MULTI-STATE POTASH STUDY

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Abstract

Potassium (K) plays a key role in several critical cotton (*Gossypium hirsutum* L.) plant processes, including photosynthesis, activation of protein enzymes, disease and drought stress mitigation, and fiber development. Across the U.S. Cotton Belt, K deficiency symptoms in cotton have increased over the past decade, which may be reducing lint yield and fiber quality in these areas. In 2015 a project was initiated at 12 locations across the Cotton Belt with the objectives of: 1) quantifying soil K levels, at depth, from major cotton production regions in the Cotton Belt experiencing K deficiencies; and 2) evaluate the impact of application method and K rate on cotton lint yield, quality, and return on investment (ROI). Based on these results, the goal was to reevaluate soil K recommendations and modify as appropriate to optimize yields. Both granular (0-0-60) and liquid (0-0-15) muriate of potash (KCl) sources of K were applied two to four weeks prior to planting cotton at rates of 0, 40, 80, 120, and 160 lb/A K_2O. In 2016 trial locations were divided with nine being designated as new sites meaning that a new field location was selected each year of the study (Alabama, Arkansas, Louisiana, Mississippi, North Carolina, Oklahoma, and Texas (Lubbock and Williamson Counties), and Virginia. Locations other than Texas and Oklahoma generally had soil K levels less than 150 mg/kg (critical level of K, Mehlich III), and as such, a yield response to applied K fertilizer was expected. In 2015 and 2016, a significant treatment effect was determined at three of locations. Two of those, Williamson County, TX, and Virginia had lower yields than most other locations. A positive lint yield response to knife-injected 0-0-15 was determined in 2015 at the Lubbock County, TX, location. Inconsistent yield responses at locations with limited soil K or with soil K concentrations well above the critical level indicate that K dynamics in cotton are not well understood and deserve continued investigation.