EFFECTS OF STILBESTROL on Range Beef Calves and Yearlings

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Summary

Effects of Stilbestrol on Range Beef Calves and Yearlings

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The use of stilbestrol (oral and implant) has been widely accepted for cattle fattened in drylot because of increased gains and improved feed efficiency. Interest in using stilbestrol has spread rapidly to those concerned in range beef cattle production.

This bulletin reports results of several experiments involving a large number of calves and yearlings to determine the effects of stilbestrol. The experiments were conducted from 1956 to 1961 at both the Lake Blackwell experimental range near Stillwater and at the Fort Reno Experiment Station near El Reno.

All cattle and calves grazed native grass pastures (Bluestem and associated tall grasses) which provided adequate forage. High quality grade Herefords, produced in the experimental herds, were used in all experiments. Most of the younger cattle were graded choice as feeders.

A variety of comparisons were included in the studies, some of which were: Stilbestrol implants for suckling calves; Adding stilbestrol to the creep-feed of suckling calves vs. implanting; Winter performance and subsequent feed-lot performance of previously implanted calves; Stilbestrol implants for yearling steers on summer grass, and subsequent feed-lot performance of previously implanted yearling steers.

Stilbestrol Implants for Suckling Calves

A total of 383 spring and fall calves were used to study the value of stilbestrol implants for suckling calves. Calves were implanted in the ear at two to five months of age and weighing from 200 to 350 pounds. The majority were three to four months of age and weighed 200 to 300

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pounds when the implant was made. The dams of the calves were fed different kinds and amounts of supplemental feed in nutrition experiments. Hormone treatment was made to an equal number of calves in each lot. In some studies the calves were creep-fed.

The ration of the cow and whether or not the calves were creep-fed were considered when deciding which calves to implant. Seven of the 11 comparisons with steers were spring calves (dropped in February, March and April) and four were fall calves (October, November and early December). In the nine comparisons with heifers, five were with spring calves and four were with fall calves.

In the first two tests, 15 mg. of stilbestrol was implanted in the ear of half of the steer calves. In three subsequent tests with steers and three with heifers, the initial implant was 12 mg. stilbestrol when the calves were 75 to 100 days old and 12 mg. about 75 days later. In one test with heifers the implant was 18 mg. stilbestrol (12 + 6). The implant was 12 mg. in the 11 remaining tests.

Stilbestrol increased gains, on the average, in suckling calves about 25 pounds or 11.1 percent in 20 comparisons. Implanted steers gained an average of 22 pounds more than control steers, while implanted heifers averaged 29 pounds more than control heifers (Table 1). There was considerable variation in response to the implants. The increased weight gains varied from —1 to 53 pounds for steers and from 5 to 42 pounds for heifers.

Table 1. Effect of Stilbestrol Implants on Suckling Calves

	Steers		Heifers	
	Control	Implanted	Control	Implanted
Number of tests	11	11	9	9
Number of calves	108	102	87	86
Average gain per calf, lb.	234	256	216	245
Increased gain due to implant, lb.		22		29

Calves were given a feeder grade at weaning in six of the early tests. Implanted calves graded average choice and the control calves low choice. The higher feeder grade of implanted calves was apparently due to more bloom and slightly fatter appearance at weaning. This difference in condition might affect the calves' price as feeders,

depending on the local market demand and preference of the feeder buyer.

Body conformation must be considered in the use of stilbestrol. In the early use of stilbestrol with yearlings, many cattlemen administered unusually high doses which resulted in undesirable side effects such as lowered loins and high tail heads.

In many of the calf studies, no side effects were observed. However, in tests where calves were implanted with 12 mg. in May and then reimplanted with 12 mg. about 75 days later, there were noticeable side effects from the second implant. Depressed loins, high tail heads, and increased udder development were prevalent in both steers and heifers and persisted until after weaning. Some of the heifers had a swelling of the vulva. In some trials with only one 12 mg. implant there were noticeable side effects in some of the heifers but none in steers.

