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FERTILIZER ON NATIVE GRASS

The trial with nitrogen fertilizer on native grass on four different range sites was continued for the second season in 1965. Plots on each of the sites were fertilized at 33, 67, and 100 pounds N per acre. The sites are designated by the name of the soil type on which they are situated. The sites included Flasher (sandy hills), Havre (sagebrush flat), Solonetz (panspot alkaline soil), and Farland (high terrace). The Flasher site is at the Dickinson Station, the Havre site is at Pyramid Park, the Solonetz site is on the Nick Oe ranch south of Belfield, and the Farland site is on the Bobb ranch south of Taylor.

The fertilizer applications were made in the spring of 1965, as they were in the spring of 1964. Portions of the vegetation on each plot were protected by steel cages, and the vegetation under the cages was clipped at the end of the growing period to provide and estimate of total yield. Yield data from each of the sites are given in Table 12. The yields on the sites from all plots, both control and fertilized, were appreciably better in the 1965 season than in the 1964 season. In terms of total increase in yield over the control plots the Flasher site was the most responsive to the fertilizer treatments, the Farland second, Havre third, and the Solonetz last.

The comparison of total yields of grass is probably more significant than the comparison of total yields of vegetation from the sites. On the Flasher site the first 33 pounds of nitrogen produced 308 pounds of grass more than the check plots. This increment of nitrogen produced 289 pounds additional grass on the Havre site, 228 pounds additional on the Solonetz site, and on the Farland site there was actually slightly less grass produced on the 33 pounds N plots than on the check plots. The 67 pounds N treatment increased grass yield on the Flasher site by 1067 pounds per acre, on the Havre site by 1162 pounds, on the Solonetz site 489 pounds, and on the Farland site by 872 pounds per acre. At the 100 pound rate the production of grass on the Flasher site was 1449 pounds more than on the check, 1478 pounds more on the Havre, 595 pounds more on the Solonetz, and 383 pounds more on the Farland.

Despite the relatively higher overall production in the 1965 season than in the 1964 season, none of the rates of

fertilizer application doubled the production of grass on any of the sites. The 33 pound rate, in terms of grass production alone, was not economical on any of the sites. The 67 pound rate was economical on the Flasher, Havre, and Farland sites; and 100 pound rate was economical only on the Flasher and Havre sites. None of the rate were economical on the Solonetz site figuring nitrogen at .10 per pound and valuing grass at .01 per pound. It should be pointed out the vegetation on all these sites would normally be harvested by grazing animals, and the returns from grazing might require a considerably different type of evaluation from that afforded by clipping yields.

Probably the forb yields should not be disregarded, since at least a portion of the forb production is suitable as livestock forage. However, most of the forb yield on all sites represents low value forage. Forb production was greatly stimulated on the Farland site by the fertilizer applications, with over half the total yield of 3504 pounds on the 100-pound-N treatment being perennial forbs. Stimulation of forb production by the fertilizer was also substantial on the Flasher site. The need for the use of herbicides on some sites in order to get maximum benefits from the fertilizer applications is apparent from these results.

Table 13 gives the percentage composition of the yields from the sites in the 1965 season as divided into three categories, (1) mid and tall grasses; (2) short grasses; (3) forbs. This analysis provides the basis for comparing the composition of the yields of fertilized vegetation with the composition of the check yields to determine whether all components of the vegetation were stimulated to approximately the same degree or whether some were stimulated more than others. From the data given in table 13 it would appear that the mid and tall grass component of the vegetation on the Flasher site was stimulated more than the other components under the 100-pounds-N treatment. On the Havre site it is apparent that the mid and tall grass component also showed greater stimulation than the other components of the vegetation at all three levels of fertilizer application. There apparently was very little differential stimulus on the Solonetz site at any of the fertilizer levels. The forb component of the vegetation was greatly stimulated on the Farland site by all levels of fertilizer application.

