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Two-Year Summary
Four Hybrid Sorghum Grains Fed in All-Concentrate
Rations to Steers

R.L. McCollough and R.R. Schalles

This station has grown and fed the same four (yellow endosperm) hybrid sorghum grains (Funk G-766W, Acco R-109, DeKalb E-57, and Northrup King 222) in an all-concentrate ration to steers two consecutive years. Results are summarized here.

Material and Methods

During the springs of 1969 and 1970, the hybrid indicated above were planted on the same irrigated bottom land near Manhattan, using similar production practices, fertilization, and harvesting.

Both years, the sorghum grain was dry rolled and incorporated into all-concentrate rations, formulated to meet minimum NRC requirements. The last 56 days of the 1970-1971 trial, 1 pound of 44% soybean meal was added per head per day. Both feeding trials lasted 126 days and used 15 steers per treatment. Ten were group fed in two pens of five in nonsheltered concrete lots, and five were individually fed in sheltered concrete lots open to the south.

Results and Discussion

Table 22 shows the proximate analyses of the same four (yellow endosperm) hybrid sorghum grains produced in different years. Differences by years were not significant.

Table 23 shows feedlot performance. Year had no significant effect on average daily gain or feed efficiency. Steers ate less ($P < .05$) in 1970-1971 (16.38 lbs./head/day) than in 1969-1970 (17.50 lbs./head/day), probably because of starting weights (728 vs. 761 lbs.). When data were pooled by year or hybrid, differences in gain, feed efficiency, or consumption between hybrids were not significant.

Table 24 shows the feedlot performance of the hybrids in sheltered (five head) and nonsheltered (10 head) concrete lots. Shelter did not significantly affect gain, but steers in sheltered lots ate less ($P < .001$) feed per day and had better ($P < .001$) feed efficiency (14.08%).

Table 25 compares two methods of determining digestibility. In 1969-1970, digestibility was determined by total collections in metabolism stalls (four steers, latin square design). In 1970-1971, five steers per treatment were fed chromic oxide indicator in individual concrete pens. Feed consumption was less ($P < .001$) (5.14 lbs. per day) for steers in metabolism crates than for steers fed in individual pens. Digestibility of crude protein, crude fiber, ether extract, dry matter, and gross energy were significantly higher for steers in metabolism stalls than for those in individual pens. Research at Kentucky has shown no significant difference between these methods except for dry matter digestion when consumption was equal. Digestibility of hybrids did not differ significantly among hybrids so differences in digestibility by steers likely represent intake differences.

Although digestibilities estimated by chromic oxide method were lower, they probably were closer to the feedlot digestibilities because confining animals to metabolism crates likely reduces their feed consumption. Many early digestion studies used total collection in crates or stalls.

Summary

Four hybrid (yellow endosperm) sorghum grains (Funk G-766W, Acco R-109, DeKalb E-57, and Northrup King 222) were used two consecutive years, 1969 and 1970. They were dry rolled and fed 126 days in all-concentrate rations to steers during the winters of 1969-1970 and 1970-1971. There were no significant differences, between years, or among hybrids for gain or feed efficiency. Feed intake was significantly greater in 1969-1970, probably because starting weight was heavier. Steers individually fed in sheltered lots had equal gain, but better ($P < .001$) feed efficiency and lower ($P < .001$) feed consumption than steers fed the same rations in nonsheltered lots.

Digestibilities of the hybrid sorghum grains were determined each year. Digestibilities of crude protein, crude fiber, ether extract, dry matter, and gross energy were significantly lower measured by the chromic oxide method. That method may estimate digestibilities for full feed conditions better than metabolism-stall method, which limits intake. Feed intake was higher ($P < .001$) for steers in individual pens than in metabolism stalls (15.56 vs. 10.42 lbs. per day).

