The Value of Diethylstilbestrol Implants[1] and Implants Plus an Antibiotic[2] for Wintering Steer Calves, 1960-61 (Project 253-6).

C. L. Drake, E. F. Smith, B. A. Koch, D. Richardson, and F. W. Boren

Thirty-four good-to-choice Hereford steer calves from near Alpine, Texas, were randomly assigned (Snedecor's[3] randomization table) to three treatments:

Lot 19. Control.

Lot 20. Each steer implanted with 24 mgs. of diethylstilbestrol in the right ear.

Lot 21. Each steer implanted with 24 mgs. of diethylstilbestrol in the right ear and fed 70 mgs. of Aureomycin daily, mixed with sorghum grain.

Each animal in each lot received daily 5 lbs. of sorghum grain, 4 lbs. of alfalfa hay, and prairie hay free choice. They will be grazed and fattened during the summer and fall of 1961. Some will be reimplanted with diethylstilbestrol to collect more information on its use in a wintering, grazing, and fattening program.

Observations

Weight gains were not significantly affected by either stilbestrol implants or Aureomycin; however, the combination treatment administered to lot 21 apparently reduced the feed required per 100 lbs. of gain compared with the controls (lot 19).

Table 8

The value of diethylstilbestrol implants with and without chlortetracycline (aureomycin) for wintering steer calves.

December 2, 1960, to March 24, 1961—112 days.

Treatment	Control	Stilbestrol implant	Stilbestrol implant and Aureomycin
Lot number	19	20	21
Number of steers	14	10	10
Initial wt. per steer, lbs.	536	521	520
Daily gain per steer	0.95	1.01	1.08
Standard error of mean	.06	.04	.08
Daily ration per steer, lbs.:			
Sorghum grain	5.0	5.0	5.0
Alfalfa hay	4.0	4.0	4.0
Prairie hay	8.7	8.0	8.1
Salt (free choice)	.....	.....	.....
Stilbestrol implant, 24 mgs.	No	Yes	Yes
Aureomycin, 70 mgs. per head daily	No	No	Yes
Feed per cwt. gain, lbs.:			
Sorghum grain	523	493	457
Alfalfa hay	418	395	370
Prairie hay	927	791	748

A Comparison of Feeding Hay to Steers on Bluestem Pasture and in Drylot, 1960-61 (Project 253-2).

C. L. Drake, E. F. Smith, F. W. Boren, and B. A. Koch

This study was designed to compare winter bluestem pasture with drylot as a place to winter calves. The same ration, alfalfa and prairie hay, was fed to both groups.

1. Diethylstilbestrol implants (Stimplants) were furnished by Chas. Pfizer and Co., Inc., Terre Haute, Ind.

2. Chlortetracycline (Aureomycin) was furnished by the American Cyanamid Co., Pearl River, N.Y.

3. George W. Snedecor. Statistical Methods. Iowa State University Press, Ames, Iowa (1959).

The following experimental treatments were used:

Pasture 8. Fourteen steers wintered in a 139-acre bluestem pasture from December 2, 1960, to March 24, 1961, and fed 4 pounds of alfalfa hay per head daily. Prairie hay and salt were offered free choice.

Lot 22. Fourteen steers wintered in a drylot 50 x 120 feet, without shelter and fed the same as those in pasture 8.

Observations

The results of this test are shown in Table 9. The steers in drylot consumed 2 pounds more prairie hay per head daily and gained slightly more than those wintered on bluestem pasture; however, the difference in gain was not statistically significant.

These steers will be grazed together this summer to determine the influence of different regimes on summer grazing gains.

Table 9

A comparison of feeding hay to steers in drylot and on bluestem pasture.

December 2, 1960, to March 24, 1961—112 days.

Lot number	22	8
Number of steers per lot	14	14
Feeding area	Drylot	Bluestem pasture
Initial wt. per steer, lbs.	490	512
Daily gain per steer	0.41	0.32
Standard error of mean	.03	.03
Daily ration per steer, lbs.:		
Alfalfa hay	4.0	4.0
Prairie hay	10.2	8.3
Salt (free choice)	.....	.....
Bluestem pasture	No	Yes

Different Methods of Managing Bluestem Pastures, 1960 (Projects 253-3 and 253-5).

E. F. Smith, K. L. Anderson, B. A. Koch, F. W. Boren, and C. L. Drake

This experiment was designed to determine the effect of different stocking rates, of deferred grazing, and of pasture burning on cattle performance, productivity of pastures, and range condition as determined by plant population changes. In addition to the yearly report, a summary of cattle gains for the past 11 years of the study is included.

