Pasture Renovation by Dragging Ant Mounds and Broadcast Baiting to Eliminate Red Imported Fire Ants

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The red imported fire ant, *Solenopsis invicta* Buren (Hymenoptera: Formicidae), impacts livestock pastures in several ways, including presenting a medical threat to animals particularly during birthing. Also the tall, hardened fire ant mounds developed to house their colonies can be a physical hazard and affect field working machinery such as cutters and hay baling equipment (**Fig. 1**). In addition, ant presence can affect other arthropod fauna such as reducing some tick and caterpillar and native ant species while aggravating other species such as mealybugs. When economic losses occur or when tall ant mounds affect the aesthetic value of the land, suppression of imported fire ants may be warranted.

Suppression of ant populations level can be achieved using registered bait formulated ant bait insecticides such as Extinguish® Plus containing a blend of hydramethylnon (siminar to Amdro® Pro plus the insect growth regulator (IGR), methoprene) or Esteem® containing the IGR, pyriproxyfen, broadcast applied using a vehicle mounted Herd GT-77 model seeder. Although previous studies have shown that this treatment generally provides 80 to 90 percent elimination of ant mounds within about weeks to months of treatment, the insecticide alone does not affect the mound structures built by the ants. Dragging or disking pastures using appropriate equipment is recognized as an effective method to temporarily reduce mound height. However, the effect of dragging alone to suppress active ant mound numbers remains a point of discussion due to lack of supporting data. This demonstration was conducted to document the effect of broadcast application of bait, dragging, and the combination of bait treating plus dragging compared to an untreated control plot. Randy Ueckert, also has applied herbicides to the pasture for the owner, Dr. Hervert Schumann, and reported difficulty with application equipment during these operations. No cattle injury or death reported from these pastures.

Materials and Methods

On April 15, 2009, 20 1-acre plots (208 by 208 ft square) were established, and 5 treatments assigned to rows of 4 plots each (non-randomized) for the purpose of photographing effects of fire ant mound leveling impact (**Fig. 2**). Prior to mound leveling and applying ant bait treatments (April 15, 2009) in plots 1-4 (Level only treatment) and 13-16 (Level and broadcast bait treatment), height of active red imported fire ant mounds were measured and counted within a 1/2-acre (82 ft radius) circular sub-plot. Sub-plots were established in the center of each 1-acre plot by marking them with a metal re-bar pole and using a 82-ft tape measure affixed to it to provide a radius while documenting mounds while walking around the sub-plot circumference. Plot corners and centers were recorded using GPS coordinates.

Broadcast bait treatments were applied, May 7, 2009, using Herd GT-77 model seeder mounted on utility vehicles or hand-held seeders; Extinguish® Plus (hydramethylnon plus

methoprene) was applied to plots 13 – 16 (level and bait) using the Herd seeder, and plots 1-4 (bait only) using hand-held seeders; Esteem® Ant Bait (pyiproxyfen) was applied to plots a-d using the Herd seeder. Mounds were leveled by Randy Ueckert, May 15, 2009, and afterwards mounds numbers and heights were documented, a tractor with a 16-ft wide blade set 5-6 inches from the ground leveled ant mounds (**Fig. 3**). Plots received over 11 inches of rain April 17-18, 2009, the weekend after leveling, which dissolved the black clay soil clods resulting from this mechanical treatment. Mound numbers were documented, June 22, 2009, 6 weeks after bait application, and again on October 19 (results not shown here). Average or mean mound height and active ant colony numbers per 0.5 acre subplot were calculated and graphed. Only results of the Extinguish® Plus treatments are presented here.

Results and Discussion

Mechanical mound leveling, estimated to cost roughly $17 per acre, dramatically reduced average or mean height of red imported fire ant mounds (**Fig. 4** and **5**). The 70.5 percent reduction in the drag and bait plots (plots 13-16) are more realistic than the 98.7% reduction in drag only plots where flooding after mound leveling undoubtedly helped dissolve remaining mound structures to further reduce mound height. Furthermore, dragging, alone, reduced active ant mound numbers in the non-flooded drag bait plots by 28.8% (**Fig. 6**), prior to the application of the ant bait product.

The broadcast application of Extinguish®Plus (hyrdamethylnon plus methoprene), applied May 7, reduced mean active ant mounds in treated plots by 94 to 89.9% in the drag/bait (plots 13-16) and bait only (5-8) plots, respectively. However, the tall mounds in the bait only plots remained.

Several conclusions can be made from the results presented: 1) Leveling mounds improved aesthetic value of land and reduces field-working equipment damage, pesticide calibration problems, and field worker fatigue; 2) Ant bait products reduce or eliminate imported fire ant colonies, but do not necessarily eliminate tall, hardened mounds; and 3) Flooding can reduce ant populations in leveled field areas.

Acknowledgments

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Figure 1. Tall red imported fire ant mound in pasture: Mound height of 14.9 ± 2.0 (S.D.) inches; 25 inch max in "drag only" plots 1-4, Austin Co., TX, April 15, 2009

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Figure 2. Plot plan for four treatments (Bait = Extinguish® Plus; Bait #2 = Esteem® in a Austin Co., TX, cattle pasture indicating plot designations (numbers or letters) and ½-acre sub-plot for monitoring ant colonies in plot 16, April 2009.

16	12	8	4	d
15	11	7	3	c
14	10	6	2	b
13	9	5	1	a
Level and bait	Untreated	Bait	Level	Bait #2

Figure 3. Tractor and plow used to level mounds in pasture, Austin, Co., TX 2009.

