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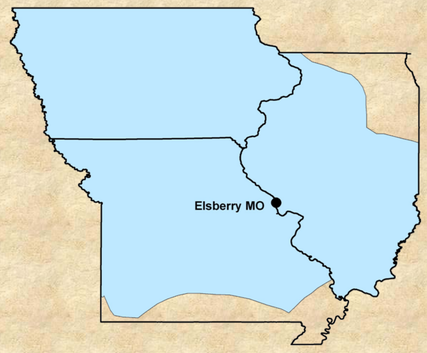
Plant Materials Program

Forage Quality of Selected Grasses in the Lincoln Hills of Missouri

P. Allen Casey[1], Steven B. Bruckerhoff[2], and Ronald L. Cordsiemon[1]



Introduction

The changes in forage quality of some grasses throughout the growing season have not been well documented in the Eastern United States. In recent years there has been a push in the Eastern United States to convert cool-season grass pastures to perennial warm season grasses. There is limited data on the change in forage quality throughout the growing season. In 2003 accessions listed in Table 1 were grown in a replicated complete block design. Vegetative samples of primary and re-growth of the selected species were taken at multiple times throughout the growing season and tested for forage quality. The acid detergent fiber (ADF) varied from 27.2% to 43.2%, the neutral detergent fiber (NDF) varied from 46.4% to 68.5%, and total digestible nutrients (TDN) varied from 49.2% to 60.6% for all species tested throughout the growing season. The selected species have the potential to provide adequate to excellent forage quality but proper management is needed to maintain that quality.

Table 1. Species and cultivar or accession used in study.

Common Name	Scientific Name	Cultivar/Accession
Bermudagrass	*Cynodon dactylon*	Ozarka
Big Bluestem	*Andropogon gerardii*	Rountree
Big Bluestem	*Andropogon gerardii*	9078831
Caucasian Bluestem	*Bothriochloa bladhii*	Variety Not Stated
Eastern Gamagrass	*Tripsacum dactyloides*	9083214
Eastern Gamagrass	*Tripsacum dactyloides*	Pete
Indiangrass	*Sorghastrum nutans*	Rumsey
Little Bluestem	*Schizachyrium scoparium*	Aldous
Sideoats Grama	*Bouteloua curtipendula*	El Reno
Switchgrass	*Panicum virgatum*	Cave-In-Rock
Switchgrass	*Panicum virgatum*	9062244
Tall Fescue	*Schedonorus phoenix*	Variety Not Stated

Methods

The evaluation nursery was planted in 2003 in a randomized complete block with three replications but did not establish well so missing plants were replanted and all plants were allowed to mature and develop during 2004. The evaluation block was fertilized with 40-0-25 in late winter (fescue) and early spring (warm season grasses).Vegetative samples were taken from the species/cultivars/accessions listed in Table 1. These samples were taken May 16, 2005, June 30, 2005, August 10, 2005 and September 20, 2005 for primary (original) growth and June 30, 2005, August 10, 2005 and September 20, 2005 for re-growth. Re-growth samples consisted of approximately 45 days of re-growth materials prior to sample date. The vegetative samples were analyzed for forage quality.

Table 2. Forage quality of selected warm season grasses and tall fescue at multiple times during the 2005 growing season.

