

2019 Soybean Extension Specialist Research Portfolio

Soybean Agronomic Extension Team
Rachel Vann, Soybean Extension Specialist
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MaKayla Gross, Graduate Student
2-3 Undergraduate Employees
County Extension Agents

Project 1: County Based Mini-Proposals/Agent Training

PI: R. Vann

Location County Based Mini-Proposals: Statewide

Location Agent Training: Unknown

The goals of this proposal are two-fold. One: Provide our County Extension Agents with the financial resources to conduct County based activities to showcase the diverse and impactful applied soybean research that has been conducted across North Carolina. Two: Provide support for hosting an annual Soybean Agent Training where agents can see field demonstrations and interface with diverse soybean experts on the fundamentals and the latest research. The NC State Soybean Extension Specialist will solicit mini-proposals from County Extension Agents across North Carolina in January each year for up to \$1,000 per proposal. A committee consisting of the Soybean Extension team at NC State and the North Carolina Soybean Producers Association Research Coordinator will review the mini-proposals and decide which proposals will be funded. Once funded, these mini-proposals will allow for agent driven soybean research and extension efforts at the County level. An important goal of the NC State Soybean Extension Team is to ensure our County Extension Agents are trained with the information and skillset needed to most effectively serve our clientele across the state. One way to make sure agents have the most up-to-date production information is by hosting an annual Soybean Agent Training where agents can see field demonstrations and interface with diverse soybean experts. Our goal is that an advanced/management focused soybean agent training will be offered annually, and that a basic soybean agent training will be offered bi-annually. Installation and execution of the demonstration plots required for adequate training opportunities requires significant technical effort. This proposal also seeks to provide some funding for the Soybean Extension Program technical staff to execute demonstration plots for the Soybean Agent Training.

Project 2: Foliar Nutrient Feeding

PI: R. Vann

Location: Unknown

Through interacting with County Extension Agents and growers across the state this summer, it is evident that many growers are using foliar nutrients to feed their soybeans. What is unknown is how these products impact soybean yield in North Carolina across our various soil types with drastically different nutrient supplying capacities. Various products and ideal application timing to maximize soybean yield requires investigation. Studies will be conducted to assess the value of foliar feeding soybeans across various regions in North Carolina (Blacklands, Coastal Plain, Piedmont). Grower feedback is solicited on the most impactful nutrients/products with which to concentrate our efforts. Results will be disseminated to various North Carolina stakeholders at grower meetings, field days, via electronic media, and through extension publications.

Project 3: Does early planting date justify fungicidal seed treatment in soybeans?

PI: R. Vann, Foote, Thiessen

Location: Unknown, although maximizes resources to be co-located with project 5

Some North Carolina producers are starting to shift soybean planting earlier into the spring due to success with early maturing soybean varieties. Most of the fungicide seed treatment work conducted by the Soybean Extension Program has been done with soybeans planted from mid-May through mid-June. How would our results differ when considering planting soybeans earlier in the season? The proposed research seeks to answer this question. We will evaluate ~10 fungicidal soybean seed treatments entered by prominent agricultural companies across four planting dates ranging from early April through mid-May. Economic analyses will occur considering both fungicidal seed treatment cost and impact on soybean yield. Results will be disseminated to various North Carolina stakeholders at grower meetings, field days, via electronic media, and through extension publications.

Project 4: NC On-Farm Soybean Variety Trial Program

PI: R. Vann, Ryan Heiniger, Baucom

Location: Statewide

Soybean variety selection is a primary inquiry of soybean growers interacting with NC State Soybean Extension. Selecting the correct variety based on soil type, production practices, and disease resistance is critical to ensure growers maximize yield and profit. Our NC State Official Variety Testing (OVT) program evaluates many soybean varieties each year (>230 in 2018). This is an excellent resource for our growers, however due to volume of soybean varieties evaluated, the test can only be conducted at 5-6 sites across the state each year. To provide more

local data, some County Extension Agents have been conducting their own variety strip trials. Our goal with this NC On-Farm Soybean Variety Trial program is to provide the structure for wide-reaching, on-farm soybean variety trials across the state to allow for more robust data collection and to ensure the on-farm soybean trial program compliments the results gleaned from NC State OVT. This program will be County Extension Agent driven with support from NC State OVT and the NC State Soybean Extension Program. These trials will be planted and harvested using grower equipment. The participating agents will select a maturity group range for their soybean variety tests (III and IV, V and VI, or >VI). Trials will be REPLICATED at both the county and regional level to allow for data presentation at both the county and regional level. Results obtained from this program will enable growers throughout the state to access local, soybean variety data to compliment the data generated from NC State OVT, therefore expanding resources provided by NC State Extension for soybean variety selection.

Project 5: Maximizing soybean yield through maturity group and population selection based on soybean planting date

PI: R. Vann

Location: Primarily co-located with NC OVT Soybean Trials

A recent verbal survey of North Carolina soybean stakeholders indicated three core areas of interest for applied soybean research that include: using planting date to maximize soybean yield, appropriate maturity group selection based on planting date, and population adjustments across diverse planting dates. This project seeks to provide locally generated data on these priority areas. This research will be conducted across North Carolina (5-6 locations/year) for three years in an effort to ask these research questions under diverse environmental conditions. We will target planting soybeans every two-weeks at each location from mid-March through mid-August. At each planting date, one soybean variety from each soybean maturity group (II-VIII) will be planted. Five populations will be tested within each maturity group at each planting date (75,000, 100,000, 125,000, 150,000, 175,000 seeds/acre). Results will be disseminated to various North Carolina stakeholders at grower meetings, field days, via electronic media, and through extension publications.

