

# CARBARYL (SEVIN®) DUST AND LIQUID FORMULATION INDIVIDUAL FIRE ANT MOUND TREATMENT EFFICACY TRIAL

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The number of conventionally-formulated products currently labeled for use against red imported fire ants (*Solenopsis invicta* Buren) in grazed and hayed pastures has dwindled to only three or four. Carbaryl (Sevin®), a carbamate insecticide, has long been registered for the control of many pests in many different crop and non-crop areas, including control of the red imported fire ant. This test was designed to test the effectiveness of two Sevin formulations in eliminating fire ant colonies: Rhone-Poulenc Sevin XLR®, applied as a drench; and Hi-Yield® 10% Sevin dust, applied as a dry dust with no irrigation. Hi-Yield 10% Sevin is not labeled for use in pastures though it is labeled for various other insects in home gardens and yards. Several other brands of Sevin products available to homeowners, including Ortho® and Green Charm® brands, are not labeled for fire ant individual mound treatments, so specific label directions must be followed carefully. Amdro® Insecticide Bait (hydramethylnon), broadcast applied, was also included in the test as a “standard” since it is labeled for pasture use.

## Materials and Methods

The test site was located north-east of Gatesville, Coryell County, Texas on a gently sloping hillside composed of heavy, clay, Blackland soil with scattered flint rocks. Grass on the site was regularly cut and baled for hay. Test plots were marked on 8 July 1997 with treatments applied between about 1:30 and 3:00 that afternoon.

Test plots consisted of 12, 75 ft. X 75 ft. squares arranged in three rows of four plots each. Within a 30 ft. radius sampling area in each plot, all active fire ant mounds were counted and marked with wire flags. A mound was considered active if a number of ants rose to the surface in a defensive manner within 10 -20 seconds of disturbance. The number of active mounds in each plot was counted and arrayed from highest to lowest. The plots were then divided into three sets of four plots each (replicates) beginning with the four highest and ending with the four plots with the fewest number of active mounds. Treatments were then assigned within replicates so that the total number of active mounds for each treatment was as equal as possible. Treatments were as follows:

<u>Treatment</u>	<u>Rate</u>	<u>Application</u>
Untreated (CK)	-	-
Sevin XLR	1.5 qts/100 gallons	approx 1 gal. per mound
Sevin 10% dust	2 TB (approx 1 oz.)/mound	dusted across mound without disturbance
Amdro	1.5 lbs./ acre	broadcast

The Sevin XLR was applied by mixing 1.5 pts. in 50 gallons of water in a tank in the back of a pickup truck. A 12 V pump drew the solution from the tank and discharged it through a garden hose at approximately 30 p.s.i.. Mounds were treated according to label directions by spraying material around each mound out to a 2 ft. radius then saturating the mound itself with at least one quart of solution per six inches of mound diameter. The Sevin 10% dust was applied by dusting each mound with two level tablespoons of material with light disturbance of the mound, according to label directions. Amdro was broadcast by means of a Solo® gas-powered backpack blower at a rate of 1.5 lbs. per acre, or approximately 0.20 lbs./plot. Weather during treatment application was partly cloudy, 85-90EF, with a strong breeze. Soil was moderately moist to dry and ants were active.

Evaluations were conducted by disturbing all flagged mounds and recording those that exhibited ant activity. The 30-foot radius sample area was also surveyed for new or “satellite” mounds at several sampling dates. Mound-marking flags were removed prior to the final evaluation so that plots could be mowed and new mounds located more easily. Evaluations were made on 11, 15, and 25 July and 5 August.

## **Results and Discussion**

Only marked and treated (flagged) mounds were evaluated for the three day post-treatment evaluation (**Table 1**). Flagged mounds were evaluated and the sample areas surveyed for new mounds at both one and two weeks. Since flags were removed for mowing, only the sample area was surveyed at four weeks.

Results indicate that both Sevin® XLR and Sevin® 10% dust yielded 100% elimination of ant activity in treated mounds within three days of application. Amdro® broadcast treatments also provided statistically significant ( $P < 0.05$ ) control versus untreated plots at three days post-treatment, though there were considerably more active mounds, numerically, than the Sevin treatments. By one week, only one Amdro-treated marked mound remained active of all pesticide-treated mounds. This degree of activity elimination is extremely fast for an Amdro broadcast application. Normally, Amdro takes a minimum of two weeks, usually about four, to achieve such results.

