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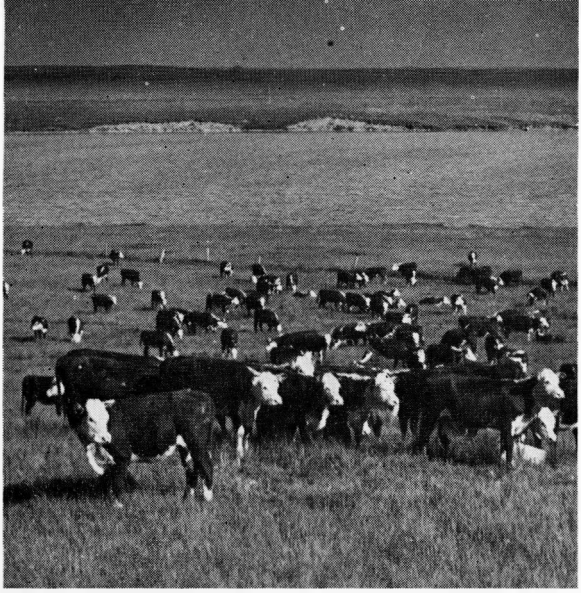

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ANIMAL HUSBANDRY DEPARTMENT

AGRICULTURAL EXPERIMENT STATION

SOUTH DAKOTA STATE COLLEGE
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WINTERING

diethylstilbestrol for beef cattle

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Appreciation is expressed to Chas. Pfizer and Company, Terre Haute, Indiana, for supplying the stilbestrol pellets used in the experiment and Eli Lilly and Company, Indianapolis, Indiana, for supplying the stilbestrol premix. Also the cooperation and courtesy of Armour and Company, Huron, South Dakota, for help in obtaining carcass information is appreciated.

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Diethylstilbestrol for Wintering, Pasturing, and Fattening Beef Cattle

By D. V. Radabaugh and L. B. Embry[1]

Research workers are constantly trying to find new ways of increasing rate and efficiency of gain by livestock. One effective method developed for cattle during recent years is the use of diethylstilbestrol (commonly referred to as stilbestrol or DES). Stilbestrol is a synthetic compound having properties similar to the natural estrogens, a group of female sex hormones.

Stilbestrol has been shown to stimulate growth in cattle when given in the feed or when implanted as small pellets under the skin of the ear. The average increase in rate of gain by fattening steers administered stilbestrol has been about 15% with about a 10% increase in feed efficiency. Feeding or implanting stilbestrol has given about the same results, with the possible exception of carcass grade, when administered at the proper levels. The response by steers on wintering rations and on pasture has been more variable than the response when fed fattening rations. The response to stilbestrol by heifers is generally considered to be less and more variable than for steers.

Since the approval of stilbestrol for cattle feeding, numerous experiments have been conducted to determine its value with various rations and feeding systems. Several questions have been raised. What are the effects of stilbestrol over a long period of time? What effects will stilbestrol administration during the pasture season have on later feed-lot performance when stilbestrol is given again? How long are implants effective? What are the comparative effects of implants and feeding stilbestrol under various feeding systems and the effects of the two methods of administration on carcass grade and carcass characteristics?

These are important questions and present research in these areas is limited or not conclusive. The

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trial reported here was conducted to obtain more specific information on these problems.

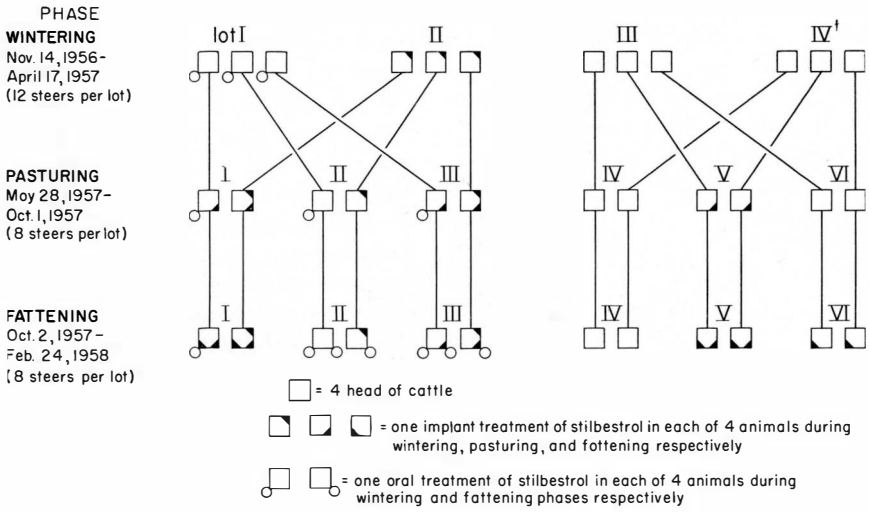
THREE-PHASE EXPERIMENT

Forty-eight steers were used in a three-phase experiment which was started in November 1956, when the steers averaged about 430 pounds. The wintering phase was conducted at the Central Substation at Highmore, the pasturing phase was conducted on a 75-acre pasture near Brookings, and fattening phase was conducted in feed lots at Brookings. The 48 steers were divided into four lots of 12 each for the wintering phase and redivided into six lots of 8 each for the pasture and fattening phases of the experiment. In the reallottment after the winter phase, four steers from each of lots 1 and 2 were put in lots 1, 2, and 3, and four steers from each of lots 3 and 4 were put in lots 4, 5, and 6. The same steers were kept in each lot for both the pasturing and fattening phases of the experiment. Figure 1 presents the design of the experiment and the stilbestrol treatment for each lot.

