



# Nitrogen Rates on Winter Wheat

By Chris Armstrong, CCA

**N**itrogen is the most cost effective input for growing a wheat crop. The nitrogen rate applied in the spring could make the difference between making and losing money. Too much nitrogen can cause lodging, increased disease pressure, and lower yields. Not enough nitrogen will limit the potential of the crop to obtain high yields and quality.

## Soil type is one of the primary factors influencing nitrogen rates on winter wheat.

The soil and its interaction with crop rotation is a big factor. Residues that are high in carbon and low in nitrogen immobilize nitrogen in the soil. This nitrogen isn't available to the plant until the bacteria in the soil decompose. Therefore, previous crops, which produce high quantities of residue, can create a deficit of nitrogen in the soil. This shortfall can be corrected by applying commercial fertilizer to the crop.

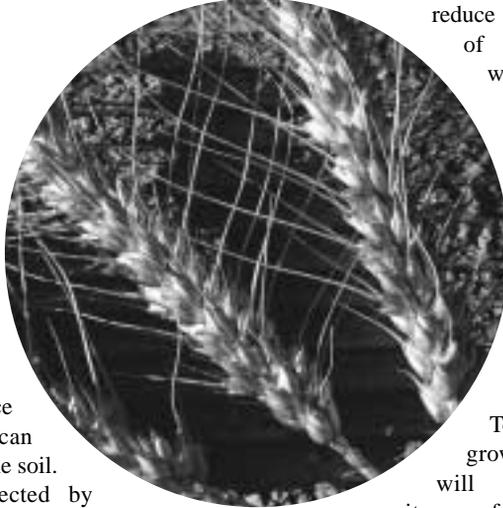
Another factor that soil contributes is the release of nitrogen from the soil organic matter. Lodging is often a problem in soils with high organic matter. Producers fail to account for the extra nitrogen being mineralized from the organic matter. The addition of commercial fertilizer plus the nitrogen from the soil often is too much for the plant and lodging occurs. Lodging can also occur from failure to account for the nitrogen left over from a previous fertilizer application. This is more evident in years following poor crops.

## Crop appearance is the next factor influencing nitrogen timing on winter wheat.

Crop appearance relates to the colour of the crop, population density, and stage of development. These three factors are all used to determine when and how much nitrogen should be applied.

The timing of nitrogen application should be made when the crop breaks dormancy and begins active growth (Zadok's #25). Nitrogen should be applied before spring growth starts to stimulate tiller growth and promote the development of larger heads. However, the risk of frost damage needs to be watched. For example, a heavy frost after the wheat

breaks dormancy could reduce the population of the crop. As wheat becomes deficient in nitrogen, the leaves will suffer from chlorosis (yellowing of the leaves). The mature leaves will be affected first. To sustain plant growth the plant will translocate nitrogen from the older leaves to newer leaves.



## Population density also is used to determine fertilizer application.

Ideally, population should be around 350 - 450 plants/sq m. Nitrogen application can be timed to increase or decrease the number of tillers. If the crop is heavily tillered, a delayed application of nitrogen can result in the abortion of some tillers. Conversely, if a crop is poorly tillered and under populated, an early shot of nitrogen could be used to minimize the loss of any tillers.

The decision to fertilize your winter wheat crop shouldn't be taken lightly. A lot of factors need to be considered to obtain maximum yield. Knowledge of your field, the variety grown, and population density are the three most important factors to consider. A good understanding of these three factors will ensure that maximum yield is achieved year after year.

*Chris Armstrong is a Certified Crop Adviser employed with Thompsons Limited in Kent Bridge, Ontario*

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