Figure 4. Pasture with red imported fire ant mounds leveled (left), Austin Co., TX, 2009.

Figure 5. Red imported fire ant mound height before (Apr. 15) and after (May 7) leveling with blade set at 6 inches, resulting in an average or mean 70.5% height decrease in drag/bait plots and a 98.7% decrease in drag only and flooded plots, Austin Co., TX, 2009.

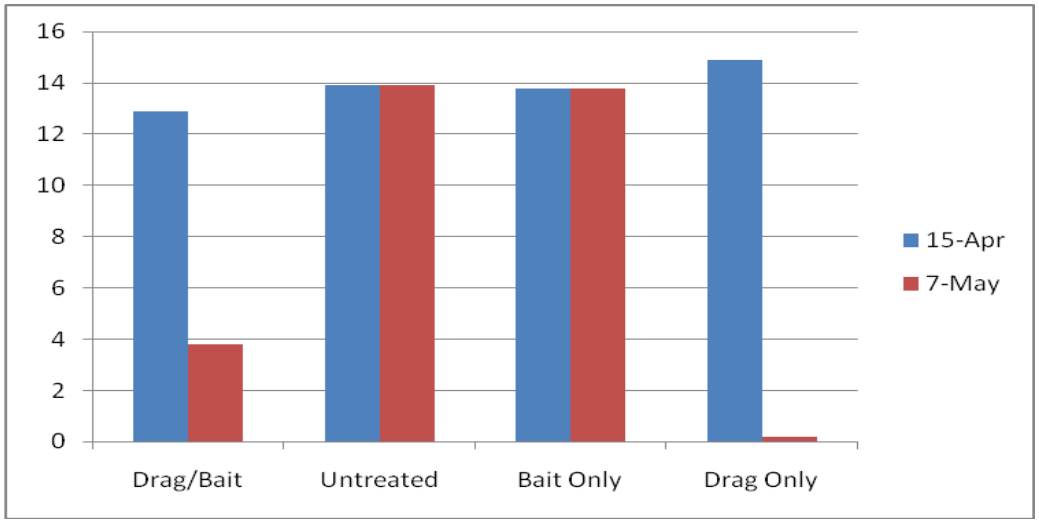
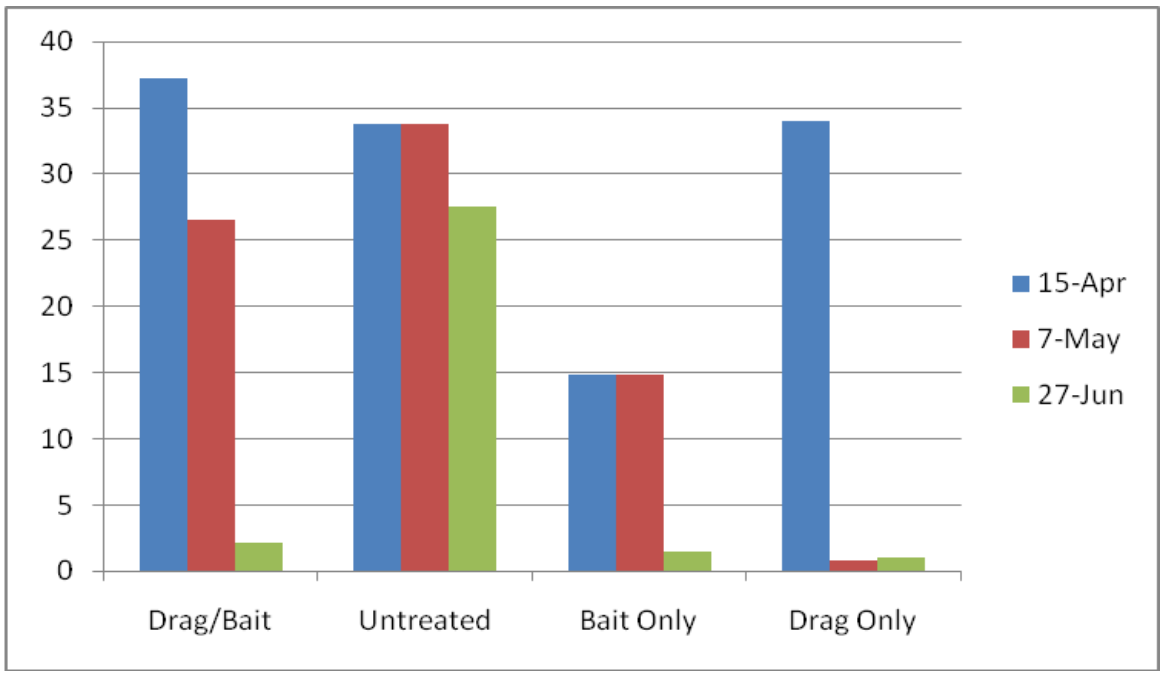


Figure 6. Mean active red imported fire ant mounds prior to (Apr. 15) and following dragging and/or receiving a broadcast application of 1.5 lb/acre Extinguish®Plus (hydramethylnon plus methoprene) granular ant bait on May 7, with percent reductions 3 and 9.5 weeks following trial initiation listed below, Austin Co., TX 2009.



3 wks	28.80%			
9.5 wks	94.00%	18.60%	89.90%	97.10%
			-------flooded plots----------	