

**Field Assessment of Removal of Granular Ant Bait Formulations
by Red Imported Fire Ants**

Bastiaan M. Drees, Bill Summrlin, Alejandro Calixto and Robert Puckett

Texas AgriLife Extension Service, Texas A&M System, College Station, Texas

Successful broadcast application treatments granular insecticide bait formulations for control of the red imported fire ant, *Solenopsis invicta* Buren (Hymenoptera: Formicidae) depend on the freshness and attractiveness of the formulation, the active ingredient, and the activity of foraging worker ants to collect the particle, return them to the mound or colony and feed them to other worker ants, developmental stages (larvae) and, ultimately through trophallaxis, the queen(s). According to most Texas AgriLife publications on the subject, red imported fire ant workers normally forage between the temperatures ranging from 65 to 95°F (Drees et al. 2008). To assure that ants are foraging and that bait is attractive, the suggestion is made to place a small quantity of the product in the area to be treated and observe ants removing the bait after 45 to 60 minutes. These practices assure that the bait is retrieved and provides a higher probability that a successful treatment will be attained. The method presented here builds on this concept in order to assess the attractiveness of multiple bait formulations or products in the field in a short (6 hr) time period.

Materials and Methods

On October 17, 2008, a field trial was established in a non-grazed pasture off Agronomy Road on the Texas A&M University campus comprising eight treatments replicated 4 times. Treatments included experimental formulations provided by MGK and included:

1. X-6407-08
2. X-6408-08
3. X-6409-08
4. X-6410-08
5. X-6411-08
6. X-6412-08
7. X-6413-08

8. untreated control (none)

These candidate bait products were strikingly different in both active ingredients but also in formulations used, and were in some cases certainly not similar to existing products containing these same active ingredients (e.g., Amdro®Pro, Distance® or Esteem® Ant Baits, Siesta®).

To assess bait acceptance by foraging red imported fire ants, a technique using water color mixing trays was developed and used. Four mixing trays with 10 depressions or wells were marked with Sharpee® pens, numbering each trays and wells on individual trays numbered from 1 to 7 at random to accommodate 1/8 tsp. (1 ml) bait formulation in each. From 9:39 – 10:05 a.m., they were placed outside of field plots, but within 3 ft (1 meter) of active red imported fire ant mounds. For the following 5 hours (1 hr: 10:44-10:59; 2 hrs: 11:38-11:57; 3 hrs: 12:35 – 12:47 p.m.; 4 hrs: 1:43-1:57; 5 hrs: 2:37-2:50), each tray was photographed along with a watch to document the time and amount bait remaining in each well. From printouts of images and in-field estimates, estimates of numbers of foraging worker ants associated with each well and percent of the amount of bait remaining in each well was estimated and recorded to document ant removal of candidate baits. Data were averaged for each treatment and graphed over time.

Results and discussion

This method proved successful in documenting recruitment of foraging red imported fire ant workers and removal of bait over time during the same period of time broadcast applications of these candidate bait products was being applied to experimental field plots. As an example of one of the replicates of water color mixing tray arrangement and removal of candidate baits is provided in **Figure 1**. For each water color mixing tray replicate (of four), ant discovery, recruitment and bait removal was unique even though all were placed an equal distance for active ant mounds or nests. The first replicate tray had the fewest ants and little bait was removed over the monitoring period, thereby adding variability to results. In remaining trays, most if not all bait was removed over the 5 hr period. On average, ant numbers associated with bait peaked during removal and then dropped to zero after all bait had been removed from a well. Thus, the graph depicting number of ants show increases followed by declines (**Figure 2**). Good examples of these trends occurred for X-6408-08 (peak at 2 hrs) and X-6410-08 (peak at 4 hrs). Removal of candidate baits progressed over time (**Figure 3**). Although statistical analysis of these data has not been performed, the X-6408-08 bait appeared to be removed most quickly by the foraging ants, whereas the combination of X-6407-08 and X-6408-08 formulation seemed to be removed most slowly.

The method described herein was found to be useful to document the attractiveness and field removal of candidate baits. However, it did not address effectiveness or efficacy of each bait applied. Results from replicated field plots will be used in conjunction with these results to document the attractiveness as well as effectiveness of each candidate bait formulation tested.

