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A PETIOLE TESTING PROGRAM FOR SOUTHERN COTTON

The use of petiole testing to determine foliar feeding requirements for southern cotton has declined considerably over the past few years. In 1996, the University of Georgia (UGA) soil testing laboratory sold 800 petiole sampling kits; in 2010, eight kits were sold. Part of the decline in use may be inconsistency in foliar feeding results, the complexity of the program, or the cost (US\$50/kit, which will provide one analysis per week for 10 weeks). However, the current high cotton prices may encourage growers to consider revisiting this site-specific nutrient management strategy.

Petiole testing is used to monitor plant nutrient status during the growing season. Most petiole testing programs are composed of weekly monitoring throughout the bloom period. The UGA program begins at first bloom and continues for 10 weeks. The sampling strategy involves collecting 30 petioles (the small stem connecting the leaf blade to the main branch) from random locations throughout the field. The petioles are placed in a provided envelope and submitted to the lab along with a card containing information such as sampling date, plant size, and fruiting positions. Accuracy of the results depends on a good quality sample being collected, so be sure to contact a local extension agent or crop consultant with questions.

Upon receiving the sample, the UGA lab will analyze the nutrient content in the petioles and return a chart indicating whether the levels of nitrogen and potassium are adequate. Since samples are being collected weekly, growers can track the nutrient status of the plant throughout the critical bloom period and identify deficiencies before they appear as symptoms on the leaf. When problems are detected, recommendations are made for foliar nutrient applications.

Foliar application of plant nutrients in cotton is often a controversial subject. Part of the controversy is likely due to inconsistent results. There are several solution, plant, and environmental factors that can affect the efficacy of a foliar nutrient application. One of the keys to a successful foliar application is the spray volume. Typically, only 10 to 15 gal/A of a low-concentration nutrient solution is applied. Dr. Glen Harris, an Extension Soil Fertility Specialist at UGA, indicates that many growers choose to use pivots or planes to make recommended foliar applications. They have little to no success due to spray volumes being too high and most of the nutrients running off to the ground or being too low (in the case of an aerial application) to achieve good coverage without burning the leaves. Recommendations through the UGA program are made for N and K. However, several micronutrients such as Mn, B, and Zn can be applied effectively through foliar feeding.

Petiole testing can be especially useful when enhanced efficiency fertilizers have been soil-applied. The growing use of urease and nitrification inhibitors along with controlled-release N sources in cotton production increase the value of petiole N monitoring. Petiole testing is also an effective tool when using organic nutrient sources like poultry litter. The mineralization of plant available N from organic sources can be tracked and supplemented through foliar feeding if necessary.

Foliar feeding is best used as a supplement to a good soil test-based fertility program. Following a sound soil testing program remains the first choice for establishing and maintaining optimum soil fertility. In-season monitoring of plant nutrient status using petiole testing is a great way to enhance and fine-tune a nutrient management program. Several universities, fertilizer dealers, and consulting services offer petiole testing programs. With cotton prices higher than they have been in decades, growers can't afford to risk losing yield due to inadequate plant nutrition.

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Abbreviations: N = nitrogen; K = potassium; Mn = manganese; B = boron; Zn = zinc

Note: *Plant Nutrition TODAY* articles are available online at the IPNI website: www.ipni.net/pnt