

H – 1906

COMPLIMENTARY TAME GRASS GRAZING SYSTEM – 1982

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The complimentary tame grass grazing system at the Dickinson Experiment Station consists of a crested wheatgrass pasture for spring grazing, a native range pasture for summer grazing and a Russian wild rye pasture for fall grazing. The study compares animal performance and herbage production between two treatments. One treatment has an annual spring broadcast application of 50 lbs. of Nitrogen per acre in the form of Ammonium Nitrate and the other treatment has no fertilizer applied. Yearling steers were used in the study from 1972 through 1976. Cow/calf units have been used from 1977 through the present.

The animals were rotated to the different pastures based on nearly identical percentage of utilization of the herbage of the reciprocal treatments from 1972-1981. In 1982, the animals were rotated to the different pastures at the same time (Table 1) to acquire same season of use data. The animals were removed from the unfertilized Russian wild rye pasture seven days earlier than the fertilized pasture because of a shortage of forage in 1982.

The fertilized system has been superior to the unfertilized system. The mean above ground herbage production per acre (Table 2) and the mean gains per acre per day in pounds of beef (Table 3) showed a distinct advantage for the fertilized system during the ten years of data collection for the steers and cow/calf units.

The individual pastures of the fertilized system showed trends of increased production over the pastures of the unfertilized system. The mean above ground herbage production (Table 4) was greater in the fertilized treatments of all three pastures for the periods of grazing by steers and cow/calf units. The mean gain in pounds of beef per acre per day for the steers and calves (Table 5) was greater in the fertilized treatments of the crested wheatgrass and native range pastures. No data was available for steer gains on the unfertilized Russian wild rye during the period of this trial. The gains for calves on the fertilized Russian wild rye were slightly lower than on the unfertilized for the period of 1978-1981 and for 1982. The mean gain in pounds of beef per acre per day for the cows (Table 5) was greater on the fertilized treatments of the crested wheatgrass and Russian wild rye pastures, but lower on the fertilized native range pasture in 1978-1981. The cow gains in pounds per acre per day were greater on the fertilized crested wheatgrass and native range pastures, but lower on the fertilized Russian wild rye pasture in 1982.

Table 1. The Rotation Dates and Stocking Pressure Data for the Fertilized and Unfertilized Complimentary Grazing Systems at the Dickinson Experiment Station – 1982

Pasture Treatment	Pasture Size Acres	Period Grazed	Days In Period	No. Of Head	No. Of AUM	Stocking Rate AUM/acre
Crested Wheatgrass:						
Fertilized	8	May 20-Jun 21 May 20-Jun 21	32 32	10 cow/calf 1 bull	11.5	1.4
Unfertilized	16	May 20-Jun 21 May 20-Jun 21	32 32	10 cow/calf 1 bull	11.5	0.7
Native Range:						
Fertilized	12	Jun 21-Aug 20 Jun 21-Aug 4	60 44	10 cow/calf 1 bull	21.1	1.8
Unfertilized	18	Jun 21-Aug 20 Jun 21-Aug 4	60 44	10 cow/calf 1 bull	21.1	1.2
Russian Wild Rye:						
Fertilized	16	Aug 20-Oct 4	45	10 cow/calf	14.8	0.9
Unfertilized	16	Aug 20-Sep 24	38	10 cow/calf	12.5	0.8

Table 2. Mean Above Ground Herbage Production for the Unfertilized and Fertilized Complimentary Grazing Systems at the Dickinson Experiment Station, given in lbs/acre

	Unfertilized System	Fertilized System
1972-1976 Steer	2296.0	3027.0
1978-1981 Cow/calf	1413.0	2405.0
1982 Cow/calf	1972.0	3844.0

Table 3. Mean Gains of Beef for the Unfertilized and Fertilized Complimentary Grazing Systems at Dickinson Experiment Station, given in lbs/acre/day

	Unfertilized System	Fertilized System
1972-1976 Steer	1.21	1.66
1978-1981 Calf	1.06	1.49
Cow	0.41	0.82
Cow/calf	1.47	2.30
1982 Calf	2.08	2.76
Cow	1.21	1.65
Cow/calf	3.29	4.41

Table 4. Mean Above Ground Herbage Production When the Animals Came Off For Each Pasture of the Complimentary Grazing System at Dickinson Experiment Station, given in lbs/acre

