United States Department of Agriculture
Natural Resources Conservation Service
Technical Note No: TX-PM-09-01
June 2009

Forage Production, Nutritive Quality and Growth Pattern of Various Warm Season Grasses

Plant Materials Technical Note

Background

Nutritive quality of different grasses is important to livestock producers when making pasture and grazing management decisions. There is very limited information available on forage and nutritive quality distribution of various warm season perennial grass cultivars. This information is needed to support and/or strengthen NRCS' efforts in:

- FSGD - Forage Suitability Group Descriptions
- NASIS – National Soil Information System
- ESIS – Ecological Site Information System
- NRCS Conservation Practice standards such as Prescribe Grazing, Pasture and Hay Planting and Range Seeding
- Web Soil Survey
- Grazingland Spatial Analyses Tool - GSAT
- Nutritional Balance Analyzer - NUTBAL

Purpose

The purpose of this technical note is to provide initial data results from a replicated study conducted at the James E. “Bud” Smith Plant Materials Center near Knox City, TX. The PMC is evaluating monthly nutritive quality distribution of various warm season perennial grass cultivars under low and high fertility management. This data will assist livestock producers and NRCS Field Office conservationist in determining optimum forage harvest times relative to livestock nutritional needs.

Results

The following information depicts the monthly percent crude protein (CP), percent In-Vitro Dry Matter Digestibility (IVDMD) and percent monthly growth data collected during FY 2008. Initial results indicate that nitrogen fertilization has no statistical influence on plant productivity and forage quality. The results displayed are calculated from the non fertilized plots.

2008 FORAGE ANALYSIS RESULTS

San Marcos eastern gamagrass

Month	% Crude Protein	% IVDMD	% Growth
April	19	71.5	3
May	15	69	9
June	12	63.4	9
July	10.5	60	13
August	11	54	13
September	11	55	14
October	13	61	19
November	8	55	20

Alamo switchgrass

Month	% Crude Protein	% IVDMD	% Growth
April	16	72.5	3
May	12	65.5	6
June	11.5	66	6
July	10	64	10
August	7	47.5	11
September	7	45	15
October	7	55	25
November	5	44.5	24

Selection 75 kleingrass

Month	% Crude Protein	% IVDMD	% Growth
April	15	70	5
May	15.3	71	9
June	14.7	69.5	7
July	12.6	68.5	7
August	10	55.5	13
September	10	58.5	20
October	10	58	19
November	6.3	56	21

Lometa indiangrass

Month	% Crude Protein	% IVDMD	% Growth
April	13.4	71.5	4
May	11	74	8
June	9.6	68.5	6
July	8.7	66.4	8
August	8	48	18
September	8	52	18
October	8	57	17
November	9	54	22

Earl big bluestem

Month	% Crude Protein	% IVDMD	% Growth
April	13	72	8
May	11.5	76	15
June	9.2	69	13
July	8.6	66	9
August	10.3	52.5	7
September	9.2	52	13
October	8	66	14
November	5	56	21

Haskell sideoats grama

Month	% Crude Protein	% IVDMD	% Growth
April	11	65	7
May	9.5	69	7
June	9.5	66	5
July	8	60.5	5
August	8.6	47.3	11
September	6.6	45.4	23
October	7	51	16
November	5.3	46.5	26

Summary

The statistical data represented in this technical note was collected at the James E. "Bud" Smith Plant Materials Center near Knox City, Texas. This data represents one year of analysis with no other spacial replication other than that within the research plot at the PMC. This information is to be used in general comparisons between species and sites and may not reflect actual results at all locations in Texas.

Crude protein and digestibility of the grasses evaluated decreased monthly as the phenological growth stage of the grasses changed from vegetative to seed maturity. Forage quality estimates were highest in April – July (vegetative and boot stage) and declined as the grasses reached reproductive stage. Biomass accumulation for most of the grasses occurred early (May – July) with the highest accumulation in August and September as a result of late summer and early fall precipitation. Under proper utilization and management the warm season grass cultivars investigated in this study can provide the nutritional needs of various beef cattle classes as illustrated in the National Research Council Crude Protein and Digestibility Needs table below.

