SUPPLEMENTAL PROTEIN LEVELS FOR SPRING CALVING COWS GRAZING OLD WORLD BLUESTEM OR TALLGRASS PRAIRIE

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Story in Brief

Eighty pregnant crossbred beef cows were assigned to one of five treatments. Twenty cows grazed tallgrass prairie and were fed cottonseed meal cubes (40% CP) to meet 100% of their estimated requirement for supplement protein. Sixty cows grazed Old World bluestem (OWB) and were fed cottonseed meal at either 25, 75, 125, or 175% of the rate fed to the cows on tallgrass prairie. Weight and body condition were monitored prepartum and postpartum until weaning. Milk production was estimated at 60, 120, and 180 days postpartum. Prepartum weight and condition losses on OWB increased linearly and quadratically as the level of supplement was reduced. Weight and condition losses on prairie were similar to the 3 lower feeding levels on OWB. From calving until the end of supplementation in April, cows grazing prairie lost less weight than cows on OWB. From the end of supplementation until weaning, OWB cows gained more weight than prairie cows. This difference can be attributed to compensatory gain and a relatively poor forage production year on the prairie. Birth weights and weaning weights were not affected by treament. However, calf gain from birth until the end of supplementation tended to increase with level of supplement on OWB while calves on range tended to gain more weight than OWB calves. Milk production during this period reflected this difference. Within OWB treatments, calf weight gain and milk production during supplementation increased linearly with level of supplement. During peak grass quality, milk production was similar for all treatments but in late summer the 75% and 125% produced more milk than the other OWB groups. Based on the response to supplementation, the nutritional value of tallgrass prairie and OWB were similar prepartum but higher for tallgrass prairie during the postpartum period until the end of supplementation.

(Key Words: Beef Cattle, Supplementation, *Bothriochloa* spp., Rangeland, Forage.)

Introduction

In recent years, large acreages of Old World bluestem (*Bothriochloa* spp.). have been established in the southern rolling plains and prairies. These introduced grasses are easily established, grow vigorously, and produce large

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quantities of forage if optimally managed (Sims, 1985). Little information is available about cow/calf production and management on old world bluestems. The objectives of this study were to (1) evaluate the performance of spring-calving beef cows grazing old world bluestem and fed different levels of supplemental protein, and (2) compare performance with cows grazing tallgrass prairie and supplemented to meet their protein requirements.

Materials and Methods

Eighty multiparous crossbred beef cows were assigned to one of five treatment groups. One group of 20 cows grazed 160 acres of tallgrass prairie and were fed pelleted 41% CP cottonseed meal to supply 100% of their estimated requirements for supplemental protein. The remaining 60 cows were allotted to 4 groups that grazed a common 200 acre pasture of old world bluestem (*Bothriochloa ischaemum* var. Plains). These four groups were supplemented with cottonseed meal equal to 25, 75, 125, or 175% of the amount fed to the cows grazing tallgrass prairie. The cows were supplemented from November 2, 1993 to April 18, 1994. The initial feeding rate on prairie was 2.2 lb/day for prairie. This rate was increased by 1.1 lb/day on December 16 and then individually after each cow calved. All cows were individually fed 5 days/week in stalls and had free access to a salt-mineral mixture and water. Grazing was managed with a 4-paddock rotation on both forage types.

Cow weights (following an 8-hour shrink) and body condition score (1-9) were recorded every 28 days before and after calving season. During the calving season, gestating cows were weighed weekly and all cows were weighed and condition scored every 14 days. Calves were weighed within 24-hours of birth and then at the same intervals as the mature cows there after. Daily milk production was estimated by machine milking following a 12-hour calf removal. Cows were milked at 60, 120, and 180 days postpartum. Data were subjected to least squares analysis of variance using a model that included the effects of level of supplement and forage type.