Although observations as to general appearance of calves were recorded in all trials, there were no consistent obvious differences in prominence of tail head and teat length. In fact, experienced cattlemen reported considerable difficulty in attempting to detect the implanted calves although they knew that half of the calves in a group had been implanted.

Stilbestrol Implants for Suckling Steers vs. Heifers

Within the 20 comparisons shown in Table 1, there were eight instances where the response of steers and heifers could be compared directly; that is, half of the steers and half of the heifers within an experiment were implanted.

Table 2 shows that heifers gained an average of 11 pounds more due to stilbestrol than steers. The lesser response of the steers was ap-

Table 2. Effect of Stilbestrol Implants on Suckling Steers vs. Heifers (8 Direct Comparisons)

	Steers		Heifers	
	Control	Implanted	Control	Implanted
Number of calves	80	74	86	85
Average gain per calf, lb.	244	262	221	250
Increased gain due to implant, lb.		18		29

parently due to two trials in which the implanted steers averaged only 1 pound and a minus 1 pound gain while the heifers averaged 34 and 41 pound gains in the same trials, respectively.

Stilbestrol Implants of Spring vs. Fall Calves

Increased gains due to stilbestrol averaged eight pounds more for spring calves than for fall calves (Table 3). The length of experiments were about the same for both spring and fall calves. However, the spring calves were about one month younger when implanted and were a month younger when weaned than the fall calves.

Table 3. Effect of Stilbestrol Implants on Spring vs. Fall Calves

	Season Calved	
	Spring	Fall
Number of tests	12	8
Number of calves	171	209
Average gain per calf, lb.		
Control	235	213
Implanted	263	233
Increased gain due to implant, lb.	28	20

In certain tests, the calves were creep-fed but there was no apparent relationship between size of response to stilbestrol and creep-feeding.

Two Levels of Stilbestrol Implants for Fall Calves

This experiment was conducted to determine whether or not lower levels of stilbestrol were effective in increasing gains without producing any noticeable undesirable side effects.

Most of the calves were creep-fed until May 1, but there were some which were creep-fed until weaning in July and some which were not creep-fed. Calves were weaned about 125 days after having been implanted.

On the average, response of both sexes was nearly equal. The implants increased gains slightly less than the average in other tests. The 6 mg. implant produced an increase of 10 pounds, as shown in Table 4. The 12 mg. implant produced an increase of 16 pounds or only 6 pounds more than the 6 mg. implant. While response was slightly less from the

Table 4. Effect of Different Levels of Stilbestrol Implants on Suckling Fall Calves (6 comparisons)

	Implant Level		
	0	6 mg.	12 mg.
Number of calves	86	77	77
Average gain per calf, lb.	217	227	233
Increased gain compared to no implant, lb.		10	16

lower level of stilbestrol, there were noticeable side effects from the higher level of stilbestrol or 12 mg. implant.

Adding Stilbestrol to Creep-feed of Suckling Calves

The value of stilbestrol added to a creep-feed mixture was studied in six tests, three with spring calves and three with fall calves (Table 5). If effective, this method would be convenient in administering stilbestrol.

Table 5. Effect of Feeding 5 mg. Stilbestrol in the Creep-Feed of Suckling Calves (3 comparisons)

	Spring		Fall	
	Control	5 mg.	Control	5 mg.
Number of calves	55	57	50	50
Average gain per calf, lb.	291	298	162	176
Increased gain due to stilbestrol, lb.		7		14

Feeding 5 mg. stilbestrol per head daily increased average gains of spring calves seven pounds more than control calves. The response, however, was quite variable for the three tests (—2, —3 and 26 pounds). Fall calves fed stilbestrol averaged 14 pounds more than control calves.

These results suggest that implantation may be a more desirable method of administration due to the variable intake of creep feed and thus, stilbestrol.

Implanting vs. Feeding Stilbestrol to Creep-fed Suckling Spring Calves

Implanting calves with 12 mg. stilbestrol in May and 12 mg. 75 days later was compared to feeding 5 mg. per head daily in creep-feed in a single test involving 57 calves.

