Kansas Agricultural Experiment Station Research Reports

Volume 0
Issue 1 *Cattleman's Day (1993-2014)*

Article 812

1991

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Dale A. Blasi

Dale L. Fjell

James P. Shroyer

See next page for additional authors

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Abstract

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Keywords

Cattlemen's Day, 1991; Kansas Agricultural Experiment Station contribution; no. 91-355-S; Report of progress (Kansas State University. Agricultural Experiment Station and Cooperative Extension Service); 623; Beef; Summer annuals; Forage sorghums; Yield; Forage quality; Nitrate

Authors

Dale A. Blasi, Dale L. Fjell, James P. Shroyer, Gerry L. Kuhl, and William F. Heer

SUMMER ANNUAL FORAGES IN SOUTH CENTRAL KANSAS

W. F. Heer[1], D. A. Blasi[2], D. L. Fjell[3], J. P. Shroyer, and G. L. Kuhl

Summary

Six, summer annual forages and three forage sorghums were evaluated for forage yield and quality under south central Kansas dryland conditions. The sudans and forage sorghums produced similar amounts of dry matter per acre, and yields for these two forage types were significantly higher than for the pearl millet cultivars tested. Conversely, the pearl millets provided higher quality forage in terms of crude protein and acid detergent fiber levels. Droughty conditions severely limited forage yields. However, forage nitrate and prussic acid levels were all relatively low, indicating the utility of raising the cutter bar to avoid harvesting the lower stalks that can contain high nitrate concentrations.

(Key Words: Summer Annuals, Forage Sorghums, Yield, Forage Quality, Nitrate.)

Introduction

Summer annual forages offer Kansas livestock producers flexibility either as substitutes for perennial warm-season grasses in complementary forage grazing systems or as hedges for harvested forage during periods of low rainfall. Because summer annual types and cultivars have various growth characteristics, it is important that proper summer annual selection be based on intended use (grazing, haying, or silage purposes). This study compared the yield and nutritional quality of six summer annuals and three forage sorghums.

Experimental Procedures

Field plots were established on the South Central Kansas Experiment Field near Hutchinson during the summer of 1990. The plot area received a broadcast application of 75 pounds of nitrogen per acre as 46-0-0, which was incorporated to a depth of 2 to 4 inches with a field cultivator. Four replications of 5 by 30 ft plots were marked off and planted on June 12. A modified KEM plot drill with a belt cone metering device was used to seed the forages in randomly assigned plots at a rate of 15 pounds seed per acre in 8-inch rows.

Agronomic data collected for each plot included stage of maturity and plant height at harvest on August 8, 1990. The plots were harvested at a height of 5 to 7 inches with a Carter forage harvester. Forage from each variety plot was weighed, and two random subsamples were collected. One subsample was placed in a drying oven for determination of dry matter content and the other was sent to Peterson Laboratories in Hutchinson, Kansas for nutritional analysis.

Results and Discussion

The yield and forage quality results for the summer annuals are shown in Table 1. All cultivars were in the vegetative stage of growth at harvest, except for common sudan and Haygrazer which were at heading and later-boot stages, respectively. Forage yield and quality were severely affected by the abnormal weather conditions experienced during the 1990 growing

[1]Agronomist-in-Charge, South Central Kansas Experiment Field.
[2]Extension Livestock Specialist, South Central Kansas.
[3]KSU Extension Crop Specialist.

season. June and early July had temperatures above normal (solid curves in Figure 1) for both highs and lows. The forages were then subjected to temperatures considerably lower than normal from mid-July through August. These temperature extremes occurred during a period of drought (long horizontal section of lower rough line in Figure 1).

The forage sorghums produced the largest amount of dry matter followed by the common sudan and Haygrazer, a sudan hybrid. The presence of a high proportion of stems makes these types of forages fit better in silage or greenchop harvesting systems. However, when planted in close rows (8-inch centers), ratio of stem to leaf decreases, and these cultivars lend themselves to grazing or hay production.

The pearl millet cultivars contained higher levels of crude protein ($P < 0.05$) than either the sudans or forage sorghums. Stage of maturity was certainly a factor, but previous Kansas work indicates that pearl millet tends to be a higher quality forage, presumably because of a higher leaf to stem ratio. This characteristic makes the pearl millets a logical choice for grazing and haying, providing they are cut at the proper stage of growth.

Despite the hot, dry environmental conditions discussed above, high nitrate and prussic acid accumulations were not observed in the samples analyzed. This may be partially attributed to the harvesting strategy employed of cutting the summer annuals at a height of 5 to 7 in. that left the potentially nitrate laden, lower portion of the plant stalks on the field.

