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Horn Fly Control and Growth Implants are Effective Strategies for Heifers Grazing Flint Hills Pasture

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Abstract

Horn flies (*Haematobia irritans* (L.)) are considered the most important external parasite that negatively affects pasture-based beef systems with losses estimated to exceed $1 billion annually to the U.S. beef industry. Control strategies have relied heavily on insecticide applications to control horn flies and are implemented when the economic threshold of 200 flies/animal have been exceeded. When horn fly populations are maintained below 200 flies/animal by treating them with insecticides then the level of stress annoyance behaviors such as leg stomping, head throwing, and skin twitching decreases while grazing increases. While most stocker operators utilize some type of fly control these are rarely used as a single pharmaceutical technology to aid in performance of the animals. Additional pharmaceutical technologies are utilized in combination of others, with the use of de-wormers and implants showing the largest impact with performance of stockers. The objective of this study was to compare a commercial injectable insecticide, LongRange, to an insecticidal ear tag for horn fly control and determine the impact of weight performance on stockers when fly control technologies were used in combination with implants versus no implants.

Keywords

horn fly, implants, LongRange

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Introduction

Horn flies (*Haematobia irritans* (L.)) are considered the most important external parasite that negatively affects pasture-based beef systems with losses estimated to exceed $1 billion annually to the U.S. beef industry. Control strategies have relied heavily on insecticide applications to control horn flies and are implemented when the economic threshold of 200 flies/animal have been exceeded. When horn fly populations are maintained below 200 flies/animal by treating them with insecticides then the level of stress annoyance behaviors such as leg stomping, head throwing, and skin twitching decreases while grazing increases. While most stocker operators utilize some type of fly control these are rarely used as a single pharmaceutical technology to aid in performance of the animals. Additional pharmaceutical technologies are utilized in combination of others, with the use of de-wormers and implants showing the largest impact with performance of stockers. The objective of this study was to compare a commercial injectable insecticide, LongRange, to an insecticidal ear tag for horn fly control and determine the impact of weight performance on stockers when fly control technologies were used in combination with implants versus no implants.

Key words: horn fly, implants, LongRange

Experimental Procedures

Crossbred stockers (n = 301; 587.82 ± 35.36 lb) were randomized by their initial weight across 15 pastures. Pastures were randomly assigned to three different treatment groups: 1) insecticide ear tag administered at 1 tag/animal (Corathon, 15% coumaphos and 35% diazinon; Bayer Healthcare LLC Animal Health Division, Shawnee Mission, KS); 2) LongRange injectable administered at 1 mL/110 lb body weight (1 mL contains 50 mg eprinomectin, Merial Limited, Duluth, GA); and 3) untreated control group. Within each treatment group, equal number of animals were randomly given either: Ralgro (36 mg zeranol; Merck Animal Health, Madison, NJ), Revalor-G (40 mg of trenbolone acetate and 8 mg estradiol; Merck Animal Health, Madison, NJ), or no implant. Stocking rates were based on pasture size (average: 253.58 ± 5.16 lb/acre).

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Individual animals were weighed and fecal samples were taken from four randomly selected animals per pasture on days 0 and 90. Fly counts began 2 weeks after initial treatment and continued on a weekly basis until the end of the study. Fifteen to 20 animals were randomly selected per pasture, and pictures were taken of one side of each animal using a DSLR digital camera with a telephoto zoom lens. Pictures were uploaded to a grid system where flies were counted by a trained observer. The study was designed as a randomized complete block with weekly analysis of horn fly populations.

Weight data, fecal egg counts, and fly counts were analyzed using the PROC GLM procedure with a preceding PROC UNIVARIATE for normality in SAS 9.4 (SAS Institute, Cary, NC). The fecal egg count data were not normally distributed so a PROC GLIMMIX procedure with pre-planned comparisons was conducted for the internal worm burden. Mean separation tests were conducted using LSMEANS with an $\alpha = 0.05$.

Results and Discussion

Eight weeks after treatment application the horn fly population increased to more than the economic threshold of 100 flies/side for all treatment groups with LongRange exhibiting a lower number of horn flies (112.01 ± 15.33 flies) than the untreated animals (175.68 ± 14.82 flies) (P=0.01; Figure 1). Interestingly, the extended release of eprinomectin for LongRange, which occurs for ~75 days post-treatment, could be seen 10 weeks after treatment with a significantly lower horn fly population (115.75 ± 22.92 flies/side) than both the Corathon tag group (256.17 ± 23.41 flies/side) and the untreated control group (319.88 ± 23.24 flies/side; P<0.001; Figure 1). LongRange provided adequate control of horn flies for 10 weeks and the Corathon tag provided control up to 8 weeks post-treatment. Overall, the application of fly control strategies demonstrated a decrease in horn fly populations in comparison to untreated animals, with LongRange providing 2 additional weeks of control when compared to the Corathon tag. The two products used in this study represent different delivery systems with the application of LongRange also targeting internal parasites. The internal parasite burden was low during this study and no differences were detected in fecal egg counts in both May (P=0.44) and August (P=0.08; Table 1). However, when a pharmaceutical technology can address both internal and external parasites then the breakeven price of not utilizing a product such as LongRange could increase dramatically. Weight performance (average daily gain) from the stockers was different in groups with no fly control or no implant compared to those with both a fly control and implant combined (P=0.002; Table 2). Stockers given the combination of both LongRange and Revalor-G exhibited the greatest average daily gain (1.60 lb) which was greater than the average daily gain of stockers with no fly control and no implant (1.23 lb) (Table 1). The 0.37 lb increase in daily performance demonstrates that these two technologies (fly control and implants) have an additive effect on weight gains, and all combinations of either a fly tag or LongRange with an implant were significantly higher than not implementing either (P=0.002; Table 1).