Table 6 shows that the implanted calves gained 35 pounds more than control calves while calves fed stilbestrol in the creep-feed gained an average of 2 pounds less than control calves. These data tend to correspond to those in Table 5 in that implantation may be the more desirable method of administering stilbestrol.

Table 6. Effect of Implanting vs. Feeding Stilbestrol on Creep-Fed Suckling Spring Calves

	Control	Feed[1]	Implant[2]
Number of calves	20	17	20
Age of calves at start, days	96	94	92
Average gain per calf, lb.	289	287	324
Increased gain due to stilbestrol, lb.		—2	35

[1] Five mg. per head daily.
[2] Implanted with 12 mg. at the start of test, reimplanted with 12 mg. 75 days later.

Subsequent Wintering Performance of Previously Implanted Calves

Table 7 shows results of three tests to determine whether suckling calves implanted with stilbestrol would perform as well when fed wintering rations after weaning as calves which had not implanted.

The weaning period was considered to be the interval between actual separation from the dams until the start of the wintering test. The gain, or loss, during the weaning period was nearly the same for both groups, —10 and —6 pounds. Winter gains were also nearly equal although there was a five pound advantage for previously implanted cattle. Considering the three periods of summer, weaning and wintering, stilbestrol implants increased total gains by 33 pounds.

Table 7. Subsequent Winter[1] Performance of Previously Implanted Calves (Av. of 3 Trials)

	Control	Implanted[2]
Number of calves	25	30
Summer gain, lb.	237	261
Gain during weaning, lb.	—10	—6
Winter gain, lb.	11	16
Total gain, lb.	238	271
Net increased gain due to implant, lb.		33

[1] Fed wintering type rations after weaning.
[2] In one trial, implanted with 12 mg. in May and reimplanted with 12 mg. 75 days later. On others, 12 mg. implanted in early June.

Subsequent Feedlot Performance of Previously Implanted Spring Calves

Three trials were run to determine the effect of stilbestrol on suckling calves in relation to their subsequent feedlot performance (Table 8).

Stilbestrol increased summer gains of spring calves an average of 28 pounds. All calves were fed 10 mg. stilbestrol per head while in the

Table 8. Subsequent Feed-Lot Performance of Previously Implanted Spring Calves (Av. of 3 Trials)

	Control	Implanted[1]
Number of calves	29	30
Summer gain as calves, lb.	232	260
Gain in feed-lot, lb.[2]	365	367
Daily gain in feed-lot, lb.	2.30	2.31
Initial feeder grade	4.2	5.4
Carcass grade	6.7	6.2
Dressing percentage	59.2	59.9

[1] In first test calves were implanted with 15 mg. when they were about 100 days old and weighed 300 lbs. In other tests implants were 12 mg. at the start of the test in May and reimplanted with 12 mg. 75 days later.
[2] All calves fed 10 mg. stilbestrol per head during feed-lot phase.
[3] Feeder grades scored as follows: A,8; A—,7; B+,6; B,5; B—,4; etc. A grade of B is average choice.
[4] Carcass grades scored as follows; High Choice, 9; Choice, 8; Low Choice 7; High Good, 6; etc.

feedlot. The feedlot gain was essentially the same for both groups, indicating no detrimental effect of the previous implant. The initial feeder grade was highest for implanted calves; however, the carcass grade at the end of the test was slightly higher for the control calves. Previously implanted calves had a slightly higher dressing percent.

Subsequent Feedlot Performance of Previously Implanted Fall Calves

Three groups of calves were used to test the feedlot performance of previously implanted fall calves. One group was implanted with 6 mg stilbestrol, one group was implanted with 12 mg. stilbestrol and one group used for controls.

Stilbestrol increased average gains while suckling 6 and 19 pounds, respectively, for the 6 and 12 mg. implanted calves over the control group. (Table 9). During the feedlot test, stilbestrol implanted in suckling calves increased gains 14 and 21 pounds for the 6 and 12 mg. groups, respectively, over the control group. Total average gains for the entire period were increased 17 pounds for the calves receiving 6 mg. stilbestrol and increased 39 pounds for calves receiving 12 mg. over the control groups.