The chart below represents the nutritional needs for various classes of beef cattle. (CP represents crude protein which is the total protein content demand and DOM is digestible organic matter demand. This chart can be used a reference in comparing plant performance versus the different beef cattle class nutritional demands.

Crude Protein and Digestibility Needs of Different Beef Classes (National Research Council, 1996)

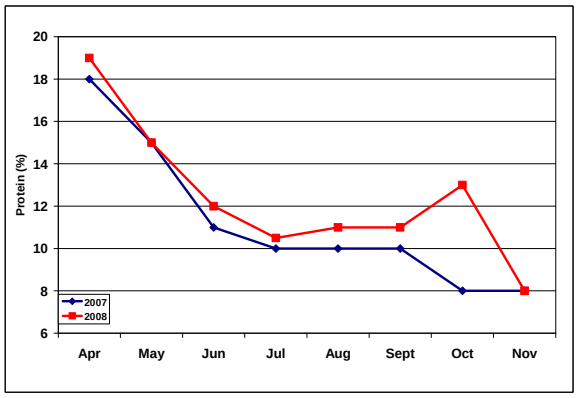
Beef Cattle Class	Age	Weight	CP	DOM
		-----lb-----	----------%----------	
Steer*	7 mo	500	15	63
Heifer*	8 mo	500	14	59
Dry cow	5 - 10 yr	1200	7	52
Lactating cow * 1.5 lb/day gain	5 - 10 yr	1200	10	58
Mid pregnant cow	5 - 10 yr	1200	9	57

*** 1.5 lb/day gain**

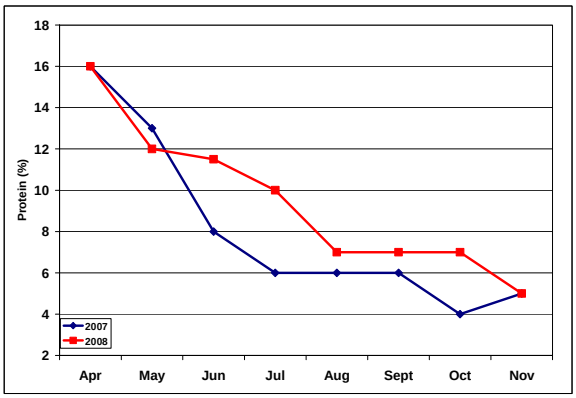
Reference

National Research Council. 1996. Nutrient requirements of beef cattle. 7th ed. National Acad. Press, Washington, DC.

