

Hatch-1922: Short Term Grazing Systems – Dickinson Experiment Station

D. Kirby

Short duration grazing systems use: (1) multiple pastures, 3 to 60, (2) 1 to 15 day grazing periods, (3) 30 to 60 day rest periods, and (4) 1 herd stocked at a heavier rate when compared with recommended seasonlong stocking rates. It has been suggested that this system will maintain or improve range condition and increase carrying capacity over conventional rangeland management systems. This project was initiated to test his hypothesis.

The grazing trial began in June, 1981 by dividing Section 16, Dickinson Experiment Station, Ranch Headquarters, into a 130 hectare seasonlong (SL) pasture and 8-16.25 hectare short duration grazed (SDG) pastures. On June 25, 1981 and June 22, 1982, 20 cow-calf pairs and 1 bull were allocated to the SL pasture and 35 cow-calf pairs and 1 bull allocated to the SDG system. Cattle were rotated every 5 days on the SDG system as pastures received 35 days rest between grazings. Drought, causing low forage production, forced removal of livestock from both systems on September 3 in 1981. In 1982 and 1983 cattle were removed October 12 and 26 concluding 112 and 131 day grazing seasons, respectively.

Forage Production and Utilization and Livestock Performance are summarized in Table 1. Forage produced and utilized was similar between grazing treatments in 1981 and 1982. In 1983 the range sites used for estimating forage production and utilization were changed to better represent the "true" sites, according to the newly revised Dunn County Soil Survey. We feel the difference in forage production in 1983 on the two grazing treatments is a result of this site change and not an effect of the grazing treatment. Utilization in 1983 on the short duration grazing system was 10 percentage points higher than on the seasonlong treatment. However, the stocking rate was 75% greater on the short duration system, which should relate to an even greater difference in utilization than actually estimated. Livestock performance per head was similar, but production per acre was higher each year for the SDG system, which reflects the increased stocking rate.

Botanical Composition (%) of Cow Diets on the Short Duration System indicated cattle select more grasses throughout the grazing season (Table 2). Grass averaged over 80% of cattle diets each year and generally increased in diets from early summer through late fall. Forbs were an important part of diets in early summer, but were selected less as seasons progressed. Except for 1981, a drought year, browse contributed little to cattle diets in any season.

Cattle Preference, as determined by Forage Availability and Composition of the Diets, is summarized in Table 3. Grass was a preferred class of forage throughout the grazing season in all years, while forbs were preferred only in early summer and browse was generally avoided by the grazing cattle. Grass preference increased as the grazing season progressed.

Research has shown that various species of grazing animals have different forage preferences. When animals don't compete for the same type of forage, an increase in stocking rate is possible without causing detrimental effects to the condition of the rangeland. Consequently, a study to determine dietary overlap of sheep and cattle on the two grazing treatments was begun in 1983. Esophageally fistulated sheep were grazed seasonally on both short duration and seasonlong grazing treatments. Botanical composition of the collected diets were determined to class and species using microscopic analysis.

Botanical Composition of Sheep Diets indicated that forb use was highest in early summer and summer on both grazing treatments (Tables 4 and 5). The last half of the grazing season showed decreases in the amount of forbs selected in diets and increases in grass and browse selection. The decrease in forb use is due to the disappearance of forb species in the latter months of the grazing season and to the decrease in palatability of forbs when mature. Forb selection on the short duration grazing treatment was higher in the early summer and summer than on the seasonlong treatment. Forb and grass use was quite similar for both treatments in the early fall and fall. Comparing sheep and cattle diets indicates that sheep have little dietary overlap with cattle for forbs. The only competitive overlap in diets appears to be for the short, warm-season grass, blue grama. Any competitive overlap in diets would appear to increase in the latter part of the grazing season.

Table 1. Forage Production and Utilization and Livestock Performance on Short Duration Grazing and Seasonlong Systems on the Dickinson Experiment Station

Year	System	Forage		Livestock			
		Production (Kg/ha)	Utilization (%)	Cows		Calves	
				ADG (kg)	(AG/ha) (kg)	ADG (kg)	(AG/ha) (kg)
1981	SD	759	55	0.2	3.4	1.0	17.9
	SL	760	51	0.3	3.4	1.0	11.2
1982	SD	1842	37	0.1	4.1	1.0	28
	SL	1978	36	0.2	3.9	1.0	16.8
1983	SD	1667	54	0.3	11.2	1.0	30.2
	SL	2101	44	0.5	9.2	1.0	17.9

Table 2. Botanical Composition (%) of Cow Diets on a Short Duration Grazing System, Dickinson Experiment Station, Ranch Headquarters

Year	Class	Season				Mean
		ES	S	F	LF	
1981	Grass	87	92	85	--	88
	Forb	12	4	1	--	6
	Browse	1	4	14	--	6
1982	Grass	71	82	87	87	81
	Forb	25	14	9	9	15
	Browse	4	4	4	4	4
1983	Grass	86	88	93	95	91
	Forb	13	11	6	4	8
	Browse	1	1	1	1	1

Table 3. Seasonal Forage Preferences for Cows Grazing a Short Duration Grazing System, Dickinson Experiment Station, Ranch Headquarters, 1981 – 1983

Class	Season			
	ES	S	F	LF
Grass	+	+	+	++
Forb	0*	-	--	--
Browse	--	--	--	--

⁺⁺strongly preferred

⁻mildly avoided

⁺preferred

⁻⁻avoided

⁰selected as available

Table 4. Botanical Composition (%) of Sheep Diets on a Seasonlong Grazing Treatment – 1983

Class	Season ¹			
	ES	S	EF	F
Grass	63	55	72	73
Bouteloua gracilis	41	45	51	39
Koeleria pyramidata	7	4	7	21
Other	15	6	14	13
Forbs	36	43	20	26
Sphaeralcea coccinea	8	7	2	11
Lotus purshianus	3	17	1	--
Artemisia ludoviciana	13	6	4	9
Solidago mollis	1	--	--	1
Other	11	13	13	5
Browse	1	2	8	1
Artemisia frigida	1	2	5	0
Other	0	--	3	1

¹Dietary collections were made seasonally in early summer, summer, early fall and fall.

Table 5. Botanical Composition (%) of Sheep Diets on a Short Duration Grazing System – 1983

Class	Season			
	ES	S	EF	F
Grass	44	43	73	70
Bouteloua gracilis	25	31	60	47
Koeleria pyramidata	8	4	4	13
Other	11	8	9	10
Forbs	55	53	18	21
Sphaeralcea coccinea	11	16	5	12
Lotus purshianus	9	24	1	--
Artemisia ludoviciana	1	--	1	--
Solidago mollis	19	--	--	1
Other	15	13	11	8
Browse	1	4	9	9
Artemisia frigida	1	4	9	9
Other	--	--	--	--