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Final / Summary

Project Title: Thrips and TSWV
Fund No. 367373 302807

Report of Progress: Research plots were established in 2010 at the Wiregrass Research and Extension Center. Individual plots were 12 X 40 ft. wide in a split plot design with four replications. Treatments consisted of tillage systems, insecticide application, and starter fertilizer application. Peanuts were planted on 4-23-10. Main plots consisted of tillage as either conventional tillage or strip tillage with a rye cover crop. The subplots were a factorial combination of starter fertilizer and in-furrow insecticide. Starter fertilizer treatments consisted of no fertilizer or N+P applied in a 2x2 band beside the row at planting, while insecticide treatments consisted of no in-furrow insecticide or phorate applied in-furrow.

Early season plant samples for nutrient content were collected from all plots at two separate times during the growing season. In addition, plants were sampled on three separate times to determine thrips numbers from each plot. Disease counts were collected from all plots, prior to digging and immediately following digging. All plots were harvested on 9-10-10.

Strip tillage peanut yields were 29% greater than conventional peanut yields. Although no yield difference was observed between starter and no starter within strip tillage peanuts, both strip tillage combinations were greater than conventional tillage peanuts with and without starter (Fig.1).

The use of phorate increased peanut yields approximately 10% across all tillage and fertilizer combinations. An interaction between starter fertilizer and insecticide was also observed (Fig. 2). First year results indicate that starter fertilizer applied without insecticide could be slightly detrimental to peanut yields. This data clearly shows the benefit of phorate use in peanut production.

Total sound mature kernels were generally low but peanut grades across all conventional tillage peanuts were two points higher than strip tillage peanuts (68 vs. 66). No other factors influenced peanut grades. Early season plant biomass and subsequent N uptake in plant tissue was not affected by any of the treatments examined during the first year of this study.

Although only one year of the experiment has been completed, it appears strip tillage remains a viable option for peanut production. Preliminary results indicate that the use of a starter fertilizer does not appear to be beneficial for peanut.

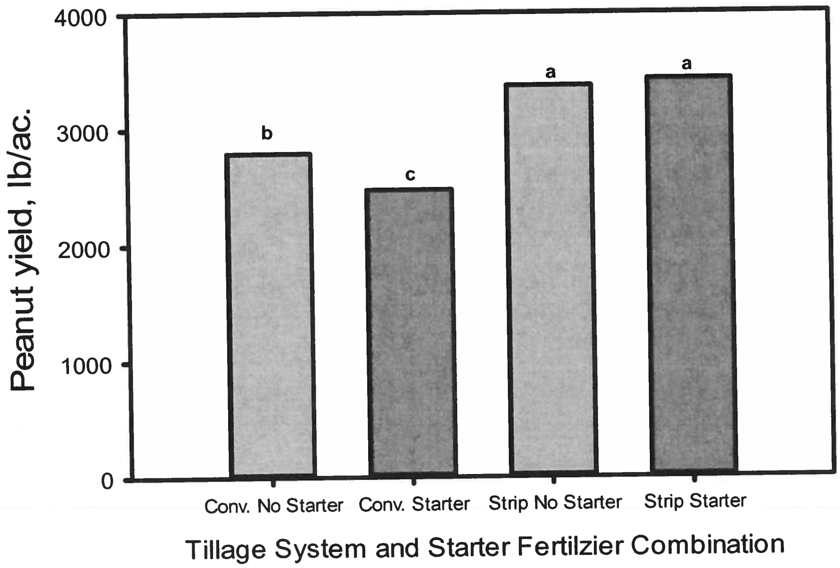

Fig.1. 2010 peanut yields across tillage and starter fertilizer combinations.

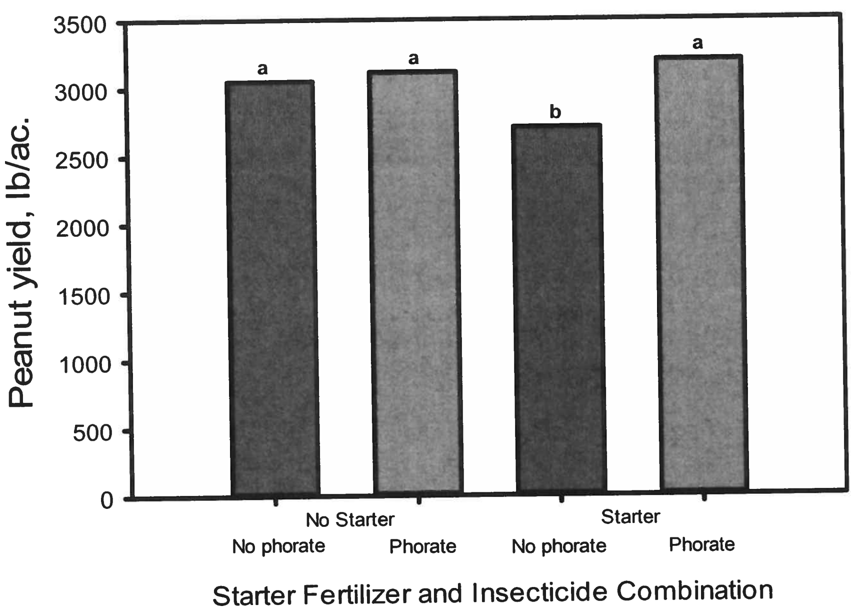

Fig. 2. 2010 peanut yields across starter fertilizer and insecticide combinations.

