

Kansas Agricultural Experiment Station Research Reports

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

Article 1377

1972

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Recommended Citation

McCollough, R.L.; Riley, Jack G.; Drake, C.L.; and Roth, G.M. (1972) "Feedlot performance of nine hybrid sorghum grains fed to steers winter, 1971-1972," *Kansas Agricultural Experiment Station Research Reports*: Vol. 0: Iss. 1. <https://doi.org/10.4148/2378-5977.2780>

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Feedlot performance of nine hybrid sorghum grains fed to steers winter, 1971-1972

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Feedlot Performance of Nine Hybrid Sorghum Grains Fed to Steers Winter, 1971-1972

R. L. McCollough, J. G. Riley, C. L. Drake,
and G. M. Roth

Introduction

Previous trials here indicated a possible difference in nutritional values of different hybrid sorghum grains with yellow endosperm hybrids being superior to white endosperm. We compared feedlot performance of yellow endosperm, white endosperm, all waxy (amylopectin type starch), and part waxy hybrid sorghum grains.

Material and Methods

In the spring of 1971, nine hybrid sorghum grains were planted under similar conditions on the same irrigated bottom land used the past two years to produce grain for similar trials. Fertilization, planting, and harvesting were similar for each hybrid. About 1000 bushels of each hybrid were harvested and stored separately until fed.

Table 26 describes the hybrids planted, NC⁺ RS-671 (RS-671) was used as the control.

Feedlot performance from the nine hybrid sorghum grains was tested with 135 head of Angus, Hereford, and Angus X Hereford steers averaging 666 pounds. Fifteen head were allotted randomly by weight to each treatment. Ten were group fed in two groups of five in nonsheltered, concrete lots, and five were individually fed in sheltered, concrete lots open to the south. Automatic waterers were available in each pen. Each steer was implanted with 24 mg of DES at the start of the trial and fed for 126 days.

The grain was dry rolled, and dehydrated alfalfa pellets were 10% of the ration. The ration in table 27 was formulated to meet minimum NRC requirements. Steers were started on a ration of 60% dehydrated alfalfa pellets and 40% grain and went to a 90% grain finishing ration in 3 weeks.

Means are reported as arithmetic means.

Results and Discussion

Hybrids with 2/3 or all waxy endosperm tended to yield less (table 28) than other hybrids, but 1/4 waxy hybrids compared well with others.

Proximate analyses and gross energy of the nine hybrids were essentially the same (table 29). Table 30 shows the proximate analyses of the complete rations.

Feedlot performance from the nine hybrids is shown in table 31 ranked according to feed efficiency. All waxy sorghum gave highest gains (2.52 pounds/day); NK-275 and RS-671, lowest gains (2.23 pounds/day and 2.25 pounds/day, respectively). Intake of 2/3 waxy (20.05 pounds/day) was greatest; and lowest for NK-275 (1/4 waxy) at 17.69 pounds/day.

Feed efficiency of yellow endosperm hybrids tended to exceed that of white endosperm hybrids. The average feed efficiency of the four yellow endosperms (G-766W, R-109, G-522 and NK-X4087) was 7.48 compared with 8.34 for RS-671, a white endosperm (table 32) a 10.31% advantage for yellow endosperms. NK-X4087 is an experimental hybrid, not commercially available. Average feed efficiency of the three commercial yellow endosperm hybrids was 7.29; 14% better than RS-671.

The all waxy, white endosperm feed efficiency was 7.27 compared with 7.24 for G-766W, 7.34 for R-109, and 7.29 for G-522 (all yellow endosperm hybrids), and 8.03 for the experimental yellow endosperm, NK-X4087. Average feed efficiency of the three white, part-waxy endosperm hybrids, NK-275 (1/4 waxy), NK-280 (1/4 waxy) and Funk's 3135 (2/3 waxy), was 7.98, 6.68% below the average of the four yellow endosperms but 4.32% better than the white endosperm RS-671. Our 1971-72 data agrees with 1970-71 data which shows the yellow endosperm hybrids had feed efficiencies of 10.39 and 9.75% better than the white endosperm.

