

Table 26  
Methods of getting cattle on a high grain ration, May 6 to October 2, 1964—149 days.

Experimental treatment	Self-fed wheat bran crumble <sup>1</sup> rations initially		Self-fed cottonseed hull rations initially		Self-fed rolled sorghum grain ration (R1) for the remainder of the test		Self-fed rolled sorghum grain ration (R1) for the remainder of the test		No. days <sup>2</sup>
	Feed hay	No hay	Feed hay	No hay	Feed hay	No hay	Feed hay	No hay <sup>3</sup>	
Lot no.	18	23	20	19	22	21	22	21	21
No. of heifers per lot	10	10	10	10	10	10	10	10	10
Initial wt. per heifer, lbs.	632	615	600	620	622	618	622	618	618
Performance first 14 days on test, lbs.:									
Daily gain	2.89	2.32	2.32	3.00	2.79	2.53	2.79	2.53	2.53
Concentrate mixture consumed per head daily	17.3	15.8	20.3	20.9	7.5	8.5	7.5	8.5	8.5
Prairie hay consumed per head daily	5.0		4.3		4.2	4.0	4.2	4.0	4.0
(2) Final wt. per heifer	955	973	931	971	939	948	939	948	948
Av. daily gain, entire test	2.16	2.40	2.21	2.36	2.11	2.22	2.11	2.22	2.22
Feed consumption per heifer daily, lbs.:									
Concentrate mixture	17.4	17.9	19.0	17.8	17.1	16.5	17.1	16.5	16.5
Prairie hay	2.4		2.3		2.3	0.71	2.3	0.71	0.71
Total feed	19.8	17.9	21.3	17.8	19.4	17.2	19.4	17.2	17.2
Feed per lb. of gain, lbs.	9.16	7.45	9.59	7.56	8.14	7.74	8.14	7.74	7.74
Feed cost per cwt. gain <sup>2</sup>	\$16.80	\$15.43	\$17.89	\$15.71	\$16.69	\$15.34	\$16.69	\$15.34	\$15.34
Carcass data:									
Carcass grade score <sup>3</sup>	18.7	18.0	19.1	20.0	19.5	19.2	19.5	19.2	19.2
Marbling score <sup>3</sup>	6.3	6.4	6.0	5.6	5.8	5.9	5.8	5.9	5.9
Rib-eye size, sq. in.	10.7	11.1	10.6	10.9	10.4	10.3	10.4	10.3	10.3
Fat thickness, in.	.9	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.1

1. Prairie hay was fed to Lot #1 only the first 31 days on test.

2. Cost per ton of ration delivered: wheat bran, \$43.30; cottonseed hulls, \$44.31; sorghum grain, \$41.19.

3. Carcass grade score: High good, 18; low choice, 19; av. choice, 20.

4. Marbling score: Lower score indicates greater degree of marbling.

in the lots. When the heifers were driven to the scales each 28 days to be weighed, two in Lot 22 that were placed directly on the sorghum grain ration seemed to be slightly sore footed during the latter part of the test. They may have experienced slight founder.

The cottonseed hull lots were changed from their last hull ration (C4, Table 25) to the rolled sorghum grain ration (R1, Table 25) after about 20 days on test, and at about 22-24 days the wheat bran lots were changed to ration R1.

From this test it seems that wheat bran compares favorably with cottonseed hulls for gradually introducing a high grain ration to finishing cattle.

Starting cattle on a high grain ration (92% sorghum grain) remains yet to be completely tested. Ten heifers brought in from pasture in the fall of 1964 were started on such a ration. Two of the ten experienced severe digestive upsets and one nearly died. The ration was somewhat different from the one outlined here but contained about the same percentage of grain.

During the first 19 days on test (Table 26) the heifers on the high grain ration (R1), Lots 21 and 22, had a much lower concentrate intake than the other heifers, about 8 pounds per head daily compared with 16-17 pounds for the wheat bran lots. Cottonseed hull rations seemed to be most palatable of all at around 20 pounds of intake daily. Low intake of Lots 21 and 22 is unexplained. Their ration was available at all times in a self-feeder. Performance over a short period (19 days) is difficult to evaluate due to variation in cattle weights from day to day. All lots seemed to be gaining satisfactorily, however.

For the entire 149-day trial, lots where hay was omitted gained more and required less feed per pound of gain than when hay was fed. Heifers in Lots 18 and 23, wheat bran lots, graded about a third of a grade lower than those on other treatments.

#### Level of Protein for Heifer Calves Wintered on Bluestem Pasture, 1963-65 (Project 253).

C. V. DeGeer, E. F. Smith, D. Richardson, and D. L. Good

The 66 heifers used were good-to-choice Herefords purchased near Fort Davis, Texas, assigned to treatments on a random weight basis.

The heifers were rotated between pastures to minimize any differences due to pastures during the first winter grazing period and the summer grazing period. Dicalcium phosphate was fed to standardize phosphorus intake between groups during the first winter grazing period.

Heifers were fed the experimental rations shown in Table 27 three times weekly. During summer grazing only salt was fed.

The heifers were bred from July 1 to October 1, 1964. From July 1 to August 15, the heifers were penned each night and those in heat artificially bred, using semen from a Hereford bull. From August 15 to October 1, a Hereford bull was with the heifers.

The results are reported in Table 27.

The heifers receiving only sorghum grain gained less than either of the other treatments during the first winter grazing period.

