

following rations: (1) prairie hay plus grain and protein concentrate; (2) corn cobs plus grain, protein concentrate, and vitamin A; (3) alfalfa hay plus grain; (4) atlas sorghum silage plus a special supplement; (5) atlas sorghum silage plus grain and protein concentrate. As already pointed out, these rations were supplemented in such a way as to make them similar in nutritive value.

At the end of the wintering period, two heifers from each of the above wintering rations were allotted to each of five lots for a fattening test. This gave five lots of 10 animals each. The animals were regrouped according to previous treatment at the end of the fattening period, in order to determine the rate of gain.

Results and Discussion

The results of this experiment are given in Table 29. There are variations in results obtained; however, it is apparent that none of the roughages in the wintering ration, or previous treatment, had a consistent effect upon the fattening results following the wintering period. It should be remembered that all of these roughages were supplemented to make them similar in calculated nutritive value.

The Value of Stilbestrol in Beef Cattle Rations—Wintering, Grazing, and Fattening Phases.

PROJECT 370

D. Richardson, F. H. Baker, E. F. Smith, and R. F. Cox

Stilbestrol, a synthetic compound which has a hormonelike effect when taken into the body, has been recognized as a growth-stimulating factor in beef cattle fattening rations. Most of the market cattle in Kansas are handled under the deferred system of feeding. Information was needed on the value of this growth-stimulating ingredient in the deferred cattle-feeding program.

This experiment was planned to obtain information on the value of stilbestrol (1) in the wintering ration of beef calves, (2) during grazing, (3) effect of removing stilbestrol from the animals while grazing, (4) when animals return to the feed lot after grazing, (5) effect of long-time continuous feeding, (6) effect upon digestibility of feed, (7) carcass grade, and (8) cooking quality of the meat. The results of the wintering phase are repeated in Table 30. For more complete details on this and the digestion studies, see the 42nd Annual Livestock Feeders' Day Report, Kansas Agricultural Experiment Station, Circular 320, pages 50-53, 1955.

Experimental Procedure

Thirty Hereford steer calves averaging about 450 pounds were divided as equally as possible into three lots of 10 animals each. Lot 1 served as the control throughout the test. Lot 2 received stilbestrol during the wintering and fattening phases (Phases 1 and 3 of the Kansas Deferred System) but not on grass. Lot 3 received stilbestrol throughout all three phases of the feeding operation. (Note—there were two control lots during the wintering phase but only one thereafter.) Stilbestrol was fed at the rate of 10 mg. per head daily throughout the test. Otherwise, feeding and management were the same for all animals except Lot 3, which received stilbestrol in $\frac{1}{2}$ pound of soybean oil meal per head daily while on grass. Grain was self-fed during the fattening phase.

Ten Hereford heifers averaging about 335 pounds each were divided as equally as possible into two lots. Lot 1 served as the control and Lot 2 received stilbestrol. These calves were fed a wintering ration for 140 days and then put on a fattening ration. They did not go to pasture as did the steers.

At the time of marketing and slaughter, carcass data were obtained on individual animals. A wholesale rib cut from each animal was purchased for chemical and cooking studies.

Results

The information obtained is shown in Table 30 for the steers and Table 32 for the heifers. Results of the cooking tests of roasts from the steer and heifer carcasses are shown in Tables 31 and 33, respectively.

Observations

Wintering phase:

1. There was a tendency toward increased gains with stilbestrol in the wintering ration of calves; however, it is doubtful that this difference is great enough to offset the additional cost and be of economic advantage.

2. There were no significant differences in rate of feed consumption or efficiency of feed utilization.

3. Approximately one-half of the calves receiving stilbestrol developed high tailheads and depressed or weak loins. The heifers showed an enlargement of the vulva and developed more of a cow appearance. These differences varied with individual animals. There was a tendency for these effects to be less apparent as the animals grew older. In fact, they were noticeable in only a few animals at the time of slaughter.

Grazing phase:

1. The rate of gain on grass for all lots was less than might normally be expected; however, these calves had made excellent gains during the winter and therefore would not be expected to make large gains on grass.

