

Effect of application timing on efficacy of TopChoice® and other fipronil based residual products

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Red imported fire ants, *Solenopsis invicta* Buren, are nuisance insects that interfere with outdoor activities and their sting can cause serious medical problems. The problems they can cause in urban areas make them a desirable pest to control (Drees et al. 2002). Chemical control options for red imported fire ant control provide relief of these unwanted invaders. Broadcasting granular products is one option for controlling fire ants within the landscape. Fipronil granules are non-repellant and usually provide season long control. In this trial, we evaluated the reduction of fire ant populations with broadcast applications of fipronil granules within quarter acre plots.

Materials and Methods

On May 9, 2008, twenty-one square plots, 100ft by 100 ft were established within a 60 acre plot of land at the Texas AgriLife Research and Extension Center at 17360 Coit Road, Dallas, TX 75252 (**Figures 1 and 2**). Pre-counts of fire ant mounds were taken within each plot on May 12, 2009 beginning at 6:30am with temperatures at 70° and winds 0-5mph. The center of each plot was marked with a piece of rebar that created a 40 foot radius circular sub-plot for sampling mounds within each plot. Red imported fire ant mounds were counted within each plot by disturbing suspected mound sites with a stick to determine activity. Mounds were considered active if many (dozens of) worker ants were observed within 15 seconds. All active fire ant mounds within the plot were counted and recorded. A minimum of 10 active fire ant mounds were recorded for each plot.

Treatments were randomly assigned to each treatment block so only minor numerical differences occurred for average mounds per plot. The treatments included:

1. Untreated control (CK) received no treatment
2. TopChoice Insecticide (0.0143% fipronil)
3. Fipronil GR, Ecogran QD (0.0142% fipronil)
4. TopChoice, New Ecogran HW (0.0143% fipronil)
5. TopChoice on Fertilizer (0.0072% fipronil)

Treatments were applied beginning at 10:00 am on May 12, 2009. Broadcast treatments were applied using a Spyker® Model 88-221 spreader (Spyker Spreaders LLC, P.O. Box 7, 140 Mill Street, Urbana, IN 46990). The TopChoice insecticide and Fipronil GR, Ecogran treatments were applied at 87 lbs./acre or 21.75 lbs. per plot; the TopChoice, New Ecogran HW was applied at 88 lb/acre or 22 lbs. per plot; the TopChoice on Fertilizer was applied at 175 lbs./acre or 43.75 lbs per plot. Each treatment was weighed and evenly distributed within each treated plot, respectively.

Evaluation of mound activity was conducted prior to treatment and at 1 week, 2 weeks, 1 month, 2 months, 4 months, 6 months, 8 months, 10 months and 12 months post treatment. Mounds were considered active if many (dozens of) worker ants were observed within 15 seconds after minimal disturbance. All active fire ant mounds within

the plot were counted and recorded. Data were analyzed using Analysis of Variance (ANOVA) test with means separated using Duncan's Multiple Range Test at $P \leq 0.05$ (SPSS for Windows, Lead Technologies, Version 13.0).

Results

Results of active mound evaluations are shown in **Table 1**. At the 1 and 2 week observations, there were no significant differences between the treatments and the untreated control plots. At the 1, 2, 4, 6, 8, 10 and 12 month observations, there were significantly less fire ant mounds in the treatment plots compared to the untreated control plots.

In this trial, the spring application of all fipronil treatments provided year long control, with the fire ant population decreasing 4 months after application. Even though no significant differences were found between treatments, the number of active fire ant mounds within the TopChoice treated plots was numerically lower than the TopChoice on fertilizer treated plots. In this trial, the Fipronil GR, Ecogran and TopChoice on fertilizer did not decrease fire ant mound activity faster compared to the TopChoice treated plots. Overall, the TopChoice and New Ecogran HW treated plots had numerically lower active fire ant mounds compared to the Ecogran QD treated plots, although not significant.

Discussion

In conclusion, all of the fipronil treatments reduced the fire ant population compared to the untreated control. At the 4, 6 and 8 month observations, there were fewer active fire ant mounds in the treated plots. However at the 10 month and 12 month observations, the fire ant activity began to increase. The increase in fire ant activity could be due to spring rains and increased pressure from untreated areas surrounding the treated plots. Overall in this study, there were fewer active fire ant mounds found within the plots treated with New Ecogran HW compared to the other treatments, even though it was not significant.

In this study, the TopChoice insecticide provided control through the peak fire ant season. Eventhough it was not significant, the control provided by TopChoice was numerically better than the TopChoice product on fertilizer. The Ecogran QD and TopChoice on fertilizer did not provide a faster knockdown compared to the other formulations. In addition, there were less active fire ant mounds in the plots treated with Ecogran HW compared to the other treatments, eventhough it was not significant.

The average daytime temperature throughout the study was ranged from highs of 50 to 95°F with a total of 32 inches of rain (<http://www.srh.noaa.gov/fwd>).

Table 1. Number of active red imported fire ant mounds found after broadcasting various fire ant baits at Ray Roberts Park, Pilot Point, TX.

Treatment	Pre-treatment	1 Week	2 Weeks	1 Month	2 Months	4 Months	6 Months	8 Months	10 Months	12 Months
Untreated Control	14.80a	14.60a	14.20b	13.60b	12.60b	11.00b	10.00b	7.60b	8.40b	10.40b
TopChoice on Fertilizer	13.50a	12.50a	11.00a	10.00a	4.00a	2.25a	1.50a	1.50a	2.50a	3.50a
Fipronil GR, Ecogran QD	14.25a	14.00a	13.25ab	9.75a	3.75a	2.25a	2.00a	1.00a	2.25a	3.25a
TopChoice Insecticide	12.25a	12.25a	11.00a	8.75a	4.75a	1.75a	1.25a	1.00a	1.50a	2.00a
TopChoice, New Ecogran HW	14.00a	13.50a	11.75a	9.00a	4.25a	1.75a	0.75a	0.50a	1.50a	2.00a

^aMeans followed by the same letter within the same column were not significantly different using Analysis of Variance (ANOVA) and means separated using Duncan's Multiple Range Test at $p \leq 0.05$ (SPSS, Windows 11.5).

Figure 1. Testing site for fipronil broadcast trial on the 60 plot of land at the Texas AgriLife Research and Extension Center in Dallas, TX.



Figure 2. Testing site for fipronil trial on the 60 acre plot of land at the Texas AgriLife Research and Extension Center in Dallas, TX, where the flags represent active mounds.



Literature Cited

Drees, BM, CL Barr, SB Vinson, D Kostroun, B Sparks, D Pollet, D Shanklin, K Loftin, K Vail, RE Gold, ME Merchant, N Riggs, B Hickman, P Nester, K Flanders, PM Horton, D Oi, PG Koehler, R. Wright. 2002. Managing Imported Fire Ants in Urban Area. TX Coop. Extension, B-6043. p. 4.

Appendix 1. Plot plan of all treatments within the broadcast trial of TopChoice at the Texas AgriLife Research and Extension Center, Dallas, TX.

