

Summer 2014, No. 7

## PLANNING WINTER WHEAT FERTILITY PROGRAMS

**Winter wheat is an important crop for the Southern and Central Great Plains Region, it could be argued that it is the most important crop to the region since it dominates total acreage.** Planting dates in the region vary by location and purpose of the crop (i.e., grain versus grazing), but for the most part planting begins in earnest during September. Planning and execution of a sound and effective program for wheat nutrition and fertilization is among the most important factors affecting the crop's performance and profitability. Such programs require forethought, and tasks such as soil testing should be done well in advance. Therefore, it's not too early to start planning wheat fertility programs. Below are a few basic points concerning major nutrients in wheat nutrition.

**Nitrogen performs many vital functions in the wheat plant.** Wheat requires 2 to 2.5 lb N/bu of grain, or, if grazed 1 lb/A for each 3 lb/A animal gain. Shortages of N may cause reduced tillering, reduction in head size, poor grain fill, and low protein content. Adequate N must be available to the wheat plant at all phases of development. Splitting N applications generally improves use efficiency, minimizes risk to investment, and safeguards the environment. Topdress applications should be made early, prior to jointing, to maximize production efficiency. Timing, placement, and N source should be managed to fit climatic conditions, soil type, and tillage system. It should be noted too that in recent years scientists at Oklahoma State University have developed the N Rich Strip as a tool to aid in N fertilizer decisions. For more on this see their website (<http://npk.okstate.edu/referencestrips>).

**Adequate P fertility is associated with increased tillering and grain head numbers, reduced winterkill, and hastened maturity.** Winter wheat takes up about 0.6 to 0.7 lb P<sub>2</sub>O<sub>5</sub>/bu grain produced. Because P is relatively immobile in soils, banded or starter applications are often most effective in soils testing low to medium. Even in high testing soils starter applications may help plants get established more quickly. Banded P also helps young plants overcome the adverse effects of soil acidity. Broadcast P should be incorporated to improve availability and reduce the risk of loss. Phosphorus is second only to N as the nutrient that most commonly limits wheat growth and development.

Potassium is mostly associated with the water economy within the plant and decreased incidence of disease and lodging. The uptake requirement for potash (K<sub>2</sub>O) is approximately equal to that of N, about 2 lb/bu. Much of the region's soils test adequate to high in K, but there are wheat-producing areas where soil levels are lower, and application can be beneficial. Placement of K is not as critical as P since it is more mobile in soils. Split applications may be beneficial on low K deep sandy soils in higher rainfall areas.

The importance of secondary and micronutrient nutrition on winter wheat should not be overlooked. The plant available form of S is sulfate, which is mobile in soils. The major native source of S is usually soil organic matter. So, the conditions that favor S shortages are low soil organic matter levels and sandy soil conditions where sulfate is subject to leaching. Several studies over recent years have shown that chloride (Cl<sup>-</sup>) application may be beneficial in wheat production. Chloride has been shown to be important in suppression of certain diseases, including leaf rust. Researchers at Kansas State University have been at the forefront of developing Cl<sup>-</sup> fertilization strategies for winter wheat and other crops. For more on this see their publication entitled *Chloride in Kansas: Plant, Soil and Fertilizer Considerations* (<http://www.ksre.ksu.edu/bookstore/pubs/MF2570.pdf>).

**Profitable and efficient wheat production involves supplying adequate amounts of plant nutrients when and where the crop needs them.** Fertilizer application rates are of little value if nutrients are not in the proper place at the proper time. Effective management strategies vary from region to region, but a characteristic of all good soil fertility management programs is early planning and application of 4R principles—application of the right fertilizer rate, at the right time, right place and use of the right source.

– WMS –

For more information, contact Dr. W.M. (Mike) Stewart, Southern and Central Great Plains Director, IPNI, Phone: (210) 764-1588. E-mail: [mstewart@ipni.net](mailto:mstewart@ipni.net).

Abbreviations: N = nitrogen; P = phosphorus; K = potassium; S = sulfur.

Note: *Plant Nutrition TODAY* articles are available online at the IPNI website: [www.ipni.net/pnt](http://www.ipni.net/pnt)