

467  
1,467  
2016

NCARS/NCCES CODE: NC-37  
ALSO FUNDED as NC-21  
OFF CAMPUS RESEARCH  
REPORT PERIOD: 01/01/2016-06/30/2017

**ANNUAL PROGRESS REPORT  
TO  
NORTH CAROLINA PEANUT GROWERS ASSOCIATION, INC.**

**TITLE:** Optimizing Peanut Production and Pest Management through Applied Research

**LEADER:** David L. Jordan<sup>1</sup>

**COOPERATORS:** Rick L. Brandenburg,<sup>2</sup> Thomas G. Isleib,<sup>1</sup> Gary T. Roberson<sup>3</sup>  
Barbara B. Shew,<sup>2</sup>

**DEPARTMENT(S):** Crop and Soil Sciences<sup>1</sup>  
Entomology and Plant Pathology<sup>2</sup>  
Biological and Agricultural Engineering<sup>3</sup>

**REPORT:**

Approximately 60 trials were conducted during 2016 at the Peanut Belt Research Station, the Upper Coastal Plain Research Station, the Border Belt Tobacco Research Station, and at on-farm locations in Bertie, Washington, Martin, and Johnston counties to compare a range of production and pest management practices. Experiments included: peanut response to inoculants; evaluation of planting dates; comparison of thrips management programs; comparison of timing and sequence of applications of Apogee; peanut response to diflufenzapyr to eliminate flowering late in the season; peanut response to Quick-Sol and other commercial plant health products; weed management with non-registered preemergence and postemergence herbicides that are may be used in peanut; comparison of rotation schemes; and corn rootworm control with Prevathon. Results from these trials will be provided to Cooperative Extension Service agents, farmers and others in agribusiness.

Eight objectives were proposed in the activities of this grant. A summary of results from 2016 is provided for each objective. While yield data for some of the trials are still being processed, key results from these experiments will be included in various chapters of 2017 *Peanut Information* and will be presented during county production meetings in February 2017 and at in-service Cooperative Extension Service agent training sessions. Results will also be included in articles written for *V-C Peanut News* and distributed in the form of *Peanut Notes*.

**Objective 1. To develop solutions to agronomic issues associated with peanut production in North Carolina.** Seven experiments were conducted to compare commercially available and experimental inoculants. Results from these experiments will be used to help farmers make decisions on inoculant selection and will help manufacturers of inoculants develop more effective strains for North Carolina conditions. A cost analysis of inoculants in the new peanut fields and fields with frequent rotations of peanut is provided in 2017 *Peanut Information*. Five experiments were conducted to determine peanut response to Apogee applied once, twice or three times with applications spaced 2 weeks apart. Multiple sprays were more effective in establishing row visibility; yield data from 2016 have not been analyzed but will be added to comprehensive data set to determine economic value of Apogee with respect to application to the variety Bailey. No difference in response of the varieties Wynne and Sullivan to Apogee was observed in single and twin row planting patterns. Quick-Sol did not affect peanut yield in 4 trials. A digging date trial was

conducted at Lewiston with Bailey, Sullivan, and Wynne planted in mid-May. Sullivan yielded higher than Bailey and Bailey yielded higher than Wynne. There was no difference in yield response based on seeding rates regardless of variety. As expected, digging early resulted in lower yield and delaying digging past optimum maturity resulted in pod shed and substantial yield loss. There was no difference in variety response to digging date.

**Objective 2. To cooperate with the plant pathologist, entomologist, and plant breeder at NCSU to refine IPM strategies for peanut in North Carolina.** Six experiments were conducted in cooperation with Drs. Brandenburg to compare a range of in-furrow products both with and without foliar applications of insecticides in some cases. Velum Total and Admire provided comparable control of thrips compared with Thimet. A major emphasis of research in 2016 was to determine if Prevathon controls southern corn rootworm as well as Lorsban. Fifteen trials were conducted to compare these treatments along with a non-treated control. Samples are still being processed at this time with results presented at county meetings and in *Peanut Notes* sent to agents for distribution to farmers. Experiments conducted for the past 4 years was completed in 2016 and included 3 planting dates and either insecticide programs for thrips or seed treatments and thrips control programs. Results have been included in *2017 Peanut Information*.

