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Bulletin 354

December 1962

Diethylstilbestrol  
Implants  
**FOR**  
**SLAUGHTER BEEF HEIFERS**  
**IN TENNESSEE**

by  
O. Glen Hall

The University of Tennessee  
Agricultural Experiment Station  
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Knoxville

## Summary

THREE experiments involving a total of 88 short yearling beef heifers were conducted at the Tobacco Experiment Station during 1957, 1958, and 1959 to determine the effects on feed lot performance of implanting beef heifers with 24 milligrams of stilbestrol. The heifers used in the tests weighed approximately 560 pounds each and graded Standard in condition when they were started on test. They were given a full-feed of concentrates (7 parts ground ear corn and 1 part cottonseed) and 3-5 pounds of hay per head daily for a period of 56-58 days. Major results of these experiments may be summarized as follows:

1. Beef heifers full-fed in dry lot and implanted with 24 milligrams of stilbestrol gained 19% faster than did comparable control heifers (2.55 vs. 2.14 pounds per head daily).
2. Stilbestrol treated heifers required 14% less feed per unit of gain than did the control heifers and feed costs per pound of gain were reduced from 14.9 cents to 13.1 cents.
3. Final condition grades and selling prices were not significantly different for the treated and control heifers in these experiments.
4. The stilbestrol cost about 25-30 cents and increased dollar returns by about \$5 per head over the controls.

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# Diethylstilbestrol Implants For Slaughter Beef Heifers in Tennessee

by

O. Glenn Hall<sup>1</sup>

**R**ECENTLY Tennessee cattlemen have found it profitable to feed beef heifer calves for the slaughter market during the late fall, winter, and early spring months. Research by the Tennessee Agricultural Experiment Station has shown that a very economical

feeding program consists of starting the heifers on a full-feed of good quality corn silage and about 5 pounds of concentrates per head daily; feed them in this manner for about 120-140 days, and then full-feed the heifers on concentrates for about 30-70 days before they are

\* The assistance in carrying out these experiments by C. S. Hobbs, Head of the Animal Husbandry-Veterinary Science Department, H. R. Duncan, Professor of Animal Husbandry-Veterinary Science Department (retired), and by J. Hugh Felts, superintendent of the Tobacco Experiment Station, Greeneville, is gratefully acknowledged. Appreciation is also expressed to Chas. Pfizer and Co., Terre Haute, Ind., for donating the stilbestrol pellets and the implanter used in the experiments.

<sup>1</sup> Associate Professor, Animal Husbandry-Veterinary Science Department.

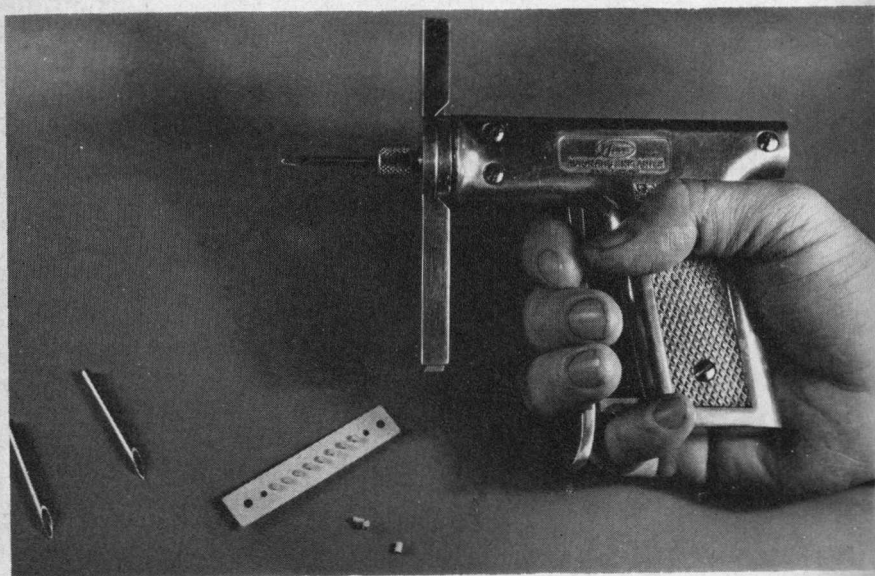


Figure 1. Stilbestrol pellets and an implanter. Each small pellet contains 12 milligrams of stilbestrol. Note that the implanter has a replaceable needle, which makes it easier to disinfect the needles after use.

