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PLAN WINTER WHEAT FERTILITY PROGRAMS NOW

The cornerstone of profitable crop production is a sound soil fertility program. Such programs require forethought and planning. One of the most useful tools in soil fertility planning is soil testing. Planning a fertility program without soil test data is largely guesswork. Other factors to consider in planning an efficient fertility program are fertilizer rates of application, placement, and timing.

Nitrogen performs many vital functions in the wheat plant. Wheat requires 2 to 2.5 lb N/bu of grain, or, if grazed 1lb/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.

Fertilizer and crop prices are at much higher levels than in recent years. What does this do to the optimum rate of N fertilization? Kansas State University economists have published a tool, available at this website: <http://www.agmanager.info/crops/budgets/proj%5Fbudget/decisions/>

The calculator enables the user to evaluate the impact of different factors on the optimum rate of N fertilization. A simple evaluation of past versus current conditions shows that the optimum rate of N fertilization for dryland wheat (60 bu/A yield goal) hasn't really changed. Under both past conditions (i.e., \$3.50 wheat and \$0.20/lb N) and more current conditions (i.e., \$9.00/bu wheat and \$0.50/lb N) the estimated optimal rate of N is the same... 106 lb N/A. So, one should be careful about overreaction to prices.

Adequate P fertility is associated with increased tillering and grain head numbers, reduced winter kill, maximum water use efficiency, hastened maturity, and lower grain moisture at harvest. Winter wheat requires about 0.6 to 0.7 lb P₂O₅/bu grain. 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 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 positional availability. Finally, remember that adequate P increases N recovery and use efficiency. The effect of balanced fertility and its impact on nutrient use efficiency is especially important in today's environment.

Potassium in wheat production is associated with increased moisture and N use efficiency, and decreased incidence of disease and lodging. The requirement for K is approximately equal to that of N. Placement of K is not as critical as P since it is more mobile in soils. Split applications should be made on deep sandy soils in high rainfall areas to increase use efficiency.

Don't overlook the importance of secondary and micronutrients on wheat. For example, sulfur deficiency can be a problem in some areas. Applications of these nutrients should be based on field history, soil tests, and plant analysis.

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 fertility management strategies vary from region to region, but a characteristic of all good soil fertility management programs is early planning.

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Abbreviations: N = nitrogen; P = phosphorus; K = potassium

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