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Yield and Petiole Nitrate Concentrations of Cotton Treated with Soil-Applied and Foliar-Applied Nitrogen

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Nitrogen fertilization and N nutrient management are crucial components of economically successful cotton (*Gossypium hirsutum* L.) production. The efficacy of foliar N applications and the timing criteria for foliar N applications have been debated by cotton producers and scientists. The objective of this research was to use established soil-applied N experiments to evaluate foliar-applied N applications for increasing cotton yields in southeast Arkansas, and petiole NO_3^- -N as an indicator of N status of the crop. A long-term, soil-applied N rates experiment was used in these studies. The test consisted of a furrow irrigated and a dry land block of plots. Soil-applied fertilization rates tested within each block ranged from 0 to 168 kg N ha⁻¹ and N treatments were applied to the same plot each year of the study. The plots (eight rows; 9.14m long and 7.72 m wide) were divided and half of each plot received three foliar N treatments (11.2 kg N ha⁻¹ treatment⁻¹) on 2-week intervals beginning at first flower. Foliar N treatments most frequently increased lint yield when soil-applied N rates were low (0-67.2 kg N ha⁻¹). Lint yield increases due to foliar fertilization tended to be greater under irrigated production conditions than under dry land conditions. Yield decreases were sometimes found due to foliar-applied N when the rate of soil-applied N fertilizer was high (100.8-168.0 kg N ha⁻¹), although differences were not significant. Higher soil-applied N treatments resulted in higher petiole NO_3^- -N throughout the growing seasons, although not all differences were significant. Foliar N treatments were found to significantly increase petiole NO_3^- -N in 13 of 38 year-irrigation-sample date combinations. The interaction of foliar N and soil N fertilizer treatments was found to significantly influence petiole NO_3^- -N in only one sampling date during 1 year of the study.