Characterization of Spatial Variability and Its Effects in Peanut Production

K. R. KIRK*, D. ANCO, J. THOMAS, B. FOGLE, M. HAYNES, and M. MUNIR**,** Edisto REC, Clemson University, Blackville, SC 29817.

Intensive spatial data collection was conducted to seek to identify and quantify factors critical to peanut yield limitation. Two fields in Barnwell County and Bamberg County, S.C. were each divided into 50 one acre grid sections for the 2017 growing season. The following factors were spatially quantified within each of the grid sections: yield, grade, soil texture, soil electrical conductivity, soil organic matter content, soil temperature, depth to clay layer, canopy temperature, soil moisture content, NDVI, rate of canopy closure, disease ratings, pest ratings, disease ratings, weed pressure, soil fertility analyses, nematode presence, digging losses, and maturity levels. There were no treatments imposed on the fields; the cooperating growers were asked to manage the fields according to their normal practices. One field was planted in Bailey and the other in TUFRunner™ 511. The purpose of the study was to better understand the effects of in-field spatial variability as related to peanut production, to seek to characterize and quantify the multiple factors that influenced peanut production profitability, and to suggest criteria for peanut yield management zone delineation. The datasets generated were used to construct multiple linear regression models seeking to use the measured in-field spatial variability to explain observed differences in yield, digging losses, disease, maturity, and pest pressure. Simulations using the developed models were used to suggest quantifiable effects of the factors involved. Some examples include: yield deficit as functions of observed micronutrient concentrations and TSWV incidence; late leaf spot incidence as functions of mid-season canopy coverage and soil texture; and TSWV incidence as functions of soil fertility and depth to hardpan.