

Potassium Deficiency In Forages

One of the most important nutrient deficiencies in forage crops is potassium. Although most often observed in perennial crops such as alfalfa and the clovers, potassium deficiency can also be seen on silage corn.

In corn, potassium deficiency is characterized by yellowing of the leaves starting at the tip of the leaf and going back along the edge of the leaf. For alfalfa and clovers, the symptoms are somewhat unique. Symptoms begin as small whitish spots starting near the tip of a leaflet and progressing back along the edge of the leaf. As the deficiency becomes more severe, the spots blend together resulting in dead (necrotic) tissue along the edge of the leaf.

Since potassium is a mobile nutrient in the plant, in a deficiency situation, potassium will move out of older tissue and into young growing tissue. Thus, symptoms will first appear on the lower leaves. As the deficiency worsens, successively younger leaves will show symptoms with the most severe symptoms on the lowest, older leaves. In corn, severe potassium deficiency will result in stunted plants and a greater incidence of stalk rot and subsequently more lodging later in the season. Both stunting and lodging can substantially reduce silage corn yields.

The usual cause of potassium deficiency in crops is low soil potassium. Soils can become depleted in potassium rapidly when crops are harvested for forage (the whole plant removed from the field). For example, a 125 bu/A corn crop removes as grain only about 40 lbs of potassium/A but, if harvested for corn silage, the same crop removes 150 lbs of potassium/A. Hay crops remove 40 to 60 lbs of potassium/ton of hay. A typical high management alfalfa crop can produce 7 ton hay/A/year and would remove about 420 lbs of potassium/A each year.

To prevent potassium deficiencies, growers should routinely soil test to monitor soil potassium levels in each production field (unit). Even when applying manure to fields, deficiencies can sometimes occur. A typical 25 ton/A dairy manure application will apply about 200 lbs potassium/A. If the crop uses less than 200 lbs of potassium/A, the typical manure application will add to soil potassium reserves. Thus, it is critical to use regular soil testing to monitor soil potassium levels especially if manure is the only potassium source and the crop rotation system includes forage crops.

Low soil potassium level is not the only situation where potassium deficiency can be observed. When something limits root growth, a reduction in nutrient uptake may occur leading to nutrient deficiency(s), especially for potassium and phosphorus, which are less mobile in the soil than nitrogen. Examples of common problems that can result in potassium deficiency on soils with

adequate soil potassium include compaction, low soil pH, herbicide injury to roots, and insect injury to roots. When restricted root growth is the cause of a nutrient deficiency, plant tissue levels of all of the nutrients are lower in the problem area of the field even though soil test levels are adequate. This condition can be tested using a tissue test in conjunction with troubleshooting soil test samples.

If potassium deficiency is the result of low soil potassium reserves, action must be taken to correct the situation. If found before corn becomes very tall, a sidedressing of potassium fertilizer can benefit corn yields. Since potassium deficiency can increase the incidence of stalk rot and thus lodging, this should be a consideration in making harvest decisions. To minimize harvest losses on low potassium fields, earlier harvest may be advisable.

For hay crops, topdressing potassium can be effective. Of critical importance on fields low in potassium is an application of at least a part of the recommended potassium in the fall as potassium plays a critical role in winter survival of forage crops.

Regular soil testing through the University of Delaware Soil Testing Laboratory will provide information needed for monitoring soil potassium levels as well as reliable recommendations for solving potassium deficiencies. If the basic cause of the deficiency is not low soil potassium level, application of potassium fertilizer without correcting the underlying problem will likely not be helpful or economical. Contact your county agricultural Extension agent for soil test bags and testing procedures.

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