Table 22. Proximate Analyses of 4 Hybrid Sorghum Grains, 2 Years^a, Dry Matter Basis

Hybrid	Year	%				Nitrogen free extract	Gross energy Kcal/gm.
		Crude protein	ASH	Ether extract	Crude fiber		
Funk's G-766W	1969	10.65	1.54	3.20	2.03	82.77	4.572
	1970	10.75	1.94	3.15	1.76	82.4	4.635
Acco R-109	1969	10.49	1.69	3.18	2.12	82.52	4.520
	1970	11.05	1.75	2.85	1.64	82.70	4.635
DeKalb E-57	1969	10.17	1.58	2.92	1.87	83.43	4.552
	1970	10.71	1.80	2.32	1.70	83.47	4.608
Northrup King 222	1969	11.83	1.58	3.20	1.87	81.52	4.585
	1970	12.40	1.70	2.34	1.51	82.05	4.668

No significant differences due to hybrid or year.

^a Produced under similar conditions on same irrigated bottom land both years.

Table 23. Feedlot performance of steers on the same 4 hybrid sorghum grains fed in all-concentrate rations, Winters 1969-70 and 1970-71, Dry matter basis.

Hybrid	year	no. head	ADG	feed/day	Feed efficiency
G-766W	69-70	15	2.17	18.07	8.49
	70-71	15	2.05	16.28	8.07
	Pooled means		2.11	17.17	8.28
R-109	69-70	14	2.33	17.02	7.37
	70-71	15	2.00	17.03	8.53
	Pooled means		2.17	17.05	7.97
E-57	69-70	15	2.30	18.04	8.10
	70-71	15	2.06	15.78	7.68
	Pooled means		2.19	16.93	7.87
NK-222	69-70	15	2.19	17.07	7.81
	70-71	15	1.97	16.19	8.32
	Pooled means		2.08	16.22	8.08
Pooled means		69-70	2.22	17.50 ^a	7.95
4 hybrids		70-71	2.05	16.38 ^b	8.15

^{a,b}Means with different superscripts differ significantly $P < .05$.

Table 24. Feedlot performance of sheltered and nonsheltered steers fed one of four hybrids in all-concentrate rations, Dry matter basis, (Pooled for two years.)

Hybrid	ADG		Feed/day		Feed efficiency	
	S	N-S ^a	S	N-S	S	N-S
G-766W	2.11	2.11	15.29	19.04	7.45	9.13
R-109	2.19	2.15	16.21	17.88	7.67	8.28
E-57	2.30	2.08	16.31	17.55	7.32	8.42
NK-222	2.26	1.91	16.04	17.02	7.33	8.83
Pooled means						
4 hybrids	2.21	2.06	15.96 ^b	17.92 ^c	7.44 ^b	8.66 ^c

^aSheltered lots, 5 head; N-S nonsheltered lots, 10 head.

^{b,c}Means with different superscripts differ significantly ($P < .001$).

Table 25. Digestibilities of four hybrid sorghum grains.

	Year 1969-1970, total collection, metabolism stalls				Year 1970-1971, chromic oxide, sheltered pens			
	Hybrid				Hybrid			
	G-766W	R-109	E-57	NK-222	G-766W	R-109	E-57	NK-222
Feed/day, lbs. Pooled	10.28	10.22	10.49 ^a 10.42 ^a	10.70	15.79	15.85	14.96 ^b 15.56 ^b	15.62
Apparent COD								
Crude protein Pooled	67.76	66.07	65.45 ^a 65.91 ^a	64.36	51.02	51.39	49.40 ^b 51.77 ^b	55.30
Crude fiber Pooled	46.90	45.35	44.76 ^a 44.57 ^a	41.27	17.98	32.14	28.18 ^b 28.04 ^b	33.86
Ether extract Pooled	65.20	65.66	67.51 ^a 65.67 ^a	64.31	28.63	45.08	37.83 ^b 32.64 ^b	19.00
Nitrogen free extract Pooled	81.56	79.78	80.61 81.11	82.47	80.00	71.34	76.61 76.88	79.59
Dry matter Pooled	79.80	76.69	77.35 ^a 78.12 ^a	78.65	71.18	66.38	70.13 ^b 70.02 ^b	72.40
TDN Pooled	78.68	76.92	77.52 ^a 77.94 ^a	78.65	70.69	69.04	69.68 ^b 69.40 ^b	71.18
Gross energy Pooled	75.53	74.61	75.42 ^a 75.45 ^a	76.24	68.27	60.47	68.51 ^b 66.91 ^b	69.91

a,b Means with different superscripts differ significantly ($P < .025$).