

SOYBEAN CANOPY RESPONSE TO CHARCOAL ROT IN ARKANSAS: OBSERVATIONS USING CROP CIRCLE™ (ACS-470).

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ABSTRACT

Charcoal Rot caused by *Macrophomina phaseolina* is a problem to soybean production, especially in hot and dry areas of southern US. As an approach to develop a fast assessment method of this soil-borne disease, soybean canopy reflectance was recorded with an active optical sensor, the Crop Circle™ ACS-470 in 2009 from a microplot field in Fayetteville, Arkansas. The microplot experiment was designed as a completely randomized factorial experiment with four cultivars, two inoculum treatments, and two water stress levels. The four soybean cultivars under observation were two moderately resistant (DT 974290 and DP 4546 RR), a drought resistant (RO1-581FCR), and a susceptible (LS 980358) cultivar. Other biological data collected include stomatal conductance, leaf temperature, leaf area, and the pathological data required for disease assessment. Various vegetation indices derived from recorded reflectance will be analyzed and tested to determine if there were differences in the indices ability to capture disease symptoms and status at various plant growth stages. The indices will be evaluated using linear and multiple regression approaches.

Keywords: Charcoal Rot, Soybean, Remote Sensing, Regression, Vegetation Index, Active Optical Sensors