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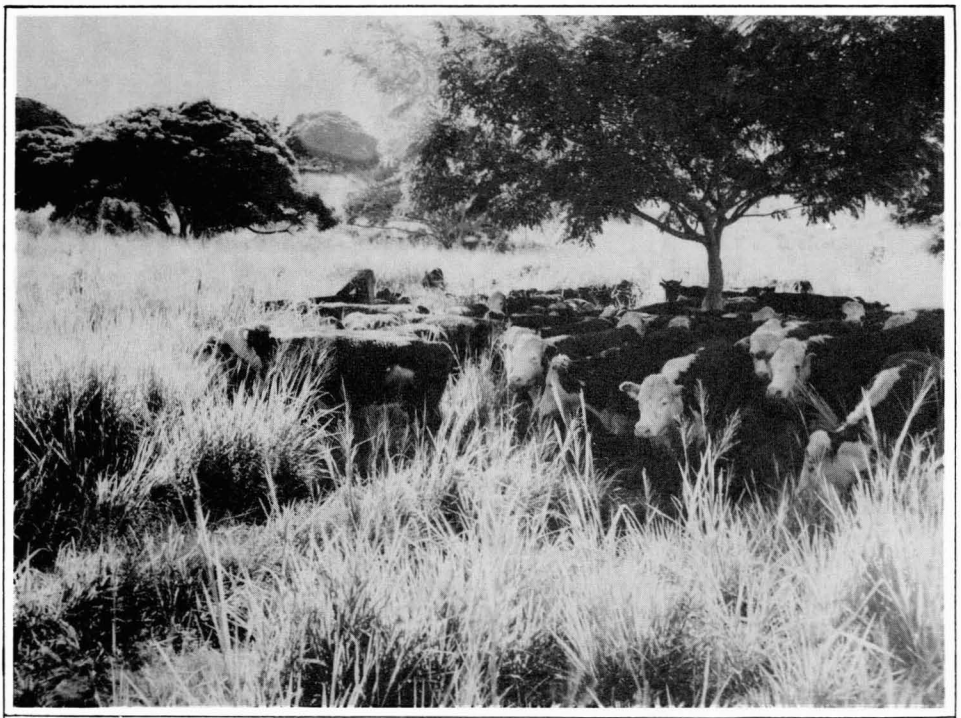

Effects of STILBESTROL IMPLANTS on Pasture Gains of Steers in Hawaii

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COVER PHOTO: Figure 1. A typical pasture scene in Hawaii.

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Effects of Stilbestrol Implants on Pasture Gains of Steers in Hawaii

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INTRODUCTION

Animal scientists are continuously striving to find new ways and means of increasing performance and feed efficiency of large animals. In the past decade, a number of feed additives, drugs, and hormones have been studied and evaluated at various agricultural experiment stations. Diethylstilbestrol (commonly called stilbestrol) is one of these.

Stilbestrol is a synthetic compound with estrogenic properties. In the early 1950's, a considerable amount of interest developed concerning the administering of this hormone-like compound to beef cattle. Since that time, both an increase in rate of gain and an improvement in feed efficiency have been repeatedly demonstrated through its proper use.

Experimental work involving stilbestrol implants for steers on pasture has been conducted by experiment stations in all sections of the Mainland and has included grazing a variety of grasses native to the respective areas. Researchers at most stations are in agreement that stilbestrol implants will significantly increase the rate of gain on steers grazing green forage. The response on pasture is reportedly less than under feedlot conditions and the amount of response is dependent upon the types of grass, the amount of grazing, and environmental conditions.

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No controlled studies involving stilbestrol implants for steers on pasture have been previously reported in Hawaii. Therefore, it seemed desirable and appropriate to conduct the tests reported herein.

LITERATURE REVIEW

Numerous researchers have reported that stilbestrol implants have increased live weight gains of beef cattle on pasture (*1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19*). In a comparison of different levels of implants, some authors have reported the 12-milligram level to be the most desirable (*3, 4, 19*). Others have reported a satisfactory response on pasture when stilbestrol was administered at the 24-milligram level (*2, 10, 11, 12, 16, 17, 18*). Implantation at the 36-milligram level and higher has reportedly produced undesirable side effects such as elevated tail-heads or depressed loin appearance (*13, 18*). McCormick *et al.* reported undesirable side effects at the 30-milligram level (*6*).

