Effect of Tillage Intensity and Seeding Date on Growth-Performance of Heifers Grazing Sod-seeded Wheat and Ryegrass Pastures

Ken Coffey[1], *Wayne Coblentz*[1], *Greg Montgomery*[2], *and Charles Rosenkrans, Jr.*[1]

Story in Brief

The first year of a proposed 3-year study was conducted using a total of 40 Gelbvieh x Angus crossbred heifers (543 ± 10.7 lb initial BW). The heifers grazed one of eight 5-acre pastures of common bermudagrass overseeded with wheat and ryegrass during the winter of 2002. One half of the pastures were seeded during the first week of September (EARLY) and half were seeded in mid-October (LATE). Within each seeding date, half of the pastures was disked once (1x) and the other half was disked twice (2x) before seeding. Grazing began December 20 on all pastures and continued through May 11. Forage mass was greater ($P < 0.10$) during early sampling periods from EARLY vs. LATE seeded pasture. Body weights tended ($P < 0.10$) to be greater on January 15 and were greater ($P < 0.05$) on February 15 from heifers grazing EARLY pastures than from those grazing LATE pastures. By the end of the grazing season, total gains did not differ ($P > 0.10$) because of tillage intensity or seeding date. Therefore, as far as animal gains are concerned, producers may have considerable flexibility in their decisions as to when to seed annual forages and to what level they till their sod.

Introduction

Sod-seeded winter annual forages provide a high-quality feed source for wintering weaned calves. In a previous 3-year study at the University of Arkansas Southeast Research and Extension Center, weaned calves gained approximately 2 lb/day between mid-December and mid-April while grazing sod-seeded winter annuals (Coffey et al., 2002). The major disadvantages of the sod-seeded winter annual program were the year to year variability and the inability to begin grazing prior to mid-December. This means producers must find other forage alternatives to winter annuals between the time of weaning and initiation of grazing in mid- to late December. Our objective in this study was to evaluate earlier seeding dates and more intensive tillage of the bermudagrass sod to determine if those practices would allow for earlier grazing or greater animal gains.

Experimental Procedures

A total of 40 Gelbvieh x Angus crossbred heifers (543 ± 10.7 lb initial BW) grazed one of eight 5-acre pastures of common bermudagrass during the winter of 2002 that were previously overseeded with winter annual forages. All pastures were seeded with 30 lb/acre of 'Marshall' annual ryegrass plus 120 lb/acre of 'Madison' soft wheat. One half of the pastures were seeded during the first week of September (EARLY) and half were seeded in mid-October (LATE). Within each seeding date, half of the pastures was disked once (1x) and the other half was disked twice (2x) prior to seeding. The eight pastures were divided into two blocks of four pastures and the pastures were allocated randomly within block to one of the four treatment combinations. Pastures were fertilized with a complete fertilizer mixture of N, P_2O_5, and K_2O (as KCl) during the fall and with an additional 50 lb/acre of N in the spring.

Grazing began December 20 on all pastures and continued until May 11. Heifers were weighed on December 17 and 18 at the Livestock and Forestry Branch Experiment Station at Batesville without prior removal from pasture and water to determine initial BW. Heifers were stratified by weight and allocated randomly to one of eight groups. They were then transported to the University of Arkansas Southeast Research and Extension Center at Monticello, weighed and turned directly onto their assigned pasture. Weights were measured monthly without prior removal from pasture and water. Heifers were offered 2 lb/day of a grain sorghum-based supplement that contained trace mineralized salt and 150 mg Rumensin,.

Available forage mass was determined monthly during the study using a calibrated disk meter. Data were analyzed within date using SAS (SAS Inst., Inc., Cary, NC) GLM procedures for a 2 x 2 factorial arrangement of treatments.

