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

TITLE: Optimizing Peanut Production and Pest Management Through Applied Research and Extension Activities

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REPORT:

SUMMARY:

Forty-five trials were conducted during 2020 in North Carolina at the Peanut Belt Research Station, the Upper Coastal Plain Research Station, and the Border Belt Tobacco Research Station and with Cooperative Extension Service agents to compare a range of production and pest management practices. Experiments included: peanut response to inoculants; variety response to planting date, digging date, and prohexadione calcium; comparison of thrips management programs; production and pest management with different nozzles used throughout the growing season; yield of commercially-available Virginia, Runner, Spanish, and Valencia market types; influence of ground speed when digging in response to prohexadione calcium; peanut and weed response to herbicide programs; and leaf spot control and peanut yield with fungicide programs including Miravis and other recently released fungicides. Rotation trials that include a range of cropping sequences, tillage systems, and fescue were maintained at two research stations were maintained.

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.

Results from these trials are provided to NC Sate Extension agents, farmers and others in agribusiness. In addition, results from key trials are included in the annual NC State Extension Peanut Information series (AG-331), formal classroom instruction on campus or at county production meetings, Peanut Notes loaded on the NCCES portal (https://peanut.ces.ncsu.edu/) (251 to date in 2020), popular press articles (V-C Peanut News, Peanut Grower magazine), the peer-reviewed literature (Peanut Science, Journal of Crop, Forage, and Turfgrass Management, Weed Science), and at field days (combined 68th Annual North Carolina Peanut Field Day and 9th Southeastern North Carolina Peanut Field Day).
RESULTS AND DISCUSSION:

Eight objectives were proposed in the activities of this grant. A summary of results from 2020 is provided for each objective. Yield and quality data for many of these trials are still being processed at the time of writing this report. Final results will be included in various chapters of 2020 Peanut Information and will be presented during county production meetings in February 2020 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. The following trials were conducted during 2020 with the number of times the trial was conducted in parenthesis (13 trials in total).

Peanut Variety Response to Digging Date (2)
Peanut Variety Response to Planting Date (1)
Yield of Virginia, Runner, and Valencia Market Types (1)
Peanut Response to Drift Rates of Dicamba (1)
Influence of Rye Cover Crop and Tillage on Peanut Yield (1)
Peanut Response to Apogee and Digging Speed (2)
Peanut Response to Digging Speed (5)

Peanut variety response to digging date was similar. The variety Walton yielded higher than the varieties Bailey II, Emery, and Sullivan in one experiment. Planting peanut in either early or mid-May resulted in higher yields than planting in late-May, mid-June or late-June. Peanut yielded the lowest when planted in early July; planting in late-May resulted in higher yields than planting in mid-June. These results are in contrast to findings in 2019 where peanut planted in early June yielded the highest. The runner market types TUFRunner 295 and TUFRunner 511 yielded as well as Virginia market types. Both runner and Virginia market types yielded higher than Spanish or Valencia market types. Only minor differences were noted for pod yield when peanut was dug at ground speeds between 2 and 4 mph.

Objective 2. To cooperate with the plant pathologist, entomologist, and plant breeder at NCSU to refine IPM strategies for peanut in North Carolina. The following trials were conducted during 2020 with the number of times the trial was conducted in parenthesis (14 trials in total).

Thrips Control with In-furrow and Postemergence Systemic Insecticides (4)
Leaf Spot Control with Fungicides Applied Alone or with Sulfur (2)
Duration of Leaf Spot Control with Miravis (3)
Timing of Miravis Application (2)
Applying Chlorothalonil with Miravis to Minimize Evolved Resistance (2)
Season-Long Pest Management using TTI and Flat Fan Nozzles (1)

Leaf spot control was not improved when sulfur was applied with Provost or Abound. However, under 2020 conditions a program of sulfur alone controlled disease well enough to protect yield. Leaf spot control and peanut yield were similar and greater than non-treated peanut when Miravis plus either Elatus or Convoy were initiated at different timings as a single application or when the follow up fungicide application was made 3, 4, or 5 weeks after the initial Miravis spray. Peanut yield was similar when all pesticides and micronutrients were applied throughout the season using nozzles delivering large droplets (TTI nozzles) or nozzles delivering smaller droplets (regular flat fan nozzles).

