

SOIL/WATER RESEARCH
South Dakota State University
2008 Progress Report
 Agricultural Experiment Station
 Plant Science Department
 South Dakota State University, Brookings, SD 57007

Influence of N rate, split application of N for corn, foliar application of N for wheat, and Nitamin and Nfusion on spring wheat and corn parameters near Aurora SD in 2008. (41208 and 41308)

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Objective: Determine the effectiveness of the Georgia Pacific products Nitamin and Nfusion on hard red spring wheat and corn productivity.

Materials and Methods

Item:	Description:
Location	Crop Improvement farm, Aurora SD
Spring wheat variety	Traverse
Corn hybrid	Dekalb DKC 46-60
Spring wheat planting date / seeding rate	April 21, 1.4 million PLS / a
Corn planting date, seeding rate	May 15, (30,100 seeds/a)
Tillage method	corn = No-till, spring wheat = no-till
Row spacing	corn = 30 inches, spring wheat = 7 inches
N rate (lbs N/a)	Corn = 0, 61, 122 Spring Wheat = 0, 27, 54
Split N application timing (corn)	50 % N surface broadcast after planting 50 % N dribble next to row at V5
N sources	UAN (28-0-0) Georgia Pacific Nitamin (30-0-0) Nfusion (22-0-0)
Pre-Plant Soil samples	0-6 and 6-24 inch
Harvest date	Corn = Nov. 3 and Wheat = Aug. 8
Measured variables	Wheat = flag leaf N, grain yield and protein Corn = ear leaf N and grain yield
Statistics	RCBD, 4 replications

Results and Discussion

Spring Wheat: Treatment significantly influenced flag leaf N concentration, grain protein and yield (Table 1). Treatments with applied N (3-7) had significantly higher flag leaf N concentrations. Grain protein and yield were significantly higher with increased N rate applications and foliarly applied N. The substitution of either Georgia Pacific product did not significantly reduce the effectiveness of the N rate or foliar application effect on ear leaf N concentration, grain protein or yield. The Nfusion and Nitamin products influenced spring wheat parameters similarly to UAN.

Corn: Treatment significantly influence ear leaf N concentrations and grain yield (Table 2). Ear leaf N and grain yield significantly increased with N rate. The

split N rate application had significantly lower ear leaf N concentrations and grain yield and were intermediate to the check and the first N rate (61 lbs/a). Dry surface soil conditions during and after the dribble N application (June 19) possibly made the N positionally unavailable to plant roots that were growing lower in the soil profile for access to store water (Figure 1). Ear leaf N and grain yield were maximized with the highest N rate (122 lbs/a). The Nfusion product provided corn ear leaf N and grain yields similarly to UAN.

Acknowledgements

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Figure 1. Rainfall at Georgia Pacific corn study near Aurora SD in 2008.

