Grower Education on the Effect of Tillage Practice Related to Peanut Water Availability and Usage

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Introduction

Strip-till is the most commonly used minimum tillage system implemented in Brooks County conservation tillage planting programs. Benefits of strip-till production include: improved soil health, decreased soil erosion, and reduced trips across the field. Strip-till systems have been applied in the production of numerous crops, including peanuts. However, peanut producers have questioned yields achieved with strip-till programs compared to typically higher harvestable peanut yields acquired through conventional tillage systems. In addition, the role of season long water availability, consumption, and usage by the peanut plant has not been defined in a strip-till management system.

OBJECTIVE

- Evaluate the effect of conventional tillage and strip-tillage, as it relates to plant water availability, usage, consumption, and harvestable yield. Information obtained will be used as a grower educational tool for peanut production in conservation tillage systems.

Fig.1. Peanut emergence in strip tillage system.

Fig.2. Peanut emergence in conventional tillage system.

Materials & Methods

- Experiments were conducted in two site locations: non-irrigated and irrigated commercial peanut fields in Brooks County, GA.
- Treatments consisted of two field cultural practices: bottom plow utilized for conventional tillage treatment and strip-tillage for conservation tillage treatment. Plots were replicated as strips three times across each field, running the entire length of each commercial field.
- AquaCheck capacitance soil moisture sensors (SMS) installed in each replicated plot on May 27th to monitor the differences in soil moisture at soil depths of 8, 16, and 24 inches. SMS data were recorded and logged hourly throughout the growing season.
- Plots were mechanically harvested and weighed by treatment strip to determine yield.

Fig.3. Irrigated Cultural Field Treatments.

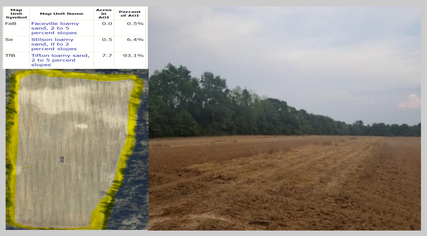

Fig.4. Non-irrigated Cultural Field Treatments.

Results

- No significant differences in season long soil moisture was observed or recorded between the two tillage treatments.
- The conventional bottom plow treatment demonstrated a tighter range of soil moisture data, likely due to soil disturbance potentially increasing soil uniformity compared to the strip-till.
- At both field locations, two of the replicated strip-till plots displayed a higher level of soil moisture than the bottom plow, but not significantly so.
- Results demonstrated an increase in yield with bottom plow treatments. However, due to noticeable variations in available soil moisture within replicated plots located across the fields, the peanut yield increase associated with conventional tillage was not attributed to available soil moisture and usage.
- Soil moisture data indicates that differences in soil type and variations within a field are closely associated with soil water availability independent of cultural practice implemented at planting.

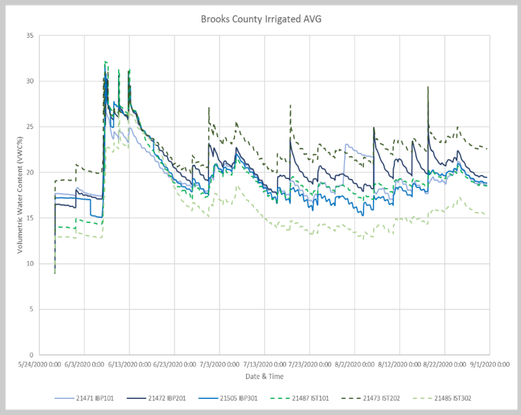

Fig.5. Irrigated – Average season long soil moisture data for all plots.

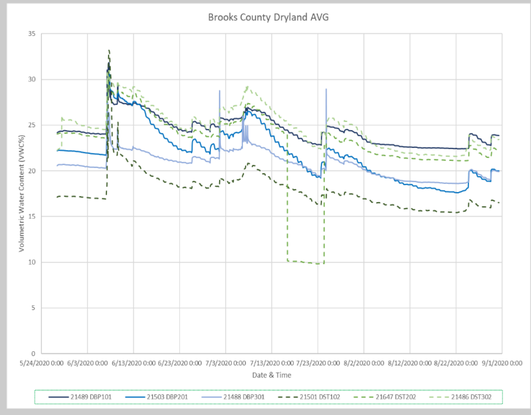

Fig.6. Non-irrigated - Average season long soil moisture data for all plots.

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