

**Small-Plot Spinosad Bait Efficacy Trial  
Coulter Field, Brazos County, Texas - 1998**

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Spinosad is a compound derived from a bacterial fermentation process and found to be highly effective against insects at extremely low concentrations. The following test was conducted to determine the compound's efficacy when formulated and applied as a 0.015% broadcast bait for the elimination of red imported fire ant (*Solenopsis invicta* Buren) mounds in non-agricultural land.

**Materials and Methods**

The test site was located at Coulter Field, the municipal airport serving Bryan, Texas. The site is located on shallow sandy soil over claypan with a vegetative cover of native grasses. The area is routinely mowed two or three times per year by the City of Bryan and has not been grazed or hayed in many years.

Plots consisted of 105 x 105 ft. squares with 40 ft. radius circular sampling areas (0.11 acre) at their centers. All active mounds were counted within the circle. Mound activity was determined using the minimal disturbance technique in which the mound was lightly disturbed with a pointed tool handle. The mound was considered active if a sufficient number of ants rose to the surface in a defensive manner within approximately 15 seconds of disturbance. Plots were set up and pre-counts made on 19 May 1998.

Pre-count numbers were arrayed from lowest to highest then divided into four equal groups (replications) of four plots each. Treatments were assigned within replications so that the total number of mounds for each treatment was as equal as possible. In this way, a full set of treatments were applied to plots of low through high mound density while keeping the total number of treated mounds approximately equal for each product. Products were applied the evening of 20 May 1998 with a bait blower apparatus to the entire square plot. Treatments included:

<u>Treatment</u>	<u>Rate</u>
Untreated	—
Amdro® (0.73% hydramethylnon)	1.5 lbs. per acre
spinosad (0.015%)	1.5 lbs. per acre
spinosad (0.015%)	3.0 lbs. per acre

Evaluations were conducted May 20, 5 June, 25 June and 9 October 1998 using the minimal disturbance technique. Results were analyzed using PC SAS analysis of variance procedures with means separated using Tukey's studentized range test ( $P < 0.05$ ) except where noted.

## Results

Mean number of active mounds per 0.11 acre plot (4 replications)

<b>Treatment</b>	<b>pre-count</b>	<b>9 days</b>	<b>16 days</b>	<b>35 days</b>	<b>20 weeks*</b>
Untreated	14.75 a	11.75 a	10.50 a	13.50 a	10.50 a**
spinosad 1.5 lb/ac	11.75 a	3.00 b	1.50 b	3.00 b	17.50 a
spinosad 3.0 lb/ac	12.00 a	3.50 b	1.00 b	2.50 b	11.50 a
hydramethylnon	12.75 a	2.25 b	1.25 b	0.00 b	7.50 a
<i>F</i>	3.92	4.66	13.89	53.63	0.93
<i>P</i>	0.0311	0.0199	0.004	0.0001	0.5460
<i>R</i> <sup>2</sup>	0.7234	0.7566	0.9025	0.9242	0.4215

Means followed by different letters are significantly different when analyzed by PC SAS analysis of variance procedures (PROC ANOVA). Means were separated using Tukey's studentized range test,  $P < 0.05$ .

\*analysis using general linear model procedures (PROC GLM) due to missing data points.

\*\* only two data points

## Discussion

As shown by the results, both rates of spinosad resulted in a rapid decrease in mound numbers that persisted through 35 days post-treatment. Mound reductions are similar to that of hydramethylnon (Amdro®) and all were significantly lower ( $P < 0.05$ ) than active mound counts in untreated plots. Though not significantly different ( $P < 0.05$ ), the spinosad treatments had more active mounds than Amdro at five months post-treatment. Further testing under better weather conditions is needed to determine if this shortened period of control is a characteristic of spinosad bait or a numerical anomaly of this test site and/or the extreme weather conditions.

The test was initiated in May after about three weeks without rain. Record-breaking 100EF temperatures persisted throughout the summer and significant rainfall was not received until mid-September. During this period, the ants ceased mound building and would not reliably rise to the surface, even in occupied mounds. Consequently, evaluations did not resume until the ants began mound building in early October when rain was received and the weather cooled.

To further complicate the test, the site was mowed by Extension personnel in late September. A week or so later, and without our knowledge, the City of Bryan mowed the site again, destroying all the plot markers in this and an adjacent test. Consequently, counts for the final evaluation were made from re-located plot centers and may not be completely accurate, though counts show definite re-infestation of the area. Two untreated plots could not be accurately re-located. Statistical analysis reflects this by using only two untreated plot numbers and the general linear model procedure that accounts for missing data points. In conclusion, the 0.015% spinosad bait gave rapid (9 day) elimination of ant activity in fire ant mounds, comparable to that produced by Amdro, currently the fastest-acting broadcast bait available. Though activity was similar, the amount of active ingredient applied to an acre for spinosad is less than 1/45th that of the active ingredient of Amdro.