

# EARLY VS. LATE-SEASON NITROGEN NUTRITION TO IMPROVE PROTEIN LEVELS IN SOFT WHITE WINTER WHEAT

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## RESEARCH OBJECTIVE:

Determine whether early and late-season applications of N can be optimized for both high yields and grain protein concentrations in soft white winter wheat cultivars.

## METHODS:

Location	Caldwell and Warren Counties
Soil Type and Drainage	Caldwell-Crider silt loam, well drained Warren-Huntington silt loam, well-drained
Previous Crop	Corn (both locations)
Tillage	Chisel Plow + Secondary Discing
Cultivar	Pioneer 25W33 and Pioneer 25W60
Planting Date/Rate	Caldwell – Oct 30, 2001; Warren – Oct. 9, 2001
Seeding Rate	30-35 seed/sq. ft
Harvest Date	Caldwell – June 20, 2002; Warren – June 19, 2002
Early N (treatments)	0, 25, 35, 45 lb N/ac as urea on 2/14/02 0, 50, 70, 90 lb N/ac as urea on 3/6/02
Late N (treatments)	0, 20, 40 lb N/ac as urea on 4/29/02
Results:	Average of 4 replications – See Tables 1 & 2

## DISCUSSION/CONCLUSIONS:

This was the second year of this experiment. At the Caldwell County location (Table 1), there was no yield difference between the two cultivars, though the 25W33 exhibited less grain protein and a greater SPAD meter reading at flowering. Greater early N did not increase yield on this soil, nor did greater late N (Table 1). Grain protein was improved by increases in late N rate, but not by differences in early N rate (Table 1).

In Warren County, the cultivars yielded equally, and 25W33 again exhibited less grain protein (Table 2). Early N rate had little effect on protein (Table 2). Again, protein was raised most by greater late N rates (Table 2), though there was not as great of a response as was observed in Caldwell County. In Warren County, there was a trend for somewhat greater lodging, and slight yield reductions, when higher late N rates were applied to wheat

that had already received higher early N rates (data not shown). Interestingly, there was no interaction between early N and late N on grain protein levels at either location. Protein increases due to higher late N rates were consistent and independent of the early N rate.

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**Table 1. Main Effects of Early and Late-Season N Nutrition on Yield and Protein in Two Soft White Winter Wheats - Caldwell**

	<b>Early Fertilizer</b>	<b>Late Fertilizer</b>	<b>Grain</b>	<b>Grain</b>	<b>SPAD</b>
<b>Cultivar</b>	<b>N Rate</b>	<b>N Rate</b>	<b>Yield</b>	<b>Protein</b>	<b>Reading</b>
	<b>lb N/acre</b>	<b>lb N/acre</b>	<b>bu/acre</b>	<b>%</b>	
P25W33			97a	11.1b	41.3a
P25W60			96a	11.8a	40.0b
	75		94a	11.4a	40.0b
	105		97a	11.3a	40.4ab
	135		99a	11.3a	41.5a
		0	95a	10.8c	40.5a
		20	98a	11.4b	40.6a
		40	98a	12.1a	40.8a

**Table 2. Main Effects of Early and Late-Season N Nutrition on Yield and Protein in Two Soft White Winter Wheats - Warren**

	<b>Early Fertilizer</b>	<b>Late Fertilizer</b>	<b>Grain</b>	<b>Grain</b>	<b>SPAD</b>
<b>Cultivar</b>	<b>N Rate</b>	<b>N Rate</b>	<b>Yield</b>	<b>Protein</b>	<b>Reading</b>
	<b>lb N/acre</b>	<b>lb N/acre</b>	<b>bu/acre</b>	<b>%</b>	
P25W33			97a	10.7b	41.2a
P25W60			99a	11.5a	40.9a
	75		95b	10.7b	40.4b
	105		99ab	11.2a	40.7b
	135		101a	11.3a	41.9a
		0	96b	10.4c	41.0a
		20	100a	11.0b	41.3a
		40	99ab	11.8a	40.8a