Project Title:

Conventional and Split-application Nitrogen Rate Performance in Elite Spring Wheat Varieties

Objective:

To determine fertilizer rate and timing on yield and quality of spring wheat

Personnel:

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Summary:

This study was laid out in a randomized complete block design with three replications. The Nitrogen (N) treatment was the main plot. The five elite spring varieties were the subplot. Management information for this study is presented in Table 1.

Results of this two-year study showed a significant yield difference with N application regardless of timing (Figure 1) in relation with the control. Higher yield was obtained with a total N application of 150 and 200 lb/a (residual + applied N) compared to control (residual N).

Fertilizing N increased grain protein. In particular, the spilt-application treatment '75p + 75h' consistently had the highest grain protein across years and is optimal. In general, falling number increased with N application relative to the control (Figure 3), except '75p + 75h' treatment.

The yield, yield component, and quality of the five elite varieties are presented in Table 2. Among the five elite varieties, Vida obtained the highest grain yield, Egan the highest grain protein content and Dagmar showed the highest test weight and thousand seed weight.

Table 1. Management Information

Seeding date:	4/18/2025 (108 Julian)	**Field Location:**	R6
Seeding rate:	26 Seeds/ft^2	**Harvest date:**	8/11/2025 (223 Julian)
Previous crop:	Canola	**Soil type:**	Creston silt loam
Herbicide:	Axial Bold Cleansweep	**Tillage:**	Conventional
		Soil residual nutrient (N, P, K lb/A):	66-8-140 (Fall 2024)
Insecticide:	N/A		
Fungicide:	N/A	**Nutrient fertilizer applied (N, P, K lb/A):**	Varies by TRT

Table 2. Yield, yield component, and quality of spring wheat in response to different nitrogen rates and timing

Yield, yield component, and quality	Variety				
	Dagmar	Egan	MT Carlson	MT Ubet	Vida
Grain yield (bu/a)	64.5c	61.4d	67.9b	65.1c	73.9a
Grain protein content (%)	15.6b	16.9a	14.8d	14.9c	14.9cd
Test weight (lb/bu)	61.1a	59.4d	59.6d	59.9c	60.8b
1000 seed weight (g)	47.0a	41.3e	45.3b	43.6d	44.4c
Falling number (seconds)	394c	539a	396c	471b	346d

The same letter assignment denotes non-significance at α=0.05.

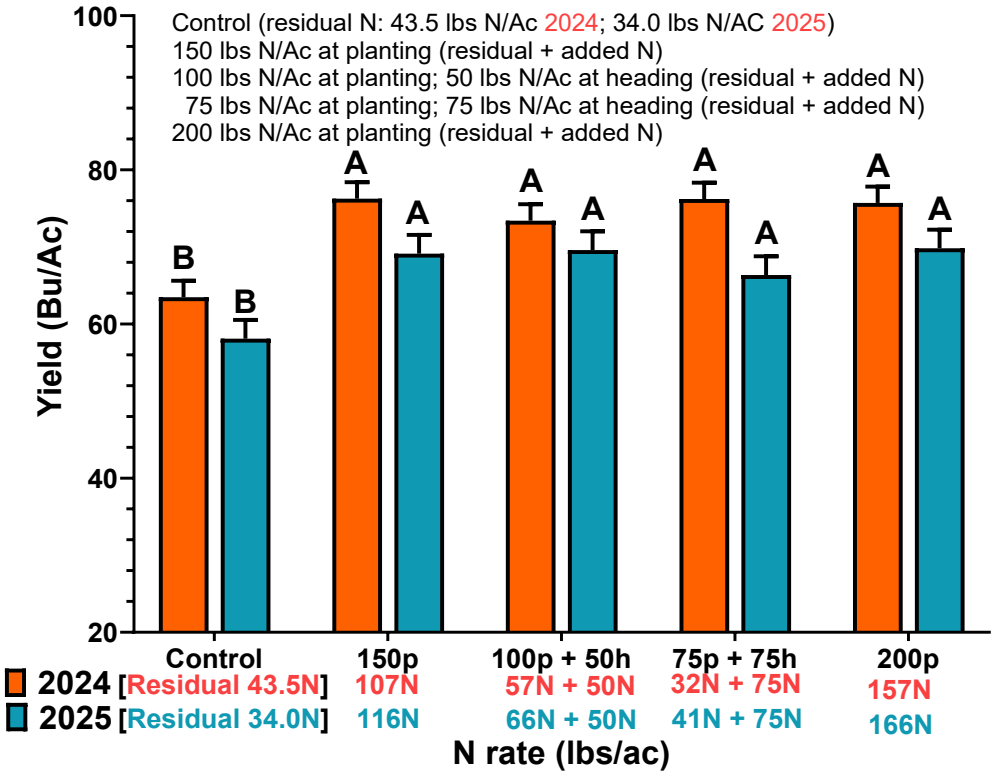

Figure 1. Yield response with N application timing. Actual applied N fertilizer is shown in x-axis by year. The same letter assignment denotes an insignificant difference at α =0.05 within year.