2. The feeding of stilbestrol on grass did not produce an increased rate of gain.

3. A decrease in rate of gain on grass was obtained with animals that received stilbestrol in the wintering ration but did not receive stilbestrol on grass. This indicates that there is no beneficial carryover effect from feeding stilbestrol during the winter for animals that are going to pasture.

Fattening phase:

1. There was no apparent advantage to long-time, continuous feeding of stilbestrol (309 and 361 days). It is suggested that nature adjusts the body to the intake of stilbestrol when taken over a long period of time. Therefore, less beneficial effect is obtained when the animals are put on a fattening ration. Lot 2 steers that did not receive stilbestrol on grass but did in the feed lot showed a beneficial effect in rate and economy of gain from stilbestrol.

2. Stilbestrol had no apparent effect upon quantity of feed consumed. (Grain and hay were fed free choice during the fattening phase.)

3. There were only small differences in shrink to market and in cooler shrink; however, there was a tendency for higher dressing percentage with the control animals.

4. There was a tendency for animals fed stilbestrol to grade slightly lower. This was caused primarily by less marbling. This effect seemed to be greatest with animals having received stilbestrol continuously over a long period of time.

5. Stilbestrol fed animals showed slightly less rib-eye area, slight increase in fat thickness over 12th rib, slightly less firmness (often accompanied by greater release of fluid at cut), slight differences in total moisture in rib-eye and fat but a tendency toward a greater quantity of press fluid from the rib-eye.

6. Cooking tests with rib roasts from each animal did not reveal any outstanding differences. The palatability scores tended to be higher for roasts from animals fed stilbestrol. The press fluid was also greater from the cooked rib-eye of roasts from animals fed stilbestrol.

Table 30

Results with and without Stilbestrol in Wintering, Grazing, and Fattening Ration of Steers.

Wintering phase, November 16, 1954, to May 3, 1955—168 days.

Lot	1	2 ¹	3 ²
Number steer calves per lot	10	10	10
Av. initial wt., lbs.	456	456	455
Av. final wt., lbs.	760	770	786
Av. total gain, lbs.	304	314	331
Av. daily gain, lbs.	1.81 ³	1.87	1.97
Av. daily ration, lbs.:			
Soybean oil meal	1.00	1.00	1.00
Ground milo grain	4.00	4.00	4.00
Atlas sorghum silage	29.04	28.94	29.05
Salt	.11	.13	.13
Mineral (½ bonemeal, ½ salt)	.10	.09	.09
Lbs. feed per 100 lbs. gain:			
Soybean oil meal	54.45	52.43	51.13
Ground milo grain	217.81	209.74	204.53
Atlas sorghum silage	1581.09	1517.60	1485.57
Salt	5.72	6.62	6.87
Mineral (½ bonemeal, ½ salt)	5.60	4.83	5.08
Feed cost per 100 lbs. gain	\$13.99	\$13.86	\$13.56

1. 10 mg. stilbestrol per head daily in wintering and fattening phase @ 0.8c.

2. 10 mg. stilbestrol per head daily during entire experiment @ 0.8c.

3. A similar control lot made 1.92 average daily gain at \$13.38 per cwt. cost.

Steers, grazing phase, May 3, 1955, to August 1, 1955—89 days.

Av. initial wt., lbs.	760	770 ¹	786 ²
Av. final wt., lbs.	845	843	874
Av. total gain, lbs.	85	73	88
Av. daily gain, lbs.	0.96	0.82	0.99

1. Stilbestrol discontinued while on grass.

2. Received 10 mg. stilbestrol in 0.5 lb. soybean oil meal per head daily.

Fattening Phase, August 1, 1955, to November 12, 1955—104 days.

