The Effects of Feeding Different Levels of Dicalcium Phosphate to Heifers on Bluestem Pasture (Project 253-2).

C. L. Drake, E. F. Smith, D. Richardson, D. L. Good and D. L. Follis

This trial was designed to study the effects of low to high levels of calcium and phosphorus supplementation for heifers grazing bluestem pasture.

Forty Hereford heifer calves were divided into four groups at random, and turned into a 140-acre pasture. Each morning the heifers were gathered and separated into four lots and fed the rations shown in Table 14.

Starting October 5, 1961, the heifers were gathered and fed three times weekly instead of each day; however, the same number of pounds of feed were fed per week. The heifers were given approximately 5 pounds of prairie hay per head per day, during the winter when there was snow on the ground, about six weeks. Heated water and a trace-mineralized vitamin A salt mixture[1] were available at all times.

Observations

The heifers lost weight during the winter months; however, they appeared to be healthy, and no signs of sickness were observed.

For the entire period on test the control heifers gained significantly more than the other three lots of heifers that received dicalcium phosphate, Table 14. There were no significant differences among the three lots receiving dicalcium phosphate.

Data from this trial indicate that dicalcium phosphate supplementation at low to high levels did not increase daily gains during a summer and winter period on bluestem pasture. During the winter months as the level of dicalcium phosphate increased, daily gain tended to decrease.

These heifers will be bred this summer, and the dicalcium phosphate levels will be maintained to study effects on gestation and calving.

1. Commercial mix containing 10% manganese, 10% iron, 14% max.—12% min., calcium, 1% copper, .5% zinc, .30% iodine, .10% cobalt. Two pounds of this mix were added to 97 pounds of salt containing 1 pound of vitamin A (10,000 I.U./gm.).

Table 14

Experimental rations and average daily gain per head.

Ration	Av. daily gain[1] 2-18-61 10-2-61	Av. daily gain[2] 10-2-61 3-3-62	Av. daily gain 2-18-61 3-3-62
LOT 1			
1 lb. dried molasses			
1 lb. 41% corn gluten meal	1.22	—.237	.623
LOT 2			
1 lb. dried molasses			
1 lb. 41% corn gluten meal			
27.1 gms. dicalcium phosphate	1.10	—.322	.529
LOT 3			
1 lb. dried molasses			
1 lb. 41% corn gluten meal			
54.1 gms. dicalcium phosphate	1.15	—.342	.550
LOT 4			
1 lb. dried molasses			
1 lb. 41% corn gluten meal			
81.1 gms. dicalcium phosphate	1.18	—.375	.553

1. Approximates a long summer grazing period.
2. Approximates a winter grazing period.

Different Methods of Managing Bluestem Pastures, 1961 (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 12 years of the study is included.

Experimental Procedure

Yearling Hereford steers with an average USDA feeder grade of about high good were used to stock the pastures in 1961. The steers came from near Thermopolis, Wyoming, were received about March 1, and were fed prairie and alfalfa hay in drylot until the test started.

The experimental treatment for each pasture was:

Pasture 1. Moderate stocking rate, 3.3 acres per steer.

Pasture 2. Overstocked, 2.3 acres per steer.

Pasture 3. Understocked, 4.6 acres per steer.

Pastures 4, 5, and 6. Deferred grazing at the moderate stocking rate was 3.3 acres per steer. All steers were grazed on pastures 4 and 5 from May 3 to June 30. They were then moved to pasture 6 where they remained until September 25, when all were allowed to graze in all three pastures until the close of the trial October 7.

Pasture 9. Burned March 3, 1961, moderate rate of stocking.

Pasture 10. Burned April 6, 1961, moderate rate of stocking.

Pasture 11. Burned April 28, 1961, moderate rate of stocking.

The steers were gathered about 3 p.m., held over night without feed or water and weighed the following morning, about 7 a.m.

Observations

The results are reported in Tables 15, 16, and 17.

Steer gains appeared to be lowered by deferred grazing and overstocking. This was the first season in 12 years that steer gains on the non-burned pasture (no. 1) exceeded gains made by steers on the mid- or late-spring-burned pastures. Forage was sufficient on all burning treatments to permit the entire pasture to be burned, which hadn't occurred for several years.

Yields of vegetation were measured in small areas protected from grazing by wire cages, located in a randomized manner within range sites. The cages were placed in new locations each year, to reflect previous management rather than effects of the previous year's cage. Protected areas were clipped at the close of the grazing season, so they represented the full season's growth. Experiments have shown that maximum range forage yields are obtained from one cutting made at the close of the growing season.

The components of yield were considered here as forage, weeds, and mulch. The burned pastures, of course, lacked the mulch found in the unburned ones.

It will be seen that the closely grazed pasture yielded less forage and had less mulch than the moderate or lightly stocked one and that the burned pastures, which had no mulch at all, yielded significantly less forage than all unburned ones except the overstocked one. Moisture-measuring devices have been established to permit detailed study of amounts of soil moisture under the different treatments.

Table 15

Yearly account of cattle gains under different methods of grazing pastures; 12-year summary, 1950-61. Average gain per steer in pounds for the summer season of approximately 150 days.

Pasture no.	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
1961	255	217	227	187	243	245	237
Average	239	221	234	203	246	263	267

Table 16

A comparison of different methods of managing bluestem pastures.

May 3, 1961, to October 7, 1961—157 days.