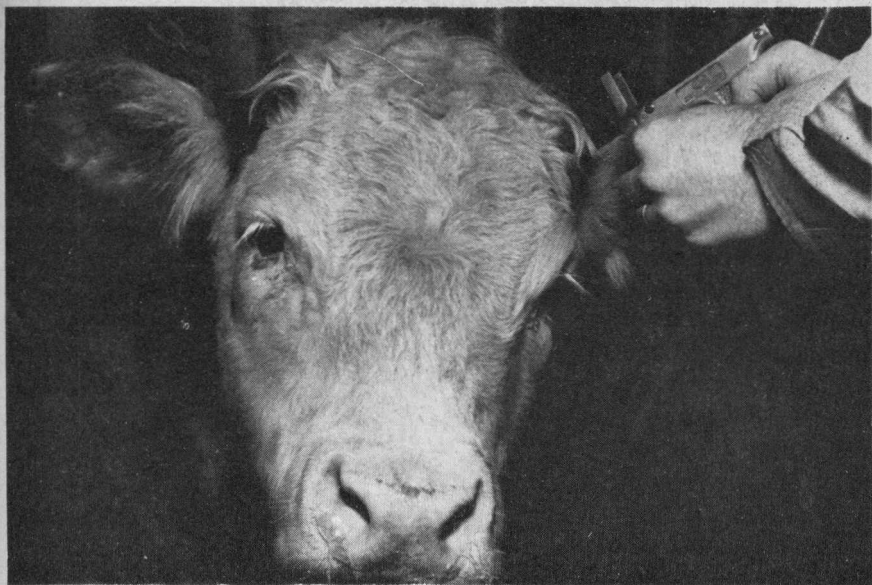


Figure 2. Diethylstilbestrol pellets are being inserted under the skin at the base of the ear of this beef heifer.

marketed in late April and early May.

If available, good fall and winter pastures are also excellent sources of feed for the heifers. Additional details of the heifer-feeding program have been described previously in Tennessee Farm and Home Science Progress Report Number 28.

During the past 8 years, numerous experiments by most of the agricultural experiment stations in this country have shown that the hormone-like drug, stilbestrol (di-

ethylstilbestrol), will markedly improve gains of and improve feed efficiency by beef steers. A much smaller number of experiments have been conducted with beef heifers than with steers. Since stilbestrol implants are inexpensive and have proved to be safe to use in beef cattle, it seemed desirable to determine the effects of stilbestrol on performance of beef heifers being fed as described above. Three experiments having this as the objective are summarized in this bulletin.

## Experimental Procedure

*Three Different Years.* Three experiments involving a total of 88 Hereford beef heifers were conducted at the Tobacco Experiment Station, Greeneville in 1957, 1958, and 1959. Most of the heifers used

were bought at various feeder calf sales in East Tennessee; some were station-raised purebred polled Herefords. Generally heifers grading Good in type were used. All the heifers had been fed a full-feed



of various kinds of silages and 5 pounds of concentrates for about 120-140 days before being used in these experiments. The calves weighed about 560-580 pounds each, were 12-14 months in age, and graded Standard in condition when they were started on test.

*Treatments.* In each experiment, one group of heifers was designated the control group and a second group of comparable heifers received the stilbestrol. Two 12-milli-gram pellets of stilbestrol (24 milli-grams total) were implanted under the skin at the base of the ear of the latter group of heifers. Both groups of heifers were fed a mixture of 7 parts ground ear corn and 1 part cottonseed meal free choice and about 3 to 5 pounds of a mixed grass-legume hay per head daily.

Water and minerals (2 parts di-calcium phosphate and 1 part salt) were available to the heifers at all times. The heifers were started on the treatments in late February or early March each year and fed until they would grade at least Good in condition. This required a feeding period of only 56-58 days.

