

Table 60

Effect of Certain Climatic Factors on the Period Average Daily Gains of Yearling Heifers.

Dry-Lot Fattening Period—June 26, 1957, to November 13, 1957—140 days.

Period	1	2	3	4	5
Date	6/26-7/24	7/25-8/21	8/22-9/18	9/19-10/16	10/17-11/13
Av. maximum temp. ¹	92.8	97.4	84.0	73.3	56.6
Av. minutes of sunshine ² ..	599.2	665.8	516.2	397.1	234.1
Av. radiation ³	526.4	578.3	434.0	318.8	191.7
Av. wind movement ⁴	141.0	145.3	131.3	133.4	141.3
Av. relative humidity ⁵	47.6	46.3	52.0	56.5	56.5
Av. daily gain:					
Lot 1 (sun)	1.89	1.16	2.79	2.07	1.57
Lot 2 (sun)	1.84	1.11	2.27	2.79	1.82
Lot 3 (shade)	2.29	1.36	2.59	2.21	1.96

1. Reading made daily at 7 p.m.; thus maximum temperature will have occurred. Thermometer in standard thermometer shelter.

2. Number of minutes the sun shone during the day. Period midnight to midnight.

3. Reading in langleys. Langleys \times 3.69 = BTU's per square foot.

4. Wind movement is miles past the station.

5. Read from an autographic hygrograph exposed in thermometer shelter.

The Effect of Shade and Hormone Implant on Fattening Yearling Heifers.

June 26, 1957, to November 13, 1957—140 days.

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

Five heifers in lots 1, 2 and 3 of the shade vs. no shade study were randomly selected to receive an implant composed of 20 mg. of estradiol benzoate and 100 mg. of testosterone. Since they were fed along with the non-implanted heifers in each lot, no feed efficiency data is available.

Table 61 shows the results of this phase of the study. Although the numbers are small, some general observations can be made. These are as follows:

1. Shade exerted a definite influence upon the average daily gains. The implanted heifers in the shade gained .12 pound more per head daily than the implanted heifers in the sun. Heifers receiving no hormone implant in the shade gained .16 pound more per head daily than the non-implanted heifers in the sun. Thus shade increased gains an average of .14 pound per head per day regardless of hormone implant.

The hormone implant increased average daily gains .30 pound in the sun lots and .26 pound in the shade. Thus the implant increased average daily gain per head .23 pound.

The combined influence of shade and implant was .42 pound increase in average daily gain per head.

2. The implanted heifers had a slightly higher dressing percentage than did the non-implanted heifers.

3. Shade influenced carcass grade. The average carcass grade of the heifers in the sun lots was just slightly over average good, whereas the shaded lot heifer carcasses graded high good.

4. The average square inches of rib eye muscle were greater in the implanted heifers. Shade apparently had no influence upon the size of rib eye muscle.

5. The implant caused no excessive development of teats and udder, raised tail heads or depressed loins.

Table 61

The Effect of Shade and Hormone Implant¹ on Fattening Yearling Heifers.

June 26, 1957, to November 13, 1957—140 days.

	No shade		Shade	
	No implant	Implant	No implant	Implant
Number of heifers	10	10	5	5
Initial wt. per heifer, lbs.	535	524	532	528
Final wt. per heifer, lbs.	786	816	805	838
Av. gain per heifer, lbs.	251	292	273	310
Av. daily gain per heifer, lbs.	1.79	2.09	1.95	2.21
Dressing percent	58.1	58.5	57.8	58.2

Carcass Data

Carcass grades, USDA:

Av. choice .....	..	1	..	..
Low choice	2	2	4	2
High good .....	..	1	..	1
Av. good	3	1	..	..
Low good	5	5	1	2
Av. carcass grade ²	17.2	17.4	18.4	17.6
Av. size of rib eye ³	4.3	4.3	4.4	3.8
Av. size of rib eye, sq. in. ⁴	9.8	10.3	9.8	10.7
Av. thickness of fat at 12th rib ⁵ ..	4.1	4.0	3.4	3.8
Av. thickness of fat at 12th rib, in. ⁶ .....	.51	.55	.59	.53
Av. degree of marbling ⁷	8.0	7.2	7.4	8.0
Av. degree of firmness ⁸	4.3	3.7	3.2	3.6

1. 20 mgs. estradiol benzoate plus 100 mgs. testosterone supplied by Squibb and Sons.