Table 9. Subsequent Feed-Lot Performance of Previously Implanted Fall Calves

	Implant Level		
	0	6 mg.	12 mg.
Number of calves	16	13	13
Gain while suckling, lb.	241	247	260
Gain from weaning until start[1] of feed-lot test, lb.	64	61	63
Feed-lot gain (133 days), lb.	321	335	342
Daily gain in feed-lot, lb.	2.4	2.5	2.6
Total gain	626	643	665

[1] All calves (steers) were implanted with 24 mg. stilbestrol at the beginning of the feed-lot test.

Stilbestrol Implants for Wintering Weanling Calves

Table 10 shows results of three trials where implanting 12 and 24 mg. stilbestrol was compared to no implant for wintering weanling

Table 10. Stilbestrol Implants for Wintering Weanling Calves* (Av. of 3 Trials).

	Implant Level		
	Control	12 mg.	24 mg.
Number of calves	69	70	68
Winter gain, lb.	33	44	53
Increased gain over controls, lb.		11	20

*In two trials, steers were wintered on dry native grass range and protein supplements. In the other trial, heifers were kept in traps and fed prairie hay, cottonseed meal and a small quantity of milo.

calves. In two trials, steers were wintered on dry native grass range and protein supplement. In the third trial, weanling heifers in traps were fed prairie hay, cottonseed meal, and a small quantity of milo.

The 24 mg. implant increased average winter gains a total of 20 pounds over control calves and the 12 mg. implant increased gains 11 pounds compared to control calves. These results indicate that gains of weanling calves can be increased by stilbestrol implants even though fed for a low rate of gain.

Subsequent Summer Performance on Grass of Cattle Implanted as Weanling Calves in November

Two trials with three lots of calves were used in this experiment. The respective lots of calves were implanted with 12 and 24 mg. stilbestrol in November and one lot was used as controls. The cattle were allowed to graze native grass pastures during the following summer.

Table 11. Subsequent Performance on Summer Grass of Cattle Implanted with Stilbestrol as Weanling Calves in November (Av. of 2 Trials)

	Implant Level		
	Control	12 mg.	24 mg.
Number of head	39	40	39
Winter gain, lb.	28	42	52
Summer gain, lb.	220	216	222
Total gain, lb.	248	258	274
Response to Stilbestrol, lb.		10	26

Table 11 shows increased winter gains due to 12 and 24 mg. implants to be 14 and 24 pounds, respectively. During the subsequent summer, gains differed only slightly. Because of the satisfactory summer gains for all groups, the increase in total gains due to the stilbestrol implants averaged 10 pounds for 12 mg. and 26 pounds for 24 mg.

Stilbestrol Implants for Yearling Steers on Summer Grass

Results from this experiment concern six trial studies related to stilbestrol implantation of yearling steers grazing native grass pastures.

In 1956, 56 steers were divided into four lots. All cattle grazed native grass pastures but two lots were self-fed a mixture of salt and ground milo to increase the energy intake. One lot receiving no supplement and one lot self-fed the salt-milo mixture were implanted with 45 mg. stilbestrol. In 1957, the test was repeated except that the stilbestrol implant was reduced to 36 mg. The two-year average increased gain due to stilbestrol was 13 pounds or 7.6 percent, as shown in Table 12. Response was not related to addition of supplemental fed.

Table 12. Effect of Stilbestrol Implants on Yearling Steers on Summer Grass

	Implant Level			
	Control	12 mg.	24 mg.	36 mg.
		2-year average[1]		
Number of steers	53			58
Summer gain, lb. (100 days)	112			185
Increased gain due to implant, lb.				13
		1958 trial		
Number of steers	23	22	21	22
Summer gain, lb. (97 days)	119	176	170	175
Increased gain compared to no implant, lb.		27	21	26
		3-year average		
Number of steers	96	96		
Summer gain, lb.	162	181		
Increased gain due to implant, lb.		19		

[1] Represents 4 comparisons. Within each year, the effect of stilbestrol implant with and without self-feeding a mixture of salt and milo (about 3.5 lb.) was studied. Supplemental feed did not affect response to stilbestrol. Stilbestrol implants were 45 mg. in one year and 36 mg. in the second year.

