

# Evaluation of Amdro® (Hydramethylnon) Quality Between Production Plants

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In 1996, the American Cyanamid Co. relocated the manufacturing plant for the fire ant bait product Amdro® Insecticide Bait (0.73% hydramethylnon). To verify the effectiveness of product lots produced at the new location, samples were tested in the field versus product produced at the old plant and an untreated control.

A second purpose of the test was to evaluate the practicality of an alternative plot sampling method more suitable for one-man set-up and evaluation than traditional methods best evaluated with at least two people. The new method utilizes the counting of mounds within concentric rings within a circular sampling area versus the traditional method of counting mounds within the area of a complete circular sampling area within a treated square area. The traditional method involves zig-zagging across circular plots while attempting to scan wedge-shaped areas. Experience has shown that plot centers are scanned repeatedly while slices along the outer edges may get missed or only viewed from a distance. Walking along a fixed radius and scanning a fixed distance to either side is essentially a circular transect and should provide much more consistent and thorough visual coverage.

It was also hoped that the use of concentric circle sub-plots would help reduce variability in mound counts across patchy fire ant infestations as opposed to traditional methods where circular plots are divided into quarters or halves. Again, experience has shown that fire ants tend to concentrate mounds along linear features such as levees, tire tracks and drainage ways. As an example, if a water diversion levee with high ant mound numbers crosses one side of a plot circle, only one or two quarter-circle sub-plots would encounter it. Potentially, all concentric circle sub-plots would cross the levee at least once, thus reducing variability.

## Materials and Methods

The site of this trial was located on an ungrazed pasture about 3 miles south of Montgomery, Montgomery County, Texas. Four adjoining one-acre non-replicated square plots were established using a surveyor's transit and a 300-foot measuring tape. Corners were marked with wire flags and each plot was marked at its center with a 3-foot piece of 3/8" reinforcing rod.

Treatments were as follows:

<u>Treatment</u>	<u>Lot#</u>
Untreated	-
Amdro®	513003E
Lot A	AC-10861-65-2
Lot B	AC-10861-65-2

Amdro® was supplied by the manufacturer, American Cyanamid, during the summer of 1996 in retail one-pound plastic bottles to be used as part of another trial. Approximately 5 pounds each of Lot A and B were supplied in two five-gallon plastic jugs in October 1996 for use in this test.

The trial was established and treatments applied, 19 November 1996. The weather during application was partly cloudy, 75 to 78°F, light breeze and moderate to dry soil moisture. Application was made using a Solo® engine-powered backpack mist blower modified to apply bait products. Baits were applied at 1.5 lbs. per acre.

Evaluations were conducted by counting the number of active fire ant mounds within each of four ten-foot wide concentric circles between 60-70-80-90-100 foot radii of the center stake. Evaluations were conducted prior to treatment and at 2, 8 weeks and five months thereafter.

Sub-plot data were analyzed two different ways. The first method was to consider each set of four rings of similar size as a replication. In this manner, the area evaluated for each replication would be similar. The second method was to divide the number of active mounds counted within each ring by the area of that ring to obtain a mound per square foot value (mound density). These densities were then ranked within each plot (treatment) from highest to lowest. The highest density ring of each plot was then considered to be "Rep 1", the next highest "Rep 2" and so on. Designations remained the same for all evaluations. All results were analyzed using PC SAS analysis of variance procedures. Means were separated using Tukey's studentized range test ( $P \leq 0.05$ ).

## **Results and Discussion**

Both sub-plot analysis methods yielded similar results by the end of the test (**Tables 1 & 2**). All treatments had significantly lower active ant mound counts than the untreated control and statistically similar counts between treatments. All treatments produced numerically lower counts by two weeks post-treatment versus the untreated control. The four week evaluation produced some variation in results between treatments and between data conversion methods. These results indicate that formulations of hydramethylnon bait from the new manufacturing facility produce similar reductions in mound numbers as existing stocks of Amdro®.