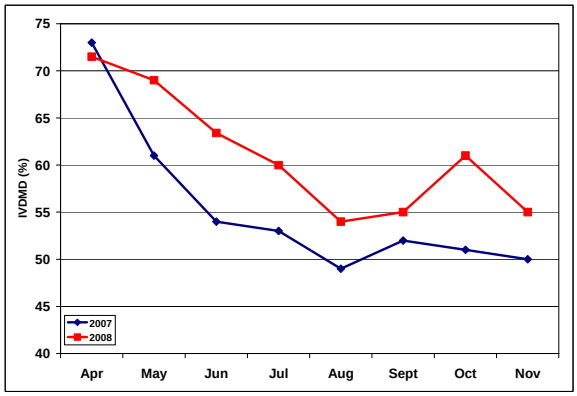
APPENDIX



'San Marcos' eastern gamagrass %Crude Protein



'Alamo' switchgrass %Crude Protein



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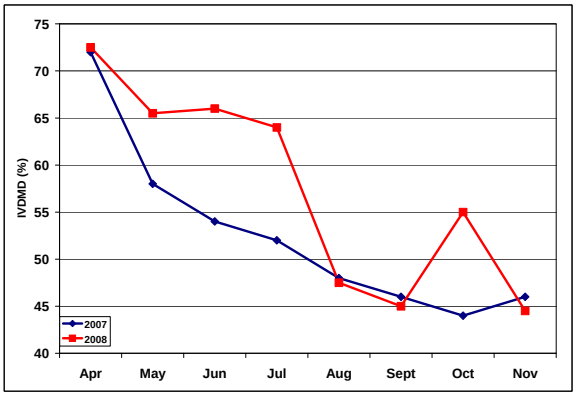
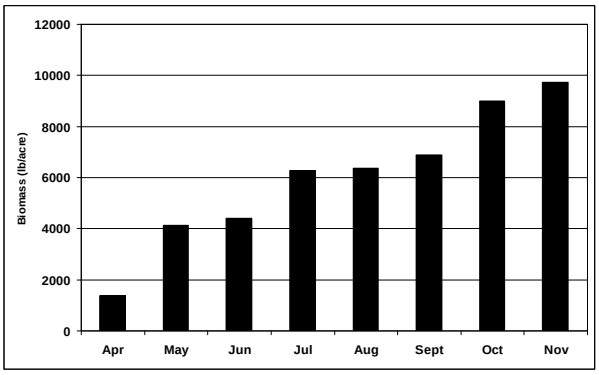
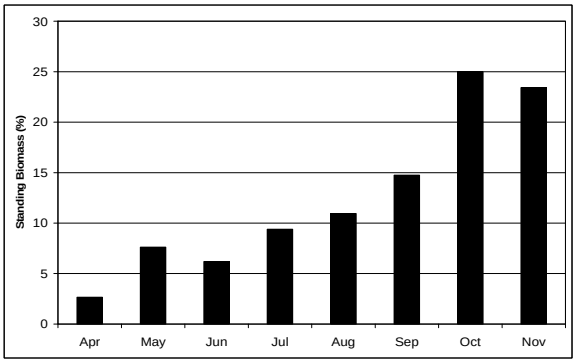


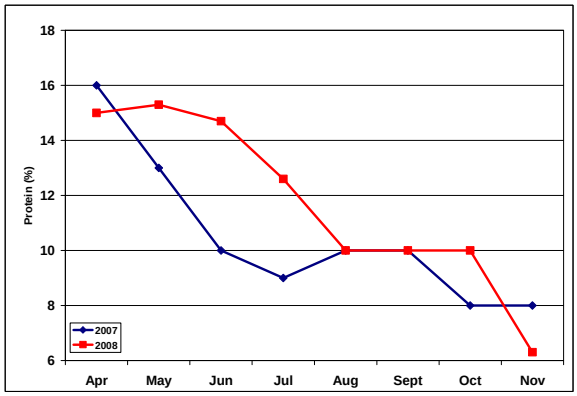
'Alamo' switchgrass %IVDMD



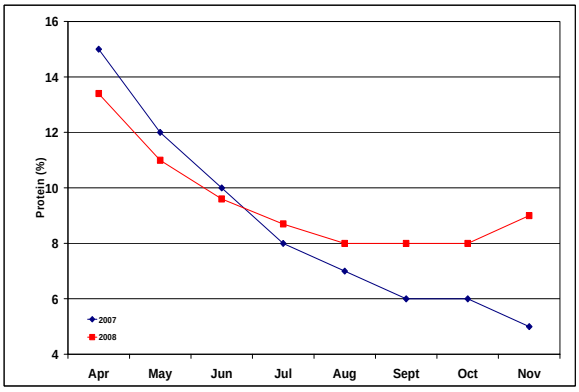
'San Marcos' eastern gamagrass cumulative biomass production



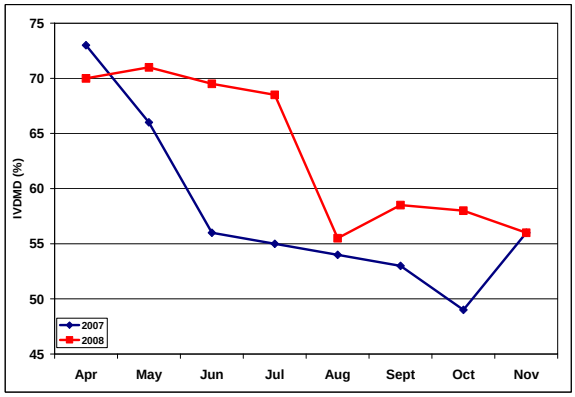
'Alamo" switchgrass cumulative biomass production