THE WINTERING TRIAL

The wintering phase of the trial was conducted in conjunction with an experiment on the feeding value and storage losses of prairie hay after storage in the open for various numbers of years. Only two lots were needed for the storage hay ex-

Figure 1. Design of experiment and the stilbestrol treatments.*



*The levels of stilbestrol implants used were 36 milligrms for the wintering and fattening phases and 24 milligrams for the pasture phase. Ten milligrams of stilbestrol per head daily were used in the steers that were fed stilbestrol.

†Lots 1, 2, and 3 were fed the same kind of hay, harvested in 1956. Lot 4 was fed hay harvested in 1955 and is not considered as a part of the stilbestrol wintering trial.

periment (lot 4—1955 hay, and lot 3—1956 hay). Cattle in lots 1 and 2 were fed hay similar to lot 3 and were used to test the value of stilbestrol in the winter rations.

The rations during the winter phase of the experiment consisted of a full feed of prairie hay and enough soybean oil meal pellets to balance the rations at about 10% protein. The hay (harvested in the Highmore area) was baled and stored in outside stacks. Lot 1 was fed pelleted soybean oil meal which contained 10 milligrams of stilbestrol per pound of the protein supplement. Each steer in lot 2 received a 36-milligram stilbestrol implant at the start of the experiment. Lot 3 received no stilbestrol and served as the control lot for the winter phase of the experiment. Lot 4, which received a different source of hay, cannot be considered in the winter phase of the experiment.

The cattle were kept in four adjacent lots of equal size and had access to an open shed. Water was available in heated automatic waterers. Prairie hay and soybean oil meal were fed once a day. The hay was fed inside the shed and the protein supplement was fed in bunks in the open lot. A mineral supplement was offered free choice and consisted of a mixture of equal parts of bone meal and trace-mineralized salt. Lots 1, 2, and 3 are shown at the end of the wintering trial in figures 2, 3, and 4.

Stilbestrol Improves Performance on Wintering Rations

The results of the dry-lot wintering phase are shown in table 1. Both the stilbestrol-treated lots (1 and 2) gained faster and consumed more feed than the control lot (3). Feed requirements per 100 pounds gain were less for the stilbestrol-treated lots than for the control lot. Rate of gain and feed requirements per 100 pounds of gain were nearly the same for lot 1 (oral stilbestrol) and lot 2 (implanted stilbestrol). Several of the calves in lot 2 showed high tail heads at the end of the wintering trial (figure 5), but this condition became less pronounced as the calves put on finish during the later phases of the experiment.

Feed cost per 100 pounds of gain was considerably greater for the control lot than for either of the stilbestrol-treated lots. The feed cost was $1.19 less per 100 pounds of gain for the 36-milligram implanted lot than for the lot fed stilbestrol orally. This was due partly to the higher price charged for the protein supplement with stilbestrol.

There was a 24- to 90-cent spread between the three lots in the average total cost per 100 pounds of final weight. The control lot had the greatest cost and the implanted lot cost the least. The cost, however, does not include any charge for labor and equipment. The average cost per 100 pounds of final weight represents the price necessary to pay for the initial cost of the steers and the feed they consumed during the winter.

THE PASTURE TRIAL

The winter trial closed April 17, 1957. Six days later the cattle were shipped to Brookings for the pas-

ture phase of the experiment. They were then full-fed alfalfa hay of fair quality until put on pasture May 28.

The summer pasture was primarily bromegrass with an estimated 15% alfalfa and sweet clover. A mineral mix (3 parts bone meal and 1 part salt) and trace-mineralized salt were offered free choice during the pasture season in an open box near the watering site. Water was available at all times in a dugout. No grain was fed while the steers were on pasture and all lots were grazed together. Three lots (1, 3, and 5) were implanted with 24 milligrams of stilbestrol at the beginning of the pasture season. The other three lots received no stilbestrol treatment during the pasture season.