The corresponding ring method of sub-plot replication grouping was certainly the easier to calculate of the two and the end results were the same. The density-calculated method, however, reduced variability between replications and produced more statistical separations. This method is similar in its grouping of true replications to the "railroad track" method used for individual mound treatment tests. In a test where replicated plots are treated and evaluated, rather than multiple sub-plot evaluations within non-replicated plots, the corresponding ring method would not be possible since only one ring of the same size would be evaluated in each plot. Therefore, the density-grouped method appears to be superior for plot assignment and statistical analysis purposes.

From a practical standpoint, evaluating concentric rings (circular transects) appears to be much

more time-efficient than evaluating entire circles. It took an average of 4:05 minutes to evaluate the outer rings of three of the plots, an area of 0.137 acres each. If that figure is extrapolated to 0.25 acres, the size of a typical circular evaluation area, it should take 7:27 minutes to cover the same amount of ground. Similar results were obtained for the other three sets of concentric rings. Evaluation of one 0.25-acre circular plot in this test took 8:38 minutes. Typically, it takes 10-12 minutes (five to six per hour) to evaluate 0.25 acre circles in a normal test.

**Table 1.** Red imported fire ant mound numbers in concentric circular subplot areas within a circular sampling area before and after application of Amdro® (0.78% hydramethylnon) bait lots, Montgomery County, Texas, applied 19 November, 1996.

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<u>Treatment</u>	<u>Ring (ft. radius)</u>	<u>Active mounds per sub-plot</u>			
		<u>Pre-count</u>	<u>Week 2</u>	<u>Week 4</u>	<u>Month 5</u>
Untreated	90-100	16	15	12	11
	80-90	16	14	12	9
	70-80	7	5	6	3
	60-70	14	10	9	8
Amdro®	90-100	16	12	8	5
	80-90	9	9	5	2
	70-80	15	8	7	2
	60-70	8	5	4	0
Lot A	90-100	18	13	11	4
	80-90	9	4	5	2
	70-80	12	9	8	3
	60-70	12	8	5	4
Lot B	90-100	8	9	3	4
	80-90	11	6	3	2
	70-80	17	7	2	3
	60-70	9	5	2	3

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**Table 2.** Statistical analysis of red imported fire ant numbers using two methods of analyzing data from concentric ring subplot area data from a circular sampling plot before and after application of Amdro® (0.78% hydramethylnon) bait lots, Montgomery County, Texas, applied 19 November, 1996.

*Corresponding ring (equal area) replications*

<u>Treatment</u>	Mean* number of active mounds			
	<u>Pre-count</u>	<u>Week 2</u>	<u>Week 4</u>	<u>Month 5</u>
Untreated	13.25 a	11.00 a	9.75 a	7.75 a
Amdro®	12.00 a	8.50 a	6.00 ab	2.25 b
Lot A	12.75 a	8.50 a	7.25 a	3.25 b
Lot B	11.25 a	6.75 a	2.50 b	3.00 b
<i>F</i>	0.40	2.47	6.16	4.94
<i>P</i>	0.8605	0.1078	0.0082	0.0167
MSD	9.3673	5.958	4.2429	4.0008
d.f. = 9				
Crit. Value = 4.415				

*Density-grouped replications*

<u>Treatment</u>	Mean* mounds per square foot x 1,000			
	<u>Pre-count</u>	<u>Week 2</u>	<u>Week 4</u>	<u>Month 5</u>
Untreated	2.5350 a	2.0775 a	1.860 a	1.4675 a
Amdro®	2.0775 a	1.6150 a	1.155 b	0.4075 b
Lot A	2.4525 a	1.6350 a	1.385 ab	0.6325 b
Lot B	2.2300 a	1.2950 a	0.475 c	0.5800 b
<i>F</i>	7.27	1.64	9.48	4.44
<i>P</i>	0.0047	0.2415	0.0018	0.0231
MSD	0.8133	1.0863	0.6331	0.7535
d.f. = 9				
Crit. Value = 4.415				

\* Means in columns followed by the same letters are not significantly different using PC SAS ANOVA and Tukey's studentized range test for mean separation ( $P \leq 0.05$ ).