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### NUTRIENT PLANS MUST CONSIDER PLANT NEEDS THROUGHOUT THE SEASON—EVERY DAY

**Plans for nutrient management usually involve a recent soil test and an estimate of total crop removal.** Important details to consider, but is that really enough to ensure adequate crop nutrition? The demand for nutrients changes through the season due to changes in the development of the crop. The ability of the soil to supply nutrients also changes throughout the season due to variations in moisture, temperature, and other factors. A complete management plan must include all of these considerations. Understanding how the crop grows and how physical, biological, and weather conditions affect each nutrient's availability is important to fine-tuning nutrient management for maximum efficiency and profit potential. Take time to study the system before investing in fertilizer and placement options.

**Early in the season, temperatures are usually low and reduce rates of chemical reactions, micro-organism activity, and plant root growth.** A concentrated source of critical nutrients is very important at that stage of crop development. Starter, pop-up, and banded application systems help meet the requirements at this time. As the root system expands, soil warms, and moisture conditions improve, the concentrated source becomes less critical. In fact, as the root system expands, it may be more important to have a more uniform distribution of nutrients to ensure maximum contact by the root system.

**During the mid-season, root growth and functionality is high, and nutrient requirements are also high, especially as grain development shifts into full speed.** High general fertility is best. If there is a question of supply of one or more nutrients, a concentrated, deeper band of nutrients may be helpful. Later in the season, as most of the energy of grain crops is shifted to seed production, nutrient requirement may again shift. High demand for nitrogen will be seen, especially for high protein grains. Potassium is critical for optimum water efficiency and for the regulation of more than 60 major enzymes in the crop. Shortage of potassium supply makes the crop more drought-susceptible and reduces the efficiency of protein and starch production. Phosphorus is a major component of all energy transfer process in the plant, helping convert solar energy into chemical energy in the form of various sugars and other carbohydrates that not only feed the crop growth processes, but also become the primary component of yield.

**The most critical nutrients change as the season progresses and different growth processes become dominant.** Impact of deficiencies also changes with stage of growth. Knowing how the crop develops and which nutrients are in greatest demand at each stage is an important part of understanding how to manage nutrients for optimum yield. Reviewing basic plant growth and development may be time well spent. There are many Extension guides and Internet resources available on the subject. Pay particular attention to the specific requirements of each particular crop. Crops like forages and winter wheat need a different management plan than spring planted crops like corn and soybeans.

**Timing and placement of fertilizer to best supply the needs of the crop at all stages of growth will help assure optimum growth.** Maintaining high soil test levels of all nutrients throughout the root zone provides flexibility in timing and placement and is usually the best strategy for the long run management of crop and soil nutrition.

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