Perennial Versus Annual Cool Season Grasses as Supplements for Wintering Beef Cows

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Story in Brief

In November 2003, 138 pregnant crossbred beef cows (average BW = 1,104 ± 22 lb) were weighed, BCS recorded. Cows were sorted into 6 groups of 23 stratified by BCS, BW, breed, and age, then assigned to six 12.5 acre dormant common bermudagrass pastures (3 groups/treatment) for 2 years. Groups of cows had ad libitum access to hay plus 1 of the following 2 supplements beginning in November until May: 1) allowed access to 6 acres of winter annual 3 days/week, or 2) allowed access to 6 acres of tall fescue 3 days/week. The winter annual pastures were also seeded to 'Red River' crabgrass for summer forage production. During the summer, the calves were allowed to grazing the cool season pastures via creep gates, and cows were only allowed to graze the pasture when the forage became over abundant and mature. From mid December until early May, cow BW and BCS did not differ ($P \geq 0.22$) between the annual and perennial cool season pastures when used as supplements to the bermuda/dallisgrass hay. Also, cow BW and BCS did not differ ($P \geq 0.27$) from early May until mid September when they grazed primarily bermudagrass. Conception rate and the post partum interval did not differ ($P \geq 0.61$) between treatments. Calving date, calf birth weight, BW, ADG, weight per day of age, and the 205 day weaning weight did not differ ($P \geq 0.11$) between treatments. These data suggest that either forage type, when used as a supplement to warm season grass hay and a creep pasture, was similar in its ability to supply nutrients to the cows and their nursing calves.

Introduction

Decreasing stored feed requirements of beef cows is a topic that has received considerable attention in recent years. However, beef cattle producers in the southern US still winter cows primarily with hay plus a concentrate based supplement. Complementary forage systems based on a warm season perennial and cool season annual grasses have shown promise as a method of providing supplemental nutrients and decreasing hay requirements (Utley and McCormick, 1978; Hill et al., 1985; Gunter et al., 2002). The common advantages noted among these reports are extension of the grazing season and decreased days and quantities of hay fed. Studies in northern Florida that evaluated the use of wheat or rye with crimson and arrowleaf clovers as a supplement to Argentine bahiagrass hay (DeRouen et al., 1991) demonstrated that winter annual pasture grazing could decrease winter hay dry matter intake (DMI) by as much as 30% compared to bahiagrass hay plus a concentrate based supplement. Gunter et al. (2002) designed a supplemental limit grazing system for gestating and lactating beef cows that eliminated the need for concentrate based supplements and decreased hay requirements. The following study was designed to compare limit grazing of winter annual pasture with that of perennial cool-season pasture for beef cows.

Experimental Procedures

In the fall of 2002, 6 pastures (6 acres each) on the Southwest Research and Extension Center were sprayed with glyphosate and disked to prepare a seedbed. Three of the pastures were planted with 'Jessup' tall fescue infected with endophyte AR542 (MaxQ, Pennington Seed, Inc., Madison, Ga.), while the remaining three 6 acre pastures were planted to annual ryegrass (var Passerel Plus; Pennington Seed, Inc.) as a cover crop. Pastures were limit grazed for 1 year to allow for the establishment of the tall fescue.

In November of 2003, 138 pregnant crossbred beef cows (average BW = 1,104 ± 22 lb) of mostly Angus breeding were weighed, BCS (Wagner et al., 1988) recorded, and a 7 way Clostridial antigen (Vision 7; Bayer Corp., Shawnee Mission, Kan.) administered to increase Clostridial antibodies at calving. Cows were sorted into 6 groups of 23 stratified by BCS, BW, breed, and age, then assigned to six 12.5 acre dormant common bermudagrass pastures (3 groups/treatment). Groups of cows remained in their assigned pasture 2 years and had ad libitum access to hay plus 1 of the following 2 supplements beginning in November: 1) allowed access to 6 acres of winter annual pasture approximately 3 days/week (Monday, Wednesday, and Friday; 0.10 acre per cow per grazing-day [7 hours/day]), or 2) allowed access to 6 acres of tall fescue pasture approximately 3 days/week (Monday, Wednesday, and Friday; 0.10 acre per cow per grazing-day [7 hours/day]). The number of times a week the cool season pastures were grazed was adjusted to compensate for available forage. It was estimated that grazing winter annual pasture 3 days/week would meet or exceed the requirements of the cow for supplemental protein and energy (Gunter et al., 2002).