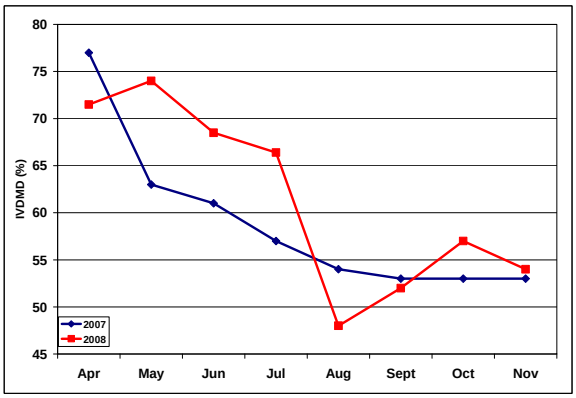
'Selection 75' Kleingrass % Crude Protein



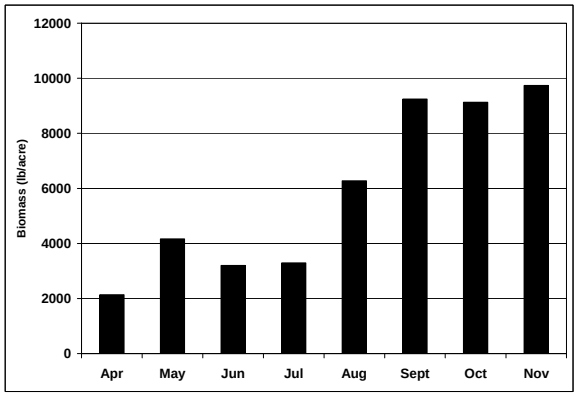
'Lometa' Indiangrass % Crude Protein



'Selection 75' Kleingrass %IVDMD



'Lometa' Indiangrass %IVDMD



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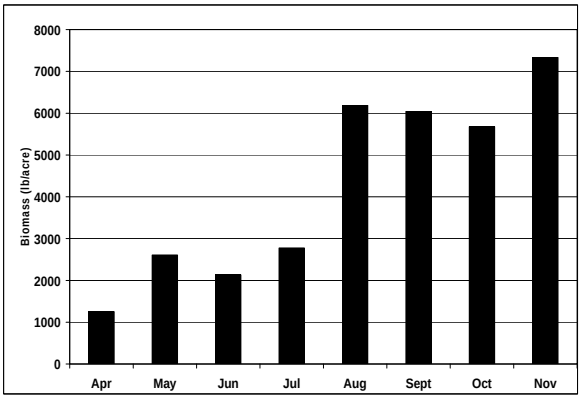
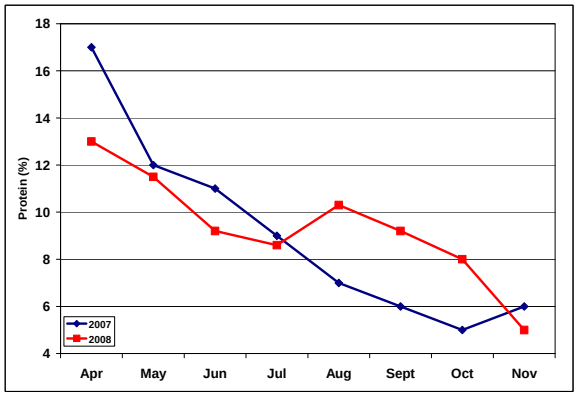
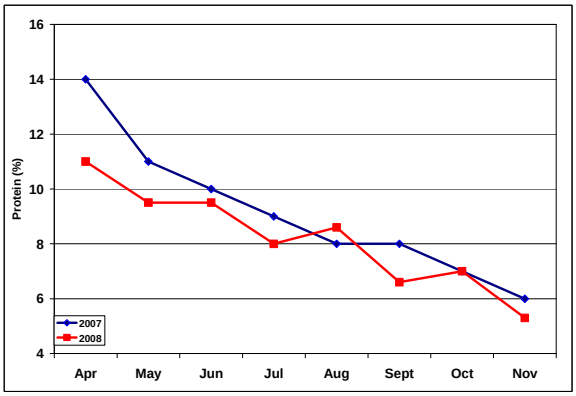