*Weighing, Grading, and Analyses.* The heifers were weighed on 2 consecutive days at the beginning and end of each experiment and at 28-day intervals throughout the experimental periods. Two qualified graders graded the heifers at the beginning and end of each experiment. After the performance data were summarized, observed treatment differences were evaluated with the aid of appropriate statistical techniques.

## Results and Discussion

### Experiment I

Results of the 58-day full feeding experiment conducted during 1957

are summarized in Table 1. Beef heifers implanted with 24 milli-grams of stilbestrol gained 22%

Table 1. Effect of Stilbestrol Implants on Performance of Beef Heifers Full-Fed in Dry Lot February 19, 1957 to April 17, 1957—58 days

	Treatment	
	Control	Implanted with 24 mg. stilbestrol
No. of animals	9	9
Av. wt. and gain, lb.		
Initial wt.	583	571
Final wt.	713	730
Total gain	130	159
Daily gain	2.24	2.74*
Grades		
Initial type	HG+	HG+
Initial slaughter	Std+	Std
Final slaughter	G+	HG
Selling price/cwt.	\$19.67	\$19.61

\*  $P < .05$ .

faster than did the control heifers during the experiment. Actual rates of gain were 2.74 pounds per head daily for the implanted heifers as compared to 2.24 pounds per head daily for the control heifers. The difference in daily gains was statistically significant at the 5% level of probability.

The condition grades of the heifers were raised a full grade during the 58-day feeding period—from Standard to Good. The implanted heifers were graded slightly higher than were the controls (high Good vs. Good plus), but the difference in average slaughter grades was not

significant. Both groups of heifers were sold for \$19.61-\$19.65 per hundredweight so the stilbestrol implants did not affect the selling price of the heifers.

Feed records were not available for this particular experiment, so it was impossible to determine the effects of the stilbestrol implants on feed efficiency and feed costs per unit of gain.

### Experiment II

Average daily gains by both groups of heifers used in the 57-day feeding experiment conducted in 1958 were slightly lower than those

Table 2. Effect of Stilbestrol Implants on Performance of Beef Heifers Full-Fed in Dry Lot  
March 4, 1958 to April 30, 1958—57 days

	Treatment	
	Control	Implanted with 24 mg. stilbestrol
No. of animals	20	20
Av. wt. and gain, lb.		
Initial wt.	561	560
Final wt.	681	707
Total gain	120	147
Daily gain	2.11	2.58*
Av. daily feed, lb.		
Hay	3.2	3.3
Concentrates <sup>1</sup>	15.1	15.5
Feed required/cwt. gain, lb.		
Hay	152	128
Concentrates	716	601
Total	868	729
Feed cost/lb. gain <sup>2</sup>	15.1¢	12.7¢
Grades		
Initial slaughter	Std +	Std —
Final slaughter	LG +	G
Sale price/cwt.	\$26.62	\$26.68

\*  $P < .05$ .

<sup>1</sup> Concentrates consisted of 7 parts ground ear corn and 1 part cottonseed meal.

<sup>2</sup> Feed costs based on following prices: ear corn, \$1.25/bu.; CSM, \$65/ton; and hay, \$25/ton.



of heifers used in the previous experiment. However, the difference in gains between the control and implanted heifers was almost identical (see Table 2). Thus the heifers implanted with 24 milligrams of stilbestrol gained 22% faster than did the control heifers—2.58 pounds as compared to 2.11 pounds per head daily, respectively. This difference was statistically significant at the 5% level of probability and approached significance at the 1% level. It can be noted from the table that 20 heifers were used in each group in this experiment.

The treated heifers ate slightly more feed than did the control heifers but since they gained significantly faster, they actually required 16% less feed for each pound of gain than did the controls. The treated heifers were very efficient in converting feed to beef since they required just slightly more than 700 pounds of feed for each 100 pounds gained. The control heifers required 868 pounds of feed per 100 pounds of gain.

The efficiency of feed utilization was reflected in the cost of feed per pound of gain also. Thus feed costs per pound of gain (using market value of feeds) for the treated heifers was 12.7 cents as compared to 15.1 cents for the control heifers.

