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I. Abstract.

Trials were conducted during 2012 to continue developing a database in areas of weed management, agronomic production, growth regulation, harvesting, and integrated pest management 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.

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 2012 at the Peanut Belt Research Station, the Upper Coastal Plain Research Station, the Border Belt Tobacco Research Station, and at on-farm locations in Bladen and Johnston 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.

II. Main Body of Report

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

Cooperating Personnel:

Drs. Rick Brandenburg, Barbara Shew, Tom Isleib, 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 peanut 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:

Approximately 60 trials were conducted at various research stations and on-farm sites in North Carolina to address the topics listed in the five 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:

Research was conducted in North Carolina during 2012 in Bertie (Peanut Belt Research Station), Columbus (Border Belt Research Station), Edgecombe (Upper Coastal Plain Research Station), Bladen, and Johnston counties to evaluate a range of production and pest management practices for peanut. Performance of varieties, in particular the performance of Bailey and Sugg

was compared with the Virginia type cultivars CHAMPS, Gregory, Phillips, and Spain and commercially available runner types. One experiment at Lewiston was conducted with CHAMPS and Perry planted during early and late May or early June with digging dates of mid and late September and early and mid-October. The goal of this research was to better define phases of crop development and improve predictions of crop maturity. Yield data for these two varieties are reported in *2013 Peanut Information* and include a summary over the past four years. Results demonstrated that planting in May, either early or late, will result in peanut yields being higher than yields for peanut planted in early June, and response varied little for the earliest maturing cultivar CHAMPS and the latest maturing cultivar Perry. 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 regulator Apogee and micronutrient combinations were evaluated in trials at several locations. These products had little to no effect on peanut yield. This was surprising for Apogee but not so for the micronutrient combinations. Long-term rotation experiments were maintained at three research stations, and a summary of yield data from these trials through 2012 will be presented in *2013 Peanut Information*. During 2013, six long-term experiments will have peanut planted in all plots. Results from the 2013 trials will allow growers to compare tillage and rotational effects resulting from many years of crop production. Research was conducted to compare efficacy of commercial and experimental inoculants that contain *Bradyrhizobia*. Results from these trials will be beneficial in helping companies identify new strains of bacteria that may improve consistency of inoculant performance. Peanut response to different nitrogen sources and rates required to correct nitrogen deficiencies was determined. A rate of 120 lbs actual nitrogen/acre is needed to obtain yields equivalent to inoculated peanut if a nitrogen deficiency occurs. Peanut response to irrigation system (subsurface drip irrigation, overhead sprinkler irrigation, and no irrigation) produced either with or without Lorsban was compared. Unfortunately, excessive rainfall during the middle and latter half of the season minimized ability to determine differences among treatments.

A wide range of pest management trials were conducted in peanut during 2012. 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. Results from these experiments will be included in a new chapter in the *Peanut Information* series on compatibility of products used in peanut. Several new herbicides including Fierce, Warrant, and Kixor were compared at two locations. These herbicides have a fit in comprehensive weed management strategies, especially where Palmer amaranth is present. In one set of trials, no difference in thrips damage was noted when comparing cultivars, although phorate reduced thrips damage significantly across all cultivars. A series of trials was conducted to compare thrips control programs across environments and different levels of thrips infestation. Results from 2012 indicated that Cruiser Maxx as a seed treatment performed inconsistently compared with Thimet, Temik, Admire Pro, and Orthene applied in the seed furrow at planting. Admire Pro did not adversely affect inoculant performance. A trial comparing disease management programs and digging dates was conducted. Data from 2012 are currently being added to a more comprehensive data set to determine when early digging is advisable based on presence of significant leaf spot in the canopy.

In summary, results from these experiments are used to refine recommendations for peanut growers in North Carolina and surrounding states. Data from many of these trials are presented in *2013 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.