

COMPARISON OF THREE COMMERCIALLY AVAILABLE CROP SENSORS UTILIZING NDVI FOR MONITORING COTTON GROWTH AND NITROGEN STATUS

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Abstract

Crop reflectance utilizing handheld or tractor mounted sensors has the potential to direct fertilizer N applications. Three commercial sensors were examined for their effectiveness in differentiating cotton (*Gossypium hirsutum* L.) plant height and leaf N based on NDVI measurements. The YARA N Sensor (Yara International ASA, Oslo, Norway), the GreenSeeker Model 505 Optical Sensor Unit (NTech Industries, Inc., Ukiah, CA) and the Crop Circle Model ACS-210 (Holland Scientific, Inc., Lincoln, NE) were utilized in this study. Field trials were conducted in 2008 and 2009 at the Plant Science Research Farm, Mississippi State, MS. Fertilizer N rates of 0, 40, 80, and 120 lb N/acre were applied to establish wide growth differences. Values of NDVI from all three sensors correlated with plant height and leaf N for all physiological stages of growth. The magnitude of NDVI values however, varied from sensor to sensor. This trend, along with a parallel relationship through most sampling dates between the two handheld units may be attributed to differences in viewing angles and field of view. The GreenSeeker and Crop Circle sense the canopy at a nadir viewing angle, unlike the YARA, which views the crop off-nadir between 58 and 70°. Following early square, NDVI values varied considerably between sensors for each sampling date, with the YARA consistently producing the greatest values, while the Crop Circle had the lowest. Crop reflectance based NDVI values are not standardized across sensors.

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