Av. initial wt., lbs.	845	843	874
Av. final wt., lbs.	1103	1121	1143
Av. total gain, lbs.	258	278	269
Av. daily gain, lbs.	2.49	2.67	2.59
Av. daily ration, lbs.:			
Soybean oil meal	1.51	1.51	1.51
Ground milo grain	19.73	19.39	19.98
Prairie hay	6.61	7.23	7.65
Limestone	.1	.1	.1
Lbs. feed per 100 lbs. gain:			
Soybean oil meal	60.1	56.5	58.4
Ground milo grain	795.3	725.4	772.5
Prairie hay	266.3	270.3	295.7
Limestone	3.9	3.6	3.7
Feed cost per 100 lbs. gain ¹	\$24.64	\$23.04	\$24.54
	1	2	3

% shrink to market	3.94	2.68	3.54
Dressing % (hot wt.)	61.29	59.98	60.86
Dressing % (chilled wt.)	60.44	59.17	60.12

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Table 30 (Continued).

Actual 48-hr. cooler shrink, lbs. . .	90.00	88.00	82.00			
% 48-hr. cooler shrink	1.38	1.34	1.22			
Carcass grade before and after ribbing: ²	before	after	before	after	before	after
Low choice	1	1	1	2		
Top good	4	3	1	1	2	
Av. good	5	3	7	2	5	5
Low good	1	3	2	5	1	5
Top commercial			1			
Degree of marbling:						
Moderate		3	1			1
Modest			1			
Small amount		5	2			4
Slight amount		2	5			5
Traces			1			
Av. size rib-eye, sq. in.	11.22	10.64	11.11			
Av. fat thickness, cm.	1.64	1.79	1.82			
Av. firmness ³	3.8	4.3	3.8			
Av. % moisture in rib-eye	72.61	73.10	72.88			
Av. % moisture in fat	7.49	7.61	7.74			
Av. press fluid in rib-eye, ml./25 gm.	7.42	8.46	8.57			

1. Soybean oil meal @ \$70.00 per T., ground milo @ \$2.50 per cwt., prairie hay @ \$20.00 per T., stilbestrol @ .6c per head daily.

2. Carcass data obtained through courtesy of L. P. Stream, district supervisor, USDA Grading Service, Kansas City, Mo.

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

Table 31

Average Results of Cooking Rib Roasts from Steers Fed Rations with and without Stilbestrol.

	Control	10 mg. stilbestrol per head daily for wintering and fattening phase	10 mg. stilbestrol per head daily for 381 days
Number of roasts	10	10	10
% total loss	22.2	22.4	21.2
% volatile loss	17.0	17.0	16.4
% drip loss	5.2	5.5	4.8
Cooking time, min. per lb.	37.1	37.5	36.5
Internal temperature, from oven	158 °F.	158 °F.	158 °F.
Internal temperature, maximum	162 °F.	162 °F.	162 °F.
Palatability scores: ¹			
Aroma	9.0	9.0	9.1
Flavor, lean	8.6	8.9	9.0
Flavor, fat	8.4	8.3	8.5
Tenderness	8.3	8.4	8.5
Juiciness	7.8	8.4	8.4
Shear value, lbs. ²	17.2	18.1	16.3
Press fluid yields, ml./25 gm.: ²			
Total	7.1	7.8	7.9
Serum	6.3	7.0	6.8
Fat	.8	.9	1.1

1. The higher the figure, the more desirable the score (10 = maximum).

2. Values obtained from rib-eye.

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Table 32

Results with and without Stilbestrol in the Wintering and Fattening Ration of Heifer Calves.

Wintering Phase, November 16, 1954, to April 5, 1955—140 days.