Pasture Gains Improved by Stilbestrol

The results of the pasture phase are shown in table 2. The pasture season was rather dry and gains for all lots were low. The three lots which received the 24-milligram stilbestrol implants show a higher average daily gain and less cost per pound of final weight than any of the nonimplanted lots. Lot 5, which received stilbestrol for the first time in the pasture phase, made a higher average daily gain than the two lots (1 and 3) that had re-

Table 1. Comparison of Feeding and Implanting Stilbestrol for Wintering Steer Calves—November 14, 1956 to April 17, 1957

	1956 Prairie Hay			1955 Prairie Hay
	Lot 1 10 mg. Fed Daily	Lot 2 36 mg. Implants	Lot 3 Control	Lot 4* No Stilbestrol
Number of steers	12	12	12	12
Number of days fed	154	154	154	154
Av. initial weight, lb.	430.0	426.9	429.8	427.2
Av. final weight, lb.	553.2	554.2	526.3	549.2
Av. daily gain, lb	.80	.83	.63	.79
Av. daily ration, lb.				
Prairie hay	11.67	11.68	11.35	11.09
Soybean oil meal pellets	.98	.98	.83	.90
Feed/100 lbs. gain, lb.				
Prairie hay	1458	1413	1809	1400
Soybean oil meal pellets	122	119	132	113
Initial cost @$21.00 cwt. $	90.30	89.65	90.26	89.71
Feed cost/100 lb. gain†, $	19.43	18.24	22.65	17.91
Av. final cost/steer‡, $	114.25	113.11	112.14	111.56
Av. cost/100 lbs. final wt., $	20.65	20.41	21.31	20.31

*Lot 4 is not considered a part of stilbestrol wintering trial; however, it is included in the table because the steers were used in the pasturing and fattening phases of the experiment.

†Feed prices per ton: Prairie hay, $20; soybean oil meal pellets, $69.25; and soybean oil meal pellets with stilbestrol added, $79.25. Stilbestrol pellets (12 mg.) were charged at 8⅓c each which does not include the labor and equipment costs of implanting.

‡Includes initial cost and winter feed cost.

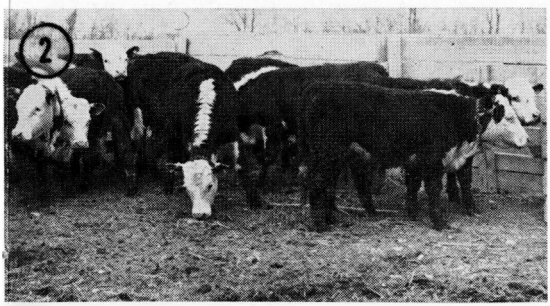


Figure 2. Lot 1 calves, fed 10 milligrams of stilbestrol daily in the protein supplement, are shown here at the end of the wintering trial. These calves have a relatively smooth top line when compared to the calves which did not receive stilbestrol.

Figure 3. Lot 2 calves, implanted with 36 milligrams of stilbestrol, had several calves with high tail heads at the end of the wintering trial.

Figure 4. This shows lot 3 calves, which received no stilbestrol, at the end of the wintering trial.

Figure 5. A close-up view of the high tail head is shown by the calf on the right. This condition was no longer noticeable by the end of the pasture season.

ceived stilbestrol previously in the winter phase. Thus the winter stilbestrol treatments showed little advantage by the end of the pasture season where all lots were implanted with 24 milligrams of stilbestrol at the beginning of the pasture season. Stilbestrol treatment with wintering rations which produce low gains as in this trial appears of questionable value when the cattle are to be implanted before going to pasture.

Stilbestrol During Wintering Period Doesn't Reduce Pasture Gains

Lot 2, which received stilbestrol in the wintering phase but not in the pasture phase, made a slightly higher average daily gain in the pasture phase than the lots (4 and 6), that received no stilbestrol in either of the two phases. This indicates that the stilbestrol treatment during the winter phase did not affect the steers' ability to gain on pasture when not given any stilbestrol during the pasture phase. They maintained the weight advantage made during the winter. Previous work *(South Dakota Farm and Home Research,* Vol. IX, (2) p. 23, 1958) where steers were implanted with stilbestrol at the beginning of the pasture season showed they

maintained the weight advantage made during the summer when fattened in dry lot without further stilbestrol treatment.

Pasture Gains Cheapened

The total cost per 100 pounds of final weight, which represents the initial cost on pasture, the cost of the stilbestrol pellet implants, and the cost of the pasture for the season, decreased with an increase in the average daily gain.

When the results of the lots treated alike in the pasture phase are combined, the results favor the implanted lots over the nonimplanted lots. These results are shown in table 3. There was a 0.24 pound difference in average daily gain between the implanted and nonimplanted lots. The total cost per 100 pounds of final weight was 80 cents per 100 pounds less for the implanted lots.

THE DRY-LOT FATTENING TRIAL

The steers were put in their respective fattening lots on October 2. Final filled weights off pasture and initial filled weights for the fattening trial were taken the previous afternoon. Shrunk weights were taken the morning of October 2.