Objective 3. To conduct appropriate research to develop weed management strategies for traditional and herbicide resistant weeds in peanut in North Carolina. The following trials were
conducted during 2020 with the number of times the trial was conducted in parenthesis (11 trials in total).

Evaluations of Anthem Flex and other Residual Herbicides (6) Compatibility of Clethodim Applied with Miravis and Residual Herbicides (5)

Palmer amaranth and common ragweed control was similar when paraquat plus Basagran were applied with Anthem Flex, Dual Magnum, and Zidua. Miravis applied with Elatus or Convoy did not adversely affect grass control with clethodim. Additionally, Anthem Flex, Dual Magnum, or Zidua did not affect grass control by clethodim or Cadre.

**Objective 4.** To continue rotation and tillage trials in order to develop more effective cropping systems. The following trials were maintained during 2020 with the number of locations for each trial is parenthesis (6 trials in total). Peanuts were not included in these trials during 2020.

Determining Peanut Yield in Long-term Cropping System Trials with Corn, Cotton, Peanut, and Soybean (2) Determining Peanut Yield in Tillage and Rotation Trials Including Corn, Cotton, and Peanut (2) Determining Peanut Yield in Cropping System Trials Including Tall Fescue and Agronomic Crops (2)

Cotton or corn was planted in these trials during 2020. Peanuts will be planted in all plots during 2021 to determine if Velum Total suppresses nematodes. In 2019, Velum Total had no effect on root knot nematode in peanut in four trials.

**Objective 5.** To determine yield and economics of seeding rates in twin and single rows with commercially available varieties.

The experiment included 3 levels of variety (Bailey II, Emery, and Sullivan), two levels of plant population (4 and 6 plants per foot of row), and two levels of Apogee (with and without two applications). Similar to research from 2017-2019, no major difference in peanut yield was noted when comparing row patterns, varieties, and prohexadione calcium.

**Objective 6.** Assisting NC State Extension agents with pod maturity clinics.

Due to COVID-19 restrictions, in-person training sessions and assisting with pod maturity clinics was limited. Digital images of crop maturation and heat unit accumulation from several trials and locations across North Carolina during August, September and October were provided to agents and posted as *Peanut Notes* on the Extension portal for peanuts.

**Objective 7.** Enhancing NC State Extension agent expertise in managing peanut.

Three agent training sessions occurred during 2020. One in-person session was held in January in combination with cotton. Two virtual sessions were held in late-summer to address disease management issues.
The following peer-reviewed articles in the scientific literature as well as abstracts and proceedings at professional conferences linked to this project in North Carolina are provided below for 2020. Extension publications linked to this project in North Carolina are also provided.

**Peer-reviewed Articles (12)**


Abstracts and Proceedings (4)


Extension Publications (13)


IMPACT STATEMENT

In addition to the publications listed above, results from these projects support the historical mission of the land grant system through research, extension, and academic programs with emphasis on peanut. And, results from these trials are provided to NC State Extension agents, farmers and others in agribusiness. In addition, results from key trials are included in the annual NC State Extension *Peanut Information* series, formal classroom instruction on campus or at county production meetings, Peanut Notes loaded on the NCCES portal (https://peanut.ces.ncsu.edu/) (251 to date in 2020), popular press articles (*V-C Peanut News, Peanut Grower magazine*), the peer-reviewed literature (*Peanut Science, Journal of Crop, Forage, and Turfgrass Management, Weed Science, Plant Disease*), and at field days (combined *68th Annual North Carolina Peanut Field Day* and *9th Southeastern North Carolina Peanut Field Day*).