Table 47
Grass decreasers and grass increasers given as percent of total vegetation and estimated range condition in percent of "original" vegetation.

Range site		Pasture number 1 (%)	2 (%)	3 (%)	4 & 6 Av. (%)	5[1] (%)	9[2] (%)	10[2] (%)	11[2] (%)
OU	Grass decreasers ..	47	33	38	48	56	42	71	72
	Grass increasers ..	33	39	40	36	29	30	15	14
	Range condition ..	62	48	51	62	72	55	86	85
LB	Grass decreasers ..	62	44	56	62	62	47	68	82
	Grass increasers ..	26	32	30	23	24	27	18	15
	Range condition ..	80	65	75	79	81	68	88	97

1. Burned late spring, 1962, before deferment.
2. Burned annually, early, mid-, and late spring, respectively.

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

C. L. Drake, E. F. Smith, H. G. Spies, D. Richardson, and D. L. Good

This trial was designed to study effects of low to high levels of calcium and phosphorus supplements on heifers grazing bluestem pasture.

February 18, 1961, 40 Hereford heifer calves, weighing about 400 pounds each, were randomly divided into four groups and turned into a 140-acre pasture. Each morning the heifers were gathered, divided into four lots and fed the experimental rations shown in Table 49. The chemical analysis is presented in Table 48.

Starting October 5, 1961, the heifers were gathered and fed three times weekly instead of each day; however, the same quantity was fed per week. The heifers were given about 5 pounds of prairie hay per day when snow covered the grass and protein supplement was fed only during winter months. A trace-mineralized vitamin A salt mixture[1] was available at all times and heated water was available during the winter.

Blood samples were obtained at five different intervals during the study and analyzed for calcium and phosphorus. The average for each lot is shown in the following table.

Blood Calcium and Phosphorus Values[1]
(Blood values in mgs. per 100 mls. blood)

Lots		Calcium	Phosphorus
1	(No mineral supplement)	10.33	5.87
2	(Low mineral supplement)	9.95	6.86
3	(Average mineral supplement)	9.92	6.95
4	(High mineral supplement)	9.76	7.50

1. Each value is the average of five samples.

There were no differences between lots in blood calcium; however, there were differences due to season. Highest values were obtained in February, June and August of 1962 while lower values were in December, 1962, and March, 1963. There were significant differences in blood phosphorus between lots and season. Blood phosphorus levels

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

increased as the supplemental phosphorus increased and blood levels were highest during winter months.

There were no significant differences in hematocrit values between lots.

Average daily gain was not influenced by mineral supplementation; however, there were seasonal differences. In general, the gains were positive from May through October and negative from November through April; however, this depended somewhat on climatic conditions. Average daily gain is shown in Table 49.

The heifers were bred as short two-year-olds in the summer of 1962 and calved in the spring of 1963. Two purebred Hereford bulls with marking harnesses were used and an attempt was made to record the breeding date or dates of each heifer. The heifers were pregnancy checked by rectal palpation for 12 weeks during the breeding season.

There were no significant correlations between blood calcium or blood phosphorus levels and reproductive phenomena. The following table shows the effects of mineral supplementation on reproductive performance.

Effects of Calcium and Phosphorus Supplementation on Reproductive Performance.

	Lots 1	2	3	4
Mineral supplement	None	Low	Average	High
Heifers per treatment	10	10	10	10
Services per conception[1]	1.5	1.5	2.4	2.3
Heifers never conceiving[2]	2	0	2	3
Embryonic death loss[3]	4[4]	1	0	2
Percent calf crop	60	90	80	50[3]
Birth weight	69	63	65	64

1. Calculated on heifers known to have conceived as detected by rectal palpation.
2. Based on 35- to 40-day rectal palpation and failure to calve. Two heifers in Lot 1 and one in Lot 4 failed to ovulate throughout breeding season.
3. One calf was born dead in this group and is not included in this figure.
4. One heifer resorbed two embryos.

Table 48
Chemical analysis of the experimental ration.

Feedstuff	Protein, %	Calcium, %	Phosphorus, %
Corn gluten meal	43.63	0.05	0.98
Dried molasses	6.25	0.73	0.16
Dicalcium phosphate	0.00	22.33	20.56
Bluestem grass	4.72	0.43	0.09

Table 49
Experimental rations and average daily gain per head.[2]

	Av. daily gain 4-15-61 9-25-61	Av. daily gain[1] 4-15-62 9-15-62	Av. daily gain 9-25-61 4-15-62	Av. daily gain 9-15-62 3-15-63
Ration				
Lot 1 (No mineral supplement) 1 lb. dried molasses	1.42	1.70	−0.32	−0.0
Lot 2 (Low mineral supplement) 1 lb. dried molasses 27.1 gms. dicalcium phosphate	1.44	1.65	−0.44	−0.10
Lot 3 (Average mineral supplement) 1 lb. dried molasses 54.1 gms. dicalcium phosphate	1.42	1.73	−0.48	−0.01
Lot 4 (High mineral supplement) 1 lb. dried molasses 81.1 gms. dicalcium phosphate	1.42	1.70	−0.53	−0.01

1. Heifers were pregnant during this period.
2. One pound of 41% corn gluten meal per head was fed daily during winter.

Supplying moderate amounts of dicalcium phosphate seemed to enhance reproductive performance. Failure to ovulate and increased early embryonic mortality accounted for the poorer reproductive performance in the no-supplemental and high-level lots. Low and average mineral supplementation gave the highest calf crop percentages, while birth weight was not affected. Too few animals were involved to draw definite conclusions before more work is completed.