Implications

The use of LongRange as a fly control technique adequately controlled horn flies up to 10 weeks and exhibited the highest weight performance in stockers when used in combination with Revalor-G.

Table 1. Internal parasite fecal egg count at initiation and end of grazing season

	Eggs per gram	
	May[a]	August
Control	0.67	1.59
LongRange	0.50	0.47
Corathon Fly Tag	1.17	1.72
P-value	0.44	0.08

[a]All cattle administered Safeguard late March 2016.

Table 2. Performance response to fly control treatments with different implant measures in crossbred stockers

	Weight performance, lb (± SE[1])			
Treatment[1]	Day 0 weight	Day 90 weight*	Weight gain*	Average daily gain*
No fly / No implant	584.72 (5.88)	695.03[c] (7.56)	110.31[d] (5.67)	1.23[d] (0.06)
No fly / Ralgro	587.19 (5.80)	704.81[bc] (7.46)	117.62[cd] (5.60)	1.31[cd] (0.06)
No fly / Revalor-G	580.49 (5.80)	708.16[abc] (7.46)	127.68[bc] (5.60)	1.42[bc] (0.06)
LongRange / No implant	595.24 (6.05)	721.18[ab] (7.78)	125.94[bcd] (5.84)	1.40[bcd] (0.06)
LongRange / Ralgro	583.18 (6.05)	717.76[ab] (7.78)	134.59[ab] (5.84)	1.50[ab] (0.06)
LongRange / Revalor-G	583.89 (5.88)	728.06[a] (7.56)	144.17[a] (5.67)	1.60[a] (0.06)
Fly tag / No implant	602.00 (6.55)	727.45[a] (8.43)	125.45[bcd] (6.32)	1.39[bcd] (0.07)
Fly tag / Ralgro	591.47 (6.44)	724.33[ab] (8.28)	132.87[abc] (6.22)	1.48[abc] (0.06)
Fly tag / Revalor-G	585.39 (6.67)	720.71[ab] (8.58)	135.32[ab] (6.43)	1.50[ab] (0.07)
P-value[2]	0.3009	0.0310	0.0023	0.0023

[1]SE=standard error.
[1]No Fly = no fly control; No Implant = no implant; Ralgro and Revalor-G (Merck Animal Health, Madison, NJ); LongRange (Merial Limited, Duluth, GA); Fly Tag = 1 Corathon Tag (Bayer Animal Health Division, Shawnee Mission, KS).
[2]Observed significance levels for weight performance for all treatments.
*Weight performance within the same column with different superscripts are significantly different $\alpha = 0.05$.

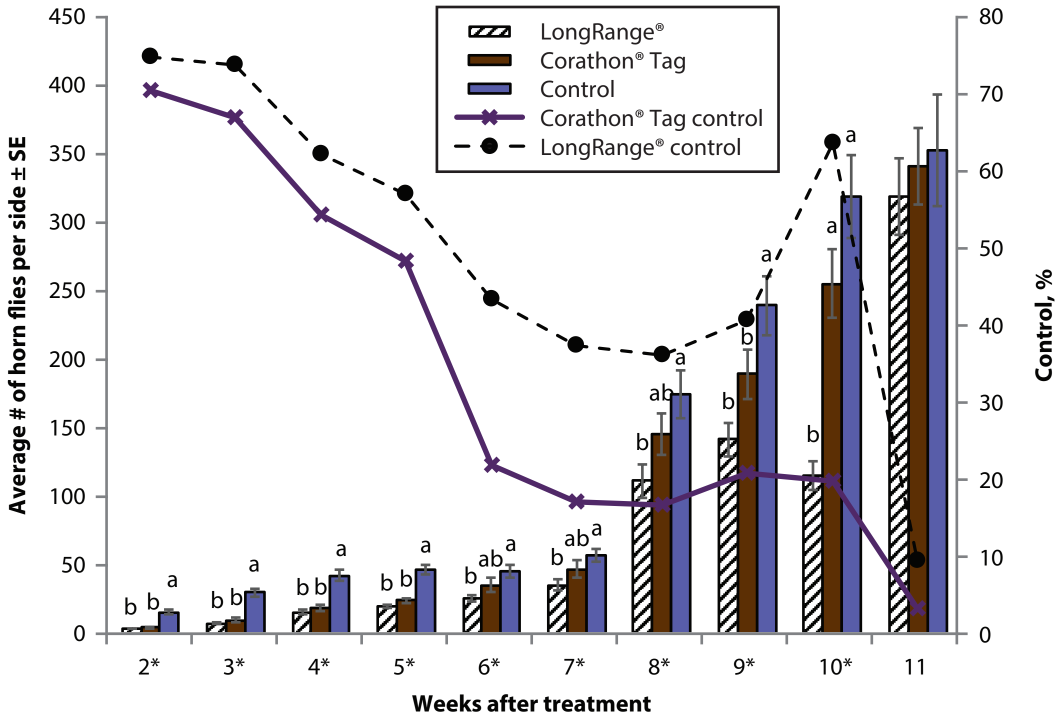

Figure 1. Horn flies per side (bars) and % control from LongRange or Corathon ear tag (lines). *Bars with different letters are significantly different α = 0.05.