

## EVALUATION OF AWARD® (FENOXYCARB) FORMULATIONS AND AN AWARD®-FERTILIZER BLEND

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Conventional bait formulated products for red imported fire ant suppression have not changed dramatically since their development and early use with mirex. They consist of processed de-fatted corn grit coated in a vegetable oil (usually soybean oil) in which the active ingredient is dissolved. This formulation, although effective, has a limited shelf life and can not be mixed with fertilizer granules, a practice that can result in reduced attractiveness of the bait to foraging ants. Flow differences resulting from inconsistent granule size and oil content cause application inconsistencies. New formulations of baits are under development, along with methods for mixing baits with specially-formulated fertilizers. This trial was conducted to evaluate several of these new formulations being developed by the CIGA-Geigy Corporation.

### Materials and Methods

This trial was established on approximately 12 acres of hay pasture in Montgomery County, Texas. Plots were established on 12 September 1994, less than a week after hay harvesting was completed. Treatment areas consisted of 150 x 150 foot squares (0.52 acres) with a circular sampling area of 0.25 acres in the center, allowing for a minimum of 32 feet of non-sampled buffer area between adjacent sampling circles. The plots were established using a surveyor's transit and measuring wheel to ensure accuracy. Due to the irregular shape of the test site, plots were established in uneven rows and columns to take advantage of the space available.

Fire ants were monitored after plot establishment by counting all active ant mounds within the 0.25 acre center circle. A mound was considered to contain an active fire ant colony if a dozen or more ants swarmed to the surface upon light disturbance with a pointed tool handle. Based on mound density, the ants appeared to be of the monogyne form and were very evenly distributed across the field. After all plots had been evaluated, ant active mound numbers from the 16 plots were arrayed from highest to lowest and divided into four replicate groups (blocks) of four treatments, thereby providing a range of ant mound densities across treatments while decreasing variability within blocks. The treatments were randomly assigned to each of the four plots within each block. Treatments and rates were as follows:

- 1) Untreated control
- 2) Award® Fire Ant Bait - 1 lb. per acre
- 3) CGA-114597 1GR-A - 1 lb. per acre
- 4) Pursell Industries, Inc. 33-0-11 mini + Award® Fire Ant Bait (0.01%; 1 lb. product contains 0.13 oz ai) - 100 lbs. per acre.

Treatments were applied the morning of 20 September 1994 from approximately 8:30 to 10:30. The 33-0-11 + Award® blend was applied using a tractor-mounted fertilizer spreader traveling at roughly 3.5 miles per hour and throwing a 30 foot swath. Award® and CGA-114597 were applied using a hand-held Cyclone® 1C1 seeder.

The 1, 2 and 9 month evaluations were conducted on 21 Oct., 18 Nov., 1994 and 14 June 1995, respectively. Mounds were disturbed with a shovel rated using the population index method (Harlan et al. 1981) as modified by Lofgren and Williams (1982):

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<u>No. worker ants</u>	<u>Weighting factor</u>	
	<u>Without worker brood</u>	<u>With worker brood</u>
<100	1	5
100-1,000	2	10
1,000-10,000	3	15
10,000-50,000	4	20
>50,000	5	25

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These numerical ratings are the population index values for each colony.

The population index for each plot is calculated by multiplying the number of colonies in each category by the numerical rating (=weighting factor) of that category. Results were analyzed using analysis of variance and means were separated using Tukey's Studentized Range Test ( $P \leq 0.05$ ).

## **Results and Discussion**

The 33-0-11 fertilizer plus Award® Fire Ant Bait blend was applied very evenly with little of the material caking onto the agitator. The Award® Fire Ant Bait seemed unusually oily and some difficulty was encountered applying it the same way twice between plots because of the uneven flow. CGA-114597 1GR-A was much more consistent in its application, though complete coverage of the plots may not have been achieved between swaths. A 1/8 cup quantity of Award® weighs 13.15 g, while CGA-114597 weighs 17.47 g. Thus, Award® is roughly 25% less dense than CGA-114597. The small particle size and higher density of the CGA-114597 formulation necessitated closing the spreader gate down to an opening the thickness of a quarter. This gave a very even and consistent flow, but only 8 swaths per plot could be applied. Good coverage has traditionally been achieved with 12 swaths using conventional bait formulations. Attempts to further reduce the gate opening resulted in erratic or blocked flow of CGA-114597.

