EVALUATION OF SOUTHWESTERN KANSAS NATIVE GRASSES

T. T. Marston and D. O. Yauk[1]

Summary

Native grass samples were collected monthly for five years and analyzed for nutrient content. Crude protein and ADF content indicate that grass quality is highest in May and June, then steadily declines until October. Stocker operators may need to begin protein supplementation as early as July to sustain weight gains. Trace mineral values were erratic from year to year and month to month between and within years, indicating that trace mineral supplementation should probably be maintained throughout the grazing season.

(Key Words: Native Grass, Protein, Minerals, Nutrition.)

Introduction

Considerable data have been compiled on the nutrient value of native grasses during the grazing season. From these data, supplementation programs have been recommended for beef producers. Most Kansas data has come from the Manhattan area or the Western Kansas Agricultural Research Center, Hays. Little information is available from southwest Kansas. Our objective was to measure and record nutrient profiles of native grasses grown in Clark County, Kansas.

Experimental Procedures

From May 1995 through October 1999, 16- by 16-foot cages were placed in various grazing sites across Clark County. Sites were selected to represent the different soil types within the county. Once the cages were in place, monthly samples (mid-May to mid-October) were harvested from within the cages. Grass species common to most of the sampling sites were little bluestem, side oats grama, blue grama, sand bluestem, and buffalograss. Hand clipped samples were of all standing plant material (dead and growing) within a half inch of the ground. Samples were weighed, sealed in plastic bags and sent to a commercial laboratory for analysis. Each year the cages were moved to a new site within the same soil type. Samples were analyzed for dry matter, crude protein, acid detergent fiber (ADF), calcium, phosphorus, copper, manganese, iron, zinc, and molybdenum contents. Data were combined across soil types for reporting purposes.

Results and Discussion

Nutrient contents are summarized in Tables 1, 2, and 3. There was considerable variation from year to year and month to month, which was probably a reflection of weather patterns. As native grasses mature through the grazing season, they decline in crude protein and increase in ADF. Cattle performance would be expected to decline correspondingly. Research from Kansas State and other universities has indicated that supplementing with degradable intake protein should enhance cattle performance when protein requirements of the animal and its rumen microflora are not met. Assuming that a 600-pound, medium-framed steer might select a diet that contains 2% more crude protein than our samples, and that forage availability is non-limiting, producers

[1]County Extension Agricultural Agent, Clark County.

may need to consider protein supplementation as early as July if their goal is to obtain daily gains of 2 pounds or greater. This is earlier than most producers supplement stocker cattle in southwest Kansas.

Trace minerals can affect performance and immunity status of the grazing animal. Our data indicated that content can be quite variable for copper, manganese, zinc and molybdenum. One third of the monthly copper means (10 of 30 sample months) were less than 50% of the daily requirements (NRC, 1996). Because of the erratic changes in trace mineral content, it may be appropriate to provide 50 to 100% of the trace mineral requirement of summer grazing animals as a supplement.

Table 1. Statistical Values of Major and Trace Minerals from Native Grass Samples Harvested During the Growing Season, Dry Matter Basis (1995-1999)

Item	No. of Samples	Mean	Standard Deviation	Minimum	Maximum
Calcium, %	273	0.51	0.20	0.14	1.56
Phosphorus, %	274	0.15	0.05	0.06	0.32
Copper, ppm	274	15.1	9.7	2.29	52.7
Iron, ppm	274	306	164	60.6	1320
Manganese, ppm	274	41.0	15.2	13.7	104.0
Molybdenum, ppm	273	1.7	0.95	0.42	6.73
Zinc, ppm	274	34.2	9.8	13.0	81.5

Table 2. Yearly Average Nutrient Content in Native Grass Samples Collected in Southwest Kansas, Dry Matter Basis (1995 – 1999)

	Year				
Item	1995	1996	1997	1998	1999
Crude protein, %	6.57	7.66	6.16	6.30	5.70
ADF, %	41.6	44.8	46.7	45.3	45.5
Calcium,%	0.69	0.46	0.50	0.46	0.49
Phosphorus, %	0.17	0.18	0.15	0.15	0.13
Copper, ppm	13.3	10.4	8.8	15.9	24.4
Manganese, ppm	45.8	33.9	37.1	38.6	48.8
Zinc, ppm	32.1	31.6	29.8	35.1	40.5
Molybdenum, ppm	1.41	1.52	1.98	1.65	1.91

Table 3. Monthly Average Nutrient Content in Native Grass Samples Collected in Southwest Kansas, Dry Matter Basis (1995-1999)

	Month					
Item:	May	June	July	Aug.	Sept.	Oct.
Crude protein, %	7.82	7.59	6.90	6.20	5.69	4.66
ADF, %	44.1	42.6	43.9	44.7	45.3	48.1
Calcium,%	0.56	0.24	0.52	0.51	0.48	0.50
Phosphorus, %	0.17	0.17	0.18	0.16	0.15	0.11
Copper, ppm	12.4	18.1	11.9	17.3	15.1	12.8
Manganese, ppm	50.0	42.1	39.9	39.0	34.0	40.2
Zinc, ppm	35.8	32.8	33.1	38.4	29.3	33.5
Molybdenum, ppm	1.33	1.67	1.84	2.03	1.68	1.61

Table 4. Percentage of Yearly and Monthly Trace Mineral Mean Values Meeting NRC Recommendations[a]

	Percentage of Samples Greater than NRC Requirements		
	Copper	Manganese	Zinc
Yearly mean values:			
1995	50.3 ± 1.4	69.9 ± 6.4	48.0 ± 5.4
1996	50.2 ± 1.3	35.5 ± 5.9	61.7 ± 5.0
1997	31.8 ± 1.2	28.3 ± 5.6	37.9 ± 4.8
1998	83.5 ± 1.1	35.2 ± 4.8	80.1 ± 4.1
1999	98.6 ± 1.1	63.9 ± 4.8	84.6 ± 4.1
Monthly mean values:			
May	60.2 ± 1.3	65.8 ± 6.0	67.8 ± 5.1
June	60.2 ± 1.3	51.0 ± 6.0	59.1 ± 5.1
July	60.2 ± 1.3	48.5 ± 6.0	67.6 ± 5.1
August	58.4 ± 1.3	39.6 ± 6.0	67.3 ± 5.1
September	80.2 ± 1.3	31.0 ± 6.0	48.8 ± 5.1
October	58.0 ± 1.3	43.3 ± 6.0	64.2 ± 5.1

[a]NCR (1996) mineral requirements: copper, 10 ppm; manganese, 40 ppm; and zinc, 30 ppm.