Timing of nitrogen splits for wheat yields and protein – Its Now!

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With the wet conditions thwarting traditional fall banding of nitrogen (N), many wheat growers needed to employ an alternative fertilization strategy. This message is for those who chose to apply a good portion of nitrogen at or before seeding and intending to follow with an in-season split application.

Extensive research on such split applications was undertaken in Manitoba at 8 sites in 2016-2017. The treatments included 80 or 110 lb N/ac urea applied at seeding versus 80 lb N/ac at seeding followed by either 30-60 lb N/ac in season. In-season applications were at stem elongation (T1), flag leaf emergence (T2) or post anthesis (T3) – Figure 1. Full details of the study are available [1].

Figure 1. In-season application stages for nitrogen: stem elongation (T1) and flag leaf emergence (T2).

The results summarized across locations and the cultivars Brandon and Prosper, are shown in Table 1.

Table 1. Split N applications on wheat yield and protein.

	Yield bu/ac		Protein bu/ac	
Total Nitrogen Rate	**110 lb N/ac**	**140 lb N/ac**	**110 lb N/ac**	**140 lb N/ac**
All at seeding	80.3	81.9	12.5	12.8
Split at T1	83.5	83.6	12.6	13.2
Split at T2	81.0	82.6	12.9	13.7
Split at T3	72.8		13.1	

Summary comments:

- At several locations, significant yield increases were found with the split at stem elongation (T1) versus other timings.
- Flag leaf split N (T2) increased protein compared to earlier applications
- Post anthesis (T3) timing increased protein but yields suffered from withholding N. At 4 locations where urea solution tested, it proved superior to UAN for yield and protein benefit.
- At 4 locations where a ESN:urea blend was banded at seeding, there was no impact on yield or protein.

It is very important to note that the success of these in-season applications was very dependent upon following rainfall. In these studies, at least 1/5" of rain was received within 5 days after nitrogen application. Lack of rainfall leaves N stranded at the surface and risks loss to volatilization.

In these studies, T1 and T2 application were made as granular urea treated with Agrotain urease inhibitor. If farmers were to dribble UAN, they may wish to dilute with water to minimize leaf injury.

Reference:

[1]Mangin, A and D. Flaten. 2018. Optimum Nitrogen Fertilizer Management Strategies for High-Yielding Spring Wheat in Manitoba. https://mbwheatandbarley.ca/wp-content/uploads/2019/03/Mangin-Flaten-N-mgmt-for-HY-wheat-project-revised-technical-report-2018-03-31.pdf