Table 11

Response of fattening steers to oral or injected vitamin A.

March 17, 1961, to July 26, 1961—131 days.

Treatment	Control	Injected vitamin A[1]	Oral vitamin A[2]
No. steers per group	20	15	14[3]
Av. initial wt., lbs.	833	842	860
Av. final wt., lbs.	1113	1122	1134
Av. total gain, lbs.	280	280	274
Av. daily gain, lbs.	2.14	2.14	2.09
Standard error of mean	±0.08	±0.09	±0.10
Shrink data:			
Av. shrink June 2, 1961[4]			
Pounds	41	38	39
Percent	3.9	3.7	3.6
Av. shrink to market[5]			
Pounds	48	55	51
Percent	4.1	4.7	4.3
Carcass data:			
Av. carcass wt., lbs.	678	689	688
Av. packer yield, %[6]	61.2	61.9	60.6
Av. USDA carcass grade[7]	11.7	11.5	11.4
Av. fat thickness, in.[8]	0.72	0.75	0.74
Av. rib eye, sq. in.[8]	11.46	11.66	11.43

1. Each steer received an intramuscular injection of 250,000 I.U. of vitamin A palmitate in oil May 5, May 19, June 2, June 16 and June 30.

2. Each steer received a bolus containing 250,000 I.U. of vitamin A in oil May 5, May 19, June 2, June 16 and June 30.

3. One steer foundered badly and was not used in calculations.

4. Cattle were individually weighed, loaded on trucks, hauled 60 miles, weighed off trucks and returned to pens.

5. Cattle were individually weighed, loaded on trucks, hauled 125 miles to Kansas City and individually weighed off trucks.

6. Based on off-truck weight at Kansas City.

7. Average grade determined as follows: Low choice, 13; high good, 12; average good, 11; low good, 10; high standard, 9.

8. Measured at 12th rib.

Trace-mineral Salt for Steers on a Fattening Ration (Concrete and Shelter vs. Dirt and No Shelter) with Observations on Shrink (Project 695).[1]

B. A. Koch, E. F. Smith, D. Richardson and M. M. McCartor[2]

Previous data reported from this station seem to indicate that supplemental dietary trace minerals may be valuable under certain feeding conditions. Those data also indicated that trace minerals might be related to weight loss during shipping. This study was designed to further determine the value of supplemental dietary trace minerals when cattle were on concrete and had shelter available and when they were on dirt with no shelter.

Experimental Procedure

A report of the wintering phase of this study along with a description of the steers used and their previous treatment is on page 3 of Kansas Circular 383, May 6, 1961.

The 40 Hereford steers used were held off feed and water 15 hours before being weighed for the fattening phase of the study. Treatment groups remained the same as for the wintering phase of the study and each animal remained in the same group. Treatment groups were as follows:

Lot 11. Plain salt (on concrete with shelter available).

Lot 12. Trace-mineral salt (on concrete with shelter available).

Lot 18. Trace-mineral salt (dirt lot, no shelter).

Lot 23. Plain salt (dirt lot, no shelter).

The fattening ration included cracked sorghum grain, soybean oil meal, and prairie hay. During the first 20 days each steer also received 10 pounds of sorghum silage per day. The amount of sorghum grain fed was gradually increased until the steers went on self-feed. The soybean oil meal was spread over the grain each morning. Initially 10 pounds of prairie hay per head per day were fed. This was cut to 4 pounds per head per day after the cattle were on full feed. Each pound of soybean oil meal fed contained 70 mgs. of chlortetracycline (Aureomycin).[3] Each steer received a 24-mg. implant of diethylstilbestrol[4] on the first day of the fattening period.

All animals had free-choice access to the designated salt and also to a mixture of that salt and bonemeal. Water was always available from automatic waterers.

The steers also were used in collecting further data on shrinkage during transport. June 2, 1961, the steers were individually weighed and hauled 60 miles. They were then weighed off trucks individually and returned to feeding pens. Climatic data were as follows: Minimum temperature, 63° F.; maximum temperature, 80° F.; average temperature, 72° F.; relative humidity, 100 at 6 a.m. and 88 at 2 p.m.; precipitation, 0.40 inch while the cattle were being moved; wind light from the east.

July 31, 1961, the steers were individually weighed onto trucks and hauled to Kansas City (125 miles), and individually weighed off the trucks at the stockyards. Climatic data follow: Minimum temperature, 73° F.; maximum temperature, 95° F.; average temperature, 84° F.; relative humidity, 100 at 6 a.m. and 68 at 2 p.m.; precipitation, 0; wind moderate from the west.

The cattle were held over night to feed and water and were sold on the Kansas City market August 1, 1961.

Observations

Results of the study are summarized in Table 12.

Trace-mineralized salt had no apparent effect on average daily gain or feed efficiency of steers fattened under conditions of this study.

Steers fed on concrete with shelter available gained somewhat faster than those on dirt with no shelter. Differences were less than during the wintering period.

No significant differences in shrink due to treatment were found when the cattle were trucked on two different occasions. Feeding and watering the cattle during the overnight stand in the stockyards changed the average weight of the cattle only slightly.

Treatment apparently did not affect carcass yield, carcass grade, or other carcass characteristics studied.

1. Partially supported by the Salt Producers Association, 33 N. LaSalle Street, Chicago 2, Ill.

2. Present address: Department of Animal Husbandry, Panhandle A & M College, Goodwell, Okla.

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

4. Stilbestrol implants were supplied by Chas. Pfizer & Co., Inc., Terre Haute, Ind.

Table 12

Trace-mineral salt[1] for steers on a fattening ration (concrete and shelter vs. dirt and no shelter).

March 17, 1961, to July 26, 1961—131 days.

