

**EVALUATION OF SOIL AND FOLIAR FERTILIZATION
WITH BORON IN ARKANSAS**

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Abstract

Boron (B) is an essential element required by cotton for optimal growth and development. Boron is thought to play a role in cell wall structure, transport of sugars, and retention of reproductive structures. Boron deficiency in cotton appears as ringed or banded leaf petioles. Ruptured squares and thick green leaves that stay green until frost are other symptoms. Current production recommendations in Arkansas call for initial preplant soil applications of 1.0 lb. to 2.0 lb. B/A or two up to six foliar applications of 0.1 lb. to 0.2 lb. B/A. This is based largely on research conducted over 30 years ago. More recently, reports of yield response to soil or foliar applications of boron have been inconsistent. However it has been observed that buffering boron spray solutions to pH 4.0 increased yields relative to buffering to pH 6.0. The purpose of this study was to evaluate yield response of soil and foliar applied boron at low and high soil nitrogen (N) levels and evaluate yield response of buffered and non-buffered foliar boron solutions. A two-year study was conducted with locations across the state. Fayetteville and Rohwer locations were on University Experiment Stations and were conducted utilizing small plot studies. Nitrogen rates for low and high soil N were 50 and 100 units, respectively. Two on-farm locations were utilized employing large plots/strips. Treatments were replicated at all locations. Initial soil B levels range from 0.1 lb. to 1.6 lb./A. Soil applied B consisted of 1.0 lb. B/A at or prior to planting. Foliar B applications consisted of three 0.2 lb. B/A applications 1, 2, and 4 weeks after first flower. 'Buffer Xtra Strength' manufactured by Helena Chemical was used to buffer spray solution to a pH of 4.0 to 5.0. Results in 1999 and 2000 indicate that soil or foliar-applied B did not significantly improve cotton yields. However, soil applied B resulted in numerical yield increases in both the low (1100 lb. vs. 1039 lb. lint/A) and high (1173 lb. vs. 1153 lb. lint/A) N soil levels compared to the control. Foliar applications of B resulted in a numerical yield increase at the low N soil levels (1093 lb. vs. 1039 lb. lint/A). However, a numerical decrease in yield was observed with foliar B applications in the high (1005 lb. vs. 1153 lb. lint/A) N soil levels compared to the control. No positive response was observed from a buffered spray solution of B compared to a non-buffer solution (1187 lb. vs. 1183 lb. lint/A). This study indicates that the application of additional B as a routine procedure may not be necessary.