Literature cited

Drees, B. M. K. Schofield, E. Brown, P. Nester, M. Keck, and K. Flanders. 2008. Fire ant control: The two-step method and other approaches. L-5496. The Texas AgriLife Extension Service. Texas A&M System, College Station, Texas. Leaflet, posted on <http://AgriLifeBookstore.org>

Figure 1. Watercolor mixing tray with wells randomly numbered to accommodate candidate granular ant bait formulations photographed periodically (hourly) to document bait removal by red imported fire ant foraging workers, October 17, 2008, Brazos Co., TX.



0 hr.



1 hr.



2 hrs.



3 hrs.



4 hrs.



5 hrs.

Figure 2. Average number of foraging red imported fire ant workers associated with candidate granular ant bait formulations, in a field trial using 1/8 (1 ml) candidate bait per well in a water color mixing tray, October 17, 2008, Brazos Co., TX.

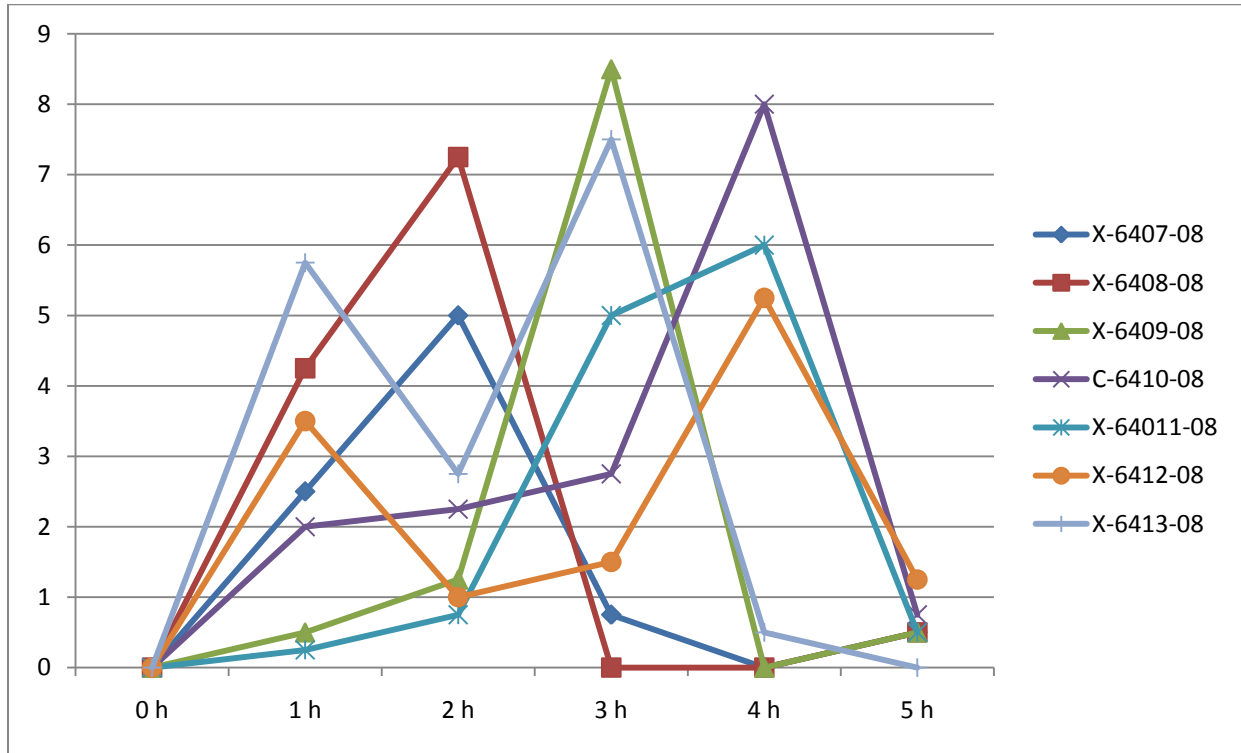


Figure 3. Average percent candidate bait formulations of 1/8 tsp remaining after foraging by red imported fire ant workers associated, in a field trial using 1/8 (1 ml) candidate bait per well in a water color mixing tray, October 17, 2008, Brazos Co., TX.

