

Fertilization of Grass for Increased Yield and Improved Forage Quality, 2007

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The adoption of fertility management for pastures and non-legume hayland has been somewhat limited in this region. This study was conducted as a preliminary investigation to determine the potential for increasing yield and improving forage quality through increased nitrogen (N) fertility management.

The study was conducted at the Carrington Research Extension Center, Carrington, ND. The site was a grass area that had not been fertilized for many years. The site was typical of many pastures and non-legume hayland of the area, primarily Kentucky Blue Grass (approximately 80%) with some Smooth Bromegrass (approximately 20%). The nitrogen rates were 0 lbs., 25 lbs., 50 lbs., 75 lbs., and 100 lbs. N/acre Urea fertilizer broadcast-applied on November 9, 2006, for the fall treatments, and on April 17, 2007, for the spring treatment.

As fertilization rate increased so did plant height and harvest moisture (Table 1). The 15% moisture (15%M) yield for the 100 lbs. N Fall rate was significantly higher than the 50 lbs. N fall, 25 lbs. N fall, and 0 lb. rates. The dry yield for the 100 lbs. N fall-rate was significantly higher than the 25 lbs. N fall and 0 lb. rates. The crude protein (CP) was significantly higher for the 50 lbs. N spring rate than the 50 lbs. N fall, 25 lbs. N fall, and 0 lb. rates. The 75 lbs. N fall rate was also significantly higher than the 25 lbs. N fall and 0 lb. rates. The 50 lbs. N spring rate had a significantly lower acid detergent fiber (ADF) than the 0 lb. rate. The 50 lbs. N spring rate had significantly higher phosphorous (P) content than the 0 lb. rate. The 50 lbs. N spring, 75 lbs. N fall, and 100 lbs. N fall rates had significantly higher potassium (K) content than the 0 lb. rate. The 50 lbs. N spring, 50 lbs. N fall, 75 lbs. N fall, and 100 lbs. N fall rates had significantly higher sulfur (S) content than the 25 lbs. N fall and 0 lb. rates. The 50 lbs. N spring rate had significantly higher total digestible nutrients (TDN) than the 0 lb. rate. There were no significant differences for neutral detergent fiber (NDF), calcium (Ca) content, magnesium (Mg) content, and relative feed value (RFV) across rates. In conclusion the 50 lbs. N spring rate proved to be the most practical treatment to increase both forage yield and forage quality.

Table 1. Effect of N fertilization on Grass Yield and Forage Quality

Treatment	Harvest Height in	Harvest Moisture %	-- Yield --		CP	ADF	NDF	Ca	P	Mg	K	TDN	RFV
			15%M	Dry T/acre									
-----%DM-----													
0 lbs.	24.3	40	1.8	1.5	7.1	37.6	58.6	0.53	0.2	0.11	1.7	59.6	95
50 lbs. N Spring	28.5	51.6	2.1	1.8	10	35.2	57.2	0.58	0.3	0.13	2.1	61.5	100
25 lbs. N Fall	24.8	45.7	1.3	1.1	6.8	36.1	57.7	0.53	0.23	0.1	1.8	60.8	98
50 lbs. N Fall	26.8	47.6	1.9	1.7	7.4	36.2	57.3	0.57	0.24	0.1	1.9	60.7	99
75 lbs. N Fall	29.5	50	2.3	2	9.3	36.2	58.2	0.5	0.28	0.1	2	60.7	97
100 lbs. N Fall	30.5	52.4	3	2.6	8.5	36.1	57.6	0.53	0.28	0.1	2	60.8	98
Average	27.4	47.9	2.1	1.8	8.2	36.2	57.7	0.54	0.25	0.1	1.9	60.7	98
C.V.%	9.7	4.8	31.6	31	16	3.4	3.1	17.4	18.6	20.5	9.1	1.6	4
LSD _{0.05}	4.1	3.8	1	0.9	2.1	2	NS	NS	0.08	NS	0.3	1.5	NS