Results and Discussion

Prepartum Phase. During gestation the 175% treatment on old world bluestem (OWB) maintained weight while the other groups on OWB and tallgrass prairie lost weight (Table 1). Among the supplement groups on OWB, weight loss increased linearly and quadratically ($P<.05$) as supplementation decreased from the 175% to 25% rate. The 25% group lost more weight ($P<.05$) than the cows on the 175% feeding level. Weight loss by the range cows was similar to losses by OWB cows on the 25, 75 and 125% treatments. Changes in body condition across the different feeding levels on OWB reflected

weight losses while there was no difference between the losses of tallgrass prairie cows and the cows on OWB. The similarity in performance among the tallgrass prairie cows (100% supplement rate) and the OWB cows receiving the 25, 75, and 125% supplementation levels suggests that the nutritional value of the forages were similar during this period.

Postpartum Phase. During the supplementation period following calving, cows grazing tallgrass prairie lost less weight (P<.05) than the cows on OWB (Table 1). In contrast to the prepartum period, weight loss among the supplement groups on OWB was similar. Changes in body condition were similar among all treatments.

Calf birth weight was similar for the cows grazing the two forage types and across the supplementation groups on OWB (Table 2). Calf weight gain during the supplementation period increased linearly (P<.10) with supplementation level on OWB. Calves on tallgrass prairie gained more weight (P<.05) than the calves nursing OWB cows on the 25% supplement level. Milk production at 60 days postpartum increased linearly (P<.05) with supplementation level on OWB. Cows on tallgrass prairie produced more milk than the OWB on the lowest rate of supplementation.

Grazing Phase. From the end of supplementation until weaning, OWB cows gained more weight than prairie cows (Table 1; P<.05) and tended to gain more BCS (Table 1). Among the OWB groups, weight gain was negatively associated with winter supplementation rate.

At 120 days postpartum, milk production was similar among all groups. However at 180 days postpartum, the OWB cows from 75% and 125% groups produced more milk than the other cows on OWB and prairie.

Calf gains from April until to weaning (Table 2) were similar for calves on both forage types. Among OWB treatment groups, calf gain tended to be negatively related to level of winter supplement. Weaning weights were similar among all treatments.

In conclusion, cows on tallgrass prairie lost less weight and tended to produce more milk from calving to the end of supplementation than cows grazing OWB. Cows on OWB are able to compensate during spring and summer grazing. However, the compensation on OWB may occur too late in the breeding season to maintain optimal rebreeding performance. Based on the response to supplementation, the nutritional value of tallgrass prairie and OWB were similar prepartum but higher for tallgrass prairie during the postpartum period until the end of supplementation.

Literature Cited

Sims, P.L. 1985. Proceedings: Old World Bluestems in the Southern Great Plains. Oklahoma State University, USDA.

Table 1. Change in cow body weight and body condition score (1-9).

Forage type	Old world bluestem				Tallgrass prairie
Supplement rate	25%	75%	125%	175%	100%
Prepartum					
Body weight, lb	-184[a]	-78[ab]	-88[ab]	0[c]	-124[a]
Condition score	-1.2[a]	-.9[ab]	-.7[ab]	-.6[b]	-.9[ab]
Calving to 4/18/94					
Body weight, lb	-94[a]	-124[a]	-118[a]	-127[a]	-46[b]
Condition score	-.8	-.8	-.7	-.7	-.7
4/19/94 to weaning					
Body weight, lb	246[c]	217[bc]	192[b]	204[b]	106[a]
Condition score	1.8[a]	1.4[ab]	1.3[b]	1.1[b]	1.0[b]

[a,b,c,d] Means in the same row with different superscripts differ (P<.05).

Table 2. Calf weights and weight gains and cow milk production.

Forage type	Tallgrass Old world bluestem				prairie
Supplement rate	25%	75%	125%	175%	100%
Birth to 4/18/94					
Birth weight, lb	86	90	93	89	86
Weight gain, lb	76[a]	87[ab]	92[ab]	98[ab]	106[b]
4/19/94 to weaning					
Weight gain, lb	323	325	306	302	308
Weaning weight, lb	485	504	494	492	503
Milk production, lb					
60 d postpartum	15.8[b]	18.8[ab]	21.4[a]	20.4[a]	22.3[a]
120 d postpartum	22.0	24.2	25.5	22.1	22.2
180 d postpartum	15.9[ab]	18.2[a]	17.5[ab]	14.7[b]	14.9[b]

[a,b] Means in the same row with different superscripts differ (P<.05).