Results and Discussion

No seeding date by tillage intensity interactions were detected ($P < 0.05$) for any of the measurements in this study. Therefore, only main effects are presented and discussed. Available forage mass tended ($P < 0.10$) to be higher from EARLY than from LATE on December 20 and February 15, and was higher ($P < 0.05$) from EARLY than from LATE on January 14 (Table 1). However, assuming a DM intake of 2.5 % of BW and 50% utilization of the forage, the average differential in available forage between December 20 and February 15 between EARLY and LATE should sustain only an additional 12 extra grazing days per acre. Available forage mass did not differ ($P > 0.10$) between seeding dates on the other sampling dates, and did not differ ($P > 0.10$) between tillage intensity on any of the sampling dates.

Heifers grazing EARLY pastures tended ($P < 0.10$) to be heavier than those grazing LATE on January 15, but BW did not differ ($P > 0.10$) between treatments on the other dates (Table 2). During the first period, BW gain by heifers grazing EARLY was greater ($P < 0.10$) than those by heifers grazing LATE. Other gains did not differ ($P > 0.10$) among treatments. Likewise total gain and daily gain did not differ statistically ($P > 0.10$) among the different treatments. Heifers grazing pastures that were disked twice prior to seeding were 31 lb heavier numerically ($P > 0.10$) than those grazing pastures that were disked only once.

[1] Department of Animal Science, Fayetteville.
[2] University of Arkansas, Monticello.

A mid-October seeding date would generally impose less environmental stress on new seedlings and less competition from the bermudagrass sod than an earlier seeding date. Although pastures seeded earlier had greater forage mass earlier in the grazing season, this increase in forage mass did not translate into greater animal production. Greater tillage and soil disturbance should reduce bermudagrass competition. However, in this study, there was no apparent advantage to multiple diskings on forage mass or animal gains. Therefore, based on the first year of a proposed 3-year study, tillage intensity and/or seeding date are not critical factors in determining total season forage and animal production. However, varied environmental conditions during the fall could differentiate between treatments in subsequent years of the study.

Implications

Sod-seeded winter annuals appear to be a viable feed source for developing heifers for the subsequent breeding season. During the course of this study, heifer gains averaged 2 lb/day and no additional hay was fed between December 20 and May 11. There were no overall statistically significant differences between seeding in early September vs. mid-October, or between disking once or twice prior to seeding the annual forages.

Literature Cited

Coffey, K. P., et al. 2002. J. Anim. Sci. 80:926.

Table 1. Winter annual forage mass (lb/acre) of sod-seeded winter annuals planted in early September (EARLY) or mid-October (LATE) after one or two diskings

	Tillage intensity		Seeding date		
Date	Once	Twice	EARLY	LATE	SE
December 20[a]	1,633	1,609	1,859	1,383	126.4
January 14[b]	2,008	2,042	2,289	1,761	129.1
February 15[a]	514	596	621	490	40.6
March 22	940	952	966	927	54.9
April 12	1,605	1,716	1,792	1,529	156.6

[a]Differences were detected between seeding dates (P<0.10).
[b]Differences were detected between seeding dates (P<0.05).

Table 2. Growth performance by heifers grazing sod-seeded winter annuals planted in early September (EARLY) or mid-October (LATE) after one or two diskings

	Tillage intensity		Seeding date		
Item	Once	Twice	EARLY	LATE	SE
BW, lb					
December 18[a]	543	544	543	543	0.2
January 15[b]	570	574	579	565	3.7
February 15[a]	636	653	658	631	12.8
March 15	696	718	720	694	12.5
April 12	768	794	793	769	14.1
May 11	815	846	836	825	15.9
Daily gain, lb					
Dec. 20 – Jan. 15[b]	0.96	1.09	1.28	0.77	0.130
Jan. 15 – Feb. 15	2.13	2.55	2.54	2.14	0.415
Feb. 15 – March 15	2.15	2.31	2.20	2.25	0.277
March 15 – April 12	2.57	2.70	2.61	2.66	0.233
April 12 – May 11	1.62	1.81	1.49	1.95	0.197
Total gain, lb	272	302	293	282	15.8
Daily gain, lb	1.89	2.10	2.03	1.96	0.110

[a]The December 18 weight represents an average of full weights measured Dec. 17 and 18 prior to shipping the heifers from Batesville to Monticello, AR.
[b]Differences were detected between seeding dates (P < 0.10).