Table 13. Effect of Previous Stilbestrol Implant on Feed-Lot Performance of Yearling Steers on Feed 192 Days[1]

	Controls	36 mg. Implant Previous Summer
No. steers per treatment	30	30
Av. initial feeder grade	B—	B
Av. weights, lb.		
Initial	725	757
Av. daily gain		
1st 83 days	2.93	2.96
for 192 days	2.14	2.07
Final feed-lot weight	1136	1154
Av. carcass grade	Gd+	Gd+
Dressing percentage	60.77	60.75

[1] All steers received 10 mg. stilbestrol per head daily in the ration.

Table 14. Effect of Previous Summer Implant on Feedlot Gains and Carcass Grades of Yearling Steers After 157 Days[1]

	Implant Level			
	0	12	24	36
No. steers	16	15	14	14
Av. gains, lb.				
Summer	146	194	178	178
Feedlot	436	378	410	426
Av. daily gain	2.78	2.41	2.61	2.71
Total	582	572	588	604
Final feedlot wt., lb.	1174	1140	1159	1207
Av. carcass grade	Ch—	Ch—	Gd+ to Ch—	Gd+ to Ch—
Av. dressing percentage	61.2	60.9	60.4	60.2
Av. live value per cwt., $	26.82	26.57	26.30	26.24

[1] One-half steers from each summer treatment implanted with 24 mg. stilbestrol at start of fattening period.

There were noticeable differences in behavior and conformation of the steers in the first test. Implanted steers appeared to be more staggy or bullish in behavior and had noticeably higher tail-heads and lower loins. This change in conformation indicated that the dosage (45 mg.) of stilbestrol may have been too high.

Buyers paid $1 to $2 per cwt. less for the implanted steers because they thought the steers would be less desirable for fattening in dry-lot. Only minor differences in appearance of the top line and tail-heads occurred during the 1957 test.

In 1958, the study was designed to determine the optimum levels of stilbestrol which would increase gains without producing noticeable side effects. One group of steers served as the control, while steers in the other three groups were implanted with either 12, 24, or 36 mg.

Summer gains were nearly equal for all groups of implanted steers but averaged 25 pounds (16.8 percent) more than gains of control steers (Table 12). The increased gain due to 12 mg. of stilbestrol was as great as the response to 24 or 36 mg., with essentially no adverse side effects. A few steers which were implanted with higher levels of stilbestrol had noticeable tail-heads and flat loins.

In three subsequent tests, 12 mg. stilbestrol was implanted in 550 pound yearling steers. This increased gains an average of 19 pounds. The overall average increase in gain due to stilbestrol implants on yearling steers was about 15 percent.

Effects of Previous Summer Implants on Feedlot Gains of Yearling Steers

The fall and winter feedlot performance of yearling steers implanted previously on summer pasture was investigated in three trials. In the first trial (Table 13) the feedlot performance of summer implanted steers was slightly reduced (13 lb. per head), possibly because they weighed 32 pounds more than the controls when placed on feed. Also, control steers may have responded more favorably to the stilbestrol fed (10 mg.) during the feedlot phase. Neither carcass grades nor dressing percentage appeared to be adversely affected by the summer implant treatment. Under the conditions of this test, about 40 percent of the improvement in gain from summer implanting had disappeared at the end of the feedlot phase.

In the second trial (Table 14) eighty yearling steers which had been implanted with either 0, 12, 24 or 36 mg. per head the previous May

were used in feeding trials at Ft. Reno. It appeared that there was no consistent response to previous summer implant, although the steers that were not implanted the previous summer made the greatest feedlot gain. This was particularly apparent from the response to stilbestrol by control steers that received their first implant when placed on feed. There were only small differences in carcass grade and yield, but these favored the controls or 12 mg. summer implant groups. This was further reflected in a higher live animal value per cwt., based on actual carcass value and dressing percentage. Effects of previous summer implant such as high tail-heads became less noticeable as the feeding period advanced. Again, as in the first trial, some feeder buyer resistance would appear justified from the results.

