Investigating Precision Ag Practices for Site-Specific Nutrient Management in Peanuts

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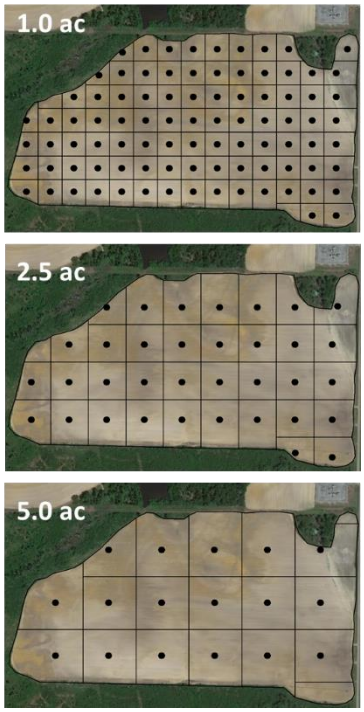
Objective: To evaluate and compare the effectiveness of different commonly used grid sizes in identifying spatial soil pH variability and for variable-rate lime applications in peanut

Locations: Tift, Worth, Colquitt, Jefferson and Terrel County

Methods & Data Collection: Five different growers fields (to be planted in peanuts in 2022) ranging in size from 22 to 92 ac were selected. Within each field, soil samples were taken using grid sizes of 1.0, 2.5, 5.0, 7.5 and 10.0 ac grids to determine spatial soil pH variability. A high-density soil sampling was also performed in each field to use as a reference and assumed to represent actual spatial variability. All soil samples were analyzed by the UGA AESL Lab and soil test results from each grid size stragetgy was used to create spatial soil pH maps. The corresponding variabel-rate lime application map for each field was also created to determine the application accuracy as well as to perform economic analysis associated with each soil sampling strategy.



Summary: The graph below presents the results for the application accuracy and costs (averaged across all fields) associated with different grid sizes for variable-rate lime applications. The study findings indicated that the soil sampling on 1-ac grid size consistently provides the highest accuracy (>80%) for determining spatial soil pH variability, followed by the 2.5-ac grid size. Contrarily, soil sampling on 5.0, 7.5 and 10.0 ac does a poor job of representing actual in-field spatial soil pH variability and results in highly inefficient (<70% accurate) variable-rate lime application in peanut fields. Interestingly, one of the most common grid sizes used by consultants and growers in Georgia for soil sampling is 5 ac with some soil sampling performed at grid sizes as large as 10 ac. From the economic analysis, it was found that soil sampling on larger grid sizes does not necessarily reduce overall costs as it increases the potential for over-application, which further increases the total amount of lime applied and hence the increased or comparable costs. Based on the study findings, it can be concluded that most peanut fields should not soil sampled on grids larger than 2.5 ac. Rather, every field should be initially soil sampled using 1-ac grid size to understand in-field soil pH variability and to determine if grid size can be increased to 2.5 ac in the consecutive years.