Summary

The all waxy endosperm hybrid (Corpustar CP-622) and 2/3 waxy (Funk's 3135) yielded less than other hybrids. These and seven other hybrids were dry rolled and fed separately in 90% concentrate rations (10% dehydrated alfalfa pellets) to 15 steers (average weight, 666 pounds) for 126 days. Gain was highest (2.52 pounds/day for all waxy (Corpustar CP-622) and lowest for NC⁺ RS-671 and Northrup King 275, (1/4 waxy) both white endosperm hybrids. Feed efficiency of the four yellow endosperm hybrids (Fund G-766W, Acco R-109, Funk G-522, Northrup King X-4087) was 10.3% better than the white endosperm hybrid control (NC⁺ RS-671).

Table 26. Description of nine hybrid sorghum grains, fed winter, 1971-1972.

Hybrid	Abbrev. in text	Pericarp color	Endosperm description
Funk G-766W ^a	G-766W	White	Yellow
Acco R-109 ^a	R-109	Red bronze	Yellow
Northrup King 275	NK-275	Red	White 1/4 waxy ^b
Northrup King 280	NK-280	Red	White 1/4 waxy ^b
Nc ⁺ RS-671 ^a	RS-671	Red	White
Corpustar CP-622	All waxy	White	White all waxy ^b
Funk G-522	G-522	Red bronze	Yellow
Northrup King X4087	NK-X4087	White	Yellow
Funk 3135 ^a	2/3 waxy	Red	White 2/3 waxy ^b

^aUsed in previous trials.

^bWaxy refers to amylopectic type of starch (α1-4, α1-6 linkage).

Table 27. Ration composition, 1971-1972 feeding trial.

Ingredients	% ration as fed
Sorghum grain	87.55
Dehydrated alfalfa pellets	10.00
Dicalcium phosphate	.33
Ground limestone	.18
Chlortetracycline (80 mg/head/day)	.04
Trace mineral premix ^a	.05
Salt	1.00
Urea	.85
Vitamin A premix (1000 IU/head/day)	.01

^a10% iron, 1% copper, 0.1% cobalt, 0.3% iodine, 5% zinc, 10% magnesium, 14% calcium.

Table 28. Yield per acre of nine hybrids irrigated, summer, 1971.

Hybrid	Endosperm	Bushels/acre as harvested	% H ₂ O	Lbs. of dry matter/acre
G-766W	Y ^a	114.69	14.58	5486
R-109	Y	133.37	15.25	6330
NK-275	W ^b 1/4 ^c	115.32	14.70	5509
NK-280	W 1/4	114.05	14.17	5482
RS-671	W	126.64	16.01	5056
All waxy	WA ^d	90.02	15.61	4254
G-522	Y	120.22	15.47	5691
NK-X4087	Y	117.98	15.31	5595
2/3 waxy	W 2/3	99.29	14.19	4771

^aYellow endosperm.

^bWhite endosperm.

^c1/4, 2/3 waxy genotype from parents.

^dAll waxy.

Table 29. Proximate analyses of nine hybrid sorghum grains, dry matter basis, summer, 1971.

Hybrid	Endosperm	% Crude				Ash	Gross energy Kcal/gm
		protein	Ether extract	Crude fiber	Nitrogen free extract		
G-766W	Y ^a	10.35	3.31	2.19	82.51	1.64	4.459
R-109	Y	10.30	3.04	2.10	82.00	1.56	4.513
NK-275	W ^b 1/4 ^c	10.84	3.15	2.12	82.28	1.61	4.349
NK-280	W 1/4	9.91	3.11	1.99	83.36	1.63	4.484
RS-671	W	11.24	2.99	1.92	82.22	1.63	4.446
All waxy	WA ^d	11.19	2.97	1.91	82.31	1.62	4.425
G-522	Y	10.67	3.20	1.78	82.76	1.59	4.482
NK-X4087	Y	10.34	3.03	2.23	82.74	1.66	4.424
2/3 waxy	W 2/3	10.90	3.17	2.14	81.93	1.86	4.508

^aYellow endosperm.