Project 6: Management of Early Maturing Soybeans in the Carolinas

PI: Gurganus, Wood, Malloy, Hurry, R. Vann, et al.

Location: Unknown

Note: The Soybean Extension Program will do what is needed to make sure this work is replicated across the state

There is a strong interest among growers in both states to learn more about managing early maturing varieties due to their potential to increase soybean yields. If funded, this project

would investigate planting date (May 1, June 1, July 1) and seeding rates (60,000-200,000 seeds/acre) of maturity group 3 and 4 soybeans at several environments in North and South Carolina. Data will be collected on soybean yield and quality. Results will be distributed through the Extension system in each state.

Project 7: Uncovering winter crop effect on soybean production in North Carolina

PI: R. Vann, Jordan, Woodley

GRADUATE STUDENT PROJECT: MaKayla Gross

Location: Central Crops Research Station (Clayton, NC), Piedmont Research Station (Salisbury, NC), Upper Coastal Plain Research Station (Rocky Mount, NC)

North Carolina growers can effectively produce various winter crops prior to their soybean crop. The appropriate soybean maturity group selection following various winter crops requires further investigation and the effects of various winter crops on diverse aspects of soybean production have not been comprehensively investigated in North Carolina. This study will be conducted from October 2018-November 2020 at three research stations in North Carolina including the Central Crops Research Station in Clayton, NC, the Upper Coastal Plain Research Station in Rocky Mount, NC, and the Piedmont Research Station in Salisbury, NC. Soybeans following five winter crop scenarios (wheat for grain, rapeseed for grain, pea for grain, cereal rye as a cover crop, and cereal rye/crimson clover as a cover crop mixture) will be compared to fallow. Three soybean maturity groups will be evaluated behind each winter crop scenario (MG III, V, VII). Data collected will include: soybean emergence, soil moisture, soil temperature, nitrogen availability, disease prevalence, insect prevalence, and soybean yield. Economic analyses will occur on the various winter crop scenario/soybean maturity group combinations. Results will be disseminated to various North Carolina stakeholders at grower meetings, field days, via electronic media, and through extension publications.

Project 8: Optimizing cover crop management to reduce troublesome pests for soybean production in the Southeast

PI: R. Vann, Reisig, Thiessen, Huseth, Everman, Huseth

GRADUATE STUDENT PROJECT: Tristan Morris

Location: Central Crops Research Station (Clayton, NC), Piedmont Research Station (Salisbury, NC), Upper Coastal Plain Research Station (Rocky Mount, NC)

Cover crops have been historically emphasized for their long-term benefits, including soil erosion reduction and increasing soil organic matter; however, there are other short-term, tangible benefits that can be achieved from cover crop use. These short-term benefits may offer an opportunity to help producers diversify pest management approaches. Together, the union of short- and long-term benefits that result from cover crop adoption may improve stability and

resilience of soybean production within intensive row crop agroecosystems. This grant seeks to enhance the sustainability of the soybean production systems in the Southeast by further investigating cover crop management strategies that maximize pest-suppression and agronomic benefits in the subsequent soybean crop. While other projects across the Southeast have investigated various benefits of cover crop use, very few projects have taken a unified, multidisciplinary research approach that is designed to document the linkages between pests and production in a cover crop/soybean system. To address this current knowledge gap, research will be conducted over three consecutive growing seasons on diverse commercial farm operations that incorporate soybean into their rotation throughout North and South Carolina. These operations have been selected to span the wide range of geographic diversity represented in our region. The producers selected to participate and guide this research are high impact growers with extensive cover crop experience who will provide crucial project inputs and results interpretation. Two major focus areas of cover crop research will include: cereal rye management and brassica management. Graduate level students advised by our multidisciplinary team will focus on investigating cereal rye and brassica cover crop management prior to soybean production. While other studies have investigated roller-crimped cover crops in our region, less research effort has been devoted to planting into standing cover crop. The majority of NC and SC soybean producers do not own a roller-crimper and are more likely to plant soybeans into a standing cover crop. For this reason, our management strategies will focus on planting into both green and terminated standing cover crops and comparing this system to planting into rolled cover crop. Contrary to previous work, we will extend traditional agronomic cover crop studies to also examine the pest-suppressive and production benefits of cover crop/soybean production systems. Currently, a large information deficit in our region is the impact of cover crop management on nematode suppression, a large challenge for soybean production in the region. Results from this study will provide foundational information on nematode management with cover crops. Within all trials, the following responses will be investigated: disease and nematode suppression and intensification, insect suppression and intensification, weed suppression and intensification, soil moisture conservation, soybean emergence, and soybean yield. Our multidisciplinary team of research and extension personnel is uniquely positioned to investigate these research topics and efficiently communicate recommendations on cover crop management to soybean producers in the region via multiple formats. These formats include Field Days, Extension Meetings, Extension Agent Trainings, Extension publications, social media platforms, academic presentations, and scientific publications.

Other collaborative projects by the larger Soybean Extension Team will be executed in 2019 and offer other opportunities to engage in complimentary on-farm strip trial testing.