Both groups of heifers graded almost average Good in condition when they were sold to local buyers. The control heifers were sold for an average of \$26.62 per hundredweight and the treated heifers for \$26.68 per hundredweight.

Thus the stilbestrol implants did not affect the selling price of the heifers used in this experiment.

### Experiment III

Results of the 56-day feeding experiment conducted in 1959 confirm those of the previous two tests (Table 3). Thus control heifers in this experiment gained 2.08 pounds per head daily as compared to 2.32 pounds per head daily by heifers implanted with 24 milligrams of stilbestrol. While the difference in gains was not as large (12%) as that in the previous experiments, it was statistically significant at the 10% level.

The treated heifers in this experiment ate more feed each day than the control heifers (as they did in the previous experiment) but they required 14% less feed per hundred pounds of gain (775 vs. 877 pounds). Feed costs per pound of gain were 14.7 cents for the control heifers and 13.5 cents for heifers implanted with 24 milligrams of stilbestrol.

The condition grades of both groups of heifers were raised from Standard to low-Good plus during the 56-day feeding period. The treated heifers sold for \$26.93 per hundredweight as compared to \$26.77 per hundredweight for the control heifers.

### Combined Results of Experiments I, II, III

The results of all three experiments were combined and these data are shown graphically in Figures 3, 4, and 5. Data on daily gains, final condition grade, and

Table 3. Effect of Stilbestrol Implants on Performance  
of Beef Heifers Full-Fed in Dry Lot  
March 20, 1959 to May 15, 1959—56 days

	Treatment	
	Control	Implanted with 24 mg. stilbestrol
No. of animals	15	15
Av. wt. and gain/head, lb.		
Initial wt.	551	559
Final wt.	667	689
Gain	116	130
Daily gain	2.08	2.32*
Av. daily feed, lb.		
Concentrates <sup>1</sup>	13.0	14.4
Hay	5.2	3.6
Av. feed req./cwt. gain, lb.		
Concentrates <sup>2</sup>	625	621
Hay	252	154
Total	877	775
Feed costs/lb. gain	14.7¢	13.5¢
Initial slaughter grade	Std	Std
Final slaughter grade	LG+	LG+
Av. selling price/cwt.	\$26.77	\$26.93

\*  $P < .10$ .

<sup>1</sup> Concentrates consisted of 7 parts ground ear corn and 1 part cottonseed meal.

<sup>2</sup> Feed costs based on following prices: ear corn, \$1.25/bu.; CSM, \$65/ton; and hay, \$25/ton.

selling price per hundredweight gain were available for all 3 years; data on the amount of feed required per unit of gain and feed costs per pound of gain were obtained during the last two experiments only.

*Gains Significant.* As shown in Figure 3, the average daily gain for the 44 beef heifers implanted with 24 milligrams of stilbestrol was 2.55 pounds as compared with 2.14 pounds for the 44 control heifers. Thus the treated heifers gained

### Daily Gains of Heifers

#### TREATMENT

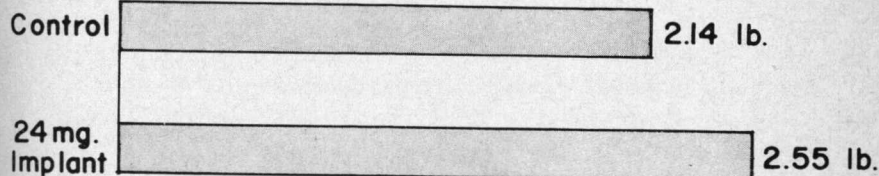


Figure 3. Average daily gains of control beef heifers and heifers implanted with 24 milligrams of stilbestrol (average results of three experiments).

19% faster than did the controls when the results of the three experiments are considered. Statistical analysis of these data revealed that this difference was significant at the 5% probability level. This increase in rate of gain is similar to observed increases in gains by beef steers which have been implanted with a similar level of stilbestrol.

*Feed Savings.* Implanting beef heifers with stilbestrol resulted in

a feed savings of 14% (see Fig. 4) according to the combined results of two experiments. Feed costs per pound of gain were also lowered from 14.9 cents to 13.1 cents by the stilbestrol treatment.