By 21 October, the increase in mound numbers above pre-count could be accounted for by rainfall. After several months of drought, the site received **28 inches** of rainfall 14-18 October. The soil was very wet at the time of evaluation, but there was no standing water.

A significant reduction in active ant mounds resulting from the Award® treatment occurred 9 months after treatment, 14 June 1995 (Table 1). Ant numbers in colonies had slowly been declining over time, but a mild winter and spring allowed worker ants (particularly larger ants and queens) to survive. Active ant mound numbers in plots treated with CGA-114597 1GA-A or the Award-Fertilizer Blend declined numerically, but were not significantly different from numbers in the untreated control plots.

Mean "Population Index" values separated dramatically after only one month of treatment (Table 1). Differences were maintained or increased during the 9 month monitoring period. These data indicate that the CGA-114597 1GR-A formulation of fenoxycarb did produce a statistically significant suppressive effect on fire ant colonies, although numerically less than that produced by the Award® treatment. The Award-Fertilizer Blend treatments caused no significant reduction of "Population Index" values, although a slight numerical decline occurred relative to those of untreated control plots.

The extruded CGA-114597 bait shows promise as a substitute for the conventional Award® formulation. Though not tested, increased density should increase swath width and require fewer passes, thus reducing labor. Also, application seemed much more uniform. Experience gained from this trial suggests that twice as much of this bait formulation with half the concentration of fenoxycarb would give more complete coverage of an area. Attractiveness of the bait particles in the Award®-Fertilizer Blend to foraging fire ants should to be re-assessed. These data appear to indicate that attractiveness was largely lost.

### **Literature Cited**

- Harlan, D. P., W. A. Banks, H. L. Collins, and C. E. Stringer. 1981. Large area tests of AC-217,300 bait for control of imported fire ants in Alabama, Louisiana, and Texas. *Southwest. Entomol.* 6:150-157.
- Lofgren, C. S. and D. F. Williams. 1982. Avermectin B<sub>1a</sub>: A highly potent inhibitor of reproduction by queens of the red imported fire ant. *Jour. Econ. Entomol.* 75:798-803.

**Table 1.** Evaluation of Award® Fire Ant Bait (1 lb. per acre), CGA-114597 1GR-A (1 lb. per acre) and Pursell Industries, Inc. 33-0-11 mini fertilizer plus Award® Fire Ant Bait (100 lbs. per acre), applied 19 September 1994, Montgomery Co., Texas, 1994.

Treatment	Mean no. active mounds per 0.25 acre circle <sup>a</sup>			
	12 Sept.	21 Oct.	18 Nov.	14 June
	<u>Pre-count</u>	<u>1 month</u>	<u>2 months</u>	<u>3 months</u>
Untreated control	10.00	17.25a	18.25a	14.25a
Award® (0.01% fenoxycarb)	11.25	14.50a	14.00a	2.50b
CGA-114597 1GR-A	10.50	16.25a	18.25a	6.75ab
Award-Fertilizer Blend	11.00	15.75a	15.50a	11.75ab
<i>F</i>		1.37	1.31	3.57
<i>P</i>		0.03205	0.3420	0.0428
MSD		11.413	13.844	10.498
d.f. = 9				
	Mean no. "Population Index" per 0.25 acre circle <sup>a</sup>			
Untreated control	---	329.3a	331.0a	269.25a
Award® (0.01% fenoxycarb)	---	58.3c	52.8b	10.75b
CGA-114597 1GR-A	---	103.8bc	68.3b	24.25b
Award-Fertilizer Blend	---	245.0ab	182.3ab	177.25ab
<i>F</i>		6.80	5.62	5.77
<i>P</i>		0.0059	0.0111	0.0102
MSD		165.50	178.9	169.43
d.f. = 9				

<sup>a</sup> Means followed by different letters are significantly different using analysis of variance (ANOVA) and Tukey's Studentized Range Test ( $P \leq 0.05$ ).