Experimental Procedure

Two-year-old Hereford steers with an average USDA feeder grade of high good were used to stock the pastures in 1960. They had been purchased as calves from near Fort Davis, Texas, and were used in this experiment in 1959 as yearlings. During the winter of 1959-60, prior to this grazing trial, they were fed sorghum silage and alfalfa hay in drylot until about March 1 when they were moved to a bluestem pasture where they were fed alfalfa hay until the grazing season started.

The experimental treatment for each pasture was:

Pasture 1. Moderate stocking rate, 3.7 acres per steer.

Pasture 2. Overstocked, 2.6 acres per steer.

Pasture 3. Understocked, 5.4 acres per steer.

Pastures 4, 5, and 6. Deferred grazing at the moderate stocking rate, 3.7 acres per steer. All steers were grazed on pastures 4 and 6 from May 4 to July 6. They were then moved to pasture 5 where they remained until September 8. From this date until September 29 they were allowed to graze in all three pastures.

Pasture 9. Burned April 7, 1960, moderate rate of stocking.

Pasture 10. Burned April 7, 1960, moderate rate of stocking.

Pasture 11. Burned May 4, 1960, moderate rate of stocking.

Pastures 9 and 10 were burned on the same date due to snow cover which prevented burning pasture 9 at its regular earlier date. In the experimental plan pasture 9 is an early-spring-burned pasture which is usually burned in March.

Observations

Results are presented in Tables 10 and 11.

Burning and overstocking have reduced the forage produced on these pastures. Only about 75 percent of the early-spring-burned and mid-spring-burned pasture was burned due to lack of forage. The soil was moist under the grass, since it had rained two days prior to the April 7 burning. The late-spring-burned pasture (burned May 4) burned only in spotty areas and along the fence rows due to new growth of grass and lack of old grass.

Steer gains appear to be increased by burning treatments, especially late spring burning, and lowered by overstocking and deferred grazing.

Plant census counts, forage yields and disappearance obtained in 1960 are shown. Disappearance is a measure of removal, and census counts made annually give a measure of population change that shows range condition. Under the treatments, pasture 2 (close grazing) and pasture 9 (early spring burning) have deteriorated in yield, vigor, and range condition. Pasture 3, 4, 5, and 6 have improved.

Table 10

A comparison of different methods of managing bluestem pastures. May 4, 1960, to September 29, 1960.

Pasture number	1	2	3	4, 5, 6		9	10	11
Management	Moderately stocked	Over-stocked	Under-stocked	Deferred		Early-spring-burned	Mid-spring-burned	Late-spring-burned
Number of steers per pasture	16	23	11	48		12	12	12
Acres in pasture	60	60	60	3–60[1]		44	44	44
Acres per head	3.7	2.6	5.4	3.7		3.7	3.7	3.7
Initial wt. per steer, lbs.	746	735	730	750		750	749	749
Final wt. per steer, lbs.	1014	977	985	985		1049	1038	1063
Gain per steer, lbs.	267	242	255	235		299	289	314
Daily gain per steer, lbs.	1.82	1.65	1.73	1.60		2.03	1.97	2.14
Gain per acre, lbs.	72	93	47	64		81	78	85

1. Three 60-acre pastures.

Table 11

Yearly account of cattle gains under different methods of grazing pastures: 11-year summary, 1950-1960. Average gain per steer in pounds for the summer season of approximately 150 days.

Pasture number ..	1	2	3	4, 5, 6	9	10	11
Management	Normally stocked	Over-stocked	Under-stocked	Deferred rotated	Early-spring-burned	Mid-spring-burned	Late-spring-burned
1950	221	210	214	205	216	254	230
1951	242	256	290	234	243	265	254
1952	246	209	228	197	251	278	283
1953	226	194	233	197	205	217	234
1954	261	237	236	214	270	271	306
1955	270	224	253	213	282	305	307
1956	179	184	168	154	212	234	216
1957	243	236	244	209	261	256	279
1958	208	207	207	198	222	270	253
1959	252	241	262	203	254	275	295
1960	267	242	255	235	299	289	314
Average	238	222	235	205	247	265	270

Table 12

Forage yields, disappearance of forage, botanical composition, and range condition of bluestem pastures under different management practices, 1960.

