

Steers fed on concrete and with shelter available gained significantly faster than those fed on dirt and without shelter. The average feed requirement per hundredweight gain was much higher for cattle on dirt and without shelter.

It should be pointed out that weather conditions were relatively mild and precipitation was almost zero during the time that this trial was in progress.

#### Cobalt Bullets or Cobalt-fortified Soybean Oil Meal for Heifers on a Finishing Ration (Project 430).

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

##### Experimental Procedure

Twenty-seven head of Hereford heifers of good to choice quality were used in this trial. They previously had been used to study various winter treatments. Treatments were as follows:

Control lot. Cracked sorghum grain and alfalfa hay fed twice a day; soybean oil meal fed once a day.

Cobalt-bullet lot. Each heifer given a cobalt bullet at beginning of the feeding period; fed the same as the control lot.

Cobalt "fed" lot. Daily allowance of supplemental cobalt carried in soybean oil meal; fed the same as the control lot.

During the first 17 days of the trial, each heifer received 10 pounds of silage per day mixed with the grain to help bring to full feed. Heifers in the cobalt "fed" lot received 0.75 mg. of supplemental cobalt per head per day in their soybean oil meal during the first 90 days. During the last 80 days, the supplemental cobalt was increased to 1.50 mgs. per head per day.

##### Observations

The heifers receiving cobalt bullets did not show significant improvement in average daily gain, feed efficiency, or carcass grade compared with the controls, but feed cost per hundredweight of gain was slightly lower and average carcass grade was slightly higher for the "cobalt" heifers.

Heifers receiving cobalt in their protein supplement each day gained an average of 0.3 pound more per day than controls, and feed cost per hundredweight gain was considerably lower. Average carcass grade was also considerably higher than that of the control group. Statistically, increase in average daily gain over that of the control group was highly significant.

In this particular test, the cobalt in the protein supplement apparently was more effective than that supplied by a cobalt bullet.

Table 2

Cobalt bullets or cobalt-fortified soybean oil meal for heifers on a finishing ration.

May 25, 1960, to November 11, 1960—170 days.

Treatment .....	Control	Cobalt bullet	Cobalt in SBOM <sup>1</sup>
Heifers per lot .....	9	9	8 <sup>2</sup>
Av. initial wt., lbs. ....	637	634	636
Av. final wt., lbs. ....	926	926	976
Av. total gain, lbs. ....	289	292	340
Av. daily gain, lbs. ....	1.70	1.72	2.00
Standard error of mean .....	±0.07	±0.13	±0.05

1. Each pound of soybean oil meal contained 0.75 mg. of cobalt added as CoSO<sub>4</sub> · 7H<sub>2</sub>O for the first 90 days. During the last 80 days each pound of soybean meal contained 1.50 mgs. of cobalt.

2. One heifer died 10-8-60 (pneumonia).

Table 2 (Continued)

Av. daily ration, lbs.:			
Sorghum grain .....	14.42	14.08	15.75
Soybean oil meal .....	1.00	1.00	1.00
Alfalfa hay .....	4.87	4.84	4.97
Salt .....	0.052	0.052	0.044
Salt and bonemeal .....	0.072	0.082	0.068
Av. feed per cwt. gain, lbs.:			
Sorghum grain .....	848.2	818.6	787.5
Soybean oil meal .....	58.8	58.1	50.0
Alfalfa hay .....	286.5	281.4	248.5
Feed cost per cwt. gain <sup>3</sup> .....	\$19.31	\$18.71	\$17.61
Carcass grades, USDA:			
Av. choice .....	1	1	1
Low choice .....		2	2
High good .....	3	2	3
Av. good .....	4	2	2
Low good .....	1	2	
Av. USDA carcass grade <sup>4</sup> .....	11.56	11.78	12.25
Av. marbling score <sup>5</sup> .....	7.11	7.56	6.75

3. Feed prices listed on inside of back cover.

4. Average grade determined as follows: Av. choice, 14; low choice, 13; high good, 12; av. good, 11; low good, 10.

5. Visual marbling score: Modest, 6; small amount, 7; slight amount, 8; moderate amount, 9.

#### Studies on Shipping Fever and Shipping Shrink in Cattle.

F. W. Boren, H. D. Anthony, D. C. Kelley, D. L. Nelson, E. F. Smith, and S. Wearden

This is the second year in which an attempt was made to determine some basic facts related to shipping fever and shipping shrink in weaned stocker calves.

As in the previous years, the calves used in this study were from Jeff Ranch, Fort Davis, Texas. They were gathered early October 21, 1960, weaned from the cows, loaded into trucks, and transported 50 miles to loading pens in Alpine, Texas.

Fifty head of heifer calves were randomly selected from a group of 85 heifers. They were then randomly assigned to two groups as follows: (1) Control calves injected intramuscularly with sterile saline; (2) each calf injected with 2.5 cc of a commercial tranquilizer which contained 50 mgs. of ethylisobutrazine (2-ethyl - 3-dimethyl lamino - 2-propyl) - 10 phenothiazine hydrochloride per cc.

The two groups of calves were weighed, combined, and loaded into one cattle car and shipped to Manhattan, Kansas. On arrival they were separated into two groups, irrespective of treatment, and placed in two lots. Subsequently, seven additional examinations, including temperature, two nasal swabs, blood samples, and body weights, were made for each animal. All calves were observed daily for symptoms of shipping fever.

##### Observations

The transit shrink for four carloads of stocker calves is shown in Table 3. Shrink varied from 5 to 9% for the calves in cars 1, 2, and 3. Car 4 contained the experimental group of calves. The average shrink of these calves was 6%, with the tranquilized calves shrinking 5% and the control calves 7%. All the calves in the shipment, 195 head, received the same transit treatment. The difference in shrink is not significant.

