Table 46

Correlations Between Carcass Characteristics.

	Fat thickness	Dressing %	Cannon circum.	Marbling score
Loin eye area	−.21**(−.44**)	.08(−.05)	.22**(.11)	.03(.00)
Fat thickness ..		.44**(.31**)	−.03(−.27**)	.17*(.14)
Dressing %			−.34**(−.57**)	.02(−.02)

* Significant at the .05 level.
** Significant at the .01 level.
( ) = partial correlation coefficients.

Fundamental Studies of Sorghum Roughages and Grains. I. A Study of the Value of Pelleting Sorghum Grain. II. A Study of the Value of Levels of Hormone and Synthetic Hormonelike Substances (Project 222).

D. Richardson, E. F. Smith, B. A. Koch and R. F. Cox

Previous work has shown that rate of gain and carcass quality are essentially the same with sorghum grain and corn when self-fed in a beef fattening ration (Kansas Agricultural Experiment Station Circulars 308, 320, and 335). However, the animals eat more sorghum grain than corn per pound of gain. Because of its relatively small size, uniform preparation of the sorghum grain is more difficult than for the larger corn grain.

This is a preliminary test to evaluate grinding sorghum grain to a meal and then making it into a pellet. Source and level of hormones and synthetic hormonelike substances used as implants are also being studied.

Experimental Procedure

Thirty-six of the heaviest Hereford steer calves purchased for experimental work were assigned to this test. Since lot space was not available, they were fed together in a group until the test started. They were divided on the basis of weight and conformation into three lots of 12 animals each, January 15, 1957. At that time they were consuming 5 pounds of grain per day and their average weight was about 540 pounds.

The daily ration for all animals consisted of grain, 1 pound soybean oil meal, 2 pounds alfalfa hay, and all of the sorghum silage they would clean up. Equal quantities of grain were fed as follows: Lot 1, rolled corn; lot 2, finely ground pelleted sorghum grain; and lot 3, rolled sorghum grain. It should be observed that silage was the only ingredient not kept on an equal weight basis between lots. The calves were hand-fed in the morning and afternoon.

The animals in each lot were assigned to four groups of three animals each on the basis of weight. One group served as the control, one group had 24 mgs. of stilbestrol implanted under the skin of the ear, and another group received 36 mgs. The fourth group received the Synovex implant (1000 mgs. progesterone and 20 mgs. estradiol benzoate). This gave three animals in each lot per treatment or a total of nine on each treatment. The calves were implanted 28 days after starting the test. They had been on a full feed of grain (10 pounds daily) for several days at that time.

Results and Observations

The results of this test are shown in Tables 47 and 48. The calves receiving corn were the first to reach a full feed of grain followed by those receiving pelleted sorghum. Lot 3 calves (rolled sorghum grain) would have consumed more grain than the others; however, grain consumption was kept the same in all lots. Lot 3 calves consumed more silage. After about 60 days on test, the calves on pelleted sorghum grain seemed reluctant to eat for a few days. No apparent reason for this was observed and normal feed consumption was resumed.

Rate of gain, feed efficiency and carcass grade were best for rolled corn followed by pelleted sorghum grain and then rolled sorghum grain. Based upon prevailing feed costs, pelleted sorghum produced gains for the lowest feed cost. The animals fed pelleted sorghum produced larger rib eyes. The reason for this is not apparent. Even though this test indicates beneficial effects from fine grinding and pelleting of sorghum grain, further work must be done to confirm or reject these apparent beneficial results.

Animals receiving implants of hormone or hormonelike substances gained faster than non-implanted animals. The highest rate of gain was produced by animals implanted with 24 mgs. of stilbestrol. Stilbestrol tended to lower the carcass grade, whereas Synovex apparently did not. Size of rib eye tended to increase as size of animals increased. Thus, the ones having gained faster, in general, had larger rib eyes. Side effects such as high tailhead, weak loin and teat development were more pronounced with the 36-mg. level of stilbestrol implantation. These results indicate that 24 mgs. is the desired level of implantation for steers of this weight when being fattened for market.

Table 47

Comparative Results with Rolled Corn, Pelleted Sorghum Grain and Rolled Sorghum Grain in Beef Steer Calf Fattening Rations.

January 15 to July 12, 1957—178 days.

