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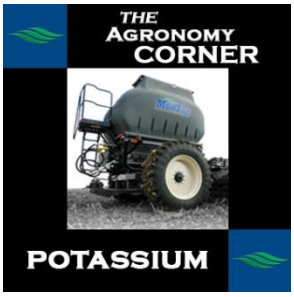

THE AGRONOMY CORNER

POTASSIUM

The third member of the Big Three of crop nutrients is potassium, also called potash.

Potassium is essential in most all of the processes needed for plant growth and development, especially reproduction. Its main function is found in improving the overall health and the ability of a plant to fight disease. Potassium determines such things as size, color, shape and quality of the reproductive seed or fruit.

Potassium increases the protein content of plants as well as the root growth and resistance to drought. Like nitrogen, potassium is also involved in the conversion of sunlight into sugars that feed the plant. Potassium activates at least 60 enzymes which are involved in plant growth. Some of these strengthen cell walls aiding in lodging protection. However it appears that potassium benefits plants the most by providing disease resistance and the in plant movement of sugars and starches, especially during the reproductive stage of plant development. Because potassium is readily moved from plant tissue to support new growth and development, potassium deficiencies are seen on old growth tissue first.

Potassium-deficient crops grow slowly, have poorly developed root systems and weak stalks. Lodging is common. Legumes (nitrogen-fixing plants) are not strong competitors for soil potassium and are often crowded out by grasses in a grass-legume pasture if potassium is low. When potassium is not sufficient, winter kill of perennial crops such as alfalfa and grasses can occur.

Potassium, like phosphorous, is regarded as being immobile in the soil. This means that it adheres strongly to soil particles and is generally lost only to erosion before being utilized by the plants. Potassium is very reactive and is not found in its pure form in nature. The two main sources of potassium in soils are from the base or primary mineral structure and fertilization. A third source is from potassium dissolved in the soil solution and held on the soil particles. This dissolved potassium is readily taken up by the plant and constantly exchanged with other ions in the soil.

It has been estimated that about 90+ percent of soil potassium is held in the base mineral structure and is not readily available to the plants in sufficient quantities for crop production. Potassium from fertilization is about 8% and although slowly released, is a much more readily available form.

It should be kept in mind that potassium fertilizers are predominately salts of potassium. Thus they should not come in contact with seeds and roots until they have had sufficient time to disassociate from the salt portion. Otherwise seed and root “burning” can occur which hinders growth.

Although potassium removal from the soil is very important, most all of the potassium ends up in the non-reproduction parts of the plant. It has been estimated that a 200 bu/ac corn crop takes up approx. 260 lbs/ac of potassium but only 50 lbs/ac ends up in the seed.

Reference is made to other sources, like those below for a more detailed discussion on identifying potassium deficiencies and for a full discussion on the Potassium Cycle as to how plants obtain their needed potassium.

A word of caution about potassium fertilization: adequate fertilization with other nutrients is very important for potassium usage by growing plants. Potassium has a unique relationship with other nutrients that can cause problems if the overall nutrient balance is off. This is especially true for magnesium. Also, improving soil pH with limestone can actually induce a potassium deficiency. Check with your local agronomy advisor to make certain these reactions are not a problem in your area or how best to handle them if they are.

Tale aways for efficient potassium usage:

Potassium is essential for plant life and adequate amounts must be present for overall health, strength and reproduction.

Deficiencies of potassium are seen first on the oldest tissues (think lower leaves) because the plant will move potassium to where it is needed for new growth and development.

Potassium deficiencies can cause major problems with root growth, stem strength, disease resistance and low yields.

Since potassium does not move very far from where it is placed or broken down, banding is a very effective method to make certain that potassium is available in sufficient quantities to the roots.

Because potassium is so involved in growth and development of the plant, a very large portion of the potassium taken up by the plant is found in the non-fruiting parts of a plant. Thus if the whole plant is taken from the field, additional potassium will need to be supplied to the next crop. Think hay crops, or removal of corn stalks.

Like other soil minerals that aid disease resistance, anything that can react with potassium, and thereby reduce its availability to the plant, harms the growing plants. Think over application of other nutrients as well as chemicals that can tie-up minerals.

Links to the sources for this discussion:

http://www.cropnutrition.com/efu-nitrogen

http://eldoradochemical.com/fertiliz1.htm