

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

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

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**REPORT:**

**Abstract**

Trials were conducted during 2013 to continue developing a database in areas of agronomic production, growth regulation, digging and harvesting, integrated pest management, weed management, and cropping systems in order to refine recommendations for peanut growers in North Carolina and surrounding states. Results are often included in the annual Cooperative Extension Service Peanut Information series, formal classroom instruction on campus or at county production meetings, newsletters and popular press articles, and the peer-reviewed literature. Results from these projects support the historical mission of the land grant system through research, extension, and teaching programs.

**Summary:**

Research was conducted during 2013 at the Peanut Belt Research Station, the Upper Coastal Plain Research Station, the Border Belt Tobacco Research Station, and at on-farm locations in Johnston, Northampton, and Martin counties to compare a range of production and pest management practices. Experiments included: peanut response to inoculants and nitrogen rates in new and rotated fields; evaluation of planting and digging dates; comparison of thrips management programs; comparison of runner and Virginia market types; determining variety response to Apogee and other plant growth regulators; weed management with non-registered preemergence and postemergence herbicides that are on track for use in peanut; comparison of disease management programs; rotation schemes; and compatibility of pesticides and other products used in peanut. Results from these experiments are provided to Cooperative Extension Service agents, farmers and others in agribusiness.

**Objectives:**

1. To develop solutions to agronomic issues associated with peanut production in North Carolina.
2. To cooperate with the plant pathologist, entomologist, and plant breeder at NCSU to refine IPM strategies for peanut in North Carolina.
3. To conduct appropriate research to develop weed management strategies for traditional and herbicide resistant weeds in peanut in North Carolina.
4. To continue rotation and tillage trials in order to develop more effective cropping systems.

5. To determine the feasibility of double-cropping peanut and other crops with wheat.
6. Assisting Cooperative Extension agents with pod maturity clinics

**Procedures:**

Approximately 60 trials were conducted at various research stations and on-farm sites in North Carolina to address the topics listed in the six stated objectives. The experiments often were conducted at more than one location and included appropriate controls and commercial standards, with data analyzed statistically prior to making recommendations. Cooperative Extension Service agents and others, including farmers, were given the opportunity to observe these experiments.

**Results and Discussion:**

Six objectives were proposed in the activities of this grant. A summary of results from 2013 is provided for each objective. While yield data are still being processed, key results from these experiments will be included in various chapters of *2014 Peanut Information* and will be presented during county production meetings in February 2014 and at in-service Cooperative Extension Service agent training sessions.

Objective 1. To develop solutions to agronomic issues associated with peanut production in North Carolina. Ten experiments were conducted to compare commercially available and experimental inoculants. Although yield data are still being processed, results from these experiments will be used to help growers make decisions on inoculant selection and will help manufacturers of inoculants develop more effective strains for North Carolina conditions. Two experiments with both runner market types and Virginia market types were conducted with varieties being used commercially in North Carolina. These experiments included 2 digging dates (Virginia market types) and 4 digging dates (runner market types). Results from these experiments are designed to assist growers in variety selection and understanding when these varieties most likely will reach optimum maturity. Six experiments were conducted to determine peanut response to Apogee under differing cultural practices. In one experiment peanut was planted in early, mid and late May with Apogee applied at the appropriate timing. Four digging dates were included to determine when peanut will respond favorably to Apogee and to see if planting date influences response. Other trials with Apogee included digging date factors only or a comparison with a generic prohexadione calcium formulation marketed in other commodities. The experiments mentioned here were conducted at Lewiston-Woodville, Rocky Mount, Whiteville, and in Wilson County. While much of the data are being processed, results of key experiments will be included in the production section of *2014 Peanut Information* and will be widely available to growers.

Objective 2. To cooperate with the plant pathologist, entomologist, and plant breeder at NCSU to refine IPM strategies for peanut in North Carolina. A major emphasis of research during 2013 was comparison of strategies to manage thrips early in the season. Twelve experiments were

conducted in cooperation with Dr. Brandenburg to compare a range of in-furrow products and seed treatments, both with and without foliar applications of insecticides in some cases. Additional trials were conducted to compare peanut response to insecticides when different planting dates were included. A final set of experiments included combinations of herbicides and insecticide applied when peanuts were healthy or had been damaged by thrips feeding. Results from these experiments will be summarized in *2014 Peanut Information* and will be presented at peanut meetings in February. Preliminary data indicate that Admire Pro and Temik performed equally well and slightly better than Orthene or Thimet applied in the seed furrow. Cruiser Maxx applied as a seed treatment did not control thrips as well as the other in-furrow insecticides in most experiments. Although not the case in all experiments, damage from thrips feeding following Cruiser Maxx alone was sufficient to lower yields compared with the more effective in-furrow treatments. Orthene applied early postemergence was effective in controlling thrips in many cases and when following in-furrow treatments, resulted in similar control and yields among all combinations. The benefit of applying Fontelis and Omega 500 at night compared with applications during the day to control Sclerotinia blight was compared at one location. These data are still being processed at the time of this report. A trial was also conducted to determine southern corn rootworm damage and peanut yield following no irrigation, overhead sprinkler irrigation and sub-surface drip irrigation. Data from this trial were also being processed at the time of this report.