2. Av. choice, 20; low choice, 19; high good, 18; av. good, 17; low good, 16.

3. Very large, 1; large, 2; moderately large, 3; modestly large, 4; slightly small, 5. Visual estimate.

4. Planimeter reading of rib eye muscle.

5. Very thick, 1; thick, 2; moderately thick, 3; modestly thick, 4; slightly thin, 5. Visual estimate.

6. Reciprocal Meat Conference Standards—1952.

7. Modest, 6; small amount, 7; slight amount, 8; traces, 9. Visual estimate.

8. Very firm, 1; firm, 2; moderately firm, 3; modestly firm, 4; slightly soft, 5; soft, 6. Visual estimate.

Adapting Roughages Varying in Quality and Curing Processes to the Nutrition of Beef Cattle (Project 370—1957-58).

Combinations of Wheat Straw and Alfalfa Hay in the Winter Ration of Beef Heifers.

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

Previous work at this station (Circular 297, p. 45-47) and at the Fort Hays Branch Experiment Station (Circular 322, p. 1-6) indicates that beef calves wintered on a daily ration of 1.75-2 pounds of ground sorghum grain, 1.25-2 pounds of protein concentrate and wheat straw fed free-choice made average daily gains of only .3 to .6 pound. One pound of molasses substituted for 1 pound of grain and sprinkled on wheat straw increased consumption only .22 pound per head daily but decreased gains .08 pound per head daily. Also 1 pound of molasses had slightly less feeding value than 1 pound of grain in a wintering ration for steer calves with wheat straw roughage. The addition of 1 pound of dehydrated alfalfa pellets increased the rate of gain and feed efficiency. Calves receiving dehydrated alfalfa pellets also consumed more straw.

Although wheat straw is considered a very poor roughage and under normal conditions should not be used as the only roughage for cattle, there are times when it can be used as a major part of the roughage. The

purpose of this study is to continue investigation of the use of wheat straw in the winter ration of beef cattle, with particular emphasis upon the effect of various combinations of wheat straw and alfalfa hay upon the performance of beef heifers being wintered in dry-lot.

Experimental Procedure

Fifty Hereford heifers of good to choice quality were allotted into 5 lots of 10 calves each on the basis of live weight and grade. The average daily ration for each heifer in the various lots is shown in Table 62. Each lot received an equal amount of ground sorghum grain and protein from soybean oil meal and/or alfalfa hay. Wheat straw was fed free-choice to lots 1, 3, 4, and 5. The same amount of alfalfa hay was fed to lot 2 as straw fed to lot 1. The soybean oil meal fed was fortified with vitamin A so that each pound of soybean oil meal contained 10,000 IU of the vitamin.

Observations

Table 62 presents the 98-day summary of this test and the following observations can be made:

1. No vitamin A deficiency symptoms were apparent.
2. Alfalfa hay fed at the rate of 5.79 pounds per head daily as the only source of roughage and protein (lot 2) produced the same daily gain per head (.91 pound) as did 1.25 pounds of soybean oil meal and 5.79 pounds of wheat straw (lot 1).
3. The feeding of 1 pound of alfalfa hay plus wheat straw fed free-choice as a source of roughage (lot 3) increased average daily gain only slightly. The calves consumed as much wheat straw as was consumed in lot 1.
4. Although the total wheat straw consumption decreased as the alfalfa allowance increased from 2 pounds to 4 pounds per head daily, total roughage consumption increased.
5. Lot 3, receiving 1 pound alfalfa hay in addition to wheat straw free-choice, made essentially the same average daily gain as was made by lot 4, which received 2 pounds alfalfa hay.
6. Increasing the alfalfa hay from 2 to 4 pounds greatly increased average daily gains.
7. Based on the conditions of this trial, 4 pounds of alfalfa hay were required, in addition to wheat straw fed free-choice, to materially increase the average daily gains.
8. As the alfalfa hay allowance increased, the cost per cwt. gain decreased.