Shipping fever did not occur in any of the calves during the experiment. However, symptoms of respiratory complexes did occur in approximately the same number in both the treated and control groups. These were treated with injections of penicillin and streptomycin, with a high degree of success.

It required about 21 days for the control group of calves to regain their initial pay weight of 428 pounds. The tranquilized group did not regain their pay weight, 443 pounds, during the course of the experiment, which was 27 days.

Red blood count, packed cell volume, and body temperatures of the control group of calves remained higher for the entire experimental period.

**Table 8**  
Transit shrink of stocker calves.

Car No.	No. head	Sex	Transit shrink, %
1	45	Steers	7
2	50	Steers	5
3	50	Mixed	9
4 <sup>1</sup>	50	Heifers	6
	25T <sup>2</sup>	Heifers	5
	25C <sup>3</sup>	Heifers	7

1. Car 4 was the experimental group.

2. Calves injected with tranquilizer.

3. Calves injected with saline solution.

#### Adapting Roughages Varying in Quality and Curing Processes to the Nutrition of Beef Cattle, 1960-61 (Project 370).

#### Comparative Value of Four Varieties of Forage Sorghum Silage for Wintering Weaned Beef Calves. A Progress Report.

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

The production of sorghum silage in Kansas has, during the past 20 years, grown from an insignificant source of farm income to one of major proportions. The total value of sorghums produced for silage and forage is about \$40 million. Each year silage accounts for about two thirds of this total, or about \$26 million. As more acres are retired from production of price-support crops, sorghum acreage is expected to increase still more.

Presently, there are 30 to 50 different forage sorghum varieties from which a farmer must choose. These varieties of forage sorghum have similar to widely different agronomic characteristics.

It is the object of this test to obtain data to help farmers select the sorghum varieties best suited to their livestock enterprises.

Four varieties of forage sorghum, widely different in agronomic characteristics, were used in this pilot test. They were:

1. DeKalb FS-1a: High grain producer; dry stalk; nonsweet; 76-77 days to reach 50% bloom.

2. Lindsey 115-F: Low-to-medium grain producer; juicy stalk; semi-sweet; late maturing.

3. Early Hegari: High grain producer; juicy stalk; nonsweet; 75-77 days to reach 50% bloom.

4. Axtell: Standard variety; low-to-medium grain producer; juicy stalk; sweet; 74 days to reach 50% bloom.

These four varieties were ensiled in upright silos when the grain reached the medium to hard dough stage.

Forty head of choice-quality heifer calves from the Jeff Ranch, Fort Davis, Texas, were used in this experiment. They were allotted, 10 head per lot, on the basis of weight, and fed silage free choice plus 1.25 lbs. of soybean meal. Dicalcium phosphate and salt were fed as a source of calcium, phosphorus, and salt. This feeding regime was such that it allowed a full expression of the production potential of the silage.

#### Results and Observations

The results of this experiment are reported in Table 4. Early Hegari produced the most gain, followed by DeKalb, with Lindsey and Axtell producing the least gain. The two high grain-yielding varieties, Early Hegari and DeKalb, produced more gain, 0.20 and 0.11 pound per animal per day, respectively, than the two low to medium grain-yielding varieties, Lindsey and Axtell. The latter two produced the same gains for the winter period. Statistical analysis of the data showed the differences in gain to be nonsignificant.

Daily ration, feed required per cwt. gain, and feed cost per cwt. gain show differences among lots, but valid conclusions are difficult to make from only one year's results. It is apparent that greater numbers of cattle are needed to detect statistically significant differences if they exist.

**Table 4**  
Comparative value of four varieties of forage sorghum silage for wintering weaned beef calves.

December 1, 1960, to March 27, 1961—116 days.

Lot number	13	14	15	16
Number heifers per lot	10	10	10	10
Silage variety fed	DeKalb FS1a	Lindsey 115F	Early Hegari	Axtell
Initial wt. per heifer, lbs.	464	454	462	465
Final wt. per heifer, lbs.	654	634	665	645
Av. gain per heifer, lbs.	190	180	203	180
Av. daily gain per heifer, lbs.	1.64	1.55	1.75	1.55
Av. daily ration, lbs.:				
Silage	37.7	38.2	39.6	33.3
Soybean meal	1.25	1.25	1.25	1.25
Lbs. feed per cwt. gain:				
Silage	2300	2463	2265	2143
Soybean meal	76	81	71	81
Total feed required per cwt. gain, lbs.	2376	2544	2336	2224
Feed cost per cwt. gain	\$9.23	9.87	9.17	8.95

#### Adapting Roughages Varying in Quality and Curing Processes to the Nutrition of Beef Cattle, 1960-61 (Project 370).

#### Performance of Yearling Beef Heifers Fed Various Ratios of Sorghum Grain to Dehydrated Alfalfa in Pellet Form.

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

This is the first year of an experiment designed to investigate the value of a complete pelleted ration for fattening cattle. Since Kansas has an abundance of sorghum grain and alfalfa, the 1960 study was designed to study the performance of yearling heifers fed various ratios of sorghum grain to dehydrated alfalfa in pellet form. Dehydrated alfalfa served as a source of roughage and protein.

The feeds used in this study were grown locally and the pellets made by the University's feed technology technicians— $\frac{3}{8}$  inch in diameter.

Fifty head of about 660-pound choice-quality Hereford heifers were used. They were allotted 10 head per lot on the basis of prior treatment and the lots randomly assigned to the various concentrate:roughage ratio pellets. The heifers were rapidly brought up to a full feed of pellets and, when on full feed, pellets were kept before them all the time. No other