Low Potassium Levels Reducing Cotton Yield Potential

- Potassium (K) deficiencies may result in poor cotton fiber quality and lower yield potential.
- High-yielding soybeans can remove enough K from the soil to significantly reduce yield potential in a following cotton crop.
- Soil tests and tissue analysis can help growers detect and correct K deficiency.
- Foliar K applications can help overcome in-season K deficiencies.

Potassium Levels Declining

Potassium deficiency symptoms can occur in cotton late in the season, potentially causing damaged leaves, poorly developed bolls, reduced fiber quality and yield potential. Another source of K deficiency in cotton could be the steadily increasing soybean yields, with some fields producing more than 90 bushels/acre.

Each harvested bushel of soybeans removes 1.4 lbs/acre of K from the soil. A 90-bushel/acre soybean crop will remove 120 lbs of K/acre 50 to 60 bushel/acre soybean crop will remove 70 to 85 lbs of K/acre. If a grower is not replacing the amount of nutrient a crop removes, the following crop is forced to “mine” the nutrients from the topsoil and subsoil. If potassium is not replaced, soil test levels will eventually fall, and a potassium-sensitive crop, such as cotton, could suffer a significant decline in yield potential.

Value of Potassium

The greatest demand for K in cotton begins near the start of flowering, with maximum daily K uptake rates of 2.2 to 3.5 lbs/acre/day during flowering. Nearly 75% of the K is needed during the boll filling period, increasing demand to 4 to 5 lbs/acre/day.1 If K is limited during this period, there is a reduction in the turgor pressure of the fiber, resulting in less cell elongation and shorter fibers. It is very difficult to apply enough K during this period to overcome deficits in soil K levels. With cotton plants demanding 4 to 5 lbs of K/acre/day, foliar application of a few lbs of K/acre will not completely overcome the deficit. By the time K deficiency symptoms are visible, yield potential may have already been reduced.

Early Detection of Potassium Deficiency

Potassium levels can be determined by soil tests, as well as petiole and leaf analysis. Tissue tests are excellent guides for determining fertilizer recommendations during the growing season. Because the levels of nutrients in petioles during any time period can be affected by environmental factors, leaf samples may be the best choice for detecting K deficiency in cotton. Leaf samples provide nutrient levels over the past few weeks, while petiole samples provide nutrient levels over the past few days. A drop in K levels in a K-deficient leaf may be greater and easier to detect than a drop in petiole-K levels.

Avoiding and Correcting Potassium Deficiencies

Following soil test guidelines, cotton growers should keep K levels in the topsoil and the subsoil high to ensure an adequate supply throughout the growing season. Even with high soil test K levels, drought during boll filling can result in reduced K uptake. When plants are small enough to allow sidedress applications of fertilizer, additional K can be applied to the soil.

Foliar K applications can be used to supplement soil-applied K. When a potential K deficiency is diagnosed by tissue samples, foliar K applications can correct the deficiency within 20 hours.1 Growers should collect tissue sample data and be prepared to begin foliar K applications from square initiation through peak boll development. Three to four foliar K applications of approximately 3 lbs K/acre should be used at each application.1

Sources:

For additional agronomic information, please contact your Deltapine® Brands Seed Representative

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