

## Wheat Response to Late-season N Application for Protein, Carrington, 2005

Greg Endres and Blaine G.Schatz

The objective of this study was to measure HRS wheat protein response with late-season nitrogen (N) sources, rates and application timings. Experimental design was a randomized complete block with four replications. The dryland trial was established on a Heimdahl-Emrick loam soil with 'Glenn' HRS wheat planted at 1 million PLS/A on April 28 at the NDSU Carrington Research Extension Center. The previous year's crop was flax. Available soil plus fertilizer N totaled 145 lb/A. N treatments are listed in the table. N sources included UAN (liquid 28% at 3 lb N/gal) and CoRoN (2.5 lb N/gal; Helena Chemical Co., Collirville, TN). All N treatments were applied with water carrier at a total volume of 21 gpa using a hand-boom plot sprayer. Boot-stage (Feekes 9) N treatments were soil-applied with stream nozzles on June 24 with 73 F, 35% RH, 50% clear sky, and 12 mph wind on a wet soil surface. Rainfall of 1.43 inches occurred on June 26. Flowering-stage (Feekes 10.51) N treatments were foliar-applied with paired-orifice nozzles on June 30 with 66 F, 65% RH, 5% clear sky, 17 mph wind, and dry foliage. Folicur at 4 fl oz/A + NIS (Induce) at 0.125% v/v was applied at flowering on June 30 across trial except as tank mixture with N in treatments 3, 8, and 9. POST-flowering stage (Feekes 10.54) N treatments were either foliar- or soil-applied with paired-orifice, stream, or flat-flan nozzles on July 4 with 60 F, 89% RH, 5% clear sky, 9 mph wind with dew present on foliage and a wet soil surface. Rainfall totaled 0.18 inches during the two weeks after N application. The trial was harvested with a plot combine on August 16.

Flag leaf burn with foliar-applied UAN at 30 lb N/acre ranged from 14 to 26% when visually evaluated one week after N application (Table). Yield loss of 4.3 to 4.9 bu/acre occurred with two of the treatments that significantly damaged the flag leaf compared to the untreated check. With foliar-applied N at 30 lb/acre, flag leaf necrosis with CoRoN (3 to 5%) was significantly less compared to UAN. Flag leaf necrosis was less and yield was higher with flowering-stage application of UAN at 30 lb N/acre plus Folicur compared to the POST-flowering stage application of UAN at 30 lb N/acre. Foliar-applied UAN at 30 lb N/acre with paired-orifice nozzles had slightly lower leaf necrosis and similar yield compared to N application with flat-fan nozzles. Protein was similar among N treatments, likely due to the high protein level of the untreated check.

**Table.**

N application <sup>1</sup>							Wheat response				
Trt	Treatment	N rate	Product rate	Nozzle	Crop stage	Target	Flag leaf necrosis	Yield	Test weight	250 kernel weight	Protein
No.	Name	lb ai/A	gal/A				%	bu/A	lb/bu	g	%
1	UAN	15	5	PO	POSTF	Foliar	6	53.3	61.1	7.24	16.1
2	UAN	30	10	PO	POSTF	Foliar	22	48.4	61.0	7.13	16.2
3	UAN	30	10	PO	FLOW	Foliar	14	53.4	61.2	7.28	16.0
4	UAN	30	10	S	BOOT	Soil	2	47.8	60.4	6.99	16.2
5	UAN	30	10	S	POSTF	Soil	9	50.4	60.7	7.01	16.2
6	CoRoN	6.2	2.5	PO	POSTF	Foliar	1	53.4	60.8	7.15	16.0
7	CoRoN	30	12.1	PO	POSTF	Foliar	3	50.8	60.8	7.16	16.1
8	CoRoN	6.2	2.5	PO	FLOW	Foliar	2	53.1	60.8	7.28	16.0
9	CoRoN	30	12.1	PO	FLOW	Foliar	5	53.4	60.8	7.10	16.1
10	CoRoN	30	12.1	S	BOOT	Soil	1	52.5	61.2	7.07	16.0
11	UAN	30	10	FF	POSTF	Foliar	26	49.0	61.1	7.14	16.0
12	untreated check	x	x	x	x	x	0	53.3	60.8	7.21	16.0
	mean						8	51.6	60.9	7.14	16.1
	CV%						18	5.0	1.0	3	1
	LSD (0.05)						2	3.9	0.6	0.26	NS

<sup>1</sup>Nozzle: PO=paired orifice (TeeJet TwinJet 8002), S=stream nozzle (TeeJet SJ3-015), FF=flat fan (TeeJet 8002); Crop stage: BOOT=boot, FLOW=flowering, POSTF=post flowering. Trt 3, 8, and 9 included a tank mixture with Folicur at 4 fl oz/A + NIS at 0.125% v/v (Folicur applied as separate application at flowering stage to balance of trial area).