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

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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:

Locations	McLean and Warren Counties
Soil Type and Drainage	McLean-Grenada silt loam, moderately well drained Warren-Huntington silt loam, well-drained
Previous Crop	Corn
Tillage	Chisel Plow + Secondary Discing
Cultivars	Pioneer 25W33 and Pioneer 25W60
Planting Date	McLean-Oct. 16, 2000; Warren-Oct. 13, 2000
Seeding Rate	30-35 seed/sq. ft.
Harvest Date	McLean-June 19, 2001; Warren-June 18, 2001
Fertilizer:	
Early N (treatments)	25, 35, 45 lb N/acre as urea on 2/20/01 50, 70, 90 lb N/acre as urea on 3/20/01
Late N (treatments)	0, 20, 40 lb N/acre as urea on 5/2/01
Fungicides	Tilt 3.2EC – 4 fl oz/ac on 5/2/01
Insecticide	Sevin 4E – 1.5 qt/ac on 5/15/01 (for armyworm)

Results: Average of 4 replications – see Tables 1 & 2

DISCUSSION/CONCLUSIONS:

This was the first year of this experiment. At the McLean County location (Table 1), there was no yield difference between the two cultivars, though the 25W33 exhibited less grain protein. Greater early N resulted in increased yield on this fragipan soil, but greater late N did not (Table 1). Grain protein was improved by increases in both early and late N rates, though the latter caused more dramatic results (Table 1).

In Warren County, the 25W33 outyielded the 25W60, and 25W33 again exhibited less grain protein (Table 2). Early N rate had no 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 McLean 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 Wheat - McLean

Cultivar	Early Fertilizer N Rate	Late Fertilizer N Rate	Grain Yield	Grain Protein
	lb N/acre	lb N/acre	bu/acre	%
P25W33			94.7a	12.0b
P25W60			95.4a	12.9a
	0		92.5b	12.1c
	20		95.2ab	12.4b
	40		97.5a	12.8a
		0	94.1a	11.1c
		20	95.2a	12.5b
		40	95.9a	13.7a

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

Cultivar	Early Fertilizer N Rate	Late Fertilizer N Rate	Grain Yield	Grain Protein
	lb N/acre	lb N/acre	bu/acre	%
P25W33			93.6a	13.5b
P25W60			84.1b	14.4a
	0		88.8a	13.9a
	20		89.2a	14.0a
	40		88.5a	14.0a
		0	89.4a	13.4c
		20	87.7a	14.0b
		40	89.5a	14.5a