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FERTILIZING COTTON THE “RIGHT” WAY

The way fertilizers are managed for cotton production can have a major impact on the efficiency of nutrient use by the crop and the potential impact on the surrounding environment. Growers are continually striving to implement fertilizer best management practices (BMPs) on their farms to improve nutrient use efficiency. By increasing the pounds of lint produced per acre for each unit of nutrient applied, growers can benefit not only from greater productivity and profitability, but also from the positive influence their practices have on cropping system sustainability and environmental health. The underlying principle for fertilizer BMPs can be described as the “Four Rights (4Rs)” strategy... applying the right nutrient source at the right rate, at the right time, and in the right place.

The “Right Source” for cotton production in the South is one that is appropriate for the soil and cropping system conditions. For example, when incorporation of surface-applied urea is not an option, selecting a less volatile N source like ammonium nitrate can help minimize losses and improve fertilizer use efficiency. It is also prudent to select fertilizer sources that supply nutrients in the appropriate relative amounts as determined by a soil test or plant tissue analysis.

The “Right Rate” can be determined using a variety of methods. The main science-based tool used to estimate the nutrient requirement for cotton production is soil testing. Regular soil testing of all the fields on a farm acts as an excellent gauge of nutrient sustainability. Other methods used to determine fertilizer application rates in the South include nutrient budgets, expected yield goals, and tissue testing.

The “Right Time” to apply fertilizer to a cotton crop is prior to the point of maximum uptake rate. Research in the South has generally shown that when all the N is applied preplant for non-irrigated cotton, yield is optimized. However in irrigated environments, cotton yields and uptake efficiency are often improved with split applications: one-fourth to one-half preplant with the remainder applied before flowering. This application scheduling follows the uptake pattern more closely, with the bulk of the N requirement being applied at the time when plant demand and uptake rate are highest.

The “Right Place” for fertilizer application is one that provides rapid uptake by the crop and reduces potential losses. The mobility of a nutrient in the soil plays a large role in the importance of placement. Immobile nutrients, such as P and K, are taken up from an area right around the root surface. This is why localized placement or banding of these nutrients is often beneficial. However, research with cotton showed that placement of P becomes less critical as soil test P increases from low to high levels.

Paying attention to the 4Rs and recognizing their interaction and interdependence when making fertilizer decisions can lead to greater production system success. Determining what is “right”, however, depends on many site-specific factors including soil, climate, and management system. To learn more, check out the 8-page publication titled *Apply the “Four Rights” for Cotton Production in the Midsouth and Southeast*. It is available as a PDF file with a companion PowerPoint slide set at the IPNI website: >www.ipni.net/bmp<.

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Abbreviations in this article: N = nitrogen; P = phosphorus; K = potassium.