	5/16/2005	6/30/2005		8/10/2005		9/20/2005	
	Primary	Primary	Regrowth \1	Primary	Regrowth \2	Primary	Regrowth \3
Little Bluestem							
%CP	14.6	8.6	9.3	4.6	6.4	4.1	10.1
% ADF	29.3	34.0	34.1	39.4	38.6	41.5	35.7
% NDF	54.3	60.5	60.3	65.9	65.3	66.2	60.6
% TDN	56.3	52.6	52.6	48.4	49.1	46.8	51.3
Sideoats Grama							
%CP	16	9.4	9.6	6.1	8.5	5.8	10.3
% ADF	27.6	35.3	34.9	40.2	36.4	42.4	34.5
% NDF	55.8	64.1	62.8	67.4	65.1	68.5	62.4
% TDN	57.6	51.6	51.9	47.9	50.8	46.1	52.3
Rumsey Indiangrass							
%CP	16.7	10.5	10.2	5.3	9.3	4.5	10.6
% ADF	25.0	33.9	34.5	39.0	37.1	39.1	36.0
% NDF	46.4	59.0	59.3	64.6	63.4	62.4	57.7
% TDN	59.7	52.7	52.3	48.8	50.2	48.7	51.1
Cave-In-Rock Switchgrass							
%CP	17.6	12.4	11	5.6	11.5	4.6	9.5
% ADF	24.1	32.5	34.6	37.5	33.0	36.9	32.0
% NDF	49.2	59.7	60.7	63.9	61.9	60.6	59.0
% TDN	60.4	53.8	52.2	49.9	53.4	50.4	54.2
9062244 Switchgrass							
%CP	19.3	12.4	11.3	6.1	9.4	4	14.2
% ADF	24.0	30.5	32.8	36.9	33.1	38.6	29.4
% NDF	49.7	58.2	60.8	65.7	61.5	64.3	57.8
% TDN	60.4	55.4	53.6	50.4	53.3	49.1	55.0
Caucasian Bluestem							
%CP	15.5	7.9	9.2	4.6	8.4	4.9	9.6
% ADF	29.1	40.0	39.0	42.7	37.9	43.2	38.6
% NDF	50.6	64.6	63.1	68.8	61.2	68.1	62.2
% TDN	56.5	48.0	48.8	45.9	49.6	45.5	49.1
Pete Eastern Gamagrass							
%CP	18.1	12.3	12	6.2	11.3	7.3	13
% ADF	27.7	31.8	33.3	37.1	33.2	35.8	31.1
% NDF	56.3	59.6	61.5	65.8	62.4	65.3	54.1
% TDN	57.6	54.4	53.2	50.2	53.3	51.2	54.9
Rountree Big Bluestem							
%CP	13.7	8.6	9.4	4.1	8.2	3.6	10.6
% ADF	32.2	34.4	34.1	41.8	38.5	42.1	33.0
% NDF	51.1	60.9	60.7	68.2	63.8	68.0	57.9
% TDN	54.0	52.4	52.6	46.6	49.2	46.3	53.4
9078831 Big Bluestem							
%CP	17	11.21	10.9	5.9	9.1	3.7	10.9
% ADF	27.2	31.9	32.8	36.1	36.4	40.8	32.0
% NDF	52.1	57.9	58.8	63.4	62.2	67.2	58.5
% TDN	44.7	54.3	53.6	51.0	50.8	47.3	54.2
9083214 Eastern Gamagrass							
%CP	19	13.1	13.1	7.4	11.2	7.6	13
% ADF	26.3	31.2	33.8	35.3	33.6	41.2	31.5
% NDF	55.5	57.4	60.5	59.4	62.3	62.7	60.9
% TDN	58.7	54.9	52.8	51.6	53.0	47.1	54.6
Ozarka Bermudagrass							
%CP	24.1	11.2	10.9	8.7	10.5	9.2	11.2
% ADF	23.8	30.2	31.6	32.2	32.8	33.5	32.3
% NDF	48.2	59.4	61.1	63.6	63.0	62.6	62.2
% TDN	60.6	55.6	54.5	54.1	53.6	53.1	54.0
Tall Fescue							
%CP	14.2	13.1	17	11.8	15.3	12.1	17.3
% ADF	26.4	31.5	26.1	34.8	30.2	37.3	26.5
% NDF	42.6	52.5	46.9	57.6	52.8	59.7	47.2
% TDN	58.6	54.6	58.8	52.0	55.6	50.0	58.5

\1 Regrowth Between May 16 and June 30
\2 Regrowth Between June 30 and August 10
\3 Regrowth Between August 10 and September 20

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Results

Percent crude protein (Table 2) was very good for samples taken May 16, 2005. This was an old stand of unimproved tall fescue with no fertility and could be similar to many unimproved fescue pastures.
Samples taken June 30, 2005 indicated an expected decline in every species and especially the Caucasian bluestem. Analysis of re-growth material showed little difference from the primary growth except for the tall fescue.
Samples taken August 10, 2005 showed percent crude protein declining again. The analysis of the re-growth samples showed higher crude protein levels.
Samples taken September 20, 2005 were similar to August 10, 2005 in that the re-growth material was higher quality than the primary growth.

Figure 1. Tall fescue (*Schedonorus phoenix*) showing amount of primary growth. (5/16/2005)

Figure 2. 'Rumsey' Indiangrass (*Sorghastrum nutans*) showing amount of primary growth. (5/16/2005)

Discussion

Warm season grass species provide adequate to excellent quality forage. Management is important in maintaining quality for the time period of greatest need which is the summer slump. Quality declined considerably between June 30, 2005 and August 10, 2005 for primary growth so producers should switch to utilizing re-growth material somewhere between these dates. In order to have re-growth material available for mid summer use, primary growth may need to be utilized earlier in the grazing season. Warm season species have the potential of being used for a much longer period than just the summer slump.

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Affiliation and Contact: USDA-NRCS Plant Materials Center
1/ 2803 N. Highway 79, Elsberry, MO 63343, (573) 898-2012
Allen Casey – allen.casey@mo.usda.gov
2/ Retired – USDA-NRCS Plant Materials Center

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