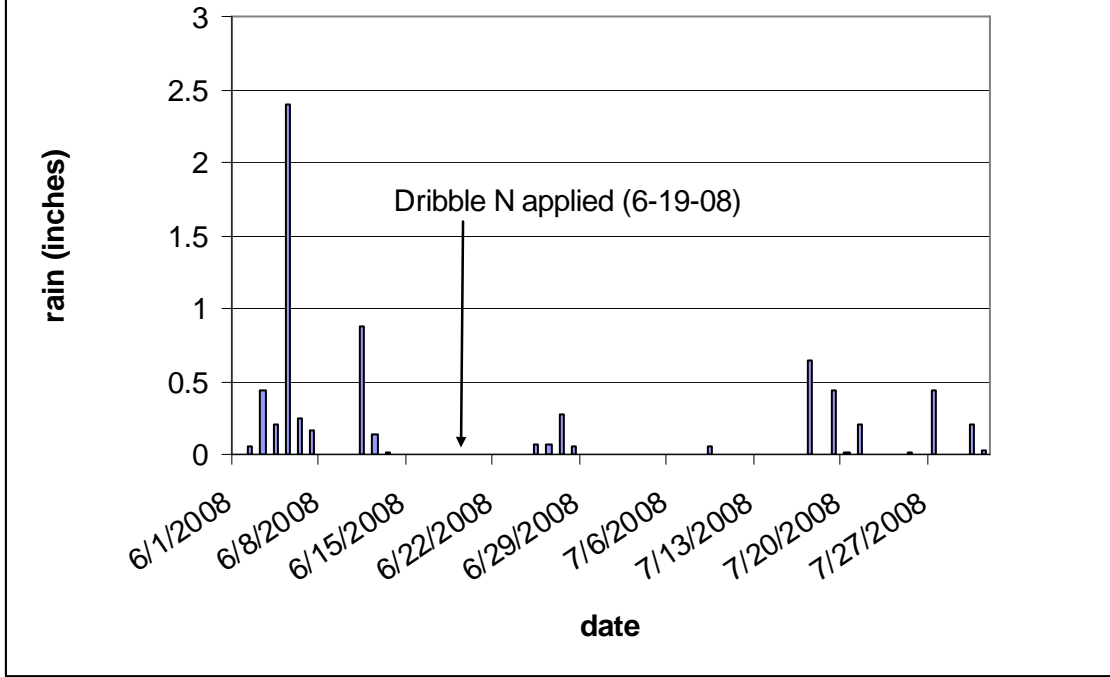


Table 1. Influence of N source, rate and foliar N on spring wheat grain protein and yield near Brookings SD in 2008.

Treatment	Planting		Foliar ^A		Flag Leaf N	Grain ^B		
	N Rate	N Source ^C	N Rate	N Source ^D		Protein	Yield	
	lbs/a		lbs/a		%	%	bu/a	
1	0	--	0	--	1.65 b	12.7 f	42.0 de	
2	0	--	0	--	1.65 b	12.5 f	41.1 e	
3	27	UAN	0	--	1.86 a	13.6 e	44.1 cd	
4	27	UAN+GP	0	--	1.83 a	14.1 d	44.3 bcd	
5	54	UAN	0	--	1.89 a	14.4 cd	46.2 bc	
6	54	UAN+GP	0	--	1.89 a	14.7 bc	44.4 bcd	
7	54	UAN	6	UAN	---	14.9 b	46.8 ab	
8	54	UAN+GP	6	GP	---	14.8 bc	45.6 bc	
9	54	UAN	30	UAN	---	16.0 a	45.7 bc	
10	54	UAN+GP	30	GP	---	15.6 a	48.9 a	
					Pr>F	0.03	0.001	0.001
					LSD _(.10)	0.15	0.42	2.6

^A Applied after Feekes 10.8

^B adjusted to 13 % grain moisture.

^C UAN = urea ammonium nitrate, GP = Georgia Pacific Nfusion.
27 lbs N/a = 9 gpa UAN, or 7.2 gpa UAN + 2.3 gpa Nfusion
54 lbs N/a = 18 gpa UAN, or 14.4 gpa UAN + 4.6 gpa Nfusion

^D UAN = urea ammonium nitrate, GP = Georgia Pacific Nitamin,
6 lbs N/a = 2 gpa UAN or GP Nitamin diluted with 2 gpa water and
applied at 4 gpa rate. 30 lbs N/a = 10 gpa UAN or GP Nitamin diluted
with 10 gpa water and applied at 20 gpa rate.

Table 2. Influence of N source, rate and application timing on corn grain yield near Brookings SD in 2008.

Treatment	Planting		Dribble ^A		Ear Leaf N %	Yield bu/a
	N Rate lbs/a	N Source ^C	N Rate lbs/a	N Source ^C		
1	0	--	0	--	1.86 d	107.5 d
2	0	--	0	--	1.80 d	99.7 d
3	61	UAN	0	--	2.24 bc	137.1 ab
4	61	UAN+GP	0	--	2.26 bc	133.4 ab
5	122	UAN	0	--	2.54 a	147.3 a
6	122	UAN+GP	0	--	2.38 b	148.9 a
7	30.5	UAN	30.5	UAN	2.10 c	120.8 c
8	30.5	UAN+GP	30.5	GP	2.11 c	124.8 bc
Pr>F					0.001	0.001
LSD _(.10)					0.16	13.2

^A 50 % N applied at planting and 50% dribble applied near the row at V5 growth stage.

^B adjusted to 15% grain moisture.

^C UAN = urea ammonium nitrate, GP = Georgia Pacific Nfusion, Treatments with UAN+GP indicate that 20% of N came from Nfusion and 80 % from UAN.

*Dribble yields lower due to dry soil conditions after N application possibly making the N positionally unavailable to plant roots.