SEEDING RATE DECISIONS AND IMPACTS ON SPATIAL YIELD VARIABILITY IN NORTHEAST ARKANSAS COTTON Tina Gray Teague Arkansas State University/ University of Arkansas Division of Agriculture Jonesboro, AR N.R. Benson University of Arkansas Division of Agriculture Blytheville, AR Amanda Mann University of Arkansas Division of Agriculture Jonesboro, AR D. Keith Morris Arkansas State University Jonesboro, AR

<u>Abstract</u>

Cotton producers in the Mid-South must focus on reducing production costs to improve crop profitability. Seed typically is a major production cost, and previous research findings have suggested that customary uniform seeding rates (3 to 4 seeds per foot of row in 38 inch row spacing) can be reduced without negatively effecting yield. Use of variable rate seeding across well-defined crop management zones also may be appropriate in fields with heterogeneous soils. Updated guidelines for uniform and prescription variable rate planting are needed. This paper summarizes results of the second year of an on-farm study in northeastern Arkansas designed to evaluate how changes in seeding rate affect plant development and yield in a commercial field with highly variable soils. Historical yield monitoring data along with georeferenced soil electrical conductivity (EC) measurements, and results from soil textural analysis were used to sub-divide the field into three soil textural zones: coarse sand, loamy sand and clay. Treatments were seeding rates of 1.5, 3.0 and 4.5 seeds per foot, as well as a variable rate treatment with rates applied based on soil textures. One 12-row planter swath across the field was one treatment strip, and there were 6 strips per treatment arranged in a randomized block across the 35 acre field. The COTMAN system was used for in-season plant monitoring across soil textural zones and seeding rate treatments and included weekly examination of main-stem nodal development, square and boll retention, and plant height. Insect pest assessments included evaluations of thrips and tarnished plant bug abundance. Yield and fiber quality determinations were made with hand-picked samples and from yield monitor data. Early season assessments of stand counts indicated acceptable plant stand densities in the uniform seeding rate strips. Target stand densities for variable rate planted strips deviated from target levels at unacceptable levels indicating problems with planter control. In hand-harvested sample areas, we observed no differences in yield among seeding rates. There were significant differences in yields among soil textural classes with higher yields from plants grown in loamy sand compared to plants growing in coarse sand or clay soils. Yield monitor data derived from field length strips indicated no significant yield differences associated with seeding rate. Results indicate rates seeding rates can be reduced without negatively effecting yield. Similar findings were observed in the 2014 trial. Reduced seeding rates may help reduce production costs, but seeding rates must be sufficient to provide successful stand establishment. This remains a critical hurdle. Planter efficiency in delivering target seeding levels in variable rate treatment lacked precision that we expected, and additional fine-tuning of the controller unit likely was needed. Overall, we observed no benefit from adjusting seeding rates among soil textural zones compared to a uniform low rate, and this raises the question of merit in the additional management requirements for developing zones.