In most of the studies cited, yearling cattle or older animals were used as the experimental units. However, increased weight gains have been attributed to stilbestrol implants with steer calves (*7, 8, 12*). In one study (*15*), implanting weanling steers failed to significantly increase weight gains.

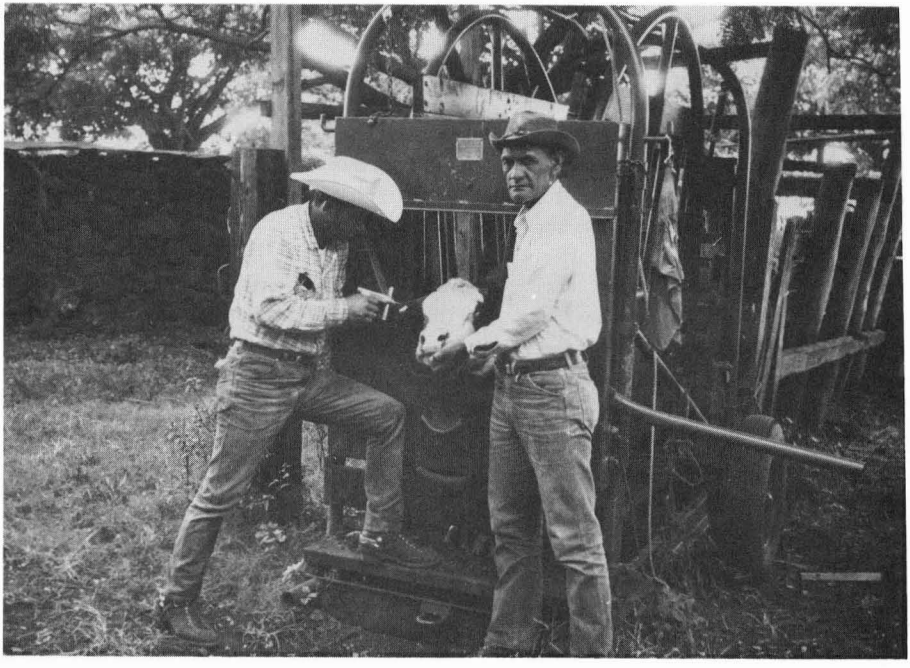

FIGURE 2. Implanting steers with stilbestrol in Hawaii.

PROCEDURE

This experiment included trials conducted at four ranches located on the island of Hawaii and one on Maui, and involved a total of 411 steers. Half of the steers at each location were implanted at random, except in one trial where steers were allotted to treatment according to weight because of limited numbers. Three age groups of steers were studied. Weanling steers were used in the Maui ranch test, and 2-year-olds on one Hawaii island ranch. The remaining experimental animals were short-yearlings, approximately 14 months old. In each trial, steers were individually identified by ear-tag and/or ear-tattoo and were weighed individually at about 8-week intervals. Rate of implantation was either at the 12- or 24-milligram level. Steers were implanted subcutaneously in the ear at the initiation of each trial and the level of implantation remained constant at each location (figure 2).

Type, quality, and quantity of available forage varied considerably between trials. A total of 323 steers in the test had access to guinea grass (*Panicum maximum*) and koa haole (*Leucaena leucocephala*); 20 had access to kikuyu grass (*Pennisetum clandestinum*) and panicum grass (*Panicum purpurascens*); and 68 grazed a combination pasture composed primarily of pangola grass (*Digitaria decumbens*) and kikuyu grass. (See figures 3, 4, and 5.)

FIGURE 3. A typical kikuyu grass (Pennisetum clandestinum) pasture in Hawaii.

FIGURE 4. A typical pangola grass (Digitaria decumbens) pasture in Hawaii.

FIGURE 5. A typical koa haole (Leucaena leucocephala) and guinea grass (Panicum maximum) pasture in Hawaii.

RESULTS

Results of four separate implantation trials with steers on pasture are reported in table 1.