Lot	1	2 ¹
Number heifers per lot	5	5
Av. initial wt., lbs.	336	338
Av. final wt., lbs.	577	592
Av. total gain, lbs.	241	254
Av. daily gain, lbs.	1.72	1.82
Av. daily ration, lbs.:		
Soybean oil meal	1.00	1.00
Ground milo grain	4.00	4.00
Atlas sorghum silage	22.57	22.54
Salt	.13	.11
Mineral (½ bonemeal, ½ salt)	.18	.18
Lbs. feed per 100 lbs. gain:		
Soybean oil meal	58.09	55.03
Ground milo grain	232.37	220.13
Atlas sorghum silage	1311.2	1240.17
Salt	7.72	5.90
Mineral (½ bonemeal, ½ salt)	10.79	10.22
Feed cost per 100 lbs. gain	\$13.63	\$13.33
Fattening Phase, April 5, 1955, to September 20, 1955—169 days.		
Av. initial wt., lbs.	577	592
Av. final wt., lbs.	919	955
Av. total gain, lbs.	342	363
Av. daily gain, lbs.	2.02	2.15
Av. daily ration, lbs.:		
Soybean oil meal	1.00	1.00
Ground milo grain	15.74	16.44
Alfalfa hay	1.78	1.78
Prairie hay	3.26	3.59
Lbs. feed per 100 lbs. gain:		
Soybean oil meal	49.1	46.3
Ground milo grain	778.1	765.3
Alfalfa hay	87.7	82.6
Prairie hay	161.4	167.2
Feed cost per 100 lbs. gain ²	23.88	23.78
% shrink to market	4.46	5.34
Dressing % (hot wt.)	61.18	59.87
Dressing % (chilled wt.)	59.93	58.72
Actual 48-hr. cooler shrink (lbs.)	55.0	52.0
% 48-hr. cooler shrink	2.05	1.92
Carcass grade:	before	after
	ribbing	ribbing
Low prime		1
Top choice		1
Av. choice	2	3
Low choice	2	2
Top good	1	3
Av. good		1
Low good		2
Degree of marbling:		
Slightly abundant		1
Moderate		
Modest	4	
Small	1	
Slight		3
Traces		1

1. Received 10 milligrams stilbestrol per head daily.

2. Soybean oil meal, \$70 per T.; milo grain, \$2.50 per cwt.; alfalfa hay, \$25 per T.; prairie hay, \$20 per T.; stilbestrol @ .7c per head daily.

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Table 32 (Continued).

Av. size rib-eye, sq. in.	11.52	10.92
Av. fat thickness, cm.	1.55	1.79
Av. firmness ³	2.8	3.6
Av. % moisture in rib-eye	73.43	73.10
Av. press fluid in rib-eye, ml./25 gm. ..	5.68	7.12
Av. % moisture in fat	8.02	7.27

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

Table 33

Average Results of Cooking Rib Roasts from Heifers Fed Rations with and without Stilbestrol.

	Control	10 mg. stilbestrol per head daily for 309 days
Number of roasts	5	5
% total loss	22.1	20.6
% volatile loss	16.8	15.0
% drip loss	5.3	5.6
Cooking time, min. per lb.	40.0	38.1
Internal temperature, from oven	158 °F.	158 °F.
Internal temperature, maximum	162 °F.	162 °F.
Palatability scores: ¹		
Aroma	9.1	8.9
Flavor, lean	8.2	8.9
Flavor, fat	8.3	8.6
Tenderness	8.3	8.5
Juiciness	8.1	8.4
Shear values, lbs. ²	17.9	18.0
Press fluid yields, ml./25 gm.: ²		
Total	7.8	9.1
Serum	6.3	7.6
Fat	1.5	1.5

1. The higher the figure, the more desirable the score (10 = maximum).

2. Values obtained from rib-eye.

The Value of Stilbestrol in Beef Cattle Rations.

PROJECT 370

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This is the second test in an experiment to determine the value of stilbestrol in the deferred cattle-feeding program. This report gives information on the wintering phase of this test.

Experimental Procedure

Twenty-seven Hereford steer calves were divided as equally as possible into three lots of 9 animals each. One lot received stilbestrol at the rate of 5 milligrams per head daily for the first 56 days. The rate was increased to 10 milligrams per head daily for the remainder of the test. Previous work indicated a lower level for young calves might be more desirable during the first part of the feeding period. The other two lots served as controls. Due to lack of pen space, they were fed together. All animals will graze bromegrass pasture without stilbestrol this summer. After returning to the feed lot, all animals except one control lot will receive stilbestrol in the fattening ration.

Results

The results of this test are shown in Table 34.

Observations

1. Rate and efficiency of gain were higher for animals fed stilbestrol.
2. Marked differences in high tailheads and weak loins were not ob-

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