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I. Abstract.

A wide range of production and pest management trials (approximately 60 total) were conducted in peanut during 2011 to continue developing a database in areas of weed management, agronomic production, plant growth regulation, harvesting, and integrated pest management. Results from these experiments are used to refine recommendations for peanut growers in North Carolina and surrounding states and are often included in the *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.

Project Title:

Optimizing Peanut Production and Pest Management through Applied Research

Project Investigator(s):

David Jordan, Department of Crop Science, North Carolina State University, Raleigh

Summary:

Research was conducted during 2011 at numerous locations in the Coastal Plain of North Carolina to evaluate a range of production and pest management practices for peanut. No difference in thrips control with the in-furrow insecticide phorate was noted for the varieties Bailey, Sugg, CHAMPS, Gregory, and VA 98R. Trials designed to compare variety response to tillage system at different planting dates revealed that in most cases peanut response to these variables will be independent. Results from a planting and digging date trial revealed that both CHAMPS and Perry planted in early or late May yielded more than plantings in June. These data, combined with digging date trials are being used to refine thermal and moisture parameters for estimating when to dig peanuts. The plant growth regulators Apogee and Rescue had little to no effect on peanut yield. The impact of timing of glufosinate drift on peanut was documented at two locations, demonstrating risks of drift from applications to other crops that are glufosinate resistant. Peanut yield following rotations including sweet potato, snap beans, and sage differed little compared with yield following corn or cotton. Research was also conducted to compare efficacy of commercial and experimental inoculants that contain *Bradyrhizobia* as well as comparing nitrogen sources and rates needed to correct nitrogen deficiencies. Peanut yield increased dramatically when irrigated by sub-surface treatment irrespective of fungicide program or tillage system. Digging using RTK equipment increased yield over manual digging. Strategies to manage herbicide-resistant and non-resistant Palmer amaranth and common ragweed in peanut developed and the herbicides Warrant, Spartan Charge, and Fierce included in the trials. Interactions of tank mixtures that included multiple pesticides were compared and will be used to develop recommendations.

II. Main Body of Report

Project Title:

Optimizing Peanut Production and Pest Management through Applied

Project Investigator(s):

David Jordan, **Department of Crop Science**, North Carolina State University, Raleigh

Cooperating Personnel:

Drs. Rick Brandenburg, Barbara Shew, and Gary Roberson

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 cooperate with faculty in the Department of Agricultural Engineering to improve harvest efficiency.
5. To continue rotation and tillage trials in order to develop more effective cropping systems.

Procedures:

Research was conducted at various research stations and on-farm sites in North Carolina to address the topics listed in the five objectives. Approximately 60 replicated trials were conducted. In addition to research findings, Cooperative Extension agents and others, including farmers, were given the opportunity to observe these experiments. The experiments included appropriate controls and commercial standards with data analyzed statistically prior to making recommendations.

Results and Discussion:

Research was conducted in North Carolina during 2011 in Bertie (Peanut Belt Research Station), Columbus (Border Belt Research Station), Duplin, Wake, Harnett, and Edgecombe (Upper Coastal Plain Research Station) counties to evaluate a range of production and pest management practices for peanut. Trials were conducted to evaluate performance of varieties, in particular the performance of the new releases Bailey and Sugg compared with CHAMPS, Gregory, and VA 98R and the runner market type cultivar Florida 07 when planted with or without phorate in the seed furrow. No difference in thrips damage was noted when comparing cultivars although

phorate reduced thrips damage significantly. Experiments were also conducted in conventional and reduced tillage systems at Lewiston to determine interactions of planting date and variety selection. One experiment at Lewiston was conducted with CHAMPS and Perry planted early and late May and early June with digging dates of mid and late September and early and mid-October. The goal of this trial research is to better define phases of crop development and improve predictions of crop maturity. Yield data for many of these variety trials are reported in *2012 Peanut Information*. These data, combined with digging trials conducted for many years, are being used to refine thermal and moisture parameters for estimating the optimum digging date. The plant growth regulators Apogee and Rescue as well as several micronutrient combinations were evaluated in trials at several locations. These products had little to no effect on peanut yield. The impact of timing of glufosinate drift on peanut and other crops was documented at two locations. Long-term rotation experiments were maintained at three research stations, and a summary of yield data from these trials through 2011 were presented in *2012 Peanut Information*. Peanut yield following rotations including sweet potato, snap beans, and sage was compared at one location. Research was also conducted to compare efficacy of commercial and experimental inoculants that contain *Bradyrhizobia* as well as comparing nitrogen sources and rates needed to correct nitrogen deficiencies. The interaction of irrigation system (subsurface drip irrigation vs. no irrigation) and tillage system (strip tillage vs. conventional tillage) was compared in one experiment when peanut was treated with various fungicide programs. Peanut yield increased dramatically when irrigated irrespective of fungicide program or tillage system. Digging using RTK equipment increased yield over manual digging.

A wide range of pest management trials were conducted in peanut during 2011. These trials included developing strategies to manage herbicide-resistant and non-resistant Palmer amaranth and common ragweed in peanut and defining interactions of tank mixtures that included up to five components in the mixture. Results from these experiments will be included in the compatibility guide developed for peanut.

Results from these experiments are used to refine recommendations for peanut growers in North Carolina and surrounding states. Data from many of these trials were presented in *2012 Peanut Information* and in formal classroom instruction on campus or at county production meetings, appear in newsletters and popular press articles, and are published in the peer-reviewed literature. Results from these projects support the historical mission of the land grant system through research, extension, and teaching programs.