Pasture no.	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
No. steers per pasture	18	26	13	55	13	13	13
Acres in pasture	60	60	60	3–60[1]	44	44	44
Acres per head	3.3	2.3	4.6	3.3	3.4	3.4	3.4
Initial wt. per steer, lbs.	451	468	466	465	469	470	450
Final wt. per steer, lbs.	706	685	693	652	712	715	687
Gain per steer, lbs.	255	217	227	187	243	245	237
Daily gain per steer, lbs.	1.62	1.38	1.45	1.19	1.55	1.56	1.51
Gain per acre, lbs.	77	94	49	57	71	72	70

1. Three 60-acre pastures.

Table 17

Vegetation yields, disappearance of vegetation, botanical composition, and range condition of bluestem pasture under different management practices, 1961.

Pasture no.		1	2	3	4, 5, 6	9	10	11
Range site	Yield of vegetation in pounds of air-dry forage per acre, 1961							
Ordinary upland	—Forage	4658	3102	5655	4227	2952	2454	2681
	Weeds	247	406	273	225	247	203	101
	Mulch	2892	1019	2037	1697			
Limestone breaks	—Forage	2795	1814	3580	3448	1803	1874	1916
	Weeds	229	366	101	97	238	137	163
	Mulch	1453	739	2478	1408			
Range site	Disappearance of vegetation in pounds of air-dry forage per acre, 1961							
Ordinary upland	—Forage	1978	2154	2231	1951	1581	1093	1530
	Weeds	88	236	141	158	112	148	7
	Mulch	520	392	194	254			
Limestone breaks	—Forage	1206	1155	741	1308	798	944	946
	Weeds	73	236	.....	52	86	46	117
	Mulch	452	419	1283	248			
Range site	Remainder after grazing							
Ordinary upland—	Forage	2680	948	2424	2276	971	1361	1151
	Weeds	186	170	132	97	135	55	194
	Mulch	2372	672	1843	1453			
	Total	5238	1790	4399	3826	1106	1416	1345
Limestone breaks	—Forage	1589	659	2839	2140	1005	930	970
	Weeds	156	130	101	45	152	91	46
	Mulch	1001	320	1195	1160			
	Total	2746	1109	4135	3345	1157	1021	1016
Range site	Botanical composition and range condition, 1961							
Ordinary upland—	% decreasers	57.4	45.4	43.6	54.3	43.0	67.2	69.7
	% increasers	26.1	29.3	33.7	31.2	24.5	15.6	15.8
	% range condition	69.8	57.2	56.6	65.6	55.9	83.2	83.3
Limestone breaks—	% decreasers	62.4	49.1	65.1	72.4	58.6	66.2	75.3
	% increasers	21.1	32.7	17.0	15.4	20.1	17.5	17.7
	% range condition	80.5	72.1	82.7	90.5	79.3	85.8	90.5

Supplemental Cobalt for Heifers on Fattening Rations, 1961-62, Progress Report (Project 253-6).

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

The 40 heifer calves, 10 per lot, used in this experiment were good to choice grade Herefords from near Ft. Davis, Texas, and were assigned on a random weight basis to their treatments. All lots received all the prairie hay they would consume, and ground corn was gradually increased until they were on full feed. Soybean meal was fed as the protein supplement, with ground limestone added to supply a tenth of a pound per head daily and enough vitamin A was added to supply 10,000 I.U. per head daily. In addition to the above ration two of the lots received cobalt, in the form of cobalt sulfate, in their soybean meal to supply 1 mg. of cobalt per head daily.

The results of the trial to date are reported in Table 18. The cobalt added to the diets of lots 21 and 22 apparently had no effect.

Table 18

The value of supplemental cobalt[1] in the ration of fattening heifers.

December 4, 1961, to March 24, 1962—110 days.

Lot no.	19	20	21	22
Treatment	Control	Control	Cobalt	Cobalt
No. heifers per lot	10	10	10	10
Initial wt. per heifer, lbs.	379	379	378	381
Daily gain per heifer	1.63	1.64	1.70	1.63
Daily ration per heifer, lbs.:				
Ground corn	6.9	7.3	7.3	7.3
Soybean meal[2]	1.4	1.4	1.4	1.4
Prairie hay	6.4	6.6	6.9	6.9
Salt, free choice				
Feed per cwt. gain, lbs.:				
Ground corn	423	445	429	448
Soybean meal	86	85	82	86
Prairie hay	393	402	406	423
Feed costs per cwt.[3] gain	$15.54	$16.07	$15.64	$16.34

1. Cobalt was mixed with the soybean meal fed to lots 21 and 22 in the form of $CoSO_4 \cdot 7H_2O$ at the rate of 1 mg. of cobalt daily.

2. The soybean meal of all lots was fortified to furnish per head daily a tenth of a pound of ground limestone and 10,000 I.U. of vitamin A daily.

3. Feed prices may be found on inside back cover.

The Value of Chlortetracycline[1] for Steers on a Wintering, Grazing and Fattening Program (Project 5-603 and 253-6).[2]

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

Twenty good to choice Hereford steer calves from near Ft. Davis, Texas, were randomly divided into two lots. One group served as the control; the other was treated in a similar way except that each animal received 70 mgs. of chlortetracycline (aureomycin) daily.

All of the animals were implanted with 24 mgs. of stilbestrol in the ear at the start of the wintering period. Both groups were fed in dry-lot during the winter and received all the prairie hay they would eat—4 pounds of alfalfa hay and 5 pounds of sorghum grain per head daily. The chlortetracycline was mixed with the sorghum grain for lot 21. The steers were grazed on bluestem pasture during the early summer with no other feed. Chlortetracycline was fed to lot 21 mixed with the salt. The

1. This project was partially supported by a grant from the American Cyanamid Company, Pearl River, N.Y., and the chlortetracycline (aureomycin) was also supplied by it.