



**THE OHIO STATE UNIVERSITY**

COLLEGE OF FOOD, AGRICULTURAL,  
AND ENVIRONMENTAL SCIENCES

### **Hardin County Extension News Release**

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## **Applying Nitrogen to Wheat**

*Hardin County* – Abnormally cooler temperatures this spring has slowed the development of wheat. Normally at this time fields would be a vibrant green with several inches of growth. Besides crop development, weather affects many decisions that a farmer has to make on a wheat crop, such as application of nitrogen.

Wheat, being a grass, has a large demand for nitrogen. The organic matter in the soil contains nitrogen but it is in an organic form, which the wheat crop cannot take up. Microbes in the soil will eventually release some of this organic nitrogen, but generally so late in the season that yield reduction has already occurred.

Farmers compensate for this by applying nitrogen fertilizer in a form that can be taken up by the plant, which is either ammonium or nitrate. Farmers generally apply a little nitrogen as a starter fertilizer in the fall prior to planting.

Most of the nitrogen is applied as a single topdress application before the wheat joints. Jointing is a farm term that describes the time when wheat switches from a vegetative to a reproductive growth stage. It normally occurs around the end of April.

The joint is a swelling or bump, called a node, which may be felt at the base of the stem when the growing point emerges above the soil surface. The cells that will form the head will be above this node. Visually, jointing is the start of stem elongation and ends with the seed head emerging.

Plants begin rapid assimilation of nitrogen at the beginning of jointing and will continue heavy uptake until flowering. Farmers generally do not wait until jointing to apply nitrogen because of the risk of wet fields preventing application.

Research has shown that yields will be reduced if nitrogen application is delayed after initial jointing. Also, jointed plants are prone to damage from application equipment, which may also reduce yields.

However, farmers do not want to put nitrogen on too early or they run the risk of losing some of it. As a compromise farmers generally put nitrogen on the field after plants have greened-up from winter and fields are fit for application.

Farmers may select a nitrogen source based on price and the potential for loss at the time of application. Liquid urea-ammonium nitrate has the greatest risk for loss because of its nitrate component at application time. Farmers can decrease this potential by applying closer to jointing.

Urea has less chance for loss from early application, but the potential may increase as temperatures get warmer. Urea requires a half inch rain event to work it into the ground and prevent volatilization. Along as conditions are cool, volatilization risks are minimal.

Farmers generally follow the University recommendations to determine how much nitrogen to apply to a field. This system relies on yield potential.

Farmers may look at wheat yields from the past five crops to determine the yield potential for a field. They may throw out the highest and lowest wheat yield, and average the remaining three.

University recommendations are based on years of nitrogen rate studies. From these studies, the following equation has been developed for mineral soils, which have both 1 to 5% organic matter and adequate drainage:

$$\text{Nitrogen Rate} = 40 + [1.75 \times (\text{yield potential} - 50)]$$

No credit is given for previous soybean or cover crops, since it is not known if that organic nitrogen source will be released soon enough for the wheat crop. The University recommends to subtract from the total any fall applied nitrogen up to 20 pounds per acre.

Based on the equation above and deducting 20 pounds from a fall application, a spring application of 110 pounds of nitrogen per acre would be recommended for a yield potential of 100 bushels, 90 for 90 bushels potential; 70 for a 80 bushel potential and 40 pounds for a 60 bushel potential.

Many farmers have already applied their nitrogen on wheat. Farmers still have two to three weeks to apply nitrogen before the crop may suffer.

Farmers have to make many decisions each year to get the most out their nitrogen application on wheat, such as nitrogen source, amount to apply, and the application time.

Farmers do not want to lose nitrogen since it is an expensive input. Non-farmers need to realize that the decisions are not easy since the outcomes are heavily affected by weather. Since the weather cannot be accurately predicted, farmers have to rely on probability of making the right decision.

*Article written by Ed Lentz, OSU Extension – Hancock County*