Potassium nitrate + adjuvant sprays enhanced cotton yield and farmers net income

The objective of this study was to determine if applying an adjuvant with foliar potassium nitrate on medium-to-high-K soils is economically beneficial to cotton producers. Experiments were conducted on no-tillage cotton produced on a high-K silt loam soil at Jackson (TN), USA, and on conventional- and no-tillage cotton produced on a medium-K silt loam soil at Milan (TN), USA. Treatments for each experiment were a non-foliar check (control), a foliar $KNO_3$ treatment, and a foliar $KNO_3$ plus adjuvant treatment. The use of adjuvants may promote absorption of foliar-applied nutrients into leaves compared with solutions without adjuvants, reducing nutrient loss and enhancing yield. $KNO_3$ foliar treatments were applied four times at 11,2 kg/ha in 94 litres/ha of water starting at flowering to 14 days after flowering on a 9-to-14-day interval. The adjuvant ‘Penetrator Plus’ was added to the foliar solutions at 1,25% (v/v). ‘Penetrator Plus’ is a light to mid-range paraffin oil, polyol fatty acid esters, polyethoxylated esters of polyol fatty acids, and ethoxylated allkylarly phosphate ester, buffering crop oil concentrate, manufactured by Helena Chemical Co. of Memphis (TN), USA.

The mean cotton lint yield statistically significantly increased on the medium-to-high K soils in Milan and Jackson for the foliar $KNO_3$ plus adjuvant treatment (Figure 1). The results suggest that farmers producing cotton on these medium-to-high-K soils who are already applying foliar $KNO_3$ can increase their net revenue substantially by adding the adjuvant ‘Penetrator Plus’ to this foliar fertilizer. On the other hand,

comparing the foliar $KNO_3$ treatment with the check on these medium-to-high-K soils was not beneficial. The unprofitability of foliar $KNO_3$ compared with the control was not surprising given the medium-to-high levels of extractable K in the soils for this experiment.

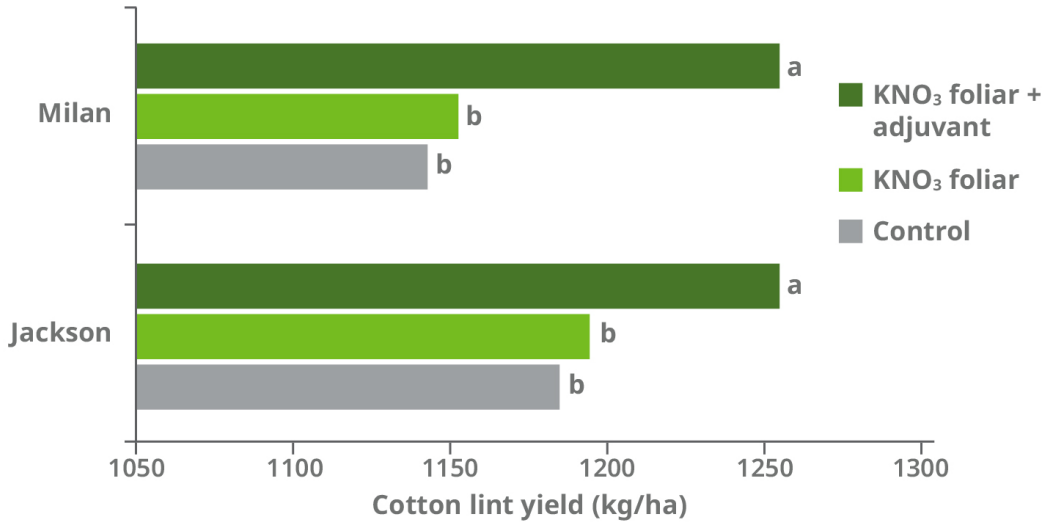


Figure 1. The overall mean for no tillage cotton lint yield at Milan and Jackson.