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Comparative nutritional composition of selected grain sorghum varieties

Abstract

For the 188 grain sorghum varieties studied, in vitro digestibilities were statistically similar, but there was a significant difference between the 12 production locations. Crude protein, calcium, and phosphorus levels indicated slight varietal differences; however, strong locational effects were evident.

Keywords

Cattlemen's Day, 1986; Kansas Agricultural Experiment Station contribution; no. 86-320-S; Report of progress (Kansas State University. Agricultural Experiment Station and Cooperative Extension Service); 494; Beef; Grain sorghum; Digestibilities

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Comparative Nutritional Composition
Of Selected Grain Sorghum Varieties

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Gerry Posler,¹ and Andy Lenssen¹

Summary

For the 188 grain sorghum varieties studied, in vitro digestibilities were statistically similar, but there was a significant difference between the 12 production locations. Crude protein, calcium, and phosphorus levels indicated slight varietal differences; however, strong locational effects were evident.

Introduction

Grain sorghums appear to vary widely in their nutritional characteristics. The differences may be due to such factors as variety, rainfall, and cultural practices. This study was designed to identify the sources of variation in sorghum grain and to find ways to predict sorghum's nutritional characteristics.

Experimental Procedures

First stage (48 hr) IVDMD was used to estimate digestibility of 188 varieties of grain sorghum grown in Department of Agronomy test plots at 12 locations across Kansas. Fourteen varieties were selected from each of the 10 locations. Selected varieties were analyzed for crude protein, calcium, and phosphorus. Data were analysed by variety and location.

Results and Discussion

Digestibilities were not statistically different among the 14 varieties. However, there were several significant differences because of locations. The data are for the 1984 crop only, so location differences may actually reflect variation in growing conditions. Several locations were wet during the spring, but dry in July and August. An early frost (about September 30) occurred at many locations.

Crude protein values ranged from 9.05 to 10.01% among varieties and from 6.7 to 11.3% among locations (dry matter basis). Calcium ranged from 296 to 360 ppm for the 14 varieties and from 281 to 412 ppm across the 10 locations. Phosphorus varied from 3277 to 4198 ppm among the varieties and from 2699 to 4240 ppm among locations. Yields ranged from 79.6 to 91.9 bushels per acre among varieties and from 34.0 to 156.1 bushels per acre among locations. Data for varieties are shown in Table 3.1, and for locations in Table 3.2.

¹Department of Agronomy.

Table 3.1. Average Nutritional Composition of 14 Grain Sorghum Varieties from 10 Locations¹

Variety	Crude Protein (%)	Calcium (PPM)	Phos. (PPM)	IVDMD ² (%)	Yield/Acre Bu.
Cargill-70	9.10	336	3480	74.3	83.3
DeKalb 42Y	9.05	340	4198	75.2	79.6
FB 301	9.46	324	3823	75.3	83.5
Funk's G550	10.01	296	3400	75.3	90.7
Jacques 408	9.72	354	3575	74.8	75.0
Oro GXTRA	9.21	343	3255	74.0	84.5
KSU RS610	9.54	296	3643	75.5	NA
Triumph 270D	9.68	323	3590	75.5	91.9
Triumph 264yG	10.37	360	3621	74.3	84.2
WAC D701G	9.36	305	3362	74.0	88.8
WAC 686	9.13	304	3341	74.6	89.7
Wheatland X TX2536	9.55	323	3426	75.2	82.7
TX3042 X TX2737	9.23	330	3277	75.9	84.2
TX2752 X TX430	9.30	325	3353	74.1	89.8

¹Values are least squares means.²In vitro dry matter digestibility.Table 3.2. Average Nutritional Composition of Sorghum Varieties at 10 Locations¹

Location (county)	Crude Protein (%)	Ca (PPM)	Phos (PPM)	IVDMD ² (%)	Yield/Acre Bu.	Rainfall (Inches)					
						Apr	May	June	July	Aug	Sept
Brown	10.6	330	3205	74.8	94.4	7.18	2.58	15.97	1.69	1.97	1.66
Franklin	8.6	326	4240	74.2	107.5	5.72	5.23	11.39	3.20	0.5	1.29
Republic	10.3	276	3500	70.0	84.4	7.55	4.28	7.25	0.60	2.92	0.93
Stafford	10.7	351	3600	76.9	46.2	4.18	1.61	2.74	0.21	1.34	0.85
Ellis	11.3	303	3639	75.6	64.9	5.29	1.37	4.43	1.16	2.18	0.94
Greeley (Irr)	8.0	412	2908	74.9	82.5	—	—	—	—	—	—
Finney (Fal)	6.7	330	2689	76.7	34.0	4.11	1.44	0.93	2.43	0.30	0.37
Finney (Irr)	9.6	315	4058	72.6	103.1	—	—	—	—	—	—
Thomas (Fal)	9.9	333	3427	76.7	79.3	3.46	2.85	2.37	0.63	2.88	0.39
Thomas (Irr)	8.5	281	3978	75.8	156.1	—	—	—	—	—	—

¹Values are least squares means of 14 varieties²In vitro dry matter digestibility