There was a slight but statistically insignificant difference in final condition grade of the two groups of beef heifers, but as shown in Figure 5, this did not affect the final sale price of the heifers.

### Lb. of Feed Used

TREATMENT	Lb. of Feed Used	FEED COST /LB. GAIN
Control	872 lb.	14.9¢
24 mg. Implant	752 lb.	13.1¢

Figure 4. Feed required per hundredweight of gain and feed costs per pound of gain by control beef heifers and heifers implanted with 24 milligrams of stilbestrol (average results of two experiments).

### General Considerations

The results of three experiments reported in this bulletin show that stilbestrol implants markedly increased gains by and improved feed efficiency of beef heifers full-fed in dry lot.

*More Returns Per Head.* The better performance of the treated heifers cannot be directly related to increased dollar returns, since the heifers were not appraised when they were started on test. However, based on the average increase in pounds gained during the 56-58 days of each experiment and the

sale price reported, the stilbestrol-treated heifers returned about \$5 more per head than did the control heifers.

Cost of the stilbestrol pellets for each heifer would be about 25-30 cents. Time and effort of implanting beef heifers with stilbestrol are not of major importance providing that a head chute or other type of restraining equipment is available.

*Time of Implantation.* In considering the above dollar returns, it should be kept in mind that the increased feed efficiency of the

treated heifers was not considered and also the fact that the heifers were only on test for 56-58 days. Due to the increased gains that might be expected, it would seem that consideration should be given to implanting beef heifers when they are first started on the silage phase of the feeding program (outlined previously) rather than at the beginning of the concentrate phase as was done in these tests. If this were done, probably the increased dollar returns from stilbestrol implants could be increased substantially. Actual experimental data are needed to verify this supposition, however.

*Safe Levels.* The fact that the level of stilbestrol for beef heifers is critical should be emphasized. A level of 24 milligrams has been found to be effective in increasing feed lot performance without serious side effects. It is known that very high levels of stilbestrol can

result in serious adverse side effects in beef heifers, such as prolapse of the vagina, excessive "riding," excessive mammary development, "sway backs," etc. For this reason, higher levels than 24 milligrams are generally not recommended for heifers.

*Observe Caution with Grazing Beef Heifers.* Although the present experiments were not concerned with grazing beef heifers, a word of caution in regard to implanting such heifers is in order. Generally good legume pastures contain chemicals that have properties similar to stilbestrol. Beef heifers also synthesize similar substances in their bodies. In view of this it can be seen that if such animals are also implanted with stilbestrol it is possible that excessively high levels of these substances may accrue in the body. If this happened, some of the side effects referred to above would then show up.

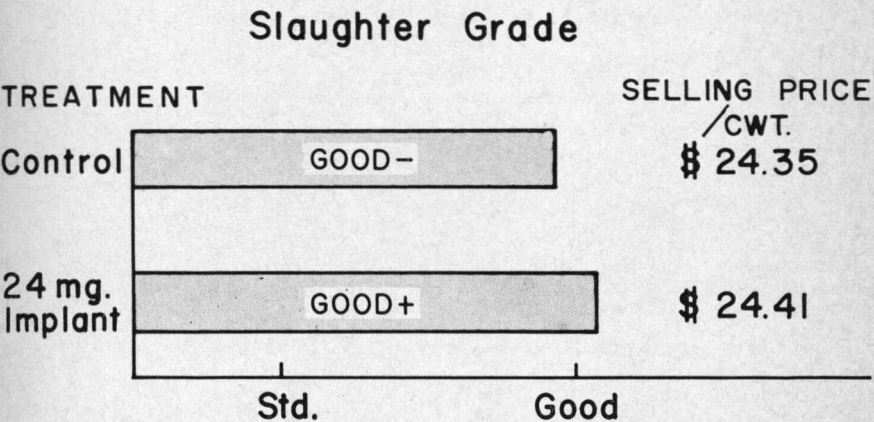


Figure 5. Average final slaughter grade and selling price per hundred-weight of control beef heifers and heifers implanted with 24 milligrams of stilbestrol (average results of three experiments).

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