TABLE 1. Performance of yearling steers implanted with 24 milligrams of stilbestrol

Treatment	No Stilbestrol	Stilbestrol (24 mg.)
Trial 1		
Number of steers	59	57
Average weights (lb.)		
Initial (May 15, 1962)	589	590
Final (September 12, 1962)	777	825
Total gain (120 days)	188	235
Average daily gain (120 days)	1.57	1.96
Trial 2		
Number of steers	75	73
Average weights (lb.)		
Initial (July 9, 1962)	514	505
Final (December 13, 1962)	692	714
Total gain (158 days)	178	209
Average daily gain (158 days)	1.13	1.32
Trial 3		
Number of steers	16	14
Average weights (lb.)		
Initial (June 26, 1962)	656	649
Final (October 31, 1962)	789	841
Total gain (127 days)	133	192
Average daily gain (127 days)	1.05	1.51
Trial 4		
Number of steers	15	14
Average weights (lb.)		
Initial (June 26, 1962)	634	648
Final (October 31, 1962)	814	860
Total gain (127 days)	180	212
Average daily gain (127 days)	1.42	1.67

FIGURE 6. Two-year-old steers used in one of the stilbestrol trials.

The implantation of 24 milligrams of stilbestrol significantly ($P < .01$) increased average daily gain of yearling steers in each of the four trials. Implants increased average daily gain 0.39 pound per day (1.57 vs. 1.96) in Trial 1. In Trials 2, 3, and 4, the increased gains were 0.19, 0.46, and 0.25 pound per day, respectively, compared to the gains of nonimplanted steers. The percentage increase in daily gain due to stilbestrol usage was 24.8, 16.8, 43.8, and 17.6 in Trials 1, 2, 3, and 4, respectively.

A limited number of 2-year-old steers (figure 6) were used as the experimental animals in one trial as shown in table 2.

TABLE 2. Performance of 2-year-old steers implanted with 24 milligrams of stilbestrol

Treatment	No Stilbestrol	Stilbestrol (24 mg.)
Number of steers	10	10
Average weights (lb.)		
Initial (July 30, 1962)	768	766
Final (December 10, 1962)	980	1048
Total gain (133 days)	212	282
Average daily gain (133 days)	1.59	2.12

Average daily gain was increased 33 percent or 0.53 pound per steer per day for 133 days following implantation. The difference in average daily gain was statistically significant ($P < .01$).

In another trial, the response to stilbestrol implants in weanling steers was recorded. These data are presented in table 3.

TABLE 3. Performance of weanling steers implanted with 24 milligrams of stilbestrol

Treatment	No Stilbestrol	Stilbestrol (24 mg.)
Number of steers	13	15
Average weights (lb.)		
Initial (April 19, 1963)	330	348
Final (August 20, 1963)	466	504
Total gain (123 days)	136	156
Average daily gain (123 days)	1.10	1.27

Average daily gain was increased 15.5 percent or 0.17 pound per day for the weanling steers. This was statistically significant at the 0.01 level of probability.

Since 24 milligrams of stilbestrol was the level used in the initial studies, it seemed desirable to check the response of yearling steers to 12-milligram implants. These results are reported in table 4.

TABLE 4. Performance of yearling steers implanted with 12 milligrams of stilbestrol

Treatment	No Stilbestrol	Stilbestrol (12 mg.)
Number of steers	20	20
Average weights (lb.)		
Initial (June 28, 1963)	703	718
Final (November 4, 1963)	826	888
Total gain (129 days)	123	170
Average daily gain (129 days)	0.95	1.32

Implantation of yearling steers with 12 milligrams of stilbestrol resulted in an increase in average daily gain of 0.37 pound per day or 38.9 percent. This increase in gain was statistically significant ($P < .01$).

The difference in weight gain attributable to stilbestrol implants decreased sometime after 120 days following treatment. This is shown in table 5 which is a relatively good representation of time response to stilbestrol treatment. In this particular trial, the response to stilbestrol treatment was lost somewhere between 120 and 177 days post treatment.

TABLE 5. Time response to stilbestrol implants, by periods

Item	No Stilbestrol	Stilbestrol	Difference in Average Daily Gain (lb.)	Average Gain in Favor of Implanting (cumulative) [1]
				pounds
Number of Steers	59	57		
Average Daily Gain Following Implantation on May 15, 1962 (lb.)				
May 15, 1962 to July 10, 1962 (56 days)	1.91	2.41	0.50	28.0
July 10, 1962 to September 12, 1962 (64 days)	1.27	1.58	0.31	47.8
September 12, 1962 to November 8, 1962 (57 days)	1.07	1.00	-.07	43.8
November 8, 1962 to January 10, 1963 (63 days)	0.46	0.35	-.11	36.9

[1] Figures in this column represent cumulative differences in gain between control and implanted steers.

The response to stilbestrol implants as presented in table 5 is portrayed diagrammatically in figure 7.