In the fattening phase, each steer received 30 pounds of corn silage daily at the start of the trial. They were refusing some feed after the first 56 days on trial, so the daily feed of silage was reduced to 25 pounds for the remainder of the fattening period. Rolled shelled corn was full-fed and 2 pounds of soybean oil meal was fed per head daily. A mineral mix (3 parts bone meal, 1 part limestone, and 1 part salt) and trace-mineralized salt

Table 2. Results of Implanted and Nonimplanted Steers on Pasture—May 28, 1957 to October 1, 1957

	Lot 1 Implant	Lot 2 Control	Lot 3 Implant	Lot 4 Control	Lot 5 Implant	Lot 6 Control
Number of steers	8	8	8	8	8	8
Number of days on pasture	126	126	126	126	126	126
Av. initial wt., lb.	626.6	629.8	616.5	589.8	606.2	613.6
Av. final wt., lb.	748.5	743.8	751.5	701.2	765.8	711.9
Av. daily gain, lb.	.97	.90	1.07	.88	1.27	.78
Pasture days/100 lb. gain	103.4	110.5	93.3	113.0	79.0	128.3
Initial cost of steers @ $22 cwt., $*	137.85	138.56	135.63	129.76	133.36	134.99
Cost of pasture, $†	12.60	12.60	12.60	12.60	12.60	12.60
Cost of implants/head, $‡	.17		.17		.17	
Total cost/steer, $	150.62	151.16	148.40	142.36	146.13	147.59
Total cost/100 lb. final wt. $	20.12	20.32	19.75	20.30	19.08	20.73

*Estimated value on pasture. The same estimated value cwt. was used for all lots since the reallotment of winter lots 1 and 2 into pasture lots 1, 2, and 3 and winter lots 3 and 4 into pasture lots 4, 5, and 6 prevented the use of cost at end of winter trial as the cost on pasture.

†Pasture cost estimated at 10c per head daily.

‡Stilbestrol pellets (12 mg.)—8⅓c each which does not include the labor and equipment costs of implanting.

Table 3. Comparison of Implanted and Nonimplanted Steers on Pasture—May 28, 1957 to October 1, 1957

	Control	Implant
Number of steers	24	24
Av. initial wt., lb.	611.0	616.5
Av. final wt., lb.	719.0	755.2
Av. daily gain, lb.	.86	1.10
Pasture days/100 lb. gain	116.8	90.8
Initial cost of steers*	134.42	135.63
Cost of pasture/head*	12.60	12.60
Cost of implants/, head $*		.17
Total cost/steer, $	147.02	148.40
Total cost/100 lb. final wt., $	20.45	19.65

*Same costs as used in table 2.

were available free access throughout the trial.

The steers in lots 1, 5, and 6 were implanted with 36 milligrams of stilbestrol at the start of the fattening phase. Each steer in lots 2 and 3 received 10 milligrams of stilbestrol daily, mixed in the soybean oil meal. Lot 4 received no stilbestrol treatment.

Response to Stilbestrol Implants

The results of the fattening phase are shown in table 4. Lots 1, 5, and 6 made about the same rate of gain during this phase of the experiment. The steers in lot 1 had received stilbestrol during the winter phase and were implanted at the beginning of the pasture season and again when they were put in dry lot. Lot 5 steers received no stilbestrol during the winter but were implanted when they went to pasture and again when put in dry lot for fattening. The only stilbestrol lot 6 steers received was at the beginning of the dry-lot fattening period. This indicates that the previous stilbestrol treatments had no effect on the growth response to stilbestrol implants during the fattening phase. Any weight advantage the steers had obtained from previous stilbestrol treatments appeared to be maintained when all lots were implanted at the beginning of the dry-lot fattening period.

Response to Stilbestrol in Protein Supplement

Lot 2, which received stilbestrol during the winter, none on pasture, but stilbestrol in the protein supplement during the dry-lot fattening phase, gained about the same as the stilbestrol-implanted steers (lots 1, 5, and 6). In this comparison, there appears to be little difference in the gains when using stilbestrol as implants or fed in the protein supplement.

The steers in lot 3 were treated the same as those in lot 2 except they were implanted at the beginning of the pasture season. Lot 3 steers gained only slightly better than the control steers in lot 4. The reason for this is not known. Stilbestrol implants during the summer do not appear to be the explanation for the reduced response to stilbestrol in the protein supplement since the steers in lots 1 and 5, previously implanted, gained as well as those in lot 6, implanted for the first time in dry lot. Results of a field trial conducted by South Dakota State College under similar circumstances, where stilbestrol was fed orally during the dry-lot fatten-

ing period following stilbestrol implants during the pasture season, showed that calves implanted at the beginning of the pasture season gained about the same in dry lot as nonimplanted calves. Results at some other stations have shown that steers respond to oral stilbestrol after implants during the pasture season to about the same degree as nonimplanted steers.