	Crested Wheatgrass		Native Range		Russian Wild Rye	
	Unfer-tilized	Ferti-lized	Unfer-tilized	Ferti-lized	Unfer-tilized	Ferti-lized
1972-1976 Steer	2136.0	2996.0	2677.0	4010.0	---	2074.0
1978-1981 Cow/calf	1504.0	2772.0	1470.0	2404.0	1266.0	2038.0
1982 Cow/calf	2455.0	4779.0	1923.0	4047.0	1538.0	2706.0

Table 5. Mean Gains of Beef When the Animals Came Off For Each Pasture of the Complimentary Grazing System at the Dickinson Experiment Station, given in lbs/acre/day

	Crested Wheatgrass		Native Range		Russian Wild Rye	
	Unfer-tilized	Ferti-lized	Unfer-tilized	Ferti-lized	Unfer-tilized	Ferti-lized
1972-1976 Steer	1.21	2.03	0.94	1.49	---	1.47
1978-1981 Calf	1.07	2.34	0.94	1.05	1.16	1.08
Cow	0.53	1.52	0.31	0.04	0.39	0.90
Cow/calf	1.60	3.85	1.25	1.09	1.55	1.97
1982 Calf	1.23	2.70	2.19	3.25	2.80	2.41
Cow	2.09	4.88	0.76	1.02	0.82	0.50
Cow/calf	3.32	7.58	2.95	4.27	3.62	2.91

The above ground herbage production data in 1982 was collected on a biweekly basis for the pastures being grazed and on a monthly basis for the pastures not being grazed. These biweekly and monthly clipping data are shown in Table 6. The percentage of difference between the ungrazed and grazed treatments of each pasture includes the amount of herbage consumed by the grazing animal and the amount lost due to trampling etc. These percentages of difference data are shown in Table 7. Fertilization increases herbage production. The amount of increased herbage production is variable between clip periods and between pastures (Table 8). The percent basal cover was greatest on the unfertilized native range pasture and lowest on the unfertilized crested wheatgrass pasture (Table 9).

The animal weight gains by weigh period are shown in Table 10. The gain per acre of the calves in 1982 on the fertilized and unfertilized systems was 74.9 lbs. and 53.2 lbs. per acre respectively. The calf beef produced on the fertilized system was 21.7 lbs. per acre greater than on the unfertilized system. Assuming an average selling price of \$0.72 per pound for the calves in the fall of 1982, the gross return would be \$15.62 per acre greater for the fertilized system. The cost of the fertilizer in the spring of 1982 was \$13.40 per acre. The net return would be \$2.22 per acre greater on the fertilized system.

Table 6. Mean Above Ground Herbage Production of Each Pasture of the Complimentary Grazing System at the Dickinson Experiment Station. Data was collected biweekly for the Pastures Being Grazed and Monthly for all Pastures, 1982

	15 May	1 Jun	15 Jun	20 Jun	1 Jul	15 Jul	1 Aug	15 Aug	20 Aug	30 Aug	15 Sep	1 Oct	30 Oct
Crested Wheatgrass:													
UNFERTILIZED:													
Ungrazed		1253	1508	2455		2132		2507			3192		2705
Grazed	874	691	697	692		1264		1039			1811		1238
FERTILIZED:													
Ungrazed		2895	3913	4779		6203		4857			4946		6263
Grazed	1612	1748	2574	1758		2056		2546			3709		4182
Native Range:													
UNFERTILIZED:													
Ungrazed					2081	2250	2301	2421	1923		1755		2486
Grazed	448		1212		1682	1306	1263	1097	871		1422		1434
FERTILIZED:													
Ungrazed					4308	4867	4546	3840	4047		2757		5246
Grazed	1148		3169		3260	3309	2601	2200	1095		1888		3020
Russian Wild Rye:													
UNFERTILIZED:													
Ungrazed										1791	1538	1673	1970
Grazed	576		1491			3214		2163		1279	879	316	723
FERTILIZED:													
Ungrazed										3382	2706	3389	4801
Grazed	1336		3079			4409		3579		2654	1774	1387	2870

Table 7. Mean Above Ground Herbage Production in Lbs/Acre on the Ungrazed Treatment and Percentage Difference between the Ungrazed and Grazed Treatments of Each Pasture of the Complimentary Grazing Systems at the Dickinson Experiment Station – 1982

