REMOTE SENSING OF COTTON N STATUS USING HYPERSPECTRAL RADIOMETRY Ermson Z. Nyakatawa, Chandra K. Reddy and David A. Mays Alabama A&M University Huntsville, AL

Abstract

The success and viability of animal waste management systems involving application on crop lands will depend on the availability and use of quick, simple, and reliable tools for monitoring plant and soil systems for nutrient buildup. This study investigated the use of hyperspectral reflectance signatures from the GER 1500 hyper-spectral radiometer to evaluate N status of cotton (*Gossypium hirsutum* L.) leaves from plants receiving poultry litter (PL) and ammonium nitrate (AN) sources of N under no-tillage system since 1996. The research was conducted on a Decatur silt loam soil in the Tennessee Valley region of north Alabama. The data were collected in 2001, 2003, and 2004. The GER 1500 hyper-spectral radiometer data was correlated to SPAD 502 chlorophyll meter and LECO measurements of leaf N. Plants which received 200kg N ha⁻¹ of PL had 30% and 20% lower reflectance in the 730 to 1092nm wavelength region, at the 50% square and 50% flower stages, respectively, than those which did not receive N. SPAD data correlated with reflectance and N content of cotton leaves. Our results indicate that hyper-spectral and SPAD data can be used to give an indication of N status in cotton plants receiving PL which can be used to assess residual N accumulation in plots receiving PL.

Keywords: hyper-spectral radiometer, poultry litter, reflectance, remote sensing, SPAD.