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Evaluation of Supplemental Energy Source for Grazing Stocker Cattle

Abstract

Thirty-six steers grazing smooth bromegrass pastures were used to evaluate the effects of a supplemental energy source on available forage, grazing gains, subsequent finishing gains, and carcass characteristics. Supplementation treatments evaluated were: no supplement, a supplement with starch as the primary source of energy, and a supplement with fat as the primary source of energy. Supplements were formulated to provide the same quantity of protein and energy per head daily. Supplementation with the starchbased or fat-based supplement during the grazing phase resulted in higher ($P < 0.05$) grazing gains than feeding no supplement. Supplementation during the grazing phase had no effect ($P > 0.05$) on finishing gain, feed intake, and feed:gain. Steers supplemented with the starch-based supplement had greater ($P < 0.05$) final finishing live weight and greater ($P < 0.05$) hot carcass weight than those that received no supplement.

Keywords

grazing, supplementation, energy, finishing

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Evaluation of Supplemental Energy Source for Grazing Stocker Cattle

L.W. Lomas, J.K. Farney, and J.L. Moyer

Summary

Thirty-six steers grazing smooth brome grass pastures were used to evaluate the effects of a supplemental energy source on available forage, grazing gains, subsequent finishing gains, and carcass characteristics. Supplementation treatments evaluated were: no supplement, a supplement with starch as the primary source of energy, and a supplement with fat as the primary source of energy. Supplements were formulated to provide the same quantity of protein and energy per head daily. Supplementation with the starch-based or fat-based supplement during the grazing phase resulted in higher ($P < 0.05$) grazing gains than feeding no supplement. Supplementation during the grazing phase had no effect ($P > 0.05$) on finishing gain, feed intake, and feed:gain. Steers supplemented with the starch-based supplement had greater ($P < 0.05$) final finishing live weight and greater ($P < 0.05$) hot carcass weight than those that received no supplement.

Introduction

Supplementation of grazing cattle is most economically feasible when cattle prices are high relative to the price of grain. Energy supplementation of grazing ruminants may reduce forage intake and digestibility, but energy supplementation at low levels (less than 0.4% bodyweight) has been shown to have little effect on forage intake when crude protein is not limiting. Several studies have evaluated the effects of supplementation on stocker cattle gains and forage utilization during the grazing phase, but few have evaluated the effects of supplementation during the grazing phase on subsequent finishing performance and carcass traits. This research seeks to obtain a more thorough understanding of the interactions among grazing nutrition and management, finishing performance, and carcass traits to facilitate greater economic utilization of these relationships.

Experimental Procedures

Thirty-six steers (446 lb) of predominately Angus breeding were weighed on two consecutive days, stratified by weight, and randomly allotted to nine 5-acre smooth brome grass pastures on April 9, 2014. Three pastures of steers were randomly assigned to one of three supplementation treatments (three replicates per treatment) and were grazed for 181 days. Supplementation treatments were: no supplement, 4.25 lb per head daily of a starch-based supplement, or 4.5 lb per head daily of a fat-based supplement. Supplements were formulated to provide the same amount of protein (0.7 lb) and energy (3.3 lb of total digestible nutrients) per head daily. Pastures were fertilized with 100 lb/a nitrogen on February 24, 2014. Pastures were stocked with 0.8 steers/a and grazed

continuously until October 7, 2014 (181 days), when steers were weighed on two consecutive days and grazing was terminated.

Cattle in each pasture were group-fed supplement in meal form on a daily basis in metal feed bunks, and pasture was the experimental unit. No implants or feed additives were used during the grazing phase. Weight gain was the primary measurement. Cattle were weighed every 28 days. Cattle were treated for internal and external parasites before being turned out to pasture and later were vaccinated for protection from pinkeye. Cattle had free access to commercial mineral blocks that contained 12% calcium, 12% phosphorous, and 12% salt. Forage availability was measured approximately every 28 days with a disk meter calibrated for smooth bromegrass.

