

**Project Title:** 2021 Winter Wheat Nitrogen Management

**Objective:** To evaluate the performance of the split-application of nitrogen in a rainfed winter wheat environment in northwestern Montana

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**Summary:**

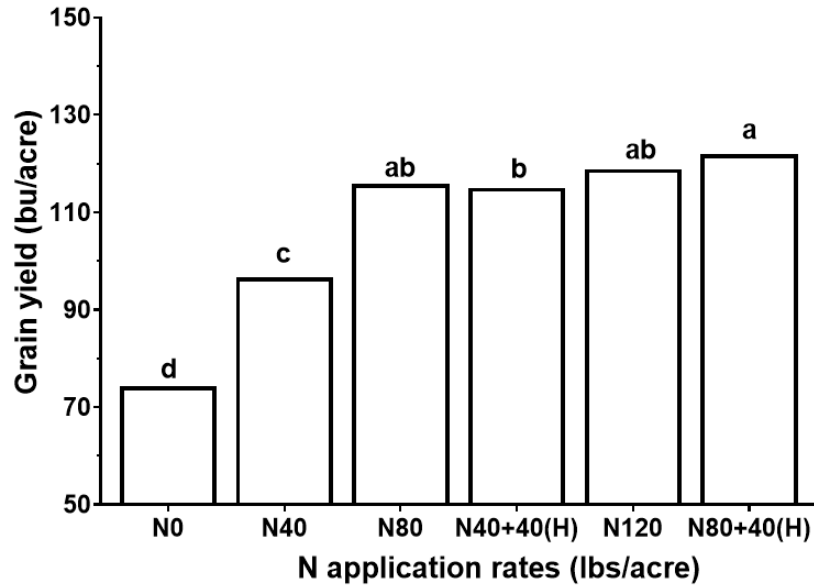
The off-station winter wheat nitrogen (N) trial was planted under no-till rainfed ground with row-spacing 12-in apart on Sept. 22, 2020. There were six different nitrogen application treatments for this trial. The nitrogen rates applied were: 1) 0 as control, 2) 40, 3) 80, 4) 80 but were split-applied, 5) 120, and 6) 120 but were split-applied lbs N/A. Urea was used as an N fertilizer source. The soil had a 52 lbs/A residual nitrate and 10 lbs N drilled with the seeds at planting.

Grain yield linearly increased from no N application until 80 lbs/A, then plateaued afterward. No significant yield differences were recorded between 80 lbs/A and 120 lbs/A N applications in either N-applied in early spring or split (early spring + heading) treatments. The grain protein increased up to the split 80 lbs/A N application (Figure 2). The spring-applied 80 lbs/A N had an inferior grain protein compared with the split 80 lbs/A N application (40 lbs in spring & 40 lbs at heading). Increasing N application to 120 lbs/A (split or not) did not show a significant protein increase in reference to the split 80 lbs/A N application. The plant height, test weights, and the falling number increased at 80 lbs/A N application (for both spring and split application) then plateaued after that (data not presented).

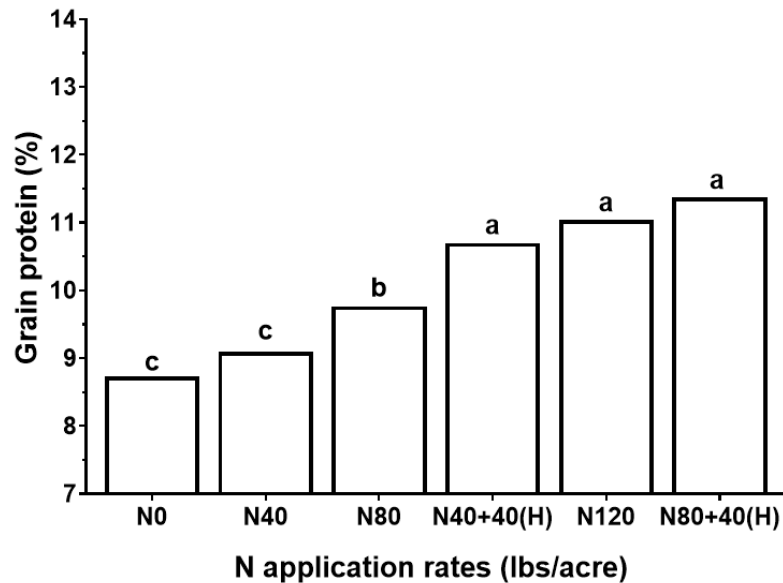
In 2021, this nursery received 9.7 inches of rain.

**Table 1.** Management Information

<b>Seeding date:</b>	9/22/2020	<b>Field Location:</b>	R13
<b>Julian date:</b>	266	<b>Harvest date:</b>	8/12/2021
<b>Seeding rate:</b>	130 lbs/A	<b>Julian date:</b>	224
<b>Previous crop:</b>	Barley	<b>Soil type:</b>	Creston Silt Loam
<b>Herbicide:</b>	5/6: CleansweepM	<b>Tillage:</b>	No-till
<b>Insecticide:</b>	None	<b>Variety:</b>	FourZeroSix
<b>Fungicide:</b>	6/11: Headline	<b>Soil residual nutrient (NO<sub>3</sub><sup>-</sup>, P, K lb/A):</b>	52-28-604
		<b>Nutrient fertilizer applied ( N, P<sub>2</sub>O<sub>5</sub>, K<sub>2</sub>O lb/A):</b>	10-35-45 (10 S, 1 Zn) Fall-drilled N applied varied, see N treatment



**Figure 1.** Yield response to nitrogen (N) application rates and timing (split-applied at heading). The first application was in early spring. The split (second) application is indicated by a '+' sign and H (at Heading). The application rate treatments specified did not include the residual N (52 lbs/A) and the amount drilled with the seeds (10 lbs/A). The same letter assignment indicates nonsignificance at  $\alpha= 0.05$ .



**Figure 2.** Grain protein response to nitrogen (N) application rates and timing (split-applied at heading). The first application was in early spring. The split (second) application is indicated by a '+' sign and H (at Heading). The application rate treatments specified did not include the residual N (52 lbs/A) and the amount drilled with the seeds (10 lbs/A). The same letter assignment indicates nonsignificance at  $\alpha= 0.05$ .