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# THE REGULATING POWER OF POTASSIUM

As Spring inches closer, growers will be making fertility decisions on their 2019 crops. Of these decisions, addressing potassium (K) is crucial for plant health and producing record crops. Muriate of potash (MOP) is the most commonly used fertilizer to address potassium requirements in crops.

The “Law of the Minimum” from Justice von Liebig states that when just one of the 17 essential nutrients is deficient, it will negatively affect yield potential even when all others are in abundant supply.

Potassium is one of three macronutrients along with nitrogen and phosphorus that plants require in the highest levels. Most K is stored in the residue or straw of the crop, so K availability for the next crop is concerning especially in forage crops such as alfalfa and corn silage, which experience high removal rates. Potassium is an immobile nutrient in the soil meaning that it doesn’t move freely through the soil profile.



As plant roots remove K from soil solution, the process of diffusion takes place where exchangeable K on the cation exchange complex moves back into the soil solution to replace what was taken up by the plant's roots.

Potassium is referred to as the regulator nutrient since it is involved in the activation of 60+ enzymes processes affecting such things as drought resistance, disease resistance, and efficiency of nitrogen uptake.

Adequate K fertilization strengthens the cell wall of plants making it more difficult for disease organisms to infect the plant. Stronger cell walls also decrease the incidence of lodging in corn by making a stronger more stable stalk for the plant.

Perhaps one of the most well-known benefits is the influence that K has on a plant's stomata cells. The stomata openings become smaller with adequate K present. It allows less water to escape and keeps water pressure in the cell at higher levels, which helps the plant with drought and disease resistance. Because K is immobile, dry conditions, which limit root growth will induce a K deficiency.

Corn takes up more potassium than any other nutrient. The majority of this remains in the stover, but almost 47 lbs K<sub>2</sub>O/ac are removed in the grain portion of a 175 bu/ac crop.

Potassium serves as a regulator nutrient that aids in photosynthesis, improves water use efficiency of the plant

through regulation of stomatal openings, and helps the plants resist disease and pests. Additionally, K promotes strong stems and stalks, which reduce the incidence of lodging. Deficiency symptoms first appear on the older leaves as K is mobile within the plant. There will be a yellowing or a scorching along the leaf margin.

In alfalfa, the benefits of adequate potassium lead to:

- Increased number of shoots per plant
- Enhanced nitrogen gas fixation
- Greater stand-survival persistence against weeds and winter kill

Alfalfa pulls most of its potassium from the surface soil. Deficiencies are usually characterized by small white or yellowish spots around the outer edge of the leaves and are most prevalent where sandy soils predominate, low potassium irrigation water is used, or there is a history of long-term, high-yielding alfalfa production.

Muriate of potash, as part of a balanced fertility program, will help to meet potassium needs for both alfalfa and corn crops while helping growers achieve higher yielding crops this growing season.

If you have any questions associated with potash fertility and your farm, please reach out to your local IFA Certified Crop Advisor.

*Written by J.A. Beall, Intrepid Potash, on behalf of IFA Agronomy, and originally published in the IFA Cooperator magazine (vol. 85, no. 1) Spring 2019.*



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