Table 14 gives the average yields on the sites for the two years of the trial, 1964-1965. On the basis of the grass yields the Havre site has been the most responsive of the sites, followed by the Flasher and the Farland. The Solonetz site has been the least responsive in terms of total extra grass. The 67-pound rate of application appears to be the most economical in terms of relative fertilizer costs in relation to pounds of grass produced. The 33-pound rate has been near the break-even point on the Havre and Flasher, but well below this point on the Farland and

Solonetz. The dat indicate clearly that initial Commercial work with fertilizer applications should largely be confined to the sites most likely to give a profitable response.

Table 12. Forage Production on Four Native Grass Range Sites Fertilized with Nitrogen at Three Rates 1965 Season.

Site	Treatment	Dry - Weight Yield - Lbs./Acre						
		Mid Grasses	Tall Grasses	Short Grasses	Total Grasses	Perennial Forbs	Annual Forbs	Total Yield
Flasher	Check	442	45	1153	1640	296	288	2224
	33 Lbs. N	380	113	1455	1948	705	138	2791
	67 Lbs. N	778	8	1938	2724	967	29	3720
	100 Lbs. N	912	242	1935	3089	972	49	4110
Havre	Check	2863	---	---	2863	455	2	3320
	33 Lbs. N	3150	---	2	3152	300	T	3452
	67 Lbs. N	4020	---	5	4025	280	2	4307
	100 Lbs. N	4287	---	54	4341	89	5	4435
Solonetz	Check	403	---	338	741	25	159	925
	33 Lbs. N	467	---	502	969	17	270	1256
	67 Lbs. N	661	---	569	1230	382	21	1633
	100 Lbs. N	769	---	567	1336	24	295	1655
Farland	Check	342	---	987	1329	384	9	1722

	33 Lbs. N	259	---	1059	1318	711	7	2036
	67 Lbs. N	400	---	1312	1712	1187	36	2935
	100 Lbs. N	412	---	1300	1712	1761	31	3504

Table 13. Percentage Composition of yields From Four Native Grass Range Sites Fertilized With Nitrogen at Three Different Rates, 1965 Season.

Site	Treatment	Percent Composition of Yield		
		Mid & Tall Grasses	Short Grasses	Forbs
Flasher	Check	21.9	51.8	26.3
	33 Pounds N	17.6	52.2	30.2
	67 Pounds N	21.1	52.1	26.8
	100 Pounds N	28.1	47.1	24.8
Havre	Check	86.3	---	13.7
	33 Pounds N	91.2	0.1	8.7
	67 Pounds N	93.4	0.1	6.5
	100 Pounds N	96.7	1.2	2.1
Solonetz	Check	43.6	36.6	19.8
	33 Pounds N	37.2	40.0	22.8
	67 Pounds N	40.4	34.8	24.8

	100 Pounds N	46.4	34.3	19.3
Farland	Check	19.9	57.3	22.8
	33 Pounds N	12.7	52.0	35.3
	67 Pounds N	13.6	44.7	41.7
	100 Pounds N	11.8	37.1	51.1

Table 14. Average Dry-Weight Yields for 1964-65 Seasons on Four Native Grass Sites Fertilized with Nitrogen at Three Different Rates.

Site	Treatment	Dry Weight Yield - Lbs. /Acre				
		Mid & Tall Grasses	Short Grasses	Total Grasses	Total Forbs	Total Yield
Havre	Check	2230	1	2231	290	2521
	33 Pounds N	2591	5	2596	262	2858
	67 Pounds N	3349	9	3358	271	3629
	100 Pounds N	3642	54	3696	146	3842
Flasher	Check	354	1040	1394	358	1752
	33 Pounds N	364	1389	1753	517	2270
	67 Pounds N	546	1822	2368	679	3047
	100 Pounds N	787	1782	2569	667	3236
Farland	Check	273	996	1269	353	1622

	33 Pounds N	276	1089	1365	590	1955
	67 Pounds N	396	1458	1854	959	2813
	100 Pounds N	449	1522	1971	1444	3415
Solonetz	Check	313	366	679	106	785
	33 Pounds N	382	449	831	27	858
	67 Pounds N	516	609	1125	232	1357
	100 Pounds N	551	677	1158	217	1375

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