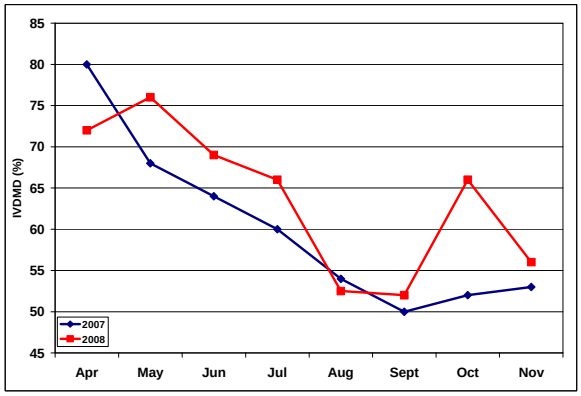
'Lometa' Indiangrass cumulative biomass production



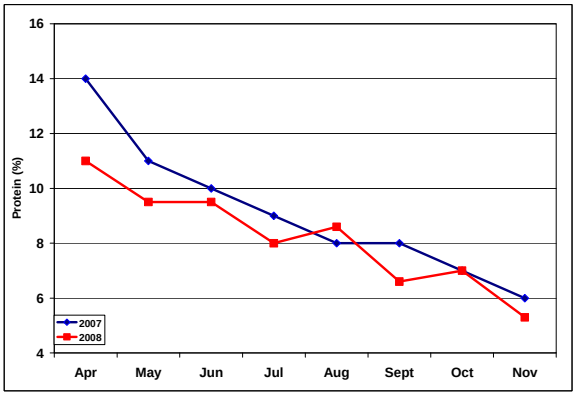
'Earl' big bluestem % Crude Protein



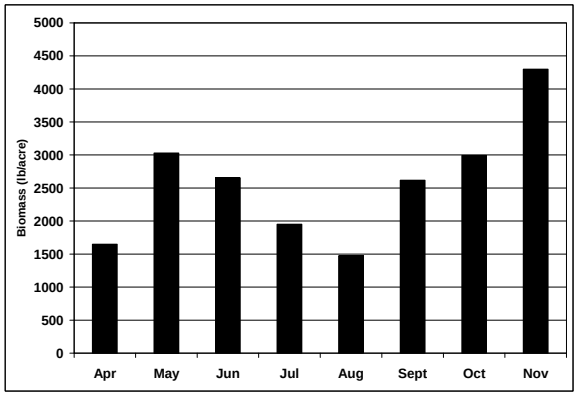
'Haskell' sideoats grama % Crude Protein



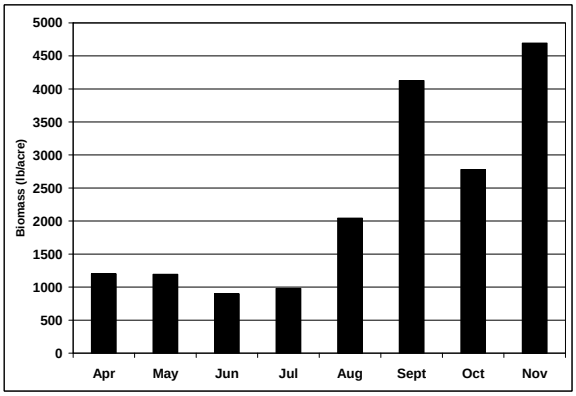
'Earl' big bluestem %IVDMD



'Haskell' sideoats grama %IVDMD



'Earl' big bluestem cumulative biomass production



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