

SENSITIVITY OF MULTIPLE CANOPY N STRESS INDICES TO CHANGES IN VARIETY AND AVAILABLE POTASSIUM**Tyson B. Raper****Derrick M. Oosterhuis****University of Arkansas****Fayetteville, AR****Leo Espinoza****University of Arkansas Cooperative Extension Service****Little Rock, AR****Taylor Coomer****Cristiane Pilon****James M. Burke****University of Arkansas****Fayetteville, AR****Abstract**

The spectral responses of variety and potassium (K) are not typically considered in the development of canopy reflectance nitrogen (N) stress indices. Response of each index to these variables must be considered to prevent inaccurate N applications. In addition, characterization of spectral K deficiency symptoms could allow for real-time determination of K deficiencies and direct foliar applications of K. The objective of this research was to examine the response of two contrasting indices to variety and available K. A randomized strip, complete block trial with five replications was conducted in 2012 and 2013 at the Lon Mann Cotton Research Center in Marianna, AR. Prior to planting, soil samples were taken from each plot and analyzed. Treatments consisted of an untreated check, 30, 60, and 90 lb applied K₂O/acre to Phytogen 499 WRF, Stoneville 5458 B2RF, and DeltaPine 0912 B2RF cotton varieties. Reflectance measurements were taken with the Crop Circle ACS-470 (Holland Scientific Inc., Lincoln, NE) at first flower and peak flower. Measured wavelengths were used to calculate the Normalized Difference Vegetation Index (NDVI) and the Canopy Chlorophyll Content Index (CCCI). Results from 2012 indicated interaction effects between available K and variety on NDVI were significant ($p \leq 0.10$), however, CCCI was only significantly affected by variety ($p \leq 0.05$). Results suggest NDVI based algorithms have the potential to recommend excessive fertilizer N quantities when K deficiencies are present. In contrast, CCCI does not appear to be susceptible to such errors. Still, both indices will require some correctional factor to adjust for varietal effects.