</sup> plots, 4 replications. Eagle Lake, TX, treated November 6, 2000.

Mean number of active mounds								
Treatment	Pre-	2 Week	4 Week	8 Week	5 mo.	12 mo.	13 mo.	24 mo.
Untreated	12.75 a	15.00 a	12.50 a	11.00 a	13.25 a	7.25 a	19.50 a	11.75 a
Chipco Choice	14.00 a	5.50 b	3.00 b	2.25 b	0.50 b	0.75 b	5.50 b	0.50 c
61748A	14.00 a	7.50 ab	3.75 b	3.75 b	1.25 b	2.25 ab	5.00 b	4.50 abc
TADS 24	14.00 a	5.50 b	3.25 b	2.50 b	0.50 b	2.50 ab	6.00 b	2.50 c
TADS 25	14.00 a	7.50 ab	6.25 ab	4.25 ab	1.00 b	2.00 b	6.75 b	4.00 bc
TADS 26	14.00 a	5.00 b	2.75 b	1.75 b	0.75 b	2.75 ab	3.00 b	2.50 c
TADS 39	14.00 a	9.25 ab	8.00 ab	5.00 ab	0.75 b	3.75 ab	3.50 b	7.00 abc
Talstar® 2G	14.00 a	0.75 b	0.75 b	0.25 b	0.00 b	1.25 b	12.50 ab	10.50 ab
F	0.19*	3.80	3.90	3.67	13.83	3.17	4.16	4.82
P	0.9838	0.0048	0.0041	0.0058	0.0001	0.0124	0.0029	0.0012
R <sup>2</sup>	0.8369	0.6440	0.6500	0.6363	0.8681	0.6015	0.6643	0.6968
MSD	4.776	9.0239	8.0372	7.1463	4.8135	5.1333	11.093	7.4131

Means with different letters in the same column indicate a significant difference ( $P < 0.05$ ) using SAS analysis of variance procedures. Means separated with Tukey studentized (HSD) range test.  $df = 21$

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