

EVALUATION OF BUFFERED FOLIAR APPLIED BORON AND POTASSIUM FOR NO-TILLAGE COTTON

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Abstract

Foliar applications of potassium (K) has increased cotton (*Gossypium hirsutum* L.) lint yields when produced under K- limiting growing conditions. Buffering of foliar applications to an acid pH range (pH 4.0) has been shown to improve yields in some years relative to unbuffered solutions. Research was initiated in 1995 and continued in 1996 on a Collins silt loam at Jackson, TN, evaluating the buffering of foliar K and boron (B). Experimental design was an RCB with treatments replicated five times. Foliar treatments included 0.1 lb/A B and 4.4 lb/A of K₂O and their combinations applied unbuffered, buffered to pH 4.0, and buffered to pH 6.0. Additional treatments included foliar applications of 0.1 lb B/A of an experimental acid boron material and foliar applications the rate of buffer required to buffer the B+K foliar solutions to pH 4.0. Also included was a non-foliar check. A total of 12 treatments were applied in the test. D&PL 50 was planted by mid-May. Plots were fertilized with 80-30-30 lb/A of N-P₂O₅-K₂O, respectively, using ammonium nitrate, concentrated superphosphate, and muriate of potash. The foliar K source applied in 1995 was KNO₃ with K₂SO₄ applied as the K source in 1996. The foliar B source was Solubor. All foliar treatments were applied in approximately in 10 gal/A of water. 'Buffer Xtra Strength', manufactured by Helena Chemical, was the buffering material. Solutions were buffered the day of application and were applied within 30 minutes after pressurizing the applications tanks. Foliar treatments were applied at bloom, bloom plus 7 days, bloom plus 14 days and bloom plus 21 days through a multi-line boom. Twenty leaf blades and petioles were collected per plot from the top most fully developed leaf, generally the third or fourth from the top of the plant. These materials were washed, dried and ground for analysis. Leaf materials were assayed for K concentrations.

The 2-yr average lint yields were increased more than 75 lbs/A by applying the buffered foliar treatments relative to the check. Foliar treatments that increased yields included foliar K (unbuffered, pH 6.0 and 4.0), K + B (unbuffered, pH 6.0 and 4.0), and foliar B (pH 4.0) relative to the check. Foliar applying the Helena experimental B increased 2-yr average yields by 130 lbs/A relative to the check. Yields were not affected by treatment when evaluated by year. Leaf and petiole K concentrations were unaffected by foliar treatments for either year of the test.