Winter annual grasses were planted in late September of 2003 and 2004, and the forage was stockpiled until grazing was initiated in December; therefore forage was not limiting in January or February when plant DM production is less than cattle demand. The winter annual pastures were also seeded to 'Red River' crabgrass for summer forage production. Pastures of cows were restricted from supplementation paddocks on non grazing days by the use of electric fences during the winter; during the summer, the calves were allowed to graze the cool season pastures via creep gates and cows were only allowed to graze the pasture when the forage

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became over abundant and rank. Hay was offered in the form of round bales in "ring" type hay feeders and technicians maintained records of the quantity of hay fed in each pasture.

Winter annual grasses were seeded using a Marliss no till drill (Sukup Manufacturing, Jonesboro, Ark.). The pastures were seeded with 90 lb/acre of 'Wintergrazer 70' rye (Pennington Seed, Inc.) via the small grain box, 25 lb of 'Passerel Plus' annual ryegrass/acre via the grass seed box, plus banding phosphorus and potassium via the fertilizer box. Phosphorus and potassium rates were selected to fulfill soil test recommendations (Chapman, 1998). Before planting, standing herbage mass was sprayed with glyphosate then removed from the area by continuously stocking with cattle until the standing herbage mass was visually estimated to be < 2 inches to insure that winter annual grasses had minimal competition. In mid October, late January, and mid March pastures were fertilized with a 50 lb of N/acre using ammonium nitrate.

From April 25 until June 25 (60 d), 6 Angus bulls that had passed a breeding soundness examination remained with the cows, 1 bull per group. Each 12.5 acre pasture was fertilized with 50 lb of N/acre using ammonium nitrate in late April, and late June of each year. Cows always had ad libitum access to a self fed commercial mineral mixture.

Cows and calves were weighed and BCS of the cows were recorded during mid December, early February, early May, late June, early August, and mid September of each year. The morning after calving, calves were weighed, tattooed in both ears with an individual number, and male calves were surgically castrated. In mid May, cows were treated for internal and external parasites (Ivomec; Merck & Co., Inc., Whitehouse Station, N.J.), vaccinated with a 7 way Clostridial antigen (Vision 7), and vaccinated against infectious bovine rhinotracheitis, bovine viral diarrhea, parainfluenza 3, bovine respiratory syncytial virus plus 5 strains of Leptospirosis (Bovishield 4 + VL5; SmithKline Beecham Animal Health, Exton, Pa.). Cows were checked for pregnancy by rectal palpation in mid September. Post partum interval was calculated by subtracting 283 d from the calving date of the following year to estimate conception date.

The data were analyzed using PROC MIXED (SAS Inst., Inc., Cary, N.C.) as a completely randomized design with the effect of treatment and the covariates of cow age and calving date in the model. The fixed effect was treatment and the random effects were pasture, year, and pasture x year. Least squares means were separated using predicted differences.

