VSB FY2021-2022 Funded Projects

Management of three-cornered alfalfa hopper in Virginia soybean

Project Leader: Sally Taylor

Total Budget: $25,000

Total Amount Funded: $25,000

Three-cornered alfalfa hopper infestations are a yearly occurrence in soybeans grown in Virginia's piedmont region causing economic damage. Fields in Virginia's central and coastal regions were likewise damaged in 2020, potentially indicating a pest range expansion. There is a definite need for funding to improve soybean IPM for this pest. The proposed research will take the first steps to characterize infestation timing, yield-damaging potential, insecticide control plans, and cultural control strategies.

Title: Eastern Virginia AREC Soybean Research Support

Project Leader: Dr. Joseph Oakes

Total Budget: $7,500

Total Amount Funded: $7,500

Justification Timeliness of the completion of various tasks that are a part of research programs is very important to their success. Many times, observations such as maturity dates and disease ratings must be done at a certain time or the opportunity will be lost. This project will make a significant contribution to the overall success of the soybean research programs at the Eastern Virginia Agricultural Research and Extension Center (EVAREC), which in turn will benefit soybean producers by providing accurate research-based information to assist them in management of their soybean crop

The conferral of drought tolerance to Virginia Soybeans from growth promoting bacteria

Project Leader: Mark A. Williams

Total Budget: $9,820

Total Amount Funded: $5,000

The need for microbial drought solutions Increases in yield, drought tolerance and disease resistance have been supported over the last many decades through soybean breeding, including molecular genetic transformations. Soybean genetics that support drought tolerance do come with some notable tradeoffs, however. Thus far, growth is not as robust in drought resilient relative to less drought resilient genotypes in years when there is no substantial drying or drought conditions. Hence, microbial inoculants that can support greater growth under both non- or moderate-drought as well as true drought conditions offer a flexible solution to this tradeoff.

Atlantic Soybean Council

Project Leader: Danielle Bauer Farace

Total Budget: $5,000

Total Amount Funded: $2,500

Project Summary: The Atlantic Soybean Council works to identify gaps and duplications in soybean research in Virginia, Maryland, Delaware, Pennsylvania, New Jersey, and the Eastern Region. Once these gaps and duplications are identified, synergies among researchers are created and limited checkoff funding is leveraged for maximum impact

Characterization of Soybean Cyst Nematode and Sudden Death Syndrome Occurrences in Virginia Soybean

Project Leader: David Langston, Professor and Extension Plant Pathologist

Total Budget: $20,000

Total Amount Funded: $18,000

Plant-parasitic nematodes (PPN) cause subtle to severe losses in Virginia soybeans. In some cases, PPN predispose plants to other diseases and cause even more losses such as with sudden death syndrome (SDS). A survey of nematode populations in soybean production areas of Virginia was conducted annually from 2016 to 2019. In this survey, soybean cyst nematode (SCN) has the greatest potential to suppress soybean yield and was identified in 14% (N=68) of 477 fields samples. In addition to crop rotation with a non-host, crop host resistance is one of the most effective and economical approaches to nematode management. The combined effect of cultural practices, resistant varieties and seed treatments need to be investigated in Virginia to provide better field-specific recommendations in managing both pathogens. 1) Survey production practices and their effects on soybean cyst nematode (SCN) and sudden death syndrome (SDS). 2) Characterize soybean cyst nematode (SCN) races in fields known to be infested with these nematodes. 3) Evaluate variety resistance, seed treatment alone and in combination for reducing losses to SCN and SDS in Virginia soybeans.

On-farm Investigation and Evaluation of Soybean Production Strategies for 2021

Project Leader: Scott Reiter

Total Budget: $9,750

Total Amount Funded: $9,750

On-farm, research-based production information is used by soybean producers in Virginia to achieve maximum economic yields and increase farm profitability. Agriculture Extension Agents with Virginia Cooperative Extension will continue replicated, on-farm research trials across Virginia in 2021 using producