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SUPPLEMENTAL PROTEIN REQUIREMENT FOR BEEF COWS GRAZING STOCKPILED BERMUDAGRASS

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Story in Brief

Fifty-four mature beef cows were used in a completely random design to determine supplemental protein requirements when grazing stockpiled bermudagrass pastures during late fall and winter. Twenty-four and thirty cows were allotted to one of four supplemental treatments at each of two locations. Bermudagrass pastures were grazed or clipped to an approximate 2-in stubble height during late August and fertilized with 50 lb of actual N per acre. Grazing was deferred until November 3, 1998, at which time grazing and supplemental treatments were initiated and continued for 90 d. Supplementation improved overall cow performance.

Key Words: Beef Cattle, Stockpiled Forage, Supplementation

Introduction

Cow-calf producers face increasing challenges to maintain profitability. A large portion of production costs is associated with hay feeding which occurs when forage nutritive value and quantity is low. The use of stockpiling bermudagrass may prove to be an alternative to reduce production costs. Bermudagrass is typically managed for summer production, but little attention has been given to bermudagrass for fall and winter use. Late summer and fall precipitation combined with late summer N fertilization offers the potential to stockpile forage with acceptable nutritive value for fall and winter grazing. Data collected by Taliaferro et al. (1987) indicated that fertilized bermudagrass can maintain high levels of crude protein through mid February, high enough to maintain a cow without expensive supplement. Wheeler et al. (1998) concluded in the first year of a 2-yr study that during the first 30 d of grazing, forage nutritive value was adequate to maintain acceptable animal performance without supplementation. Supplementation was required to minimize weight loss during the final 49 d of the study and supplemental protein further reduced weight loss. This progress report includes a second year□s data evaluating supplemental protein requirements of spring calving beef cows grazing stockpiled bermudagrass.

Materials and Methods

This study was conducted at the Eastern Research Station near Haskell, OK, and the Range Cow Research Center near Stillwater, OK. Thirty cows were used at the Haskell location and 24 cows were used at the Stillwater location. Cows grazed 45 acres of stockpiled bermudagrass from November 3, 1998, to February 2, 1999, for a total of 90 d. Average initial weight and BCS were 1189± 36.0 lb and 5.2 ± .26, respectively. During the third week in August, bermudagrass pastures were clipped to an approximate 2-in stubble height and fertilized with 50 lb of actual N per acre. Cows were allowed to strip graze the forage at Stillwater and cows at Haskell were rotationally grazed to decrease waste and prolong forage nutritive value. The Haskell location accumulated 4059 lb forage/acre while the Stillwater location accumulated 1881 lb forage/acre.

Treatments were: 1) no supplement (C), 2) 53 g of supplemental DIP (L), 3) 152 g of supplemental DIP (M); and 4) 252 g of supplemental DIP (H). All supplements were fed at the equivalent of 2 lb per day, but were prorated for 4 d/wk feeding. Supplement composition is shown in Table 1. Cows were assigned to treatments on November 3, 1998, and were individually fed in portable supplementation wagons.

Cows were weighed and condition scores were recorded on d 0, 28, 63 and 90 following a 16-h shrink period where both feed and water were withheld. Model One of Beef Cattle NRC (1996) was used to estimate DIP balance of cows within each treatment. Measured values for weight, forage intake, forage digestibility (TDN), and supplemental protein characteristics were used. Microbial efficiency was assumed to be 10%.

Data were analyzed using the general linear models of SAS (1985) and the least squares means were calculated. The final model included location, treatment, and the location x treatment interaction. Because there was no location x treatment interaction, the data were pooled. Means were tested for differences in supplemented versus non-supplemented treatments. Supplemented treatments were orthogonally arranged with respect to supplemental protein, therefore were tested for linear and quadratic effects.

Results and Discussion

During the months of December and January, temperatures were 80% and 34% above the 10-yr average at Stillwater and Haskell, respectively. Forage nutritive value is shown in Table 2. Protein concentration declined through January, but increased in February. Similarly, organic matter digestibility was lowest in December and increased through February. Improvement in nutritive value was likely due to growth of cool season annual species in response to moderate temperatures during the first of January through the first of February.

No significant differences were found for weight or BCS change until the final 30-d period where supplemented cows lost less body condition compared with control cows (Table 3).

Over the entire 90-d period, total weight gain was greater for supplemented cows compared with non-supplemented cows ($P<.05$). Even though cows gained weight, minimal loss of body condition was noted. This is not uncommon for cows during the last trimester of gestation and is the result of rapid fetal development. Overall body condition loss was greater ($P<05$) for non-supplemented cows (Table 3).

Projected degradable protein balance was 141, 206, 284 and 383 g/d for C, L, M, and H treatments, respectively. By providing 2 lb of any one of the supplements, gain was maximized and body condition loss was minimized. Dietary energy, rather than protein, limited cow performance.

Literature Cited

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Table 1. Supplement composition.

	% dry matter		
Item	L	M	H
Soybean hulls	92.9	61.3	31.2
Soybean meal	--	31.7	61.9
Molasses	3.23	.33.3	3.3
Dical P	2.8	2.4	1.2

$CaCO_3$	.5	1.2	2.5
KCl	.5	0.0	0.0
CP %, actual	12.1	23.2	35.0
	Nutrients supplied per day, g/d		
CP calculated	89	197	307
DIP calculated	67	134	201
CP actual	110	211	318
DIP actual	53	162	275
Ca	14	14	14
P	5	9	5
K	14	14	18
Mcal/d NEm	1.5	1.5	1.6

Table 2. Chemical composition and organic matter digestibility of esophageal masticate samples collected from cows grazing stockpiled bermudagrass.

	Month				
Item [a]	Nov	Dec	Jan	Feb	SEM
OM	85.6	85.9	86.0	84.1	.9
CP [b]	15.3	14.7	11.6	13.2	.6
DIP	50.5	65.9	58.6	67.4	-
ADIN	11.7	13.0	15.7	10.3	1.4
NDIN	36.6	26.7	40.5	30.4	1.9
NDF	60.6	57.0	64.6	62.0	1.3
ADF	30.5	32.1	38.9	33.4	.8
Lignin	6.8	8.6	9.5	7.2	1.2
OMD [c]	76.8	58.4	62.1	66.7	2.4

[a]Organic matter, crude protein, degradable intake protein, acid detergent insoluble nitrogen, neutral detergent insoluble nitrogen, neutral detergent fiber, acid detergent fiber, and organic matter digestibility.

[b]Cubic effect $P<.05$.

[c]Quadratic effect $P<.05$.

Table 3. Live weight change, BCS change, and daily forage dry matter intake in spring calving cows grazing stockpiled bermudagrass and fed increasing amounts of DIP.

		Treatment				
Days		C	L	M	H	Sem
0-28	Wt, lb	54.6	57.2	56.6	54.4	12.1
	BCS [a]	0	.12	-.04	.10	.10
29-63	Wt, lb	1.8	26.7	30.6	16.3	14.8
	BCS	.03	.01	.14	-.04	.10
64-90	Wt, lb	4.2	7.9	9.7	12.8	10.8
	BCS [b]	-.45	-.11	-.19	-.14	.10
0-90	Wt, lb [b]	60.8	91.2	96.7	82.5	18.1
	BCS [b]	-.42	-.03	-.10	-.08	.11
Forage intake, lb/d		25.1	28.6	29.7	28.6	2.1
Forage intake, % of BW[c]		2.04	2.32	2.39	2.26	.10

[a]BCS = Body condition score.

[b]C treatment differs from supplemented treatments P<.05.

[c]C treatment differs from supplemented treatments P=.07.

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