Stilbestrol Reduces Cost of Fattening

Corn silage and soybean oil meal were fed at constant levels; thus as the average daily gain increased in each lot, the corn silage and soybean oil meal requirements per 100 pounds of gain decreased. There was considerably more variation in the rolled shelled corn requirements per 100 pounds of gain. Each

Table 4. Comparison of Feeding and Implanting Stilbestrol for Fattening Steers in Dry-Lot—October 2, 1957 to February 24, 1958—145 days

	Lot 1 Implant	Lot 2 Oral	Lot 3 Oral	Lot 4 Control	Lot 5 Implant	Lot 6 Implant
Number of steers	8	8	8	8	8	8
Av. initial filled wt., lb.	748.5	743.8	751.5	701.2	765.8	711.9
Av. final filled wt., lb.,	1221.5	1220.8	1173.2	1104.4	1227.6	1181.9
Av. daily gain, lb.	3.26	3.29	2.91	2.78	3.19	3.24
Av. daily ration, lb.						
Corn silage	26.1	25.7	25.7	24.8	26.1	26.1
Rolled shelled corn	14.7	13.9	13.6	12.5	14.7	13.9
Soybean oil meal	1.96	1.96	1.96	1.96	1.96	1.96
Feed/100 lb. gain, lb.						
Corn silage	800.4	780.5	882.7	891.1	817.8	806.1
Rolled shelled corn	449.8	423.3	468.6	449.5	462.4	430.1
Soybean oil meal	60.2	59.7	67.5	70.6	61.7	60.6
Av. market weight, lb.*	1161.2	1171.2	1112.5	1051.2	1158.8	1123.8
Carcass grade score†	7.4	7.9	7.2	7.6	7.9	7.8
Initial cost @ $22 cwt., $‡	164.67	163.64	165.33	154.26	168.48	156.62
Feed cost/100 lb. gain, $§	12.57	12.20	13.61	13.13	12.89	12.24
Av. cost of steers and feed, $	224.11	221.83	222.75	207.19	228.04	214.16
Av. cost/100 lb. market wt., $	19.30	18.94	20.02	19.71	19.68	19.06
Av. selling price/100 lb., $	25.49	26.19	25.88	25.58	25.74	26.06
Av. selling price/head, $	295.99	306.74	287.92	268.90	298.28	292.86
Profit/head, $‡	71.88	84.91	65.17	61.71	70.24	78.70

*Weight just prior to slaughter at Huron, South Dakota. Trucked 75 miles and held over night on hay and water (16 hours from final weight to market weight).

†Carcass grade score based on High Choice, 9; Average Choice, 8; Low Choice, 7; High Good, 6.

‡Cost of steers and profit per head calculated on assumption that all lots had the same initial value per 100 pounds in the feed lot.

§Feed prices per ton: shelled corn $36, corn silage $6, soybean oil meal $67, soybean oil meal with stilbestrol $75. Stilbestrol pellets (12 mg.) were charged at 8⅓ cents each.

lot was fed all the corn the steers would consume. Lots 2 and 6, which had high average daily gains, showed the least corn requirement per 100 pounds of gain. Lots 1 and 5, which had high corn consumption, showed a poorer feed efficiency. Lot 3, which had a low average daily gain, showed the highest corn requirement per 100 pounds of gain.

The most profitable lot for the fattening phase was lot 2, which had the highest average daily gain. With the exception of lot 1, the lots ranked in the same order on rate of gain and net profit per head.

THE OVER-ALL TRIAL

The results of the over-all 415-day trial are shown in table 5. The average daily gains of lots 1, 2, and 5 are about the same and are the highest, which indicates that stilbestrol was most effective when used in either two or three of the phases. Lot 3, which received stilbestrol in three phases, had a lower average daily gain because of the low gain in the fattening phase. Lot 4, the control lot, had the lowest average daily gain.

All of the stilbestrol-treated lots showed more profit than the control lot 4. Lot 2 had the highest profit, which was due to the higher selling price and heavier steers. The control lot had the lowest selling price. The selling price was based on packer carcass grade and yield, while the grades shown are the federal grades. This system resulted in some changes in the relationship of the lots on average carcass grade and average selling price because of differences in the grading systems. Weight and yield of individual carcasses also brings about some changes in the relationship between grade and selling price.

The profits shown in table 5 are greater than shown in table 4 because table 4 includes only the fattening phase of the experiment, and the steers were estimated to have an equal value per pound at the beginning of the fattening phase. This method did not give any benefit to the saving in feed cost resulting from the previous treatments. The initial cost shown in table 5 is the cost at the beginning of the winter phase.

EFFECTS OF STILBESTROL TREATMENT ON THE CARCASS

The steers were shipped by truck from Brookings to Armour and Company, Huron, South Dakota, for slaughter. They were weighed at Brookings and again just prior to slaughter at Huron, 16 hours later. Trucking distance was 75 miles. The difference in the two weights represents the farm - to - market shrink.

Buyers at Armour and Company graded the steers live but purchased them on the basis of their carcass grades and yield. The carcasses were also graded by federal graders and are the grades used in the tables. At the time the carcasses were graded, the rib-eye area and the external fat covering were measured with the use of a photographic grid (figures 6 and 7).