**Objective 3. To conduct appropriate research to develop weed management strategies for traditional and herbicide resistant weeds in peanut in North Carolina.** Four experiments were conducted to compare herbicides that may serve as viable alternatives to those currently used in peanut, especially to control Palmer amaranth and other resistant weeds. The herbicides Zidua and Anthem Flex were compared in multiple experiments. While these herbicides showed promise, they generally did not control the entire weed spectrum present. Results from these trials will be used to formulate strategies that control a broad spectrum of weeds in peanut. Over 100 samples of Palmer amaranth were collected from the North Carolina coastal plain during fall 2016. These samples will be tested for resistance and/or elevated tolerance to PPO-inhibiting herbicides.

**Objective 4. To continue rotation and tillage trials in order to develop more effective cropping systems.** Experiments have been in place at two locations since 1997 to compare cropping systems that include various rotations, tillage systems, and pest management inputs. Two experiments were conducted to determine peanut yield after farmers previously transitioned out of peanut-based cropping systems, then to corn/wheat/soybean systems and now back to peanut. In other experiments, peanut responded similarly to rotations containing two years of corn, two years of grain sorghum, and two years of cotton. Other rotations with a similar impact on peanut included corn or grain sorghum followed by cotton. Long-term tillage and rotation experiments are still in place at two locations as are rotations with sod-based systems. Peanut was a focus of 3 of these trials in 2016.

**Objective 5. To determine the feasibility of double-cropping peanut and other crops with wheat.** This experiment in 2016 was a repeat of work during 2013-2015. This trial will be conducted again in 2017 with an economic analyses performed in cooperation with Dr. Blake Brown to determine what commodity prices have to be in place to make double cropping peanut with wheat a feasible alternative to soybean and grain sorghum. Peanut yield in the double-crop system was lower than yield for May plantings in 3 of 4 seasons. However, yield differed when comparing planting dates of early and late May, although peanut response to planting date in May was inconsistent.

**Objective 6. To determine yield and economics of seeding rates in twin and single rows with commercially available varieties.** A new planter was purchased during 2015 with support from the NCPGA to allow comparison of twin and single rows with new varieties. One experiment was conducted during 2016 at the Peanut Belt Research Station to compare yield when the variety Bailey was planted in both twin and single row planting. A second experiment was conducted with seeding rates and the varieties Bailey, Sullivan and Wynne in twin and single row patterns. In one trial seeding rate had no impact on yield but yield was lower in twin rows compared with single rows regardless of variety. It is suspected that travel lanes for fungicide application disproportionately affected peanut vines in the twin tow pattern in a negative way. Only 12 rows are sprayed with research station equipment and the cumulative impact of traffic may have damaged peanut in twin rows more than peanut in single rows.

**Objective 7. Assisting Cooperative Extension agents with pod maturity clinics.** Two opportunities were provided to agents to enhance their skills with pod blasting techniques and interpretation of results.

**Objective 8. Enhancing Cooperative Extension Service agent expertise in managing peanut.** Weed control plots were established at the Upper Coastal Plain Research Station to allow Cooperative Extension agents to identify weeds and insect injury and develop recommendations on herbicide and insecticide use. Agents met in early June and made these recommendations for three plots. We then sprayed the plots as recommended by the agents. Agents returned to the plots to view the results of their recommendations.

## IMPACT STATEMENT

Approximately 60 trials were conducted during 2016 to continue developing a database in areas of agronomic production, growth regulation, fertility, digging and harvesting, integrated pest management, weed management, and cropping systems in order to refine recommendations to peanut growers in North Carolina and surrounding states. Results from key trials are included in the annual Cooperative Extension Service *Peanut Information* series, in formal classroom instruction on campus or at county production meetings, *Peanut Notes* sent by e-mail to clientele (210 to date in 2016), popular press articles, the peer-reviewed literature, and field days and plot tours. Results from these projects support the historical mission of the land grant system through research, extension, and teaching programs with emphasis on peanut. Virtually all of the trials are conducted in cooperation with other research and extension faculty at NC State and with other partnering institutions including NCDA&CS, Virginia Tech, Clemson University, and the University of Georgia.