# DISEASE SCOUTING FOR AERIAL BLIGHT BASED ON LOGICAL AREAS OF COLLECTION IN SOYBEAN FIELDS ROTATED WITH RICE

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## SUMMARY PAPER

*Rhizoctonia solani* AG1-IA causes sheath blight in rice and aerial blight in soybean. In Arkansas, rice and soybean rotations facilitate a continuous source of *R. solani* AG1-IA inoculum from one year to the next. Aerial blight is a two stage disease where colonization of the plant occurs during the early vegetative growth stages and aerial blight symptoms occur during the reproductive growth stages after canopy closure (2). At canopy closure, aerial blight becomes problematic because the signs and symptoms of disease occur underneath the canopy and are not visible without extensive scouting. Disease develops rapidly and spreads plant to plant through the canopy and detection late in the reproductive growth stages is often too late for a fungicide application to be of economic value. Spatial analyses were used to determine the spatial aggregation of soil inoculum potential and plant colonization. Models indicated soil inoculum potential and plant recovery of *R. solani* AG1-IA was controlled by the levee system from the previous year and elevation (1). Dissemination of *R. solani* AG1-IA as floating residue or sclerotia appears to be important in distribution of inoculum in a rice field flooded much of the year in addition to this pathogen being soilborne. The inoculum of the pathogen aggregates in the collection areas, over winters and is available to cause disease in the next year's soybean crop at these positions. Disease scouting at or near areas in a soybean field that correspond to "logical areas of collection" from the levee system utilized the year before should result in a more efficient scouting methodology to detect and manage aerial blight. Subsequently, work has been done to determine what constitutes a logical area of collection using LiDAR elevation data (provided by

USGS) for much of the agricultural region of Arkansas. In combination with LiDAR, GPS levee maps were quantified spatially ($m/m^2$) using the line density tool in ArcGIS 10.1. Fields that were in levee rice the previous year and had sheath blight were assigned 5000 random points and predictive modeling based on line density and elevation (or both) using geographically weighted regression in ArcGIS 10.1 used to identify areas where collection of *R. solani* AG1-IA was most likely. After areas were identified in the fields, straight line verification strips were arbitrarily placed in the fields and disease assessments will be made after canopy closure on random points within the strips to determine disease severity at locations both identified as logical areas of collection and not. Spatial statistics and predictive modeling of logical areas of collection will be a valuable tool in making disease scouting more efficient and efficacious.

## LITERATURE CITED


1. Spurlock, T., Rothrock, C., and Monfort, W. S. 2012. Doctoral Dissertation. University of Arkansas.
2. Yang, X. B., Berggren, G. T., and Snow, J. P. 1990. Seedling infection of soybean by isolates of Rhizoctonia solani AG-1, causal agent of aerial blight and web blight of soybean. Plant Dis. 74:485-488.


## FIGURE

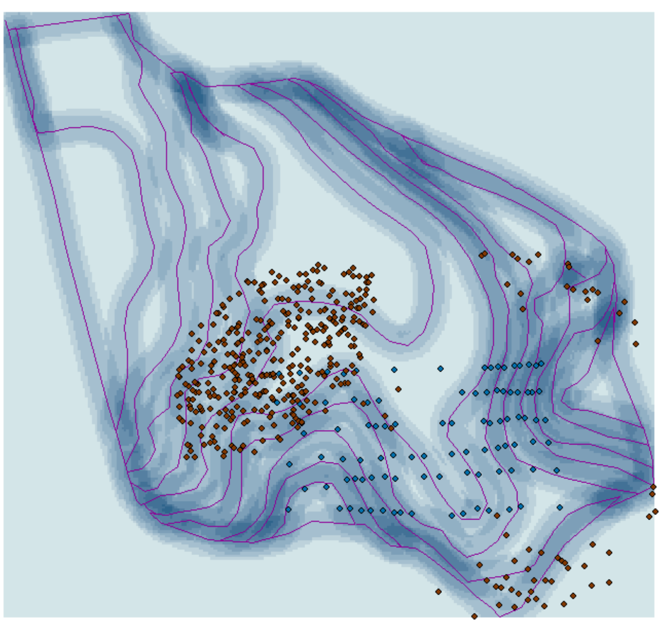

Figure 1. Prediction of logical areas of collection (aggregated brown diamonds) based on sampling Rhizoctonia populations across rice levee positions from the previous year's rice crop (pink lines) in the soybean field. Levee map bends were quantified and prediction made using geographically weighted regression, based

on levee bends and Rhizoctonia populations at the sample points (blue diamonds). Verification strips will be sprayed at the appropriate growth stage across these collection areas to determine response to yield of various fungicides.