DISCUSSION AND RESULTS

In all trials, stilbestrol implants significantly ($P < .01$) increased steer gains on pasture. Response from stilbestrol implants appeared to be lost somewhere between 120 and 177 days following treatment. This is in agreement with Story *et al.* (*16*), who reported that maximum influence of the implants was noticed within 140 days. Radabaugh and Embry (*14*) reported that growth response to stilbestrol implants appears to drop off after 120 to 140 days.

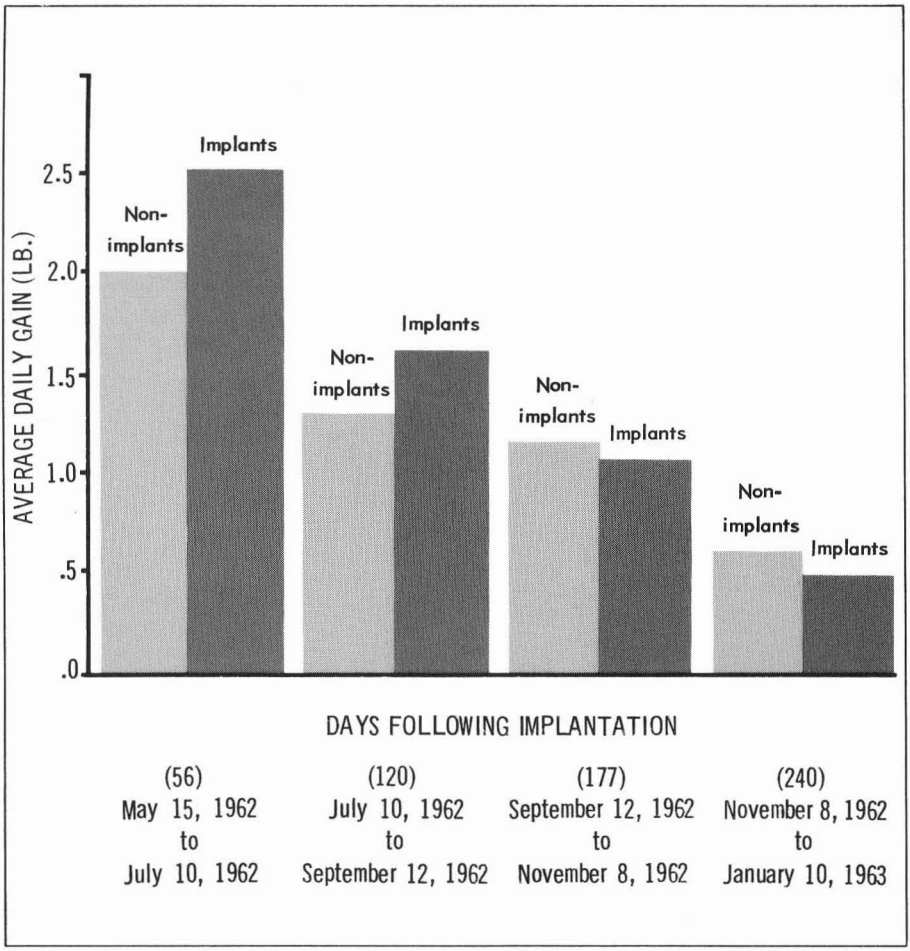

FIGURE 7. Response to stilbestrol implants by periods.

Considerable variation was noted in response between trials. However, the 12-milligram level appeared adequate with yearling steers. Similar results, relative to level of stilbestrol usage on pasture, have been reported by Behrens (*3*), Fontenot *et al.* (*4*), and Woods (*19*).

The lowest increase in gain due to stilbestrol usage was 15.5 percent in the trial with weanling steers on pasture. Some of these steers appeared to have elevated tail-heads when compared to controls. However, no visual side effects were apparent in any of the other trials. Studies are needed to investigate the optimum level of implantation and the persistence of stilbestrol treatment in relation to carcass grade. Carcass data were not collected in the trials reported herein.

SUMMARY

A total of 411 steers on pasture was used to determine the effects of stilbestrol implants on live weight gain in Hawaii. Under the conditions of these trials, stilbestrol implants significantly ($P < .01$) increased average daily gain compared to gains of controls in all trials. For yearling steers, the 12-milligram level of implantation appeared sufficient to produce the desired results.

In all trials, response to stilbestrol implants continued for at least 120 days post treatment. No undesirable side effects were noticeable or apparent, either at the 12- or 24-milligram level with yearling steers, or, at the 24-milligram level with 2-year-old steers.

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