	15 May	1 Jun	15 Jun	20 Jun	1 Jul	15 Jul	1 Aug	15 Aug	20 Aug	30 Aug	15 Sep	1 Oct	30 Oct
Crested Wheatgrass:													
UNFERTILIZED:													
Lbs/acre	874	1253	1508	2455		2132		2507			3192		2705
% Difference	0.0	44.8	53.7	71.8		40.7		58.6			43.3		54.2
FERTILIZED:													
Lbs/acre	1612	2895	3913	4779		6203		4857			4946		6263
% Difference	0.0	39.6	34.2	63.2		66.9		47.6			25.0		33.2
Native Range:													
UNFERTILIZED:													
Lbs/acre	448		1212		2081	2250	2301	2421	1923		1755		2486
% Difference	0.0		0.0		19.2	42.0	45.1	54.7	54.7		19.0		42.3
FERTILIZED:													
Lbs/acre	1148		3169		4308	4867	4546	3840	4047		2757		5246
% Difference	0.0		0.0		24.3	32.0	42.8	42.7	73.0		31.5		42.4
Russian Wild Rye:													
UNFERTILIZED:													
Lbs/acre	576		1491			3214		2163		1791	1538	1673	1970
% Difference	0.0		0.0			0.0		0.0		38.4	42.9	81.1	63.3
FERTILIZED:													
Lbs/acre	1336		3079			4409		3579		3382	2706	3389	4801
% Difference	0.0		0.0			0.0		0.0		24.0	34.4	59.1	40.2

Table 8. Percentage of Above Ground Herbage Production on the Fertilized Pastures Compared to the Herbage Production on the Unfertilized Pastures on the Complimentary Grazing Systems at Dickinson Experiment Station – 1982

	15 May	1 Jun	15 Jun	20 Jun	1 Jul	15 Jul	1 Aug	15 Aug	20 Aug	30 Aug	15 Sep	1 Oct	30 Oct
Crested Wheatgrass:													
% Fert/Unfert	184.5	231.0	259.5	194.7		291.0		193.8			155.0		231.6
Native Range:													
% Fert/Unfert	256.2		261.5		207.0	216.4	197.5	158.7	210.4		157.0		211.0
Russian Wild Rye:													
% Fert/Unfert	232.2		206.5			137.2		165.4		188.9	175.9	202.5	243.7

Table 9. Percent Basal Cover on the Fertilized and Unfertilized Pastures of the Complimentary Grazing System at the Dickinson Experiment Station, 1982

	Crested Wheatgrass		Native Range		Russian Wild Rye	
	Fertilized	Unfertilized	Fertilized	Unfertilized	Fertilized	Unfertilized
Litter	73.0	73.1	78.1	63.7	64.0	56.7
Soil	11.9	17.2	4.1	6.8	19.1	31.0
Grass	15.0	7.9	17.1	21.4	16.7	11.7
Forbs	0.1	1.8	0.4	1.4	0.1	0.6
Club Moss	0.0	0.0	0.2	6.7	0.1	0.0

Table 10. The Mean Weight, the Gain in Pounds per Day per Head and the Gain in Pounds per Day per Acre by Weigh Period for the Calves and Cows on the Unfertilized and Fertilized Complimentary Grazing Systems at Dickinson Experiment Station – 1982

	Crested Wheatgrass		Native Range		Russian Wild Rye		
	20 May	21 Jun	19 Jul	20 Aug	10 Sep	27 Sep	4 Oct
UNFERTILIZED SYSTEM:							
Calf:							
Mean Weight	137.5	200.5	261.0	317.5	366.5		403.0
Gain lbs/day/head		1.97	2.18	1.77	2.33	2.15	
Gain lbs/day/acre		1.23	1.21	0.98	1.46	1.34	
Cow:							
Mean Weight	897.0	1004.0	1049.5	1041.5	1066.0		1068.5
Gain lbs/day/head		3.35	1.63	-0.25	1.17	0.15	
Gain lbs/day/acre		2.09	0.90	-0.14	0.73	0.09	
FERTILIZED SYSTEM:							
Calf:							
Mean Weight	139.5	208.5	277.0	323.5	374.0		409.0
Gain lbs/day/head		2.16	2.45	1.45	2.40	1.46	
Gain lbs/day/acre		2.70	2.04	1.21	1.50	0.91	
Cow:							
Mean Weight	893.5	1018.5	1082.5	1048.5	1085.0		1062.5
Gain lbs/day/head		3.91	2.29	-1.06	1.74	-0.94	
Gain lbs/day/acre		4.88	1.91	-0.89	1.09	-0.59	