Treatment	Concrete lot + shelter		Dirt lot, no shelter	
	Plain salt	T-M salt	Plain salt	T-M salt
Lot no.	11	12	18	23
No. steers per lot	10	10	9[2]	10
Av. initial wt., lbs.	849	857	852	846
Av. final wt., lbs.	1154	1162	1140	1126
Av. total gain, lbs.	305	305	288	280
Av. daily gain, lbs.	2.33	2.33	2.20	2.14
Standard error of mean	±0.08	±0.12	±0.07	±0.09
Av. daily ration, lbs.:				
Cracked sorghum grain	21.6	22.1	21.7	22.2
Soybean oil meal	1.0	1.0	1.0	1.0
Prairie hay	6.0	6.0	5.9	5.9
Sorghum silage	1.7	1.7	1.7	1.7
Av. feed per cwt. gain, lbs.:				
Sorghum grain	927	948	986	1037
Soybean oil meal	43	43	45	47
Prairie hay	258	257	269	277
Sorghum silage	72	72	76	78
Feed cost per cwt. gain:[3]	$21.41	$21.84	$22.73	$23.84
Shrink data:				
Av. shrink June 2, 1961[4]				
Pounds	39.5	45.5	38.9	38.5
%	3.6	4.2	3.7	3.6
Av. shrink to market[5]				
Pounds	54.5	57.5	46.1	50.0
%	4.5	4.7	4.0	4.3
Av. overnight wt. change, lbs.[6]	+15.0	+9.5	+1.0	+9.5
Carcass data:				
Av. carcass wt., lbs.	710	709	684	682
Av. packer yield, %[7]	62.1	61.2	61.1	61.1
Av. U.S.D.A. grade[8]	11.8	11.3	11.7	11.9
Av. fat thickness, in.[9]	0.84	0.82	0.67	0.61
Av. rib eye, sq. in.[9]	11.51	11.62	11.46	11.71

1. Commercial trace-mineral salt containing not less than 0.150% manganese; 0.010% cobalt; 0.033% copper; 0.005% zinc; 0.007% iodine; 0.125% iron.

2. One steer foundered badly and was not used in gain or carcass calculations.

3. Based on feed prices listed on page 2.

4. Cattle were individually weighed, loaded on trucks, hauled 60 miles, weighed off trucks, and returned to pens.

5. Cattle were individually weighed, loaded on trucks, hauled 125 miles, and individually weighed off trucks.

6. Cattle were fed and watered during overnight stand in the Kansas City Stockyards.

7. Based on off-truck weight at Kansas City.

8. Average grade determined as follows: Low choice, 13; high good, 12; average good, 11; low good, 10; high standard, 9.

9. Measured at 12th rib.

The Effect of Added Calcium and Phosphorus with and without Added Protein to the Ration of Steers on Bluestem Pasture (Project 253-1).

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

This experiment was designed to evaluate the desirability of supplementing bluestem pasture as indicated in the title.

Forty Hereford steer calves were divided into four lots of 10 each and fed the following experimental rations per head daily:

Lot 1. Two pounds of dehydrated molasses (a molasses product dried on soybean hulls).

Lot 2. Two pounds of dehydrated molasses and 39.1 grams of dicalcium phosphate.

Lot 3. One pound of dehydrated molasses and 1 pound of 41% corn gluten meal.

Lot 4. One pound of dehydrated molasses and 1 pound of 41% corn gluten meal plus 29.6 grams of dicalcium phosphate.

The trial was started February 18, 1961, with steers weighing about 445 pounds each. They were all pastured together on a 190-acre bluestem pasture, gathered each morning, divided into different lots and fed. This system was continued until October 5, 1961, when they were fed three times per week instead of every day. The ration was increased so three feedings provided the same ration as the previous seven.

The cattle were weighed every 28 days, and a blood sample was obtained from the jugular vein of each animal. This was analyzed for calcium and phosphorus as soon as possible after collection. Hematocrit values were also determined.

At the beginning of the trial a bone sample was obtained from the coccygeal vertebra and a tooth was extracted to determine the effects of added mineral on the amount deposited in the bone and teeth. This procedure was repeated at the completion of the third and sixth months and more samples will be obtained at slaughter. The samples were placed in a sharp freeze and will be analyzed when the project is terminated.

Average weights and daily gains are shown in Table 13.

The October 2, 1961, gains are shown to approximate a long summer grazing season and it is evident that there was an increased gain when the steers received a protein supplement at 1 pound per head per day.

March 3 was the most recent weigh period and clearly shows the effect of wintering on dry bluestem grass. Approximately 5 pounds of prairie hay were provided per head daily when the snow cover was deep, about six weeks.

Adding protein to lots 3 and 4 gave a highly significant increase in gain over lots 1 and 2 for the entire period. Gain differences between lots 1 and 2 or between lots 3 and 4 were not significant.

The following table gives average calcium, phosphorus, and hematocrit values.

Calcium, Phosphorus and Hematocrit Values

(Blood values in mgs./100 mls. blood)

Lots	Calcium	Phosphorus	Hematocrit
1	10.47	5.65	35.73
2	10.27	6.82	35.13
3	10.39	6.28	34.77
4	10.27	6.42	36.52

Table 13

Effects of added calcium and phosphorus on steers with and without protein added on pasture.

	Starting wt. 2-18-61	Wt. 10-2-61	Av. daily gain 2-18-61 to 10-2-61	Wt. 3-3-62	Av. daily gain 2-18-61 to 3-3-62
Lot 1	438	680	1.07	579	.373
Lot 2	455	689	1.04	613	.418
Lot 3	441	734	1.30	702	.690
Lot 4	457	740	1.25	710	.669