Objective 3. To conduct appropriate research to develop weed management strategies for traditional and herbicide resistant weeds in peanut in North Carolina. Twelve 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 Brake, Fierce, Zidua, and Warrant were compared in multiple experiments. While these herbicides showed promise as, 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. The impact of planting date on peanut response to Fierce and Valor SX was compared at one location. Peanut responded the same to both Fierce and Valor SX. When applied at 6 oz/acre, a rate 3 times that recommended in the V-C region, yield was lower in some but not all instances. When applied at 3 oz/acre, a rate slightly higher than the recommended rate for the region, peanut recovered from early season injury. As noted previously, rainfall pattern within the first two weeks after planting affected injury potential. The greatest injury was noted when rainfall did not occur until peanut were beginning to emerge. Temperature appeared to have little impact on injury from these herbicides. Peanut tolerance to Brake and Zidua was adequate and the manufacturers of these companies most likely will pursue labels for peanut. Benefits of ET compared with other early season herbicides were compared, and effectiveness of both ET and Aim to manage late-season weed escapes was determined. Tolerance of ET is still a question when applied late in the season while peanut injury from Aim appeared to be lower than ET in 2013. Additional research is needed to determine in these herbicides can be used safely to manage escaped weeds. The herbicide ET provided good control of morningglory when applied early in the season, often when mixed with other postemergence herbicides. ET will not be a replacement for any herbicide currently used for early postemergence applications, although it

can be used to augment current approaches to weed management. A series of experiments was conducted to determine peanut response to mixtures of postemergence herbicides, residual herbicides and insecticides. As expected, chloroacetamide herbicides increased injury in several instances. There appeared to be no increase in injury when Orthene was included, and in cases where thrips were not controlled, Orthene increased the rate of recovery from early season injury from these herbicide combinations.

Objective 4. To continue rotation and tillage trials in order to develop more effective cropping systems. Experiments have been in place at three 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. Although peanut yields varied considerably based on the number of times peanut were in the rotation, after six years of corn (3 years), wheat/soybean (2 years), and cotton (one year), peanut yield was the same irrespective of response prior to transition to grain crops out of peanut-based cropping systems. These results suggest that the negative impact of short rotations with peanut can be negated when growers are out of peanuts for six years. Research was also conducted to determine if peanut response the same to two years of grain sorghum, two years of corn or two years of cotton prior to planting peanut. Peanut yield was the same following two years of corn, cotton, or grain sorghum. Results from long-term rotation and tillage experiments that have been in place since 1999 and 2000 are currently being processed. Results from sod-based experiments indicate that peanut yield can be increased in some instances when following fescue that was terminated four years earlier. A similar response was noted for corn.

Objective 5. To determine the feasibility of double-cropping peanut and other crops with wheat. Although cotton, peanut, grain sorghum, and soybean following wheat have not been harvested, yield of peanut and cotton most likely will be considerably lower when following wheat compared to earlier plantings in May. This trial will be conducted for several more years with an economic analyses performed 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. Results from 2013 suggest that planting peanut and cotton after wheat is extremely risky.

Objective 6. Assisting Cooperative Extension agents with pod maturity clinics. Dewayne Johnson assisted many Cooperative Extension agents with pod maturity clinics in their counties, especially county agents with limited experience with this process. Two trips to each of 8 counties were made during early to late September, with approximately 400 samples processed. Given growers can gain up to 500 pounds/acre or \$150/acre at current prices by digging on time versus digging one week early, assistance in determining peanut maturity by Dewayne had a direct and positive impact on farm income.

## IMPACT STATEMENT

Research was conducted during 2013 at the Peanut Belt Research Station, the Upper Coastal Plain Research Station, the Border Belt Tobacco Research Station, and at on-farm locations in Johnston, Northampton, and Martin counties to compare a range of production and pest management practices. Experiments included: peanut response to inoculants and nitrogen rates in new and rotated fields; evaluation of planting and digging dates; comparison of thrips management programs; comparison of runner and Virginia market types; determining variety response to Apogee and other plant growth regulators; weed management with non-registered preemergence and postemergence herbicides that are on track for use in peanut; comparison of disease management programs; rotation schemes; and compatibility of pesticides and other products used in peanut. Results from these experiments are provided to Cooperative Extension Service agents, farmers and others in agribusiness.