When both marked and non-marked mounds are included in the analyses, however, the three chemical treatments are significantly different from the untreated plots only for the three-day and one week evaluations. Despite great numerical differences at two weeks, all treatments are statistically similar due to the high degree of variability in mound counts. By week four, the total number of active mounds became relatively similar for all treatments.

The main purpose of this trial was to compare the two products currently labeled for pasture use and widely available - Amdro® and Sevin® - in a side-by-side comparison. In the past, Orthene® TT&O (Valent U.S.A. Corp.) has, until recently, been the "standard" individual fire ant mound treatment product labeled for pasture use. It's main advantages over other products was that it could be applied as a dry dust, requiring only a teaspoon and protective clothing for application,

and low cost. Other drench and broadcast-type products require considerably more time and/or equipment for application. Orthene costs only \$0.17 - \$0.35 per mound for a very effective treatment. Orthene TT&O labels produced after 1996 no longer include pastureland as a registered use site, however.

Sevin® XLR costs \$24.44 per gallon which would make 267 gallons of solution at a rate of 1.5 quarts per 100 gallons. At one gallon solution per mound, the per mound cost comes to \$0.092. However, at one quart per six inches of mound diameter, the product cost could be cut by more than half in some areas. It took approximately one hour to mix and apply Sevin XLR to 47 mounds in this test. At minimum wage, the additional labor cost would be approximately \$0.105 per mound for a total of \$0.20 per mound.

Sevin 10% cost \$4.58 for a four-pound bag. At one ounce (dry) per mound, the cost comes to \$0.072 per mound. It took less than half an hour to treat the 50 mounds in this test, so the minimum-wage labor rate would be, at most, \$0.05 per mound, for a total cost of about \$0.13 per mound.

The Sevin dust also has the advantage of easy, dry application. One of the most common complaints heard about fire ant individual mound treatments is that “the ants just move over after you treat.” There is always a concern that dry-applied products will result in mound relocation, rather than elimination. Though not conclusive at this time, test results showed more non-marked mounds in 10 percent Sevin-treated plots, a possible indication of mound relocation. The test site received no rain over the course of the test and high temperatures were in the mid-90's every day. It is strongly suspected that the drought suppressed ant mound building activity and that an accurate representation of the pesticides' effectiveness cannot be obtained until significant rainfall occurs and/or temperatures moderate. Therefore, the test will continue to be monitored.

## **Acknowledgements**

We wish to extend our deepest thanks to Mr. John Hendricks and his son, Mr. Samuel Hendricks, for their invaluable help in obtaining access to the test site, laying out the test, applying treatments, and assisting in evaluations.

**Table 1.** Number of active red imported fire ants before (Init.) and periodically following application of insecticides, applied 8 July 1997, Coryell County, Texas.

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<u>Treatment</u>	Mean* no. active fire ant mounds/75 by 75 ft. plot						
	<u>Init</u>	<u>3 day</u> <u>marked</u>	<u>one week</u> <u>marked</u>	<u>total</u>	<u>two weeks</u> <u>marked</u>	<u>total</u>	<u>four weeks</u> <u>total</u>
CK	15.7 a	15.0 a	14.7 a	15.3 a	10.0 a	11.0 a	6.3 a
Sevin XLR	15.7 a	0.0 b	0.0 b	1.0 b	0.0 b	1.0 a	3.7 a
Sevin 10%	16.7 a	0.0 b	0.0 b	1.0 b	0.0 b	1.3 a	4.3 a
Amdro	16.0 a	4.3 b	0.3 b	0.7 b	0.7 b	1.0 a	2.0 a

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<i>F</i>	8.54	22.29	14.98	10.51	6.31	3.92	2.44
<i>P</i>	0.0106	0.0008	0.0025	0.0063	0.0221	0.0633	0.1545
MSD	9.69	5.71	7.24	8.62	7.70	10.22	6.46

df. = 6  
crit. value = 4.896

\* Means followed by different letters are statistically different ( $P < 0.05$ ) using PC SAS analysis of variance procedures and Tukey's studentized range test.