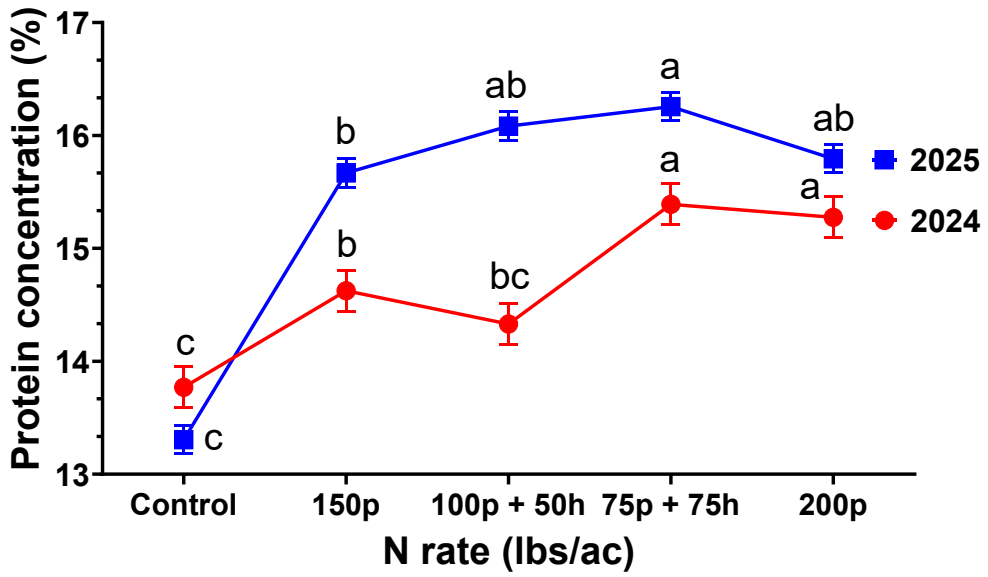

Figure 2. Grain protein concentration with N application timing. The same letter assignment denotes an insignificant difference at α =0.05 within year.

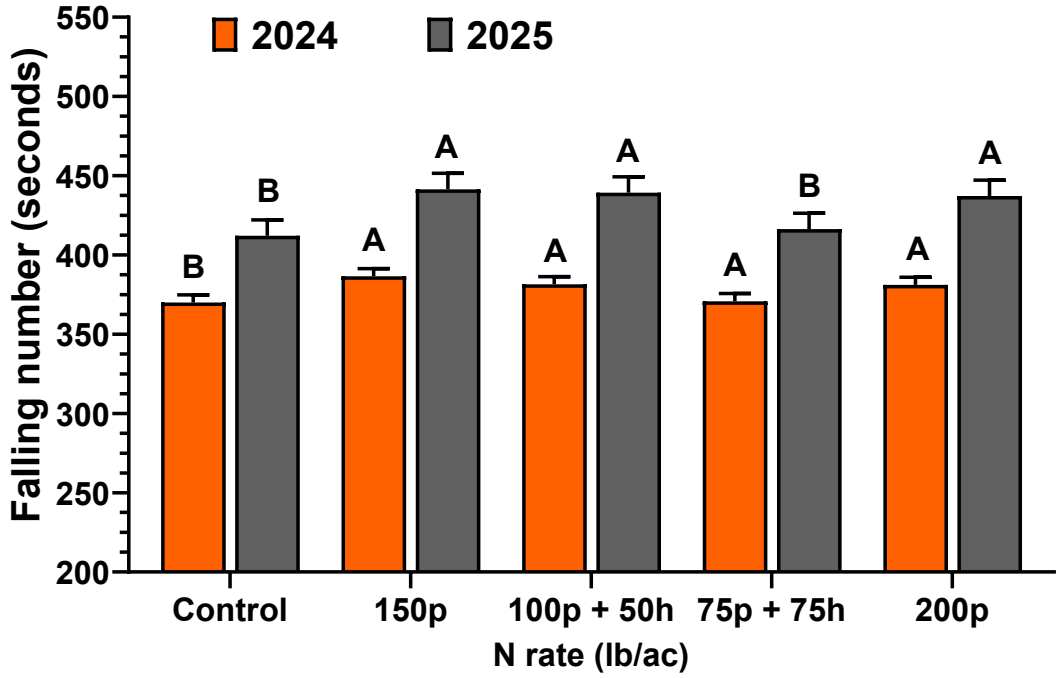

Figure 3. Falling number with N application timing. The same letter assignment denotes an insignificant difference at α =0.05 within year.

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