The Effects of Adding Protein to Dry-rolled Sorghum Grain Fattening Rations (Project 370).

C. V. DeGeer, F. W. Boren, E. F. Smith, D. Richardson, and R. F. Cox

Previous work (Bulletins 447 and 460) indicated sorghum grain fattening rations supplemented with 0.5 pound per head daily of soybean oil meal produced less efficient gains but carcasses about equal to those from heifers fed 1 pound of soybean oil meal per head daily. With each increase of 0.5 pound of protein (0.5 lb.-1.5 lbs.) came an increase in average daily gain and an increase in feed efficiency.

This experiment repeated a part of the previous experiment with the following modifications for a 140-day fattening period.

Lots 8 and 13—One half pound of soybean oil meal per head daily.

Lots 9 and 14—One pound of soybean oil meal per head daily.

Lots 10 and 15—One and one half pounds of soybean oil meal per head daily.

Lots 11 and 16—One half pound of soybean oil meal per head daily for the first 28 days, then increasing one half pound each 28 days for the 140 days.

Lots 12 and 17—Two and one half pounds of soybean oil meal per head daily for the first 28 days, then decreasing one half pound each 28 days for 140 days.

The heifers used in this experiment were good-to-choice Herefords from near Fort Davis, Texas, and were assigned on a random-weight basis to their treatments.

The amount of feed was increased gradually until they were on full feed. Half the ration was fed twice a day; any remaining feed was weighed back.

The sorghum grain used in the experiment contained an average of 10 percent protein.

Observations

Data collected in Trial 1 appear in Table 50. Average daily gain increased 0.13 and 0.07 pound, respectively, as daily soybean meal intake increased from 0.5 to 1.5 pounds. A daily intake of 1.5 pounds of protein fed in an increasing or decreasing manner resulted in an increased gain of 0.07 and 0.02 pound, respectively, compared with the half-pound level.

Feed efficiency increased as the protein intake increased from 0.5 to 1.5 pounds. A slight increase over the half-pound level was noted when 1.5 pounds of protein were fed in an increasing manner; however, 1.5

Table 50
Trial 1: Effects of adding protein to dry-rolled sorghum grain fattening rations, April 19, 1963, to September 6, 1963—140 days.

Lot no.	13	14	15	16	17
Protein feeding: Lbs. per head daily	.5	1	1.5	0.5 first 28 days plus 0.5 increase each 28 days	2.5 per day decreasing 0.5 each 28 days
No. heifers per lot	10	10	10	10	10
Av. initial wt., lbs.	650	656	648	650	650
Total gain, lbs.	200	218	210	210	203
Av. final wt., lbs.	850	874	858	860	853
Av. daily gain, lbs.	1.43	1.56	1.50	1.50	1.45
Av. daily ration, lbs.:[2]					
Sorghum grain	14.7	14.7	13.7	13.6	13.9
Soybean oil meal	.5	1.01	1.51	1.52	1.48
Sorghum silage	15.0	14.9	14.1	14.0	13.9
Prairie hay[3]	.82	.82	.82	.82	.82
Feed required per cwt. gain, lbs.:					
Sorghum grain	1031	942	912	904	957
Soybean oil meal	35	65	101	101	103
Sorghum silage	1048	958	940	933	960
Prairie hay	58	53	55	55	57
Total	2172	2018	2008	1993	2076
Feed cost per cwt. gain:[2]					
Sorghum grain	$19.59	$17.90	$17.33	$17.16	$18.18
Soybean oil meal	1.56	2.93	4.55	4.55	4.59
Sorghum silage	3.40	3.11	3.06	3.03	3.12
Prairie hay	.55	.50	.52	.52	.54
Total	$25.10	$24.44	$25.46	$25.26	$26.43
Carcass data					
Av. area rib eye, sq. in.	10.76	10.83	10.73	11.82	11.57
Av. fat thickness, 12th rib, in.	.89	.98	.92	.88	.88
Av. carcass grade:					
Prime	1				
Prime −		1			
Choice +		1	1	2	1
Choice	6	1	2	2	2
Choice −	3	6	4	6	4
Good +		1	3		2
Good					
Good −					1

1. Each animal received 0.1 lb. dicalcium phosphate and 10,000 I.U. vitamin A daily. Salt fed free choice; none of these included in feed costs.
2. Feed costs on page 78.
3. Prairie hay fed from August 15 to end of period; silage supply exhausted.