Final Report for work done under project agreement entitled:
"Evaluating peanut cultivar response to agronomic management and planting date and irrigation impacts on new peanut cultivars, yield, grade, aflatoxin and water requirements and use of drone technology for management decisions".

NPB Project # 463
BID # 1542
SID # GA-180

INSTITUTION: University of Georgia

Principle Investigator: Dr. W. Scott Monfort

EXPIRATION DATE: 30 June 2018

SPRI CONTACT: Hannah Jones

NPB CONTACT: Bob Parker

Final Report
Peanut research trials were conducted to evaluate cultivar response to differing agronomic practices in Georgia. Numerous cultivar trials were conducted to evaluate the yield and grade potential of newly released peanut cultivars compared to the industry standard Georgia-06G. Several trials were planted to evaluate the response of cultivars to row configuration in both conventional tillage/reduced tillage and dryland/irrigated situations along with seeding rate and planting date. New irrigation and planter technologies were also evaluated to determine utility in crop growth and yielding potential.

Project 1:
All trials were planted from late April to Early June with no notable weather issues. The 2017 growing year was more optimum for yield potential and quality except for the dry conditions in August. All trials were harvested and analyzed. Results for the variety trials at the RDC Pivot and the Berrien County On-Farm Trial are included.

RDC Pivot -- Higher plant stands were noted in twin row across all cultivars. There were differences observed in how quickly some cultivars emerged and started growing (Vigor). Georgia-16HO was one of the fastest emerging cultivars. The new Georgia-16HO cultivar also performed very well compared to Georgia-06G across all locations and environments. Georgia-16HO also had a very high overall grade and in some trials had a higher grade than Georgia-06G. There were little differences observed across row patterns (twin and single). A majority of the newer cultivars had good to moderate levels of TSWV and Leafspot resistance with TufRunner 297 and Algrano 914 having the highest level of TSWV and Leafspot incidence. Some of the varieties including GA-16HO and FLORun 331 have potential to compete with Georgia-06G for yield and grade, especially when combined with a Hi OL premium. AUNPL-17 has been noted
as a good variety in other state trials but it has not performed very well in my agronomic trials due to germination and vigor issues.
Berrien County Cultivar Trial:
The new cultivars like GA-16HO, FLORUN 331, and TUFRunner 511 performed well compared to Ga-06G with AUNPL-17, GA-13M, GA-12Y, TifNV Hi-o1 and the short season 914 not performing very well.

**PRODUCTION PRACTICES OF 17.33**
**BERRIEN COUNTY- CULTIVAR TRIAL**

<table>
<thead>
<tr>
<th>Planting Date:</th>
<th>Digging Date:</th>
<th>Harvest Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 5th, 2017</td>
<td>September 29th, 2017</td>
<td>October 5th, 2017</td>
</tr>
</tbody>
</table>

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**Cultivars:** 914, TufRunner 297, Tif NV Hi-OL, GA-13M, GA-16HO, AU NPL 17, GA-12Y, GA-06G, TufRunner 511, FLORun 331.

**Row Pattern:** Twin Rows
Final Report (Agronomic Project #2, Tifton, GA):

An experiment was conducted at the UGA Lang Farm in Tifton, GA to evaluate twin-row peanut grown under different reduced tillage management scenarios either with or without a cover crop. Wrens Abruzzi rye was planted in appropriate plots at 90 lb/ac on Dec. 2, 2016 and fertilized with 200 lb/ac of 34-0-0 on Jan. 17, 2017. Cover crop was sprayed with glyphosate to terminate growth on April 10, 2017. Tillage treatments included a non-treated check, a single shank strip-till implement (shank centered between the two twins), a dual shank strip-till implement (one shank directly in-line with each twin-row), and a paratill. Strip-till operations were performed on April 24 and peanuts were planted on April 25, 2017. Crop management was conducted using UGA Extension recommendations for weed, insect, and disease control and plots were irrigated with a Rain Reel based on the UGA checkbook method. Peanuts were dug on Sept. 20 and harvested on Sept. 27, 2017.

There was no interaction between cover crop and tillage. There were differences in yield and grade (Total sound mature kernels [TSMK]) for inclusion vs exclusion of the rye cover crop (Table 1). When rye was included, there was a reduction in yield and grade for peanut. This could be as result of cover crop impeding pegging and causing other interference or disruption to peanut growth and development. The reduction in both yield and grade might suggest that the presence of the rye cover crop may have delayed maturity, hence requiring additional time to maximize yield and grade. Sometimes a cover crop can cause elongated pegs which take longer to reach the soil surface and additional energy expenditure by the plant before they can form pods. While this data was not measured in this test, it has been observed in other experiments.

