Table 20

A comparison of different methods of managing bluestem pastures, May 5, 1964, to September 27, 1964—145 days.

Pasture number	1	2	3	4, 5, 6	9	10	11
Management	Moderately stocked	Over-stocked	Under-stocked	Deferred and late-spring burned[1]	Early-spring burned	Mid-spring burned	Late-spring burned
Number of steers per pasture	18	25	13	54[2]	13	13	13
Acres in each pasture	60	60	60	3-60[3]	44	44	44
Acres per steer	3.3	2.4	4.6	3.3	3.4	3.4	3.4
Initial wt. per steer	556	571	573	568	575	582	577
Gain per steer	214	196	196	209	225	231	218
Daily gain per steer	1.48	1.35	1.35	1.44	1.55	1.59	1.50
Gain per acre	64.8	81.7	42.6	63.3	66.2	67.9	64.1

1. Deferred pasture number 6 was late-spring burned.
2. Ten of the steers in this pasture were counters only, because they came from a different source.
3. Three 60-acre pastures.

Different Methods of Managing Bluestem Pasture, 1964 (Projects 253-3-5).

E. F. Smith, K. L. Anderson, F. W. Boren, and C. V. DeGeer

This experiment was 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 15 years is included.

Experimental Procedure

Yearling Hereford steers with an average U.S.D.A. feeder grade of choice were used in 1964. They were purchased as calves the previous fall near Sterling, Kansas, and received silage, prairie hay, and about 4 pounds per head daily of a mixture of grain, dehydrated alfalfa and bran in dry lot during winter before the test started. They were assigned to pastures on a random-weight basis.

The experimental treatment for each pasture was:

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

Pasture 2—Overstocked, 2.4 acres per steer.

Pasture 3—Understocked, 4.6 acres per steer.

Pastures 4, 5, 6—Deferred grazing and burning, moderate stocking rate, 3.3 acres per steer. The steers were grazed on pastures 4 and 5 from May 5 to July 1. They were then moved to pasture 6 where they remained until September 17, when they were grazed in all three pastures until September 27, close of the trial. Deferred pasture 6 was burned April 30.

Pasture 9—Burned March 31, 1964, moderate rate of stocking.

Pasture 10—Burned April 8, 1964, moderate rate of stocking.

Pasture 11—Burned April 30, 1964, moderate rate of stocking.

The steers were gathered in the afternoon, held over night without feed or water and weighed the following morning about 8:00. Starting and final weights were obtained after putting all steers together and weighing them in random order.

Observations

Results are reported in Tables 20, 21, 22, and 23. Gain per steer under the various treatments ranged from 231 to 196 pounds per steer. Mid- and late-spring burning produced the highest gain, over- and understocking produced the least gain. It was dry and a 10-15 mile-per-hour wind

Table 21

Grass decreasers and grass increasers shown as percent of total vegetation and an estimated range condition percentage based on percent of the vegetation that is "original."

Pasture number	1	2	3	Av. of 4 & 5	6[1]	9[2]	10[2]	11[2]
Range site	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)
Ordinary upland								
Grass decreasers	38	25	31	39	52	40	63	67
Grass increasers	38	45	46	45	30	32	17	15
Range condition	73	37	47	51	68	52	78	82
Limestone breaks								
Grass decreasers	49	34	54	57	68	54	62	72
Grass increasers	30	43	29	27	24	23	24	19
Range condition	72	61	77	78	90	80	84	92

1. Burned late spring, 1964, before deferment.
2. Burned annually early, mid, and late spring, respectively.

Table 22

Yearly account of summer gains (pounds per steer) under different methods of grazing pastures; 15-year summary, 1950-1964, the summer season of approximately 150 days.

Pasture no.	1	2	3	4, 5, 6	8	10	11
Management	Moderately 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
1962	232	177	215	167	201	205	212
1963	202	180	195	170[1]	187	200	233
1964	214	196	196	209[1]	225	231	218
Average	235	214	228	200	238	253	258

1. The deferred pasture of these three pastures was burned in late spring in 1963 and 1964.

Table 23

Per acre production and disappearance of forage, weeds, and mulch, Donaldson pasture, near Manhattan, Kansas, 1964.

Range site		Pasture number 1	2	3	Av. of 4 & 5	6	9	10	11
		lbs./acre	lbs./acre	lbs./acre	lbs./acre	lbs./acre	lbs./acre	lbs./acre	lbs./acre
		Production							
OU (Ordinary upland)	Forage	1925	2412	3663	2974	3093	1681	2341	2892
	Weeds	308	456	535	311	181	267	262	205
	Mulch	1207	366	1985	976	229	....	....	....
LB (Limestone breaks)	Forage	1392	1165	2546	2703	2244	1460	2346	2366
	Weeds	388	639	295	121	35	337	156	22
	Mulch	1401	262	2493	1029	291	....	....	....
		Disappearance (index of amount grazed)							
OU	Forage	773	1993	848	711	2081	729	670	1128
	Weeds	141	106	271	97	132	106	174	130
	Mulch	—	—	156	—	90	....	....	....
LB	Forage	86	856	621	795	1167	729	1061	396
	Weeds	117	311	123	—	—	187	84	—
	Mulch	—	—	53	119	108	....	....	....
		Remainder (amount left ungrazed at end of season)							
OU	Forage	1152	419	2815	2263	1012	952	1671	1764
	Weeds	167	350	264	214	49	161	88	75
	Mulch	1207	366	1829	976	139	....	....	....
LB	Forage	1306	309	1925	1908	1077	731	1285	1970
	Weeds	271	328	172	121	35	150	72	22
	Mulch	1401	262	2440	910	183	....	....	....