The variation in yield and forage quality of the summer annuals examined in this study further emphasizes the importance of selecting the proper summer annual to plant based on intended use.

Table 1. Summer Annual Forage Yield and Nutritional Quality

Cultivar[1]	Plant Height Inches	Dry Matter %	DM Yield Ton/A	Crude Protein %	Nitrate (NO_3) PPM	Prussic Acid PPM	ADF[3] %
Horsepower PM	25.8	30.6	1.0	13.1	3025	90	30.3
Tifleaf PM	17.8	30.6	0.8	15.4	3050	109	28.8
GM 404 PM	26.8	29.0	0.9	13.0	3500	129	29.9
German Millet FM	19.0	32.8	1.4	11.1	2105	94	30.5
Common Sudan	50.3	39.3	2.1	6.8	1370	86	37.4
Haygrazer	51.3	29.8	2.0	9.0	1920	55	31.3
Silomaker FS	37.5	28.9	1.9	7.9	2460	82	31.7
Milk-A-Lot FS	32.5	36.7	1.8	9.2	1730	158	31.5
FS 555 FS	34.3	33.0	1.9	9.2	1960	159	31.5
Average	32.8	32.3	1.4	10.5	2347	106	31.4
L.S.D.[3]	3.9	NS	0.3	1.2	860	NS	1.6

[1]PM = Pearl millet; FM = Foxtail millet; Haygrazer = Sudan hybrid; and FS = Forage sorghum.
[2]ADF = Acid Detergent Fiber.
[3]Least significant difference ($P < .05$); NS = not significant.

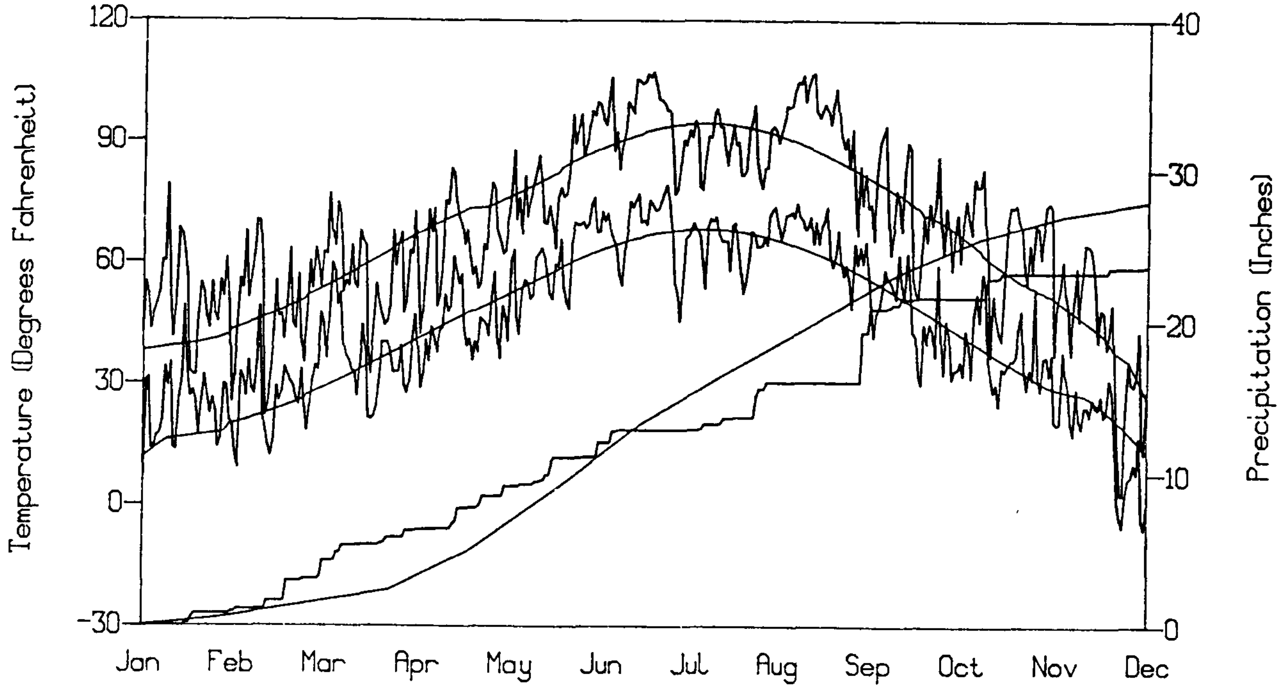

Figure 1. Graphical Weather Data Summary for Hutchinson, KS, 1990. K.S.U. Weather Data Library