Results and Discussion

From mid December until early May, cow BW did not differ ($P \geq 0.75$) between the limit grazed annual and perennial cool season pastures used as supplements for the bermuda/dallisgrass hay (Table 1). Furthermore, cow BW did not differ ($P \geq 0.27$) from early May until mid September when they grazed primarily bermudagrass. From mid December until early May, BCS did not differ ($P \geq 0.22$) between the limit grazed annual and perennial cool season pastures when used as supplements for the bermuda/dallisgrass hay (Table 1). During the summer, BCS did not differ ($P \geq 0.53$) from early May until mid September. During peak lactation (early February to early May), at no time did BCS decrease to a point where rebreeding performance would become a concern. Supporting this conclusion, conception rate did not differ ($P = 0.94$) between treatments and was near an optimum rate for this type of production system and class of cattle. The post partum interval did not differ ($P = 0.61$) between treatments and was less than 79 days, which is necessary to maintain a minimum 365 day calving interval. Apparently, both the perennial and the annual grasses were able to adequately supplement the hay during gestation and lactation to maintain these cows in an adequate plain of nutrition.

Calving date did not differ ($P = 0.86$) between annual grasses (February 21) and the tall fescue (February 21; Table 2). Calf birth weight, BW, ADG, weight per day of age, and the 205 day weaning weight did not differ ($P \geq 0.11$) between treatments. These data suggest that either forage type when used as a supplement to warm season grass hay was similar in its ability to supply nutrients to the growing calves. Based on these 2 years of data from this complementary forage system, either forage type of cool-season grass (annual or perennial) was equivalent in meeting the nutritional need of the cow herd. Hence, the choice of forage type for a specific producer needs to be based on the agronomic factors of production and the economics of production.

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Table 1. Body weight, BCS, conception rate, and post-partum interval of mature beef cows fed bermudagrass/dallisgrass hay supplemented by limit grazing on rye/ryegrass or tall fescue pasture 3 days weekly.

	Treatments[a]			
Item	Annual	Fescue	SE	*P*-value
Cow BW, lb				
Mid December	1,156	1,149	17.9	0.75
Early February	1,240	1,245	20.6	0.79
Early May	1,152	1,157	13.9	0.79
Late June	1,112	1,136	21.1	0.27
Early August	1,107	1,112	19.9	0.77
Mid September at weaning	1,130	1,119	42.5	0.51
BCS[b]				
Mid December	6.1	6.2	0.08	0.34
Early February	6.6	6.4	0.11	0.22
Early May	6.3	6.3	0.31	0.77
Late June	6.0	5.9	0.14	0.78
Early August	5.8	5.8	0.11	0.83
Mid September at weaning	6.0	5.9	0.09	0.53
Conception rate, %	91	90	4.4	0.94
Post-partum interval, d	75	77	1.8	0.61

[a]Annual = limit grazed winter-annual pasture (‘Wintergrazer 70 rye and ‘Passerel Plus’ ryegrass) approximately 3 days weekly and fescue = limit grazed ‘Jessup’ tall fescue pasture infected with AR542 endophyte approximately 3 days weekly from January until May.
[b]Body condition score range 1 to 9; 1 = emaciated, 9 = obese (Wagner et al., 1988).

Table 2. Birth date and weight, BW, ADG, weight per day of age, and 205-day-weight of calves nursing mature beef cows fed bermudagrass/dallisgrass hay supplemented by limit grazing on rye/ryegrass or tall fescue pasture 3 days weekly.

	Treatments[a]			
Item	Annual	Fescue	SE	*P*-value
Birth date, Julian calendar	52	52	1.2	0.86
Birth weight, lb	82	79	1.4	0.21
Calf BW, lb				
Early May	230	229	3.6	0.75
Late June	336	337	7.1	0.87
Early August	386	381	5.8	0.52
Mid September at weaning	428	410	6.6	0.11
ADG, lb				
Birth to May	2.0	2.0	0.05	0.83
May to weaning	1.9	1.7	0.08	0.11
Birth to weaning	1.8	1.8	0.03	0.15
Weight per day of age, lb	2.3	2.2	0.03	0.12
205-day-weaning weight	456	437	7.2	0.13

[a]Annual = limit grazed winter-annual pasture (‘Wintergrazer 70 rye and ‘Passerel Plus’ ryegrass) approximately 3 days weekly and fescue = limit grazed ‘Jessup’ tall fescue pasture infected with AR542 endophyte approximately 3 days weekly from January until May.