

Efficacy of Spinosad Bait for the Control of Individual Fire Ant Colonies Brazos Co., Texas - 1997

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Spinosad is a compound derived from the soil actinomycete *Saccaropolyspora spinosa* that affects insect nervous systems at very low doses. This test was conducted to determine the effectiveness of different application rates of a spinosad-based bait for the control of individual colonies of red imported fire ants (*Solenopsis invicta* Buren). The test, sponsored by Dow AgroSciences LLC, was intended to be non-replicated with results combined from similar tests across the country to form a statistically viable study.

Materials and Methods

The test site was located in western Brazos County, Texas in an ungrazed pasture with heavy clay soil. Active fire ant mound density averaged about 150 mounds per acre. Mounds were physically large, but due to a hot, dry summer, the colonies occupying them were relatively small. The test method used a modified version of the "railroad track" design.

A strip, 30 feet wide and of indeterminate length was marked near a fence line. Beginning at one end of the strip, the first 10 mounds encountered were marked with wire flags of a single color. The next 10 mounds marked with a different color flag and so on using different or alternating flag colors. Each set of 10 mounds was considered a plot. Because there was no replication of plots, treatments, as listed above, were assigned randomly. A set of untreated control plots were also established as part of another, concurrently run test.

The bait treatments were applied during the afternoon hours of 18 September 1997. Though the soil was dry, ant brood was noted near the tops of mounds throughout the application period and ants were actively foraging.

Treatments included application of 0.015% spinosad on soybean oil coated defatted corn cob grit bait granules at two, four and six tablespoons per active mound. Ten mounds of each rate were treated with bait scattered within a three-foot radius of the mound.

Evaluations were conducted at 4, 7, 14, 28 and 35 days post-treatment using the minimal disturbance technique. At 14 and 35 days post-treatment, the plots were evaluated for "satellite" mound formation within their borders. Mounds were disturbed with a pointed tool handle until a sufficient number of ants rose to the surface in a defensive manner. The exact number of ants required to consider a mound "active" was determined by the evaluator in comparison to untreated mounds under the prevailing moisture, sunlight and temperature conditions.

Results

Number of active mounds of 10 treated or as indicated

Treatment	4 day	7 day	14 day	14 day sats.	14 day total	28 day	35 day	35 day sats.	35 day total
untreated (mean)	10.0	8.25	9.0	0.0	9.0	7.75	8.0	1.25	9.25
2 TB	7	7	3	1	4	1	3	1	4
4 TB	4	3	1	0	1	3	0	2	2
6 TB	3	7	6	3	9	5	4	4	8

* sats = satellite or unmarked mounds found within plot; tot = active marked + sat mounds

Discussion

Results indicate that the four tablespoon per mound rate was the most effective treatment. The apparent oddity is that the higher rate was, in fact, the worst performer. Acceptance could not have been a factor since the treatments were all of the same formulation (from the same container, in fact).

The answer may lie in the activity of spinosad. Tests on other insects show that spinosad has a very narrow threshold between ineffective and lethal doses. The two tablespoon rate may not have provided enough active ingredient to some colonies to have an effective dose reach the queens, the ultimate target for colony elimination. One necessary trait of fire ant baits is that the active ingredient must act slowly enough to allow its circulation throughout the colony undetected. Unhealthy workers are removed from the colony to prevent the spread of whatever is making them sick. The six tablespoon rate may have supplied too much active ingredient, which sickened too many workers, too quickly and caused the colony to switch off that food source, thus protecting the queens and the colony's existence.

Over the course of the year 2000, Pennington Seed and Central Garden and Pet, with licenses from Dow AgroSciences, will release a series of spinosad-based bait products. Labels for the products have directions to apply four tablespoons of material to each active fire ant mound, six tablespoons to mounds larger than 15 inches in diameter.