Pasture number	1	2	3	4, 5, 6	9	10	11
Yields of vegetation in pounds of air-dry forage per acre, 1960							
Range site:							
Ordinary upland							
Forage	4799	4522	5838	5548	2756	3940	4438
Weeds	287	472	300	239	344	324	152
Mulch	1415	1914	1742	1848			
Limestone breaks							
Forage	3549	2676	4526	3901	2458	2892	2873
Weeds	284	287	185	137	293	132	157
Mulch	1329	648	1310	1784			
Disappearance of vegetation in pounds of air-dry forage per acre, 1960							
Ordinary upland							
Forage	2109	2957	2383	2836	1186	1288	2397
Weeds	49	315	71	38	110	106	
Mulch		1103	133	295			
Limestone breaks							
Forage	1598	1512	1576	1295	1058	1422	1134
Weeds	81	102	62	47	95		91
Mulch	295	161		397			
Botanical composition and range condition, 1960							
Ordinary upland							
% decreasers[1]	58	37	38	55	42	69	65
% increasers[2]	23	35	35	26	24	14	20
% range condition	70	47	50	65	54	82	77
Limestone breaks							
% decreasers	48	42	62	65	59	68	77
% increasers	25	36	16	21	19	20	16
% range condition	69	68	78	86	81	90	92

1. In these pastures big bluestem and little bluestem and indiangrass are the most abundant; they decrease under heavy grazing pressure.

2. Increasers include the gramas, buffalograss, bluegrass, and others that increase under grazing pressure.

The Value of Supplemental Copper, Cobalt, Copper and Cobalt, and Aureomycin[1] for Steers on Bluestem Pasture.

E. F. Smith, D. Richardson, W. S. Tsien, C. L. Drake

It has been tentatively reported, on the basis of chemical analyses, that some of the dominant species growing in bluestem pastures were inadequate in cobalt content and borderline in copper content for proper nutrition of cattle. Other work such as that of Glendening (Mineral Content of Certain Cattle Feeds Used in North Central Kansas, Journal of Animal Science, Volume 11) indicates adequate copper and cobalt content of bluestem pasture grasses.

This study was undertaken to evaluate the desirability of supplying these two trace minerals alone and in combination to steers grazing bluestem pastures.

Under a grant from the American Cyanamid Company, aureomycin (chlortetracycline) was fed to one lot to evaluate this antibiotic under grazing conditions.

Experimental Procedure

Fifty good to choice yearling Hereford steers were allotted into five lots of 10 steers each on the basis of prior treatment. They were purchased as calves the previous fall near Fort Davis, Texas, and were grazed on bluestem pastures the winter prior to this study. They were fed, in addition to the grass, soybean meal and small quantities of molasses and bonemeal.

In this study, the steers received only grass and their mineral or antibiotic treatment.

Each group was in a 60-acre bluestem pasture except the antibiotic group, which was in a 120-acre pasture with 10 other steers.

Copper carbonate was mixed with the salt to supply about 25 mgs. of copper per steer daily, about one half the requirement. The copper lot

Table 13

The value of supplemental copper, cobalt, copper and cobalt, and aureomycin for steers on bluestem pasture.

May 21, 1960, to October 21, 1960—153 days.

Pasture number	13	7A	15	7B	8
Treatment	Control	Copper[1]	Cobalt[2]	Copper[1] and cobalt[2]	Aureomycin[3]
Number steers	10	10	10	10	10
Initial wt. per steer, lbs.	509	516	515	512	507
Daily gain per steer*	1.54	1.61	1.47	1.44	1.70
Daily ration per steer:					
Salt, self-service, lb.	0.083	0.062	0.084	0.068	0.080
Copper, mgs.[1]		22.0		24.0	
Cobalt, mg.[2]			0.38	0.30	
Chlortetracycline, mgs.[3]					Ad libitum
Bluestem pasture					80.0

* Least significant mean difference: $P<.05 = 0.15$ lb.; $P<.01 = 0.20$ lb.

1. Copper was fed in the form of copper carbonate mixed with salt, 714 mgs. of copper sulfate to 1 lb. of salt.

2. Cobalt was fed in the form of cobalt sulfate mixed with the salt, 21 mgs. of cobalt sulfate to 1 lb. of salt.

3. The source of aureomycin (chlortetracycline) was Aurofac 10 mixed with the salt, about 1 lb. of Aurofac 10 to 10 lbs. of salt.

1. Trade name of American Cyanamid Company for chlortetracycline.

actually consumed 22 mgs. and the copper-cobalt lot 24 mgs. due to variation in salt consumption.

Cobalt sulfate was mixed with the salt to supply about one half the requirement, 0.3 mg. per steer daily, the cobalt lot actually consumed 0.38 mg., and the copper-cobalt lot 0.3 mg. per steer daily. It was planned to supply chlortetracycline at the rate of 70 mgs. per steer daily; they received 80 mgs.

Observations

Neither copper, cobalt nor the combination of copper and cobalt produced a significant difference in gain compared with the control lot. The group fed copper gained significantly more than those fed copper and cobalt. Aureomycin increased steer gains 0.16 pound per steer daily over the control lot, which was significant at the 5 percent level.