— No apparent disappearance.
.... No mulch in burned pastures.

was blowing when the early-spring-burned pasture was burned; there was very little grass to burn and only about half the pasture burned. Very little of the late-burned pasture actually burned due to lack of old grass and much new growth. The deferred pasture, 6, was burned in late spring and more of it burned than any of the other burning treatments but parts of it failed to burn.

Despite greater precipitation in 1964, yields of herbage were not significantly greater than in the dry season of 1963. The growing season of 1963 had started with ample reserve of soil moisture, so herbage growth continued well into the summer. Amounts of moisture at the beginning of the 1964 season were low in the upper 6 feet of soil, and the reserve was not replenished during the year.

Amounts of mulch remaining at the close of the 1964 growing season were generally somewhat smaller than a year earlier, reflecting the reduced production of dry 1963.

Range condition estimates in 1964 revealed little change from 1963. Light stocking, deferred grazing, and mid- to late-spring burning have resulted in increased grass production, however.

Supplementing Prairie Hay Rations with Urea and Trace Minerals, 1964-65 (Project 253-4-6).

E. F. Smith, F. W. Boren, D. Richardson, and D. W. Loeppke

The trace minerals, cobalt, iodine, copper, and zinc, were added to a prairie hay-limited sorghum grain ration in an effort to improve utilization of prairie hay. Since increased quantities of urea are being successfully used in high-energy rations, its value as a protein extender in a primarily prairie hay ration was tested.

Prairie hay and rolled sorghum grain were the base feeds in all rations. In two of the lots, 18 and 19, those two feeds supplied the only source of protein. Lot 19 was fed a trace mineral supplement described in Footnote 1, Table 24. Lots 20 and 21 received enough urea to build their protein equivalent intake to 1.50 pounds per animal daily; one of those lots, 21, received the trace mineral supplement. Lots 22 and 23 received soybean oil meal to increase protein intake to 1.50 pounds per steer daily; Lot 23 received the trace mineral supplement.

The 60 steer calves, 6 lots of 10 steers each, used in the trial were choice-grade feeder calves purchased near Alden, Kansas.

As much prairie hay was offered the calves as they would clean up without wasting it. The grain was fed once daily; mixed with it each day was 1 pound of finely ground sorghum grain carrier per steer to which the additives listed in Footnote 1, Table 24, were added as well as the urea and trace minerals for the indicated lots. Soybean meal fed to Lots 22 and 23 was fed once daily and mixed with the grain.

The urea supplement was unpalatable. It took from one feeding to another, 24 hours, for it to be eaten. After the first two weeks, 5% molasses was added but it seemed to have little effect. All the steers had been receiving some sorghum grain prior to the start of the test. The first one or two times urea was fed mixed with the sorghum grain, the animals ate it readily but then started to leave feed so that four hours after a feeding half the feed would be left. The cattle were not accustomed to soybean oil meal; lots receiving it did not clean up their feed the first one or two feedings but they quickly found it quite palatable.

Urea as well as soybean oil meal increased hay intake and rate of gain and reduced the amount of feed required to produce a pound of gain compared with the prairie hay-sorghum grain diet.

Performance was best in lots where soybean oil meal was fed.

This trial shows that urea is utilized in a prairie hay and limited sorghum grain diet but less efficiently than soybean oil meal.

The added cobalt, iodine, copper, and zinc seemed to have little measurable effect on the steers.

Table 24
Supplementing prairie hay rations with urea and trace minerals, December 23, 1964, to March 31, 1965—98 days.

Experimental treatment	Prairie hay, sorghum grain		Urea, prairie hay, sorghum grain		Soybean oil meal, prairie hay, sorghum grain	
	No trace minerals added	Trace minerals added	No trace minerals added	Trace minerals added	No trace minerals added	Trace minerals added
Lot no.	18	19	20	21	22	23
Initial wt. per steer, lbs.	438	450	447	454	441	436
Daily gain per steer, lbs.	.76	.88	1.28	1.14	1.66	1.67
Daily ration per steer, lbs.:						
Urea[1]	....	....	0.15	0.15	....	....
Soybean oil meal	....	....	....	....	1.0	1.0
Sorghum grain, rolled	5.0	5.0	4.85	4.85	4.0	4.0
Prairie hay	8.0	8.8	10.1	10.1	10.2	10.2
Trace minerals (cobalt, iodine, copper, and zinc)[1]		Yes		Yes		Yes
Monosodium phosphate, stilbestrol, aureomycin, vitamin A and molasses[2]	Yes	Yes	Yes	Yes	Yes	Yes
Feed per lb. of gain, lbs.:						
Concentrates	6.6	5.7	3.9	4.4	3.0	3.0
Prairie hay	10.5	10.1	7.8	8.9	6.2	6.1
Total	17.1	15.8	11.7	13.3	9.2	9.1

1. The urea and trace minerals were added to finely ground sorghum grain fed at 1 pound per steer daily. Cobalt sulfate, potassium iodine, copper carbonate, and zinc carbonate were added to supply per head daily: 1 mg. cobalt, 1.1 mg. iodine, 32 mgs. copper, 312 mgs. zinc. Other materials were fed in the following quantities: monosodium phosphate to supply 4 grams of phosphorus per head daily; stilbestrol, 10 mgs. per steer daily; aureomycin, 50 mgs. per head daily; vitamin A, 10,000 I.U. per steer daily. Five percent molasses was added to the 1 pound of sorghum grain two weeks after the trial began.