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COTTON NUTRITION AND FERTILIZATION

Cotton has made quite a comeback over the past few months with steep, and at times extreme, price increases in 2010. Prices are expected to remain relatively strong through 2011 as stocks should be tight. As a result, cotton acres may increase in some regions this year. A major factor affecting both cotton yield and quality is the availability of adequate and balanced nutrition. Given the optimism, now is a good time to review some cotton fertility basics.

Nitrogen is essential for the development of shoots, buds, leaves, roots, and bolls. Cotton takes up about 60 lb of N for each 480-lb bale produced, though it should be noted that N uptake figures can vary. Uptake is limited early in the season prior to squaring, and the majority of N is taken up after first bloom. Therefore, split applications of N improve the chances of meeting the crop needs during peak demand periods. A general recommendation is to provide about 10 to 20% of the crop N needs before bloom, and apply the remainder during the boll development period. Texas Tech University research has shown that on the Texas South Plains about 5 lb of N would be required per inch of water consumed. Since cotton is an indeterminate perennial, too much N late in the season may cause excessive vegetative growth and should be avoided. Soil and petiole tests can be helpful in determining preplant and midseason N management.

Phosphorus is important in early root development, photosynthesis, cell division, energy transfer, early boll development, and hastening of maturity. About 25 to 30 lb of P_2O_5 is taken up per bale of cotton produced. Placement of P fertilizer is not as important as in the production of some other crops. However, banding P can be advantageous in some situations (e.g., reduced or no-till, compacted soil conditions). Insufficient P results in dwarfed plants, delayed fruiting and maturity, and reduced yield. Use soil tests to determine optimum P application rate.

Potassium is an especially important nutrient in cotton production. It reduces the incidence and severity of wilt diseases, increases water use efficiency, and affects fiber properties like micronaire, length, and strength. It is important in maintaining sufficient water pressure within the boll for fiber elongation. Cotton utilizes about 60 lb of K_2O per bale. The need for K increases dramatically during early boll set, and about 70% of uptake occurs after first bloom. Potassium deficiency may be expressed as a full season deficiency, or it may not appear until late season since this is the period of greatest demand. A shortage of K reduces fiber quality and results in plants that are more susceptible to drought stress and diseases. Preplant applications of K fertilizer, and in some cases mid-season foliar applications, are effective in correcting deficiencies. Soil testing is the first step in predicting K needs.

Secondary elements and micronutrients may also be critical to profitable cotton production. For example, cotton responds to trace elements such as zinc and boron where these nutrients are deficient. Soil tests, plant analyses, field history, and experience should be considered when establishing the need for these elements.

Good nutrient management results in higher cotton yields, improved fiber quality, greater water and nutrient use efficiency. So, in this year of optimism make sure that fertility doesn't limit cotton production.

– WMS –

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Abbreviations: N = nitrogen; P = phosphorus; K = potassium.