Lot number	1	2	3
Number calves per lot	12	11[1]	12
Av. initial wt., lbs.	541.3	537.3	538.8
Av. final wt., lbs.	968.3	954.1	933.7
Av. daily gain per calf, lbs.	2.40	2.34	2.22
Av. daily ration, lbs.:			
Sorghum silage[2]	9.0	8.6	10.6
Alfalfa hay	2.4	2.3	2.4
Soybean oil meal	1.0	1.0	1.0
Rolled corn	12.0	....	....
Pelleted sorghum grain	....	12.0	....
Rolled sorghum grain	....	....	12.0
Lbs. feed per cwt. gain:			
Sorghum silage	375.6	369.5	478.9
Alfalfa hay	100.6	99.5	107.8
Soybean oil meal	41.7	42.7	45.1
Rolled corn	501.8	....	....
Pelleted sorghum grain	....	511.3	....
Rolled sorghum grain	....	....	542.5
Av. feed cost per cwt. gain,[3] $	18.65	18.15	19.16
Carcass data:			
Av. hot carcass wt.	591.3	571.1	551.7
Av. hot carcass dressing %[4]	63.3	62.6	60.4
Av. hot dressing % based on final feed lot wts.	61.1	59.9	59.1
Av. carcass grade:[5]			
Before ribbing	12.6	12.3	11.5
After ribbing	12.9	12.2	12.0
Av. finish:			
Fat thickness[6]	3.2	4.0	3.8
Fat distribution[7]	1.6	3.0	2.8

1. One animal removed because of urinary calculi.

2. Sorghum silage discontinued May 8.

3. Feed cost per 100 lbs.: Sorghum silage, $0.50; alfalfa hay, $1.00; soybean oil meal, $3.50; rolled corn, $2.85; pelleted sorghum grain, $2.70; rolled sorghum grain, $2.60.

4. Based on selling weight.

5. Based on top choice 15, av. choice 14, low choice 13, top good 12, av. good 11, and low good 10.

6. Based on very thick 1, thick 2, moderate 3, modest 4, slightly thin 5.

7. Based on very uniform 1, uniform 2, moderately uniform 3, modestly uniform 4, slightly uneven 5.

Table 47 (Continued)

Degree of marbling[8]	8.0	7.6	7.9
Size of rib eye (visual est.)[9]	3.7	3.3	4.1
Size of rib eye (sq. in.)	10.29	10.50	9.91
Degree of firmness[10]	2.2	2.5	3.0

8. Based on modest amount 6, small amount 7, slight amount 8, traces 9, practically devoid 10.

9. Based on very large 1, large 2, moderately large 3, modestly large 4, slightly small 5.

10. Based on very firm 1, firm 2, moderately firm 3, modestly firm 4, slightly firm 5, soft 6.

Table 48

Results of Implanting 24 and 36 Mgs. of Stilbestrol and Synovex Pellets with Beef Steer Calves on Fattening Ration.

February 12 to July 12, 1957—150 days.

Treatment	Control	24 mgs. stilbestrol	36 mgs. stilbestrol	Synovex[1]
Number of calves per treatment	9	9	8	9
Av. initial wt., lbs.	618.9	614.4	611.3	610.0
Av. final wt., lbs.	910.5	995.0	957.5	945.6
Av. daily gain, lbs.	1.94	2.54	2.31	2.22
Carcass data:				
Av. hot carcass wt., lbs.	548.8	592.4	574.7	569.8
Av. hot carcass dressing % based on final feed lot wt.	60.3	59.5	60.0	60.3
Av. carcass grade:[2]				
Before ribbing	12.6	11.8	11.5	12.7
After ribbing	13.1	11.6	11.8	13.0
Av. finish:				
Fat thickness[3]	3.6	3.7	3.9	3.6
Fat distribution[4]	2.0	2.6	2.5	2.8
Degree of marbling[5]	7.0	8.3	7.9	6.9
Size of rib eye (visual est.)[6]	3.8	3.7	3.9	3.4
Size of rib eye (sq. in.)	9.79	10.64	10.26	10.21
Degree of firmness[2]	1.9	3.0	3.1	2.2

1. 1000 mgs. progesterone and 20 mgs. estradiol benzoate.