^bWhite endosperm.

^c1/4, 2/3 waxy genotype from
parents.

^dAll waxy.

Table 30. Proximate analyses of the complete rations, dry matter basis, winter, 1971-1972.

Hybrid	Endosperm	%			Nitrogen free extract	Ash	Gross energy Kcal/gm
		Crude protein	Ether extract	Crude fiber			
G-766W	Y ^a	13.73	3.17	3.96	74.68	4.46	4.312
R-109	Y	13.78	2.82	3.71	74.52	5.17	4.284
NK-275	W ^b 1/4 ^c	15.87	3.78	4.19	70.98	5.18	4.316
NK-280	W 1/4	14.24	3.29	3.69	74.58	4.20	4.376
RS-671	W	14.76	3.03	3.90	73.98	4.33	4.250
All waxy	WA ^d	15.57	3.42	3.80	72.83	4.38	4.368
G-522	Y	14.17	2.70	4.05	74.33	4.75	4.368
NK-X4087	Y	13.15	3.02	3.86	76.53	3.44	4.417
2/3 waxy	W 2/3	15.20	2.57	4.28	73.84	4.11	4.388

^aYellow endosperm.

^bWhite endosperm.

1/4, 2/3 waxy genotype from
parents.

^dAll waxy.

Table 31. Feedlot performance from nine hybrid sorghum grains.^a

Hybrid	Endosperm	ADG, lbs.	Dry matter /day	Feed efficiency
G-766W	Y ^b	2.47	17.92	7.24
All waxy	W ^c A ^d	2.52	18.29	7.27
G-522	Y	2.46	17.90	7.29
R-109	Y	2.45	18.02	7.34
NK-280	W 1/4 ^e	2.35	18.55	7.90
NK-275	W 1/4	2.23	17.69	7.95
NK-X4087	Y	2.36	18.92	8.03
2/3 waxy	W 2/3	2.48	20.05	8.08
RS-671	W	2.24	18.67	8.34

^a Ranked according to feed efficiency.

^b Yellow endosperm.

^c White endosperm.

^d All waxy endosperm.

^e 1/4, 2/3 part waxy genotype from parents.

Table 32. Comparison of feed efficiencies of nine hybrid sorghum grains fed winter, 1971-1972. Fifteen head per hybrid.

Hybrid	Endo- sperm	Feed efficiency	% Value of ^a			
			4 yellow endosperm	White endosperm	3 part waxy endosperm	All waxy endosperm
G-766W	Y ^b	7.24	96.79	86.81	90.73	99.59
R-109	Y	7.34	98.13	88.00	91.98	100.96
NK-275	W ^c 1/4 ^d	7.95	106.28	95.32	99.62	109.35
NK-280	W 1/4	7.90	105.61	94.72	99.00	108.67
RS-671	W	8.34	111.50	--	104.51	114.72
All waxy	WA ^e	7.27	97.19	87.41	91.35	100.26
G-522	Y	7.29	97.45	87.41	91.35	100.26
NK-X4087	Y	8.03	107.35	96.28	100.63	110.45
2/3 waxy	W 2/3	8.08	108.02	96.88	101.25	111.14
4 yellow endosperm avg.		7.48	--	89.69	93.73	102.89
3 part waxy endosperm avg.		7.98	106.68	95.68	--	109.77

^aValues above 100 indicate poorer feed efficiency; those values below 100 indicate superior feed efficiency. The amount above or below is the percentage increase or decrease.

^bYellow endosperm

^cWhite endosperm

^d1/4, 2/3 part waxy genotype from parents.

^eall waxy endosperm