



Spring Nitrogen Fertility Considerations for Winter Wheat

By: Cody Creech

Optimizing the timing of nitrogen (N) applications on winter wheat is the most important factor to achieving a response in both yield and protein. Adequate N levels promote tillering, large head size, and is the primary factor determining the protein level of the grain at harvest. If your wheat protein has consistently been below 11.5% in the past, consider some changes in N management to boost that number in the TAPS contest.

Spring is the ideal time to apply N to winter wheat to ensure top yields and high grain protein. First, an estimate of grain yield potential is needed. By judging the yield potential of the wheat and knowing what residual N is available in the soil, a nitrogen management plan can be developed.

The N recommendation for Nebraska is different than other states. The recommendation considers the price of wheat and fertilizer to achieve the greatest economical return; not necessarily the greatest yield or high protein levels. The formula is:

$$\text{Nitrogen Rate (lbs/acre)} = ((N \text{ Price} / \text{Wheat Price}) + (NO_3\text{-N}/68.7) - 0.235) * 725$$

N price is the dollars per lb of nitrogen fertilizer and wheat price is in dollars. NO₃-N is the average parts per million (ppm) nitrate-N in the top three of the soil profile.

Since the Nebraska formula is based on economical returns, each grower must consider what their respective priorities are.

Timing is critical. In order to get the highest return on a N application, N should be topdressed no later than two weeks before jointing. This is during the period when wheat is actively tillering and growing. Head size is determined when wheat reaches Feekes 5 and any N that has been applied needs to have been moved into the root zone with moisture before that critical period to be available to the plant. Because precipitation events can be unpredictable, it is recommended to apply N before Feekes 3 or 4 to ensure the N reaches the root zone.

However, some evidence exists that splitting N applications, can improve N use efficiency. A late application can improve grain protein if good conditions are present. Typically, when N is applied late, a yield increase is not consistently observed.

It can be said that you get out what you put into something. Wheat is no different. Wheat removes approximately 1.2 pounds of N per bushel and not all N applied will be removed at harvest. Nitrogen management is only one piece of the puzzle. Adequate fertility provides the basis for potential grain yield and protein levels. Variety, precipitation, and pest management account for the majority of the remainder. Get your wheat off to the best start in the TAPS contest by giving it the N it needs to reach its potential.