After the grazing period, cattle were shipped to a finishing facility, implanted with Synovex-S (Zoetis, Madison, NJ), and fed a diet of 80% whole-shelled corn, 15% corn silage, and 5% supplement (dry matter basis) for 125 days. All cattle were slaughtered in a commercial facility at the end of the finishing period, and carcass data were collected.

Results and Discussion

Average available forage for the smooth bromegrass pastures during the grazing phase and grazing and subsequent finishing performance of grazing steers are presented by supplementation treatment in Table 1. Supplementation treatment had no effect ($P > 0.05$) on the quantity of forage available for grazing. Pastures grazed by supplemented steers would be expected to have greater available forage DM because consumption of supplement by steers grazing these pastures would likely reduce forage intake, thereby resulting in more residual forage.

Supplemented steers had greater ($P < 0.05$) weight gain, daily gain, and steer gain/a than those that received no supplement. Supplementation with either supplement resulted in an average of 0.6 lb greater average daily gain over those that received no supplement. Grazing weight gain, daily gain, and gain/a were not different ($P > 0.05$) between steers that were supplemented with the starch-based or fat-based supplement.

Steers fed the starch-based supplement had greater ($P < 0.05$) final finishing weight, greater ($P < 0.05$) hot carcass weight, greater ($P < 0.05$) overall (grazing + finishing) gain, and greater ($P < 0.05$) overall daily gain than those that received no supplement. Finishing performance was not different ($P > 0.05$) between steers fed the fat-based supplement and those that received no supplement or the starch-based supplement while grazing. Supplementation during the grazing phase had no effect ($P > 0.05$) on finishing weight gain, feed intake, feed:gain, backfat, ribeye area, yield grade, or marbling score.

Under the conditions of this study, supplementation of stocker cattle grazing smooth bromegrass pasture improved grazing performance and increased slaughter weight and carcass weight. Most of the increase in slaughter weight and carcass weight can be attributed to greater gains of supplemented cattle during the grazing phase.

Table 1. Effects of supplemental energy source on grazing and subsequent finishing performance of steers grazing smooth brome grass pastures, Southeast Agricultural Research Center, 2014

| Item | Supplemental energy source | | |
|--|----------------------------|--------|---------|
| | None | Starch | Fat |
| Grazing phase (181 days) | | | |
| No. of head | 12 | 12 | 12 |
| Initial weight, lb | 446 | 446 | 446 |
| Final weight, lb | 706a | 817b | 810b |
| Gain, lb | 260a | 371b | 364b |
| Daily gain, lb | 1.43a | 2.05b | 2.01b |
| Gain/a, lb | 208a | 296b | 291b |
| Supplement consumption, lb/head per day | 0 | 4.25 | 4.5 |
| Supplement, lb/additional gain | --- | 6.9 | 7.8 |
| Average available smooth brome grass forage, lb/a dry matter | 7,140 | 7,128 | 6,985 |
| Finishing phase (125 days) | | | |
| Beginning weight, lb | 706a | 817b | 810b |
| Ending weight, lb | 1,241a | 1,338b | 1,307ab |
| Gain, lb | 535 | 522 | 497 |
| Daily gain, lb | 4.28 | 4.17 | 3.98 |
| Daily dry matter intake, lb | 26.1 | 27.0 | 24.7 |
| Feed:gain | 6.11 | 6.49 | 6.20 |
| Hot carcass weight, lb | 769a | 830b | 810ab |
| Backfat, in. | 0.45 | 0.50 | 0.47 |
| Ribeye area, sq. in. | 11.2 | 12.1 | 12.1 |
| Yield grade | 2.8 | 3.0 | 2.8 |
| Marbling score ¹ | 630 | 648 | 650 |
| Percentage USDA grade choice | 100 | 100 | 100 |
| Overall performance (grazing plus finishing; 306 days) | | | |
| Gain, lb | 795a | 892b | 861ab |
| Daily gain, lb | 2.60a | 2.92b | 2.81ab |

¹600 = modest, 700 = moderate.

Means within a row followed by the same letter are not significantly different ($P < 0.05$).