Table 62

The Effect of Various Combinations of Wheat Straw and Alfalfa Hay on the Performance of Beef Heifers Wintered in Dry-Lot.

December 12, 1957, to March 20, 1958—98-day progress report.

Lot number	1	2	3	4	5
Number heifers per lot	10	10	10	10	10
Av. initial wt. per heifer, lbs.	457	455	454	456	455
Av. final wt. per heifer, lbs.	546	544	552	557	577
Av. gain per heifer, lbs. ..	89	89	98	101	122
Av. daily gain per heifer, lbs. ....	.91	.91	1.00	1.04	1.24
Av. daily ration per heifer, lbs.: ¹					
Ground sorghum grain	4.00	4.00	4.00	4.00	4.00
Soybean oil meal + Vitamin A ²	1.25	0	1.00	.75	.25
Alfalfa hay	0	5.79	1.00	2.00	4.00
Wheat straw	5.79	0	5.75	5.05	4.17

1. Salt supplied free-choice and a mixture of equal parts salt and steamed bone meal, free-choice.

Table 62 (Continued)

Av. lbs. feed per cwt. gain:					
Ground sorghum grain	440	440	400	384	321
Soybean oil meal	137	0	100	72	20
Alfalfa hay	0	637	100	192	321
Wheat straw	637	0	575	485	335
Av. feed cost per cwt. gain, ³ \$	17.21	13.90	15.60	14.54	11.67

2. Vitamin A used was Nopcay 30 type V supplied by Nopco Chemical Co., Harrison, N.J. Each pound of soybean oil meal contained 10,000 I.U. of vitamin A.

3. Feed prices for 1957-58 are inside back cover.

Short-Term Feeding of Aureomycin (R) to Suppress the Occurrence of Respiratory Diseases in Cattle (Project 370-2—1957).

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

One of the major problems confronting cattlemen is control of occurrence of respiratory diseases such as the shipping fever complex, colds, nasal congestion, and pneumonia. These respiratory conditions are especially troublesome to the cattle feeder who ships and receives cattle during the fall and winter months when adverse weather conditions create added stress on cattle.

It is the purpose of this study to investigate the value of orally administering antibiotics to weaning calves to control the occurrence of respiratory diseases during the first 28 days they are in the dry-lot.

Experimental Procedure

The 161 heifer and steer calves used in experiment number 1 of this test were purchased from two different ranches in New Mexico. They were loaded into railroad stock cars at Clovis, N.M., October 18, 1957. On October 20, they were unloaded at Emporia, Kan., given hay, water and allowed to rest. Then the calves were loaded into the stock cars and arrived in Manhattan October 21. They were unloaded, weighed and immediately trucked from the railroad stock pens to the experimental beef cattle unit at Kansas State College. The calves were then randomly placed in two lots, 81 head in the control lot, and 80 head in the lot to receive aureomycin. There was approximately the same number of steer and heifer calves in each lot. Each lot was then weighed and an average beginning weight per head determined.

The 223 heifer and steer calves used in experiment number 2 of this test were purchased from one ranch in New Mexico. They were loaded into railroad stock cars at Logan, N.M., October 16, 1957, and shipped to Manhattan. The calves arrived in Manhattan October 18. They received no feed, water and rest stop en route. Upon arrival in Manhattan they were treated exactly as the calves in experiment number 1, except that they were randomly placed in two lots with about the same number of heifers and steers in each lot. One of the lots was fed aureomycin and the other was the control lot.

The daily concentrate ration fed to the control and treatment calves was as follows (pounds):

	1st week	2nd week	3rd week	4th week
Wheat bran	1.50	1.20	....	....
Dehydrated alfalfa meal .....	.40	.45	.40	....
Molasses .....	.10	.15	.20	....
Soybean meal .....	....	....	.40	1.00
Ground sorghum grain .....	....	1.20	3.00	4.00
Total daily ration	2.00	3.00	4.00	5.00