The area of the rib-eye muscle was measured by counting and adding the one-fourth square inch areas

of the grid covering the rib-eye muscle. Only squares of which one-half or more were covered by the rib-eye muscle were counted in obtaining the total area. The area of the external fat was determined by plotting two perpendicular lines at both ends of a straight line drawn through the long axis of the rib-eye muscle. The external fat within the boundary of these two perpendicular lines was measured by counting the grid squares as above for an estimate of the area of fat. The proportion of rib-eye muscle was determined by the following formula:

Proportion of rib-eye muscle=rib-eye area÷rib-eye area plus area of external fat

Stilbestrol-Treated Steers Grade and Dress High

Results of the carcass information are presented in table 6. There was very little difference in carcass grades except that the steers receiving stilbestrol in all three phases of the experiment (lots 1 and 3) graded slightly lower than those in the other lots. The average carcass score of each lot fell within the

Table 5. Results of Over-all Stilbestrol Experiment—November 14, 1956 to February 24, 1958*—415 days

	Lot 1	Lot 2	Lot 3	Lot 4	Lot 5	Lot 6
Stilbestrol treatments						
Wintering	Stil.	Stil.	Stil.	No Stil.	No Stil.	No Stil.
Pasturing	Implant	No Stil.	Implant	No Stil.	Implant	No Stil.
Fattening	Implant	Oral	Oral	No Stil.	Implant	Implant
Av. initial wt., lb.	430.2	426.8	428.4	424.8	428.2	432.4
Av. final wt., lb.	1221.5	1220.8	1173.2	1104.4	1227.6	1181.9
Av. daily gain, lb.	1.70	1.71	1.60	1.46	1.72	1.61
Initial cost @ $21 cwt.,	90.34	89.63	89.96	89.21	89.92	90.80
Feed cost/head, $						
Wintering†	23.70	23.70	23.70	21.88	21.88	21.88
Pasturing	12.77	12.60	12.77	12.60	12.77	12.60
Fattening	59.44	58.19	57.42	52.93	59.56	57.54
Total cost/head, $	186.25	184.12	183.85	176.62	184.13	182.82
Av. market wt., lbs.	1161.2	1171.2	1112.5	1051.2	1158.8	1123.8
Av. selling price/100 lbs. $‡	25.49	26.19	25.88	25.58	25.74	26.06
Av. selling price/head, $	295.99	306.74	287.92	268.90	298.28	292.86
Profit/head, $§	109.74	122.62	104.07	92.28	114.15	110.04

*Dates are not inclusive, gains are not included for time between winter and pasture phase—April 17, 1957, to May 28, 1957.

†Wintering feed costs based on average of two stilbestrol-treated lots for lots 1, 2, and 3 and average of control lot for lots 4, 5, and 6.

‡Sold on basis of packer carcass grade and yield. Selling price per cwt. calculated back to live market weight.

§Profit above initial cost of animal, feed costs, and cost of stilbestrol.

same one-third of a grade. The live grades correpsond very closely to the carcass grade except that lot 6 graded one-third of a grade higher on the hoof than in the carcass. The similar condition of the lots shortly before being sold is shown in figures 8 to 12.

There was very little difference in the dressing percent among the lots; however, lot 5 had a slightly lower dressing percent than any of the other lots. It was the only lot that fell below 60%.

The greatest difference in farm-to-market shrink between any two lots was 1.52 percentage points between lot 2 and lot 5. Lot 2 received oral stilbestrol and lot 5 received stilbestrol implants. Shrink for the other lots, including control lot 4, was about the same. In lots 2 and 3, fed stilbestrol, lot 2 had a low shrink but lot 3 was higher than all others except lot 5. Thus, the influence of stilbestrol treatment on amount of shrink appears rather inconclusive in this experiment.

There were no significant differences between the lots in rib-eye measurements. Because of the small variations among the lots, it ap-