2. Based on top choice 15, av. choice 14, low choice 13, top good 12, av. good 11, and low good 10.

3. Based on very thick 1, thick 2, moderate 3, modest 4, slightly thin 5.

4. Based on very uniform 1, uniform 2, moderately uniform 3, modestly uniform 4, slightly uneven 5.

5. Based on modest amount 6, small amount 7, slight amount 8, traces 9, practically devoid 10.

6. Based on very large 1, large 2, moderately large 3, modestly large 4, slightly small 5.

Fundamental Studies of Sorghum Roughages and Grains. A Study of the Value of Pelleting Sorghum Grain (Project 222).

D. Richardson, E. F. Smith, B. A. Koch, F. W. Boren and R. F. Cox

A preliminary test indicated that the efficiency of utilization of sorghum grain by beef cattle may be increased by grinding the grain very fine and making it into pellets. Digestion, nitrogen balance, digestible energy and feedlot tests are being conducted. This report is on the wintering phase of the feedlot test.

Experimental Procedure

Forty Hereford steer calves from one herd were divided as equally as possible on the basis of weight and conformation into four lots of 10 animals each. Two additional steers became available about 10 days after the test started and they were added to lot 3. The daily ration consisted of 1 pound soybean oil meal, 5 pounds grain, 2 pounds alfalfa hay, and all the sorghum silage they would clean up. Salt and a mineral mixture of two parts steamed bonemeal and 1 part salt were fed free-choice. Water was supplied by electrically heated automatic water fountains. The grain used was as follows: lot 1, rolled sorghum grain; lot 2, cracked corn; lot 3, finely ground and pelleted sorghum grain; lot 4, finely ground sorghum grain.

Results and Observations

Results of the wintering phase of this test are shown in Table 49. Rate of gain and feed efficiency were exceptionally good in all lots. The lower rate of gain in lot 4 was caused primarily by two animals which became lame and had to be treated. They have apparently recovered. These data do not indicate any real differences between corn and sorghum grain or method of preparation of sorghum grain in the wintering ration of beef steer calves. The fattening phase of this test is now in progress.

Table 49

Comparative Results with Cracked Corn, Rolled Sorghum Grain, Finely Ground Sorghum Grain and Finely Ground Pelleted Sorghum Grain in Beef Steer Calf Wintering Rations.

December 7, 1957, to March 17, 1958—100 days.

Lot number	1	2	3	4
Number calves per lot	10	10	12	10
Av. initial wt., lbs.	431	432	426.3	432
Av. final wt., lbs.	636	628	623.3	620
Av. daily gain per calf, lbs.	2.05	1.96	2.00	1.88
Av. daily ration, lbs.:				
Sorghum silage	19.2	17.6	17.7	17.8
Alfalfa hay	2.0	2.0	2.0	2.0
Soybean oil meal	1.0	1.0	1.0	1.0
Rolled sorghum grain	5.0	....	....	....
Corn	....	5.0	....	....
Pelleted sorghum grain	....	....	5.0	....
Finely ground sorghum grain	....	....	....	5.0
Lbs. feed per cwt. gain:				
Sorghum silage	938	897	870	945
Alfalfa hay	97.6	102	100	106.4
Soybean oil meal	48.8	51.0	50.0	53.2
Rolled sorghum grain	243.9	....	....	....
Corn	....	255.1	....	....
Pelleted sorghum grain	....	....	250	....
Finely ground sorghum grain	....	....	....	266
Feed cost per cwt. gain, $[1]	10.57	11.54	10.76	11.26

1. Based on ingredient prices given on inside of back cover.

Self-Feeding Molasses Mixed with Urea, Phosphoric Acid and Water with or without Ethyl Alcohol to Beef Heifers. I. Feedlot and Carcass Study (Project 536).

D. Richardson, Ed F. Smith, B. A. Koch and R. F. Cox

Phosphoric acid has been found to be an excellent source of phosphorus when used in beef cattle rations. Urea, a non-protein-nitrogen compound, has long been recognized as a satisfactory source of protein equivalent for ruminants. Recently, the idea has been advanced that small amounts of ethyl alcohol would be beneficial in ruminant rations. Because of the labor-saving aspect, the practice of self-feeding liquid supplements seems to appeal to many people. All of the above ingredients can be mixed easily and thoroughly with molasses. This test was conducted to study the value of self-feeding a mixture of molasses, urea, phosphoric acid