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K-STATE Research and Extension

2023 SEREC AGRICULTURAL RESEARCH

Evaluation of Implants, Clover, and Fescue Variety on Stocker Steers – Year 3

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Summary

Sixty-four growing steers were used in a split-plot experiment, where the whole plot was pasture, and the split-plot was the implant level. Whole plot treatment was a 4 × 2 factorial with four levels of fescue (High Endophyte, Low Endophyte, Novel, or Endophyte Free) and two levels of legume (Legumes or No Legumes). The split-plot included four implant levels (No Implant, Synovex One Grass, Revalor-G, or Ralgro). Data collected were weights and ultrasound carcass characteristics when steers were coming off grass. Steers on High Endophyte had a lower average daily gain (ADG) and final weight than steers on novel endophyte, with those grazing pastures that had low endophyte and endophyte free were intermediate. There was no difference in cattle gains or carcass measurements based on the addition of legumes or the type of implant the steers received. The drought restricted the days on grass and potentially reduced the positive effects of implants.

Introduction

Fescue makes up a large portion of pastureland in the United States. Kentucky 31 (K31) is the most commonly-planted fescue type due to its hardiness and easy stand maintenance. Kentucky 31 is hardy due to the symbiotic relationship with a fungus commonly known as endophyte. The endophyte allows the fescue to be less susceptible to flood, drought, pests, and other environmental impacts. However, the endophyte produces ergot toxins that can cause metabolic issues and possibly vasoconstriction. Vasoconstriction can lead to increased respiration rates, sloughing of hoof wall and/or tails, pregnancy loss, breeding issues, and reductions in stocker calf gains.

A variety of options have been discovered and tested to help combat the issues pertaining to cattle performance, including fescue development, the addition of clover, or implants. The other fescue varieties have shown improvements to cattle gains, but the gains may come at the cost of stocking rates, pasture persistence, grazing days, or grazing management. Legumes often improve cattle gains but may impose a problem with return on investment. Implants have been proposed as a way to control the fescue toxicity issues. The use of implants in cattle during grazing has shown improved gains compared to cattle grazing without implants.

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The purpose of this study is to identify management practices that result in the greatest economic return to the stocker operation and determine which management techniques reduce toxicity issues.

Experimental Procedures

Sixty-four growing steers were weighed on two consecutive days and allotted to one of sixteen fescue pastures. Four levels of fescue pastures were used: K31, high endophyte (HIGH); K31, low endophyte (LOW); endophyte free fescue (FREE); and novel endophyte fescue (NOVEL). Eight of the pastures also had ladino clover (6 lb/acre) to serve as an interseeded legume (two pastures per fescue type). Four steers were assigned to each pasture. The steers in each pasture were assigned to one of four implant treatments. The implant treatments included no implant, Ralgro (Merck Animal Health), Revalor-G (Merck Animal Health), and Synovex One Grass (Zoetis).

Steers were turned out on May 18, 2022, and grazed until August 10, 2022. Pastures were fertilized according to recommendations of soil test results in February 2022. Legumes were interseeded into pastures in 2014. Seedheads were clipped in all pastures June 2022.

At the end of the grazing period, steers were weighed off grass, and scanned with ultrasound for body composition.

Results and Discussion

In this third year of data collection, no interaction effects were detected ($P > 0.10$). Steers grazing high endophyte fescue had a lower average daily gain (ADG) than steers on novel endophyte pastures, with low endophyte and endophyte free being intermediate ($P = 0.03$; Table 1). There were no differences in ADG based on whether there were legumes or not in the pastures ($P = 0.67$; Table 2) and no differences based on implant type ($P = 0.19$; Table 3). There were no differences in carcass ultrasound measurements based on forage type, addition of legumes, or type of implant ($P > 0.10$; Tables 1, 2, and 3). Since the steers were only on grass for 84 days and a majority of that summer was excessively dry (extreme drought conditions), all steers underperformed, thus a reason why there were no differences in cattle gain based on implant. The advantages of low endophyte and low toxin producing fescues was not as obvious this year, as compared to others (Buessing and Farney, 2021; Farney et al, 2022) and could possibly be explained due to all pastures having limited biomass production.

References

Buessing, Z. T. and Farney, J. K. (2021) "Evaluation of Implants, Clover, and Fescue Variety on Stocker Steers," *Kansas Agricultural Experiment Station Research Reports*: Vol. 7: Iss. 2. *https://doi.org/10.4148/2378-5977.8040*

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Table 1. Steer performance measures based on fescue type

Item	Endophyte Free	Novel Endophyte	Low Endophyte	High Endophyte	SEM	*P*-value
Initial wt, lb	656	656	656	656	14	1.00
Final wt, lb	753[ab]	785[a]	756[ab]	726[b]	17	0.10
Grazing ADG, lb/d	1.19[ab]	1.55[a]	1.26[ab]	0.85[b]	0.12	0.03
Loin muscle depth, mm	47	50	47	47	1.4	0.37
Marbling score[1]	5.66	5.58	5.74	5.38	0.19	0.64
Backfat, in.	0.13	0.12	0.15	0.13	0.01	0.37

SEM = standard error of the mean. ADG = average daily gain.

[ab] Different letters indicate $P < 0.05$.

[1]Ultrasound marbling score: 4.5–4.9 is Slight 50–90; 5.0–5.9 is Small 00–90 (CUP labs, 2007; *https://www.cuplab.com/Files/content/V.%201%20IMF%20or%20Marbling%207-1-07.pdf*).

Table 2. Steer performance measures based on legume presence

Item	No legume	Legume	SEM	*P*-value
Initial wt, lb	656	656	14	0.99
Final wt, lb	754	757	12.0	0.84
Grazing ADG, lb/d	1.19	1.24	0.09	0.67
Loin muscle depth, mm	47	49	1.0	0.32
Marbling score[1]	5.55	5.63	0.14	0.71
Backfat, in.	0.13	0.13	0.007	0.53

SEM = standard error of the mean. ADG = average daily gain. Legume = ladino clover seeded at 6 lb/acre.

[ab] Different letters indicate $P < 0.05$.

[1]Ultrasound marbling score: 4.5–4.9 is Slight 50-90; 5.0–5.9 is Small 00–90 (CUP labs, 2007; *https://www.cuplab.com/Files/content/V.%201%20IMF%20or%20Marbling%207-1-07.pdf*).

Table 3. Steer performance measures based on implant

Item	No Implant	Ralgro[1]	Revelor-G[2]	Synovex One Grass[3]	SEM	*P*-value
Initial wt, lb	656	656	656	656	14	0.99
Final wt, lb	742	768	751	762	18	0.74
Grazing ADG, lb/d	1.02	1.38	1.15	1.31	0.11	0.19
Loin muscle depth, mm	47	51	47	48	1.4	0.17
Marbling score[4]	5.67	5.58	5.51	5.62	0.20	0.95
Backfat, in.	0.13	0.13	0.13	0.13	0.01	0.97

[1] Merck Animal Health, Madison, NJ.
[2] Merck Animal Health, Madison, NJ.
[3] Zoetis, Parsippany, NJ.
SEM = standard error of means. ADG = average daily gain.
[ab] Different letters indicate $P < 0.05$.
[4]Ultrasound marbling score: 4.5–4.9 is Slight 50–90; 5.0–5.9 is Small 00–90 (CUP labs, 2007; *https://www.cuplab.com/Files/content/V.%201%20IMF%20or%20Marbling%207-1-07.pdf*).