The Value of Chlortetracycline[1] for Steers on Winter Bluestem Pasture, 1961 (Project 5-663).

E. F. Smith and B. A. Koch[2]

Forty Hereford steers were divided into two groups of 20 each on the basis of weight. Each group was pastured in a 160-acre bluestem pasture on the Pringle Ranch near Rose, Kansas. Both groups were fed protein blocks and chlortetracycline was included in the blocks for one group, to supply about 70 mgs. per steer daily. The blocks were composed primarily of soybean meal with 10% salt to limit intake. They were kept before the animals continuously during the first half of the trial but during the latter half were rationed to keep consumption of both groups at about the same level.

As shown in Table 14, the steers receiving chlortetracycline gained significantly more than the control group. The protein blocks were readily consumed and those containing chlortetracycline seemed to be the more palatable.

Table 14

The value of chlortetracycline for steers on winter bluestem pasture. January 27 to April 7, 1961—70 days.

	Control	Chlortetracycline[1]
Number of steers	20	20
Initial weight, lbs.	493	493
Daily gain	0.07	0.36*
Daily feed consumption:		
Protein blocks[2]	2.36	2.48
Winter bluestem pasture	160 acres	160 acres

* Significantly higher at the 5% level.

1. Aureomycin supplied by American Cyanamid Co., Pearl River, N.Y.
2. Protein blocks supplied by Harvest Brand, Inc., Pittsburg, Kansas.

1. Chlortetracycline (Aureomycin) was supplied by the American Cyanamid Co., Pearl River, N.Y.

2. Pringle Ranch, Rose, Kansas; P. R. Zimmer, American Cyanamid Co., Pearl River, N.Y.; and M. A. Hoelscher, Harvest Brand, Inc., Pittsburg, Kansas, were cooperators in the experiment.

The Value of Diethylstilbestrol Implants[1] and Aureomycin[2] for Steer Calves on a Wintering, Grazing, and Fattening Program, 1959-60 (Project 253-6).

E. F. Smith, B. A. Koch, F. W. Boren, and C. L. Drake

This is the third trial in a series designed to study the use of stilbestrol implants combined with aureomycin for steers on growing and fattening rations. The others are reported in circulars 371 and 378 from this station.

The good-to-choice Hereford steer calves used in this test came from near Fort Davis, Texas, and were assigned to treatment on a random-weight basis.

The animals under all treatments received the same basic ration.

The experimental treatment was as follows:

Lot 19. Control group of steer calves implanted with 24 mgs. of stilbestrol August 10, 1960.

Lot 21. Ten steer calves implanted with 24 mgs. of stilbestrol May 10, 1960.

Lot 20. Twelve steer calves, all implanted with 24 mgs. of stilbestrol December 1, 1959; four reimplanted with 24 mgs. of stilbestrol May 10, 1960, and four others reimplanted August 10, 1960, leaving only four with the original fall implant. See Table 16 for gains of different implant groups.

Lot 22. Twelve steer calves received the same treatment as lot 20 plus 70 mgs. of aureomycin per head daily.

Observations

Results of this test are reported in Tables 15 and 16.

In Table 15, a 24-mg. stilbestrol implant increased steer gain 0.12 pound per steer daily for the winter period (compare the average gain of lots 19 and 21 with that of lot 20 which received the implant). Aureomycin fed in lot 22 increased gain 0.25 pound per head daily compared with lot 20 and also increased feed efficiency. A 24-mg. implant administered May 10 to steers in lot 21 increased pasture gain 0.25 pound as compared with nonimplanted steers in lot 19. However, aureomycin fed with salt in lot 22 reduced summer gain 0.25 pound per steer daily.

During the fattening period beginning in August, steers implanted in May gained at about the same rate as those implanted in August. However, steers implanted in August were slightly more efficient. Aureomycin fed to lot 22 during this period increased gains over lot 20 by 0.34 pound per steer daily.

In summary of the three phases, wintering, grazing, and fattening, the steers implanted in August gained about the same as those implanted in May. Their carcasses graded slightly higher but their dressing percentage tended to be lower. Aureomycin increased steer gains in lot 22 0.16 pound over the steers in lot 20 and also improved dressing percentages and carcass grades slightly.

From the results shown in Table 16, it appears desirable to reimplant fall-implanted steers when they are placed on a fattening ration in August rather than to implant only in the fall or in the fall and spring.

1. The diethylstilbestrol implants were supplied by Chas. Pfizer and Co., Inc., Terre Haute, Ind.

2. The aureomycin (chlortetracycline) was supplied by the American Cyanamid Company, Pearl River, N.Y.