The results indicate there was no advantage to feeding 2 pounds of soybean oil meal compared to feeding 1 pound of sorghum grain and 1 pound of soybean oil meal.

Heifers received only sorghum grain slightly outgained heifers on the other treatments during the summer grazing period.

During the second winter grazing period, heifers receiving only sorghum grain lost weight, an average of 0.46 pound per head daily. As the amount of soybean oil meal increased, performance improved. Heifers receiving 1 pound of soybean oil meal and 1 pound of sorghum grain per head daily gained an average of 0.48 pound per head daily, while those receiving 2 pounds of soybean oil meal gained an average of 0.69 pound per head daily.

Table 27  
Level of protein for heifer calves wintered on bluestem pasture, December 6, 1963, to March 4, 1965—451 days.

Treatment	Sorghum grain			Sorghum grain and soybean oil meal			Soybean oil meal	
	1	3	4	2	4	5	5	5
No. of heifers	11	11	11	11	11	11	11	11
Initial wt. per heifer, lbs.	433	424	436	427	426	426	426	438
Winter grazing period—December 6, 1963, to May 1, 1964—146 days.								
Daily gain per heifer, lbs.	0	.12	.45	.47	.49	.49	.49	.40
Daily ration per heifer, lbs.:								
Ground sorghum grain	2	2	1	1	1	1	1	1
Soybean oil meal	...	...	...	1	1	1	2	2
Dicalcium phosphate	.1	.1	.075	.075	.075	.075	.075	.05
Vitamin A, IU	15,000							
Bluestem pasture	Free choice							
Salt	Free choice							
Summer grazing—May 1, 1964, to December 3, 1964—214 days.								
Initial wt. per heifer, lbs.	426	447	502	495	491	491	491	494
Daily gain, lbs.	1.03	1.03	.86	.93	.97	.97	.97	.86
No. of heifers pregnant	8	10	11	11	8	8	8	10
Winter grazing—December 3, 1964, to March 3, 1965—91 days.								
No. of heifers	8	10	11	11	8	8	8	10
Initial wt., lbs.	646	667	687	694	639	639	639	678
Daily gain per heifer, lbs.	-.57	-.35	.45	.40	.66	.66	.66	.71
Daily ration per heifer, lbs.:								
Ground sorghum grain	2	2	1	1	1	1	1	1
Soybean oil meal	...	...	...	1	1	1	1	2
Bluestem pasture	Free choice							
Salt	Free choice							
Summary, December 6, 1963, to March 3, 1965—451 days.								
Final wt. per heifer, lbs.	594	635	728	730	759	759	759	744
Gain per heifer, lbs.	161	211	289	303	333	333	333	306
Daily gain per heifer, lbs.	.36	.47	.64	.67	.74	.74	.74	.68

1. Average weights and gains from this point are based on pregnant heifers only.

Over the entire period, heifers receiving only sorghum grain gained less (an average daily gain of 0.37 pound per head) than either those receiving 1 pound of sorghum grain and 1 pound of soybean oil meal per head daily (an average daily gain of 0.66 pound per head) or those receiving 2 pounds of soybean oil meal per head daily (an average daily gain of 0.71 pound per head).

The results indicate level of protein in the winter ration had no effect on conception rate.

### Improvement of Beef Cattle Through Breeding (Project 286).

W. H. Smith, J. D. Wheat, and H. G. Spies

The purebred Shorthorn cattle breeding program was continued during 1964 according to the plan initiated in 1949. Inbreeding of the two lines has been continued. The Wernacre Premier Line is in its fifth generation and the Mercury line in its fourth generation of inbreeding. The inbreeding program for both lines has been basically to continue successive generations of half-siblings.

The study was initiated to study the inheritance of production traits in beef cattle, to evaluate the effects of inbreeding in cattle and to explore the feasibility of using inbred lines of beef cattle for the breeding improvement of their production traits. No extensive line crossing has been attempted because of the relatively low levels of inbreeding represented in both lines to date, and the limited number of animals in the project during its progress. Inbreeding levels will continue to be increased as a major objective.

Numerous production data have been collected on both lines. Some data have been subjected to preliminary statistical analyses.

Management of the experimental cattle includes weighing each cow and calf immediately following parturition. Summer pasture breeding is practiced and the calves are born during the spring and early summer each year. Creep feeding during the suckling period is not practiced. Calves are weaned, weighed and scored for type at approximately 6 months and the standardized weaning age for weaning weight adjustment is 180 days. All calves are placed on individual feeding trials for record-of-performance tests for 182 days shortly after they are weaned. The final age at the termination of the feeding test is approximately 365 days. Feed consumption and live weight gains are maintained during the feeding period. The calves are weighed and scored for type at the termination of the feeding trials. Individuals possessing higher gains or weight per day of age and type scores have been retained for breeding replacements.

The full-feed ration for the bulls consists of 75% cracked corn and 25% chopped alfalfa hay; that for the heifers, 55% cracked corn and 45% chopped alfalfa hay. No calves have been castrated and fed as steers since 1957.

Production data for the 1963 calves are summarized in Table 28. The 1964 calves had not completed their feeding tests when this was written. Thirty-seven calves of the 1964 calf crop are being fed individually.

To date, no abnormalities attributable to inbreeding have occurred in either inbred line. More calves have been still-born in the Mercury line than the Wernacre Premier.