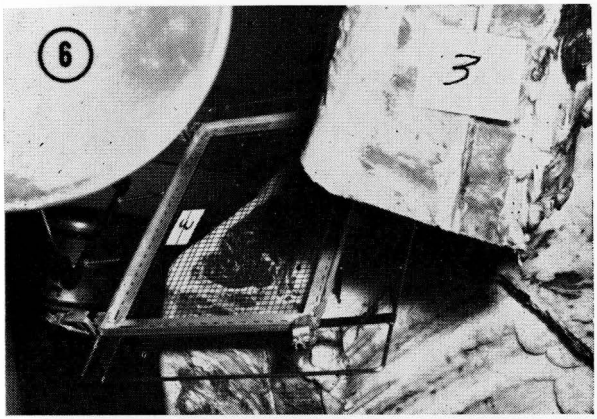
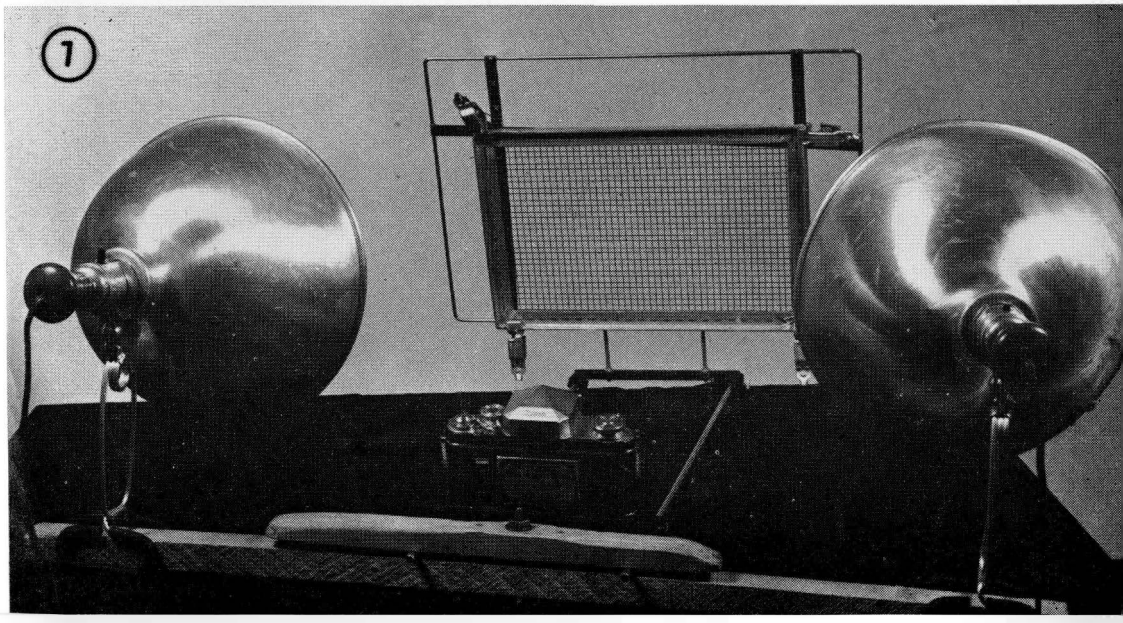


Figure 6. This is the method used in photographing the rib-eye area. Each square of the grid is one-fourth inch square. The area of the rib-eye and the external fat covering were determined by counting the squares, as explained in the text.

Figure 7. The camera, focus guide, and photographic grid used in photographing and measuring the rib-eye area of the carcasses are shown here. The method is adapted from Schoonover and Stratton (Journal of Animal Science, Vol. 16:957, 1957).



pears that the stilbestrol did not have any important effect on size of the rib-eye or proportion of the rib-eye to the external fat covering.

SUMMARY

Results of a 415-day experiment using growing-fattening steers to study the use of stilbestrol are reported here. The experiment was divided into three phases—wintering, pasturing, and fattening. In the trial there were 48 steers which were divided into four groups in the wintering phase and then redivided into six groups during the pasturing and fattening phases.

Use of stilbestrol in the wintering phase with a prairie hay and soybean oil meal ration increased the average daily gains 30.1% over the control steers. There was no significant difference between the steers that were fed 10 milligrams of stilbestrol daily and the steers that were implanted with 36 milligrams

Table 6. Carcass Information

	Lot 1 Stil. Imp.	Lot 2 Stil. Oral	Lot 3 Stil. Oral	Lot 4 No. Stil.	Lot 5 Stil. Imp.	Lot 6 Stil. Imp.
Number of steers	8	8	8	8	8	8
Carcass grades—number						
High Choice	1	2	—	1	2	1
Average Choice	1	3	3	3	3	4
Low Choice	6	3	4	4	3	3
High Good	—	—	1	—	—	—
Av. carcass score*	7.4	7.9	7.2	7.6	7.9	7.8
Av. percent of shrink†	4.92	4.08	5.16	4.84	5.64	4.95
Av. dressing percent	60.56	60.28	60.53	60.09	59.70	60.62
Live grades—number						
Low Prime	—	—	—	1	—	2
High Choice	—	1	—	1	2	3
Average Choice	5	4	3	4	3	2
Low Choice	3	3	4	1	3	1
High Good	—	—	1	—	—	—
Average Good	—	—	—	1	—	—
Av. live grade score*	7.6	7.8	7.2	7.9	7.9	8.8
Rib-eye measurement, av. sq. in.						
Rib-eye muscle	10.31	10.92	10.16	10.34	10.72	10.85
External fat	3.88	3.72	3.70	3.99	3.95	4.21
Total	14.19	14.64	13.86	14.33	14.67	15.06
Proportion of rib-eye muscle to external fat	.726	.750	.736	.722	.731	.722

*Carcass and live grade score based on Low Prime, 10; High Choice, 9; Average Choice, 8; Low Choice, 7; High Good, 6; and Average Good, 5.

†Trucked from Brookings to Huron (75 miles) and held over night and fed hay and water (16 hours from final weight to market weight).

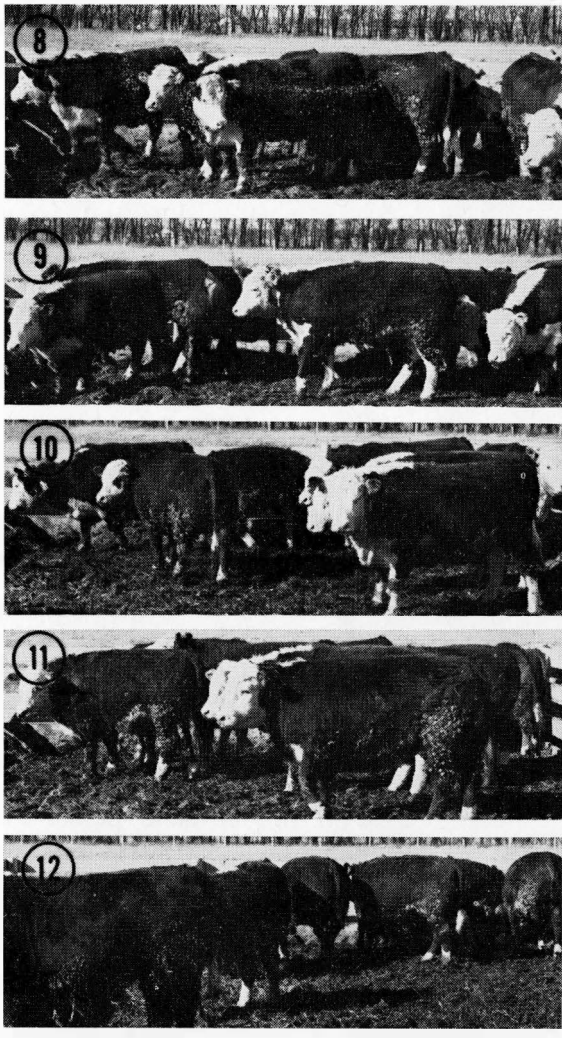
Figure 8. Lot 1 steers, which received stilbestrol during the wintering trial were implanted with 24 milligrams before going to pasture and with 36 miligrams when put in dry lot for fattening.

Figure 9. These steers, from lot 2, received stilbestrol during the wintering trial, none on pasture, and 10 milligrams daily in the protein supplement during the fattening phase.

Figure 10. Lot 3 steers were treated the same as lot 2 except they were implanted with 24 milligrams of stilbestrol at the beginning of the pasture season.

Figure 11. Steers in lot 4 received no stilbestrol in the experiment and served as the control lot.

Figure 12. These lot 5 steers received no stilbestrol during the wintering trial but were implanted with 24 milligrams at the beginning of the pasture season and with 36 milligrams when put in dry lot for fattening.



of stilbestrol. Since the winter rations produced a low rate of gain, the increased gain from the stilbestrol treatments amounted to only about 0.2 pound per head daily.

Implants of 24 milligrams of stilbestrol increased the average daily gains 22.7% over the nonimplanted steers when pastured for 126 days on a primarily bromegrass pasture. The greatest response to stilbestrol on pasture was obtained with steers which had not received stilbestrol during the previous winter. The winter stilbestrol treatment appeared of questionable value with wintering rations that produce low gains, as in this experiment, when all lots are to be given stilbestrol implants before going to pasture.

Steers which received stilbestrol during the winter but none on pasture gained at a rate similar to steers which did not receive stilbestrol in either phase. This indicates the stilbestrol treatment during the winter phase did not affect the steers' ability to gain on pasture when not given any stilbestrol during the pasture phase. In previous

work at the South Dakota Experiment Station, it was found that steers implanted with stilbestrol on pasture maintained the weight advantage when fattened in dry lot without further stilbestrol treatment.

Use of stilbestrol in the fattening phase increased the average daily gain 17.3, 18.3, 4.7, 14.7, and 16.5% in the five stilbestrol-treated lots over the control lot. The average increase was 14.3%. One of the lots that received stilbestrol orally in the fattening phase and had received stilbestrol previously in both the wintering and the pasturing phases did not gain at a much faster rate than the control lot. There was no signficant difference between the fast-gaining oral stilbestrol lot and the lots that received stilbestrol implants.

Results of the over-all experiment indicate that stilbestrol should be used in two or more phases for growing-fattening steers. When handled as in this experiment, there did not appear to be any advantage in using stilbestrol in three phases over only two phases. However, stilbestrol should be used in the fattening phase because of the faster rate and greater total gain made in this period.

There were no significant differences in carcass grade or dressing percent due to stilbestrol treatment. However, steers which received stilbestrol in all three phases of the experiment graded slightly lower than those in the other lots. The farm-to-market shrink varied some between the lots, but the results are rather inconclusive as to the effect of stilbestrol on farm-to-market shrink. There were no significant differences between the lots in rib-eye measurements.

In a previous trial, stilbestrol administered either orally or as implants appeared to lower carcass grade. However, the cattle were not fed as long or to as high a degree of finish as in the trial reported here, which may account for the apparent differences in the effect of stilbestrol on carcass grade.

In all three phases of the experiment, stilbestrol - treated lots showed more profit than the non-stilbestrol-treated lots. It, therefore, can be concluded that stilbestrol treatments, either oral or implant, showed a profitable advantage in this experiment.