This research was conducted in 2015, 2016, and 2017. Only 2017 results are reported here. However, a poster evaluating all 3 years of this research was presented at the 2018 Crop Science Society of America meeting in Baltimore, MD. A copy of this poster presentation is included with this report.
Table 1. Plant stand, yield, and grade (Total Sound Mature Kernels [TSMK]) of twin-row peanut grown following different cover crop and tillage management, Tifton, GA 2017.

<table>
<thead>
<tr>
<th>Cover/Tillage</th>
<th>Stand (plants/ft)</th>
<th>Yield (lb/ac)</th>
<th>TSMK (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Cover</td>
<td>4.4</td>
<td>5450 a</td>
<td>74.5 a</td>
</tr>
<tr>
<td>Rye Cover</td>
<td>4.7</td>
<td>4920 b</td>
<td>72.7 b</td>
</tr>
<tr>
<td>Level p*</td>
<td>0.210</td>
<td>0.082</td>
<td>0.015</td>
</tr>
<tr>
<td>No-Till</td>
<td>4.7</td>
<td>5330</td>
<td>74.1</td>
</tr>
<tr>
<td>Paratill</td>
<td>4.4</td>
<td>4930</td>
<td>73.5</td>
</tr>
<tr>
<td>Dual Shank</td>
<td>4.8</td>
<td>5270</td>
<td>72.7</td>
</tr>
<tr>
<td>Single Shank</td>
<td>4.4</td>
<td>5210</td>
<td>74.1</td>
</tr>
<tr>
<td>Level p</td>
<td>0.530</td>
<td>0.775</td>
<td>0.429</td>
</tr>
</tbody>
</table>

* Mean separation was conducted at alpha = 0.05 when p-value was less than 0.05, and at alpha = 0.10 when p-value was between 0.05 and 0.10. Means followed by a different letter are significantly different according to pairwise t-test.


This study was conducted again in 2018 to evaluate the planter setup for improving seed placement that ultimately translates to high crop emergence for peanuts. Downforce technology on planters has gained a lot of traction recently due to its potential of increasing crop emergence by ensuring correct seed placement at the desired depth providing optimum seed-to-soil contact by leaving near-perfect field conditions. Downforce is an important consideration when setting seed depth on the planter which is mostly neglected by producers. Downforce can also vary with at-planting field conditions and in-field variability that can create seeding depth variations in the field. In 2018, this study was conducted at two locations (University of Georgia’s RDC farm located in Tifton, GA and Southeast Research and Education Center in Midville, GA). A 4-row Monosem Vacuum planter equipped with a manual downforce control was used for planting a GA-06 variety at three different seeding depths (1.5”, 2.5” and 3.5”) utilizing three different downforce setups. The selected downforce settings consisted of low, medium and high corresponding to 100, 200 and 400 lbs of force on individual row units. These depth-downforce settings were selected to evaluate the possible combinations to see if a particular downforce maximizes crop emergence at the desired seeding depth. The trials were planted in Early May in Midville and Mid-June in Tifton (the Tifton location was planted so late due to the excessive rainfall during mid- to late May). Emergence data was collected at both locations by taking stand counts in middle two rows (10-ft section within the plots) at 1, 2 and 3 weeks after planting to evaluate the effect of downforce treatments on crop emergence.

Results from the study indicate varying crop emergence for different seeding depth treatments with the lowest emergence of around 45% for peanuts planted at the 3.5” seeding depth. The highest crop emergence of 75% was obtained for peanuts planted at 1.5” seeding...
depth with the selected downforce setups. A similar study was conducted during 2017 using a 4-row John Deere planter with a pneumatic downforce system provided a very low emergence (20-30%) at the similar seed depth and downforce treatments used this year. The issue was determined to be the planter setup in 2017. This finding suggested the importance of verifying the planter setup and operation by digging the seeds behind the planter to ensure correct seeding rates as well as seed spacing and depth. The graph below shows the emergence data collected at 1 and 3 weeks after planting for the study planted in Midville, GA. Data comparison among treatments showed significant differences between the crop emergence values for peanuts planted using three different seeding depths. Visual observations during planting also showed significant soil compaction in the plots where seeds were planted using high downforce treatments. Field observations during data collection also indicated uneven and delayed crop emergence between different depth and downforce treatments. Yield data will be collected at harvest and analyzed to evaluate any yield differences between study treatments. The low emergence in peanuts planted at 3.5" depth will likely cause a yield reduction in this treatment. The results from the study emphasize the importance of correct selection of planter setup (specifically matching downforce to desired seeding depth) based on at-planting field conditions to maximize crop emergence in peanuts.