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# FERTILITY



DID YOU KNOW THAT  
WINTER WHEAT  
CAN YIELD 15 TO 30  
PERCENT MORE THAN  
ITS SPRING-SEEDED  
COUNTERPART?

**Nitrogen fertility** is an important factor in winter wheat production. Because winter wheat can yield 15 to 30% more than its spring-seeded counterpart, producers should match their nitrogen rate to their yield goal. Product choice, timing and placement are also important considerations. Ideally, producers should make their fertility decisions based on soil test results in the fall prior to seeding.

### Fall Applied N Options:

There are several advantages to a producer applying all of the nitrogen required by their winter wheat crops before or at planting time. Typically, the price of nitrogen is more cost-effective in the fall than in the spring of the following year. If the nitrogen requirements of the crop can be applied at the time of seeding, the additional expense of a second pass over the field can be eliminated. Also, by applying nitrogen fertilizer in the fall, it ensures that there are nutrients available to the crop early in the spring, when yield potential is determined. Spring applications can be delayed (ie. poor weather or adverse field conditions), thus limiting the roots access to available nitrogen.

Banding fertilizer prior to seeding does require an extra pass over the field. This results in additional fuel consumption, more stubble disturbance, and generally a higher risk of fertilizer losses due to the effect the warmer soils can have on N conversions. Winter losses can be minimized by applying fertilizer when the soil is cooler, as cold soil slows the losses associated with immobilization, denitrification and fixation. However, seeding should not be delayed as to avoid fertilizer losses, given that yield, early maturity and biological weed competition may be compromised.

If placing N in the seedrow, safe rates of up to 30 lbs/ac can be applied, but may vary with moisture conditions, soil type, type of opener, and row width. Products such as Environmentally Smart Nitrogen (ESN) can create more options for producers wishing to place higher rates of N in the seed row. However, with the increased adoption of openers with options to place fertilizer away from the seedrow, applying all of the N down at seeding time has become a popular choice.

Topdressing in late fall has also attracted the attention of some growers. With the cooler temperatures that the Prairies typically experience in late fall, N losses are usually minimal. Applying urea to cold (temperatures below 10°C, approximately), but not frozen soils is the primary way to minimize losses. Precipitation, either as rain or wet snow, is always needed to move surface-applied urea into soil so it does not volatilize. On warm soils having temperatures above 15°C, it is essential that precipitation occur within a day or two of application to minimize losses. On cold soils, the critical window for rain or snow is a little wider at five to seven days after application. To minimize nitrogen losses, spread urea fertilizer when rain or snow is in the forecast or when the chances are good for substantial showers soon after application.



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*There are a variety of fertility options available to winter wheat producers.*

Selections should be a function of soil type and moisture conditions. Availability of equipment, expected weather patterns, time management, and cashflow should also be considered to determine which option is most suited for a particular farming operation. Producers may be well served to contact local specialists and experienced growers in their area to assist in determining the optimal approach for their farm.

## Spring Applied N Options:

The key to a successful spring broadcast N application is to apply early when soil conditions are still cool. A healthy winter wheat crop will resume growth early in the spring. Cereal crops use 70% of their nitrogen by late tillering and late applications of nitrogen will hinder the plant's ability to convert this into yield. As a rule of thumb, spring N applications should be made as soon as it is dry enough to operate equipment without making too many ruts. Some growers will even apply very early when they can still travel on the frost, however it is not a good idea to apply N on frozen soils.

Liquid UAN (28-0-0) is less susceptible to volatilization losses than urea (46-0-0), but under ideal conditions, spring topdressing would occur just before a significant precipitation event and both of these products would perform equally well. However, if warm and humid conditions persist for a period of time, some N losses will likely occur. To minimize volatilization losses associated with these products, the use of commercial urease inhibitors, such as Agrotain, can be considered. Such inhibitors limit losses for up to 14 days before moisture is available to transport the fertilizer into the soil. Dribble banding or coultering UAN can also decrease volatilization potential. The amount of trash on the soil surface may affect liquid N efficiency by immobilizing applied N.

## Split Applications:

Some producers prefer to split their N fertilizer application between the fall and the spring. The value of this option depends on how practical it is for individual growers. For example, this may be a good fit for producers who do not have side or mid-row banding capabilities but want to make sure their crop has enough N to make it through the first few weeks of growth in the spring before they can get out and topdress the balance. In the spring, the producer can then apply the remaining N requirement based on soil moisture and crop conditions.

## Rates:

Regardless of the option chosen to apply N, there is one component that is critical. Be certain to use adequate rates. Relatively higher rates of N are required to meet the higher yields offered by winter wheat. Be certain to set appropriate yield goals and fertilize accordingly. The Canadian Fertilizer Institute states that a 50 bushel per acre winter wheat crop will uptake approximately 75 lbs of N per acre. Using a soil test and the assistance of a local agronomist to determine proper rates is advised.

## Other Nutrients:

Other nutrients and micronutrients are required in similar fashions and levels as spring-seeded wheat varieties. For instance, it is important to pay particular attention to phosphate applications. In addition to a potentially good yield response, adequate seed-placed phosphate will aid in the establishment of a healthy winter wheat crop in the fall and increase winter hardiness. The general recommendation is to apply 20-25 lbs/ac of actual phosphate with the seed. Not unlike other cereals, maintenance amounts of nutrients such as sulphur, potassium and copper are required.

▶ For more information please contact one of our winter wheat specialists at Ducks Unlimited Canada

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