In a third trial, the advantage of 24 pounds gain during the summer from a 12 mg. implant almost completely disappeared by the termination of the feedlot phase (Table 15). On the basis of this average response and considering no difference in feed consumption or efficiency during the fattening phase, it is estimated that the value of a 700 lb. yearling feeder in the fall would be reduced by approximately $.80 per cwt. because of previous summer implanting.

Differences in carcass grades were small; dressing percentage and live animal value slightly favored the steers previously implanted. Shortly

Table 15. Effect of Summer Implant of Yearling Steers on Subsequent Feed-lot Performance (154 days)[1]

	Implant Level		Differences Due to Stilbestrol
	0	12 mg.	
No. steers on treatment	32	31	
Av. gains, lb.			
Summer	142	166	24
Feed-lot	407	385	—22
Av. daily gain	2.64	2.50	— 0.12
Total gain	549	551	— 2
Av. carcass grade	Gd+	Gd+	
Dressing percentage	58.8	59.3	
Live value/cwt. $	24.64	24.93	

[1] All steers implanted with 24 mg. at the start of the feed-lot test

after all steers were implanted with 24 mg. at the start of the feedlot test, those which had been implanted previously exhibited high tails and flat loins. These differences disappeared and no noticeable side effects were present at market time.

In the Ft. Reno feedlot tests it was not possible to feed the controls vs. summer implanted steers separately so that feed intake and efficiency of gains could be measured.

The difference in feedlot gain pattern between these results and previously reported data on calves may be due to compositional changes between the response of a calf vs. a yearling to summer implant treatment. With the older steers, summer implant gains tend to be lost in the feedlot while in the calf they may be more in the form of true growth and thus retained.

Summary

Stilbestrol implants of 12-15 mg. in 3-4 month old suckling steer calves increased weaning weights about 22 lb. in 20 comparisons. With heifers the response, although greater on the average, resulted in more adverse side effects such as swollen vulva and increased teat length. The implantation of steers at the above level had no detrimental effect on feeder grade; in fact, they appeared to be fatter and showed more "bloom" in most trials. Higher implant levels resulted in more adverse side effects and high tail heads; lower implant levels (6 mg.) gave less gain response. Implanting appeared to give a greater gain response than feeding stilbestrol in the creep-mix. Response to stilbestrol implants was greater with spring than fall-dropped calves.

Gains of yearling steers grazing good native pastures were increased about 15 percent by implanting with stilbestrol. From the levels used during the summer grazing phase, it appears that 12 mg. may be most satisfactory in that it will promote good gains and yet minimize possible side effects.

Winter gains on dry grass or in a trap on hay were slightly improved by implanting with 12 mg. Presumably, the low energy intake prevents maximum response in gain from stilbestrol. Increased gains made by summer-implanted suckling calves were not lost during the following winter.

Feedlot performance of calves which had been previously implanted was not adversely affected. With yearlings, average daily gains on feed

were slightly reduced, and in some cases previous summer gains were nullified. Hence, the feeder buyer may be justified in a discount on implanted yearling feeders.

Results indicate that:

- The implant level should be kept low to avoid adverse side effects, yet get a good gain response;
- Young suckling heifers should not be implanted because of adverse side effects and possible appearance of heat or estrus;
- The commission man or feeder buyer should be advised of the use, level and time of stilbestrol implant; and,
- Only one implant should be made, preferably 120 days or so before marketing and while cattle are on the best grass, or when steer calves are 3-4 months of age.

Oklahoma's Wealth in Agriculture

Agriculture is Oklahoma's number one industry. It has more capital invested and employs more people than any other industry in the state. Farms and ranches alone represent a capital investment of four billion dollars—three billion in land and buildings, one-half billion in machinery and one-half billion in livestock.

Farm income currently amounts to more than $700,000,-000 annually. The value added by manufacture of farm products adds another $130,000,000 annually.

Some 175,000 Oklahomans manage and operate its nearly 100,00 farms and ranches. Another 14,00 workers are required to keep farmers supplied with production items. Approximately 300,000 full-time employees are engaged by the firms that market and process Oklahoma farm products.

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