EVALUATION OF LINDANE (GAMMA-MEAN® L. O.) AS AN INDIVIDUAL RED IMPORTED FIRE ANT MOUND INJECTION TREATMENT

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Gamma-Mean® L. O. (lindane 40%) was evaluated for effectiveness as an individual mound treatment to eliminate red imported fire ant activity. This treatment was compared to a "standard" treatment (Diazinon 5G) and a water, only injection.

Materials and Methods

Plots were established on the Texas A&M University Riverside Campus, 25 September 1996, in a 30 foot wide strip between an abandoned airport runway and a fence line. Active fire ant mounds were located and marked with wire surveyor's flags. Moving along the line of plots, ten mounds were marked with the same color flag, constituting a single plot. The next group of ten mounds were marked with a different color and so on until twelve sets of ten mounds had been marked. The length of each plot was measured and arrayed from lowest to highest before being assigned to one of four blocks or replicates containing three treatment plots apiece. Treatments were assigned at random within replications so that the average plot length for each replication would be roughly equal for each treatment.

The following treatments were used:

Treatment	Volume (concentration)	Method
Gamma-Mean® L. O. lindane 40%	2 gallons per mound (1.5 qt. lindane/100 gal.)	Mound injection
Diazinon 5G diazinon 5 % granule	1/3 cup granules per mound	Granules applied dry to mound, followed by a 1 gallon water/mound irrigation
Water	2 gallons per mound	Mound injection

Gamma-Mean® L. O. was mixed in a large plastic container at the label rate of 1.5 qt per 100 gallons or 9.6 oz. pr 20 gallons. Water used for the Gamma-Mean treatment was buffered to pH 7.0 " 0.2 using Nutra-Buffe® 1200 agricultural buffer. The solution was drawn from the container by means of a 12V diaphragm pump delivering 2.8 gallons per minute at 30 p.s.i.. The injection apparatus consisted of 3/8" galvanized pipe, crimped, welded and sharpened at the end. Two holes were drilled and recessed on either side of the tip to emit sufficient solution and prevent clogging. The unit was calibrated to deliver two gallons of solution in approximately 40 seconds.

Treatments were applied the afternoon of 25 September 1996 (Weather conditions: temperature=89-94EF, mostly sunny, wind SSE 5-10 mph). Injections were made by inserting the

probe into the center of a mound until firm resistance was met, usually 6- 10 inches deep. The shut-off valve was then opened and a stopwatch started. The probe was left in one spot until the solution bubbled up and began to puddle. If a mound was large enough, the probe was re-inserted several times. If necessary, efforts were made to knock down any built up mound structure with a stream of solution. The valve was shut off after 40 seconds. The water-only control treatment was applied in a similar manner.

The diazinon standard treatment was applied by sprinkling 1/3 cup of Diazinon 5G on and around a two foot radius of each mound in a plot. The mounds were then irrigated with one gallon of water using a plastic watering bucket with a breaker nozzle.

Evaluations were conducted 30 September, and 3, 15, 23 October or 5, 8, 20, and 28 days, respectively. The uneven spacing of the evaluations was due to cool, cloudy weather that resulted in very low ant activity. Ant mounds were evaluated using the minimal disturbance method, whereby each mound was lightly disturbing them with a pointed tool handle. If more than 20 ants emerged within about 15 seconds, the mound was considered to contain an active ant colony. Plots were surveyed for "new" (satellite mounds or immigrant colonies) mounds occurring within the plots or 3 and 23 October by counting all active, unmarked mounds within each plot. Results were analyzed using PC SAS Analysis of Variance (ANOVA) and Tukey′s studentized range test for mean separation ($P \leq 0.05$).

Results and Discussion

Results (**Table 1**) indicate that Gamma-Mean L. O. (lindane) injection performed similarly to the diazinon "standard" treatment on all evaluation dates. Both treatments had significantly fewer mounds than the water injection control plots throughout the monitoring period. Diazinon-treated plots contained no treated mounds remaining active after treatment while Gamma-Mean® L. O. treated plots contained one or two. An unusually large number of water-injected mounds became inactive, compared to what is usually seen for untreated or water-drenched mounds. This observation indicates that the injection process itself is highly disruptive to fire ant colonies and often causes them to move. The "new", satellite mound counts support the idea that colonies in water-injected treatment plots simply relocated, since the number of ant mounds was significantly higher than those from chemical treatment plots on the first evaluation date and numerically higher on the last. Total mound counts (marked + "new") showed significant differences between the water-injected treatment and both insecticide treatments on both evaluation dates, suggesting that colonies in insecticide treated plots were, indeed, eliminated.

Results indicate that Gamma-Mean® L. O. injected at the rate of two gallons per mound is as effective at the elimination of ant activity as Diazinon 5G applied according to label directions. Furthermore, Gamma-Mean significantly reduced the number of active mounds compared to a water-injection control.

Table 1. Mean number of active red imported fire ant mounds following an individual 2 gallon mound injection of lindane (Gamma-Mean) or water (untreated control) or granular diazinon granular treatment watered in after application, Brazos County, Texas, treated 25 September 1996.

	Mean number* active fire ant mounds/10, new or plot							
	5 days	8 days			20 days	28 days		
Treatment	per 10	per 10	"new"	total	per 10	per 10	"new"	total
Gamma-Mean®	0.50b	0.25b	1.50a	1.75b	0.25b	0.25b	2.25a	2.50b
Diazinon 5G	0.00b	0.00b	2.00b	2.00b	0.00b	0.00b	0.25a	0.25b
Water	6.00a	4.75a	5.25b	10.0a	3.75a	4.75a	3.50a	8.25a
F	36.27	73.50	9.48	73.74	45.21		16.60	2.6525.01
P	0.0001	0.0001	0.0061	0.0001	0.0001	0.0010	0.1244	0.0002
Min. Sig. Dif.	2.1826	1.2312	2.6117	2.1577	1.2312	2.5909	3.9758	3.2573

d.f. = 9
Crit. Value = 3.948

* 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 ($P \leq 0.05$). Means represent either 1) number of mounds per ten originally treated within a plot; 2) number of "new" (satellite or immigrant) ant colonies occurring in treatment plots; or 3) total number of mounds occurring within treatment plots.