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NATIONAL PEANUT BOARD / SOUTHEAST PEANUT RESEARCH INITIATIVE

Final Report for work done under project agreement entitled:
"Fertilization, Tillage, and Phorate Interaction on Thrips & TSWV Incidence in Early Planted Peanuts".

NPB Project # 310
GPC Budget # 4-947-653-5
UGA Account #25-21-RF328-851

INSTITUTION: University of Georgia

Principle Investigator: Dr. R. Scott Tubbs

EXPIRATION DATE: 30 June 2011

SPRI CONTACT: Emory Murphy
NPB CONTACT: Marie Fenn

Final Report:

A field experiment was established to evaluate peanuts planted using two tillage systems (conventional and strip-till), with and without starter fertilizer (10.9 gal / ac of 10-34-0) in a 2x2 placement at planting (two inches below and to the side of the seed), and with or without phorate insecticide in-furrow at planting (5 lb / ac). All combinations of these treatments were represented as a factorial arrangement in a Randomized Complete Block design. A rye cover crop ('Wrens Abruzzi') was planted at 90 lb / ac on November 22, 2009. It was terminated with glyphosate. 'Georgia-06G' peanut was planted on April 22, 2010 at 6 seed / foot of row. Thrips sampling occurred on May 11, 18, and 25 for this location (corresponding to 19, 26, and 33 days after planting [DAP]). Plots were dug on September 9, immediately after TSWV ratings and immediately before white mold ratings, and were harvested on September 14, 2010.

After planting peanuts, the soil temperature at the 2-inch depth fell from around 70 F to 66 F within the first week after planting. This delayed emergence. However, warmer temperature prevailed the following week and sampling was able to be initiated for thrips at 19 DAP. Figure 1 shows that immature thrips were virtually non-existent on the first sampling date, while there were measurable populations of adult thrips on the plants at the time (Fig. 2). As expected, there were fewer adult thrips on plants that were treated in-furrow with phorate than on plants that did not receive this insecticide. Yet, by the second sample date one week later, the number of immature thrips that were present and feeding on the peanut foliage was tremendous in the plots where there was no phorate applied, but where phorate was applied, immature thrips populations were reduced by 90%. The sheer volume of immature thrips on the non-treated foliage caused the adult thrips to move to the only nearby host that was not overrun with immatures, which was the phorate treated peanut plants. Thus there was a reciprocal effect on adult thrip populations related to phorate application from 19 DAP to 26 DAP. By the time of the final thrips sampling at 33 DAP, thrips populations were non-existent in this test. Thrips pressure is considerably lower in late May than in late April/early May, which is why planting date recommendations were shifted to mid-late May when tomato spotted wilt virus (*Tospovirus*) (TSWV) became a major problem in peanut.

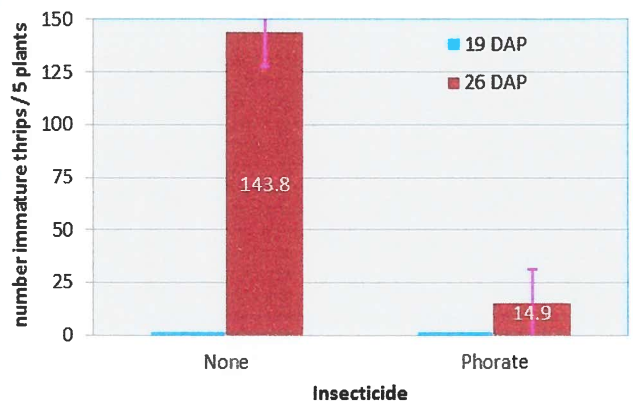

Fig. 1. Number of immature thrips as influenced by phorate; Tifton, GA 2010.

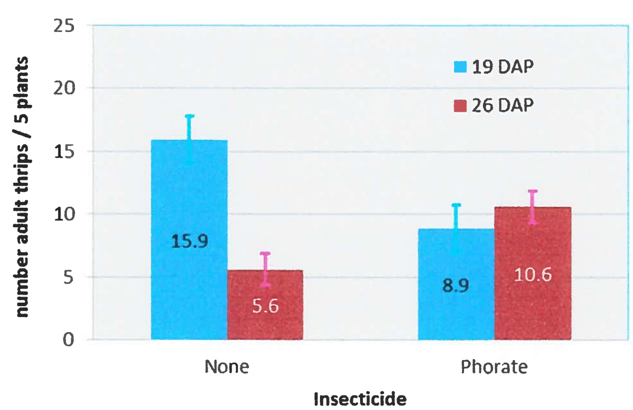

Fig. 2. Number of adult thrips as influenced by phorate; Tifton, GA 2010.

However, despite heavy feeding pressure from thrips, when analyzed to determine the concentration of thrips that were carrying TSWV, the results showed that there were virtually none that were viruliferous. Although, despite not detecting much TSWV in the lab analyses, there was still a distinguishable field incidence of TSWV on the plants when comparing phorate-treated vs. untreated plots (Fig. 3). Also, there is typically an observed tillage difference for TSWV when there is significant thrips pressure, however that was not observed in this test primarily due to the severe vegetative necrosis caused by rampant infestation of white mold (*Sclerotium rolfsii*) in this field (Fig. 4). There was a measured difference between tillage systems for white mold, with strip-tillage suffering nearly double the incidence of the pathogen. Previous research has shown that soil inversion from conventional tillage will assist in control of the disease since residues hosting the inoculum are buried, while strip-till systems maintain residue hosts at or near the soil surface where it can infect the crown of a peanut plant and spread down the row, as was the case in this experiment.

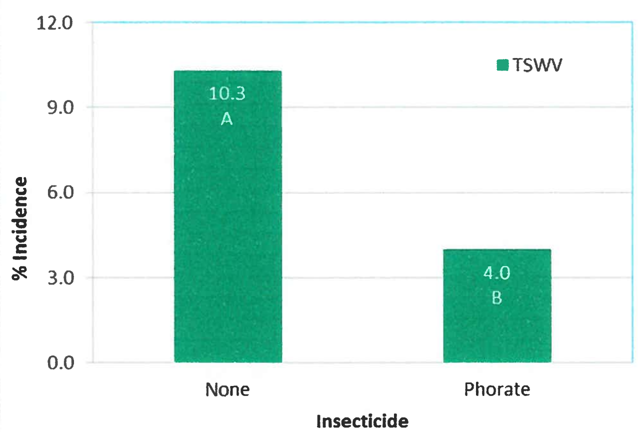

Fig. 3. Incidence of TSWV as influenced by phorate; Tifton, GA 2010.

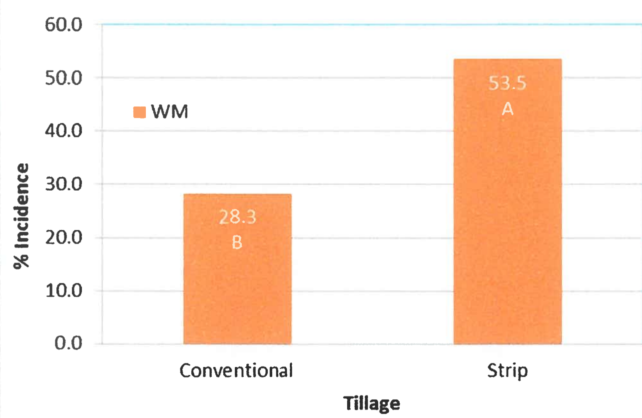

Fig. 4. Incidence of white mold as influenced by tillage; Tifton, GA 2010.

Due to the overwhelming presence of white mold, yields were strongly influenced by those results and thus we were unable to detect whether thrips or TSWV damage affected yield for this test (Fig. 5). The inclusion of the second (Headland, AL) location of this trial along with additional years of research should provide some very useful information on the entomological and pathological responses to the agronomic management variations used in this project.

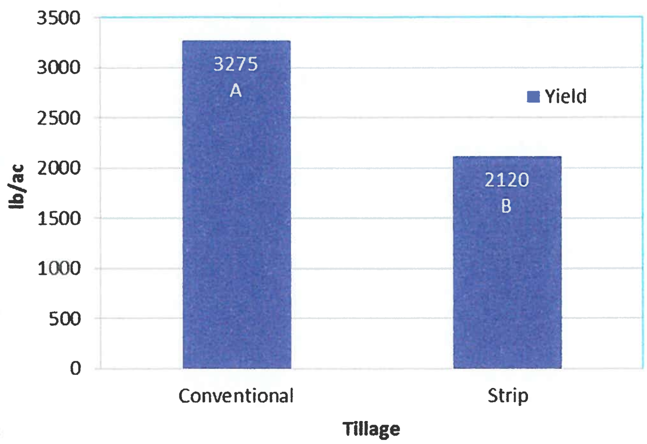

Fig. 5. Yield of peanuts as influenced by tillage; Tifton, GA 2010.

There were no statistical differences for any variable regarding the use or lack of starter fertilizer at planting. It was theorized that the addition of a starter fertilizer might help the peanut seedling have more rapid growth during and just following emergence, which might in turn affect thrips feeding behavior. This did not turn out to be true, as there were equivalent numbers of thrips (immatures and adults) at all three sample dates regardless of the other dependent variable levels in combination (no interactions were detected). Starter fertilizers are typically not recommended for peanut as the plants are both leguminous (for N) and good scavengers of P and K when following a normally fertilized agronomic crop rotation with corn or cotton, and this data continues to support that advisement.