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### ROLE OF POTASSIUM IN CROP ESTABLISHMENT

**Farmers are well aware that planting high quality seed in a firm, moist seedbed is the first critical step to establishing a crop.** Seedbed fertility is also important to consider, especially for the soil-immobile nutrients like potassium.

**Potassium plays an important role in the growth and development of plants.** It activates enzymes, maintains cell turgor, enhances photosynthesis, reduces respiration, helps transport sugars and starches, aids in nitrogen uptake and is essential for protein synthesis. In addition to plant metabolism, potassium improves crop quality because it extends the grain filling period, helps with grain filling and kernel weight, strengthens straw, increases disease resistance, and helps the plant better withstand stress.

**Potassium is critical to not only getting the crop off to a good start, but to supporting maturity.** Plants short of potassium have poorly developed roots, grow slowly, lodge easily, produce small seed, and have lower yields. They also use water inefficiently, are less winter hardy, and are more susceptible to disease infection.

**While phosphorus is well known for promoting early root formation and growth, potassium may have an even greater effect on root development.** Cereals have two root systems: seminal roots that develop initially from the seed, and nodal roots which develop from the crown level to support tillers. A deficiency in potassium will negatively affect both of these root systems.

**Research in Australia found that comparing nitrogen, phosphorus, and potassium deficiencies, it was a shortage of potassium that most severely affected root growth.** Within 4 days after seeding there were fewer root numbers on potassium-deficient plants. After 3 weeks, the potassium-deficient plants had half the seminal roots compared to the nitrogen- or phosphorus-deficient plants. And at 30 days after seeding, the potassium-deficient plants still had no nodal roots, while the nitrogen- and phosphorus-deficient plants did.

**Potassium shortage influenced root length in the same way.** The length of seminal roots for plants grown without potassium was only 15% of those that had an adequate supply at 16 days after seeding. This compares to 70% for phosphorus and 98% for nitrogen.

**Given the critical role of early season potassium on root development, and also the limited mobility of potassium in soils, starter fertilizer rates (15 to 20 pounds of K<sub>2</sub>O per acre) can be a very important part of your nutrient management plans to overcome early season deficiencies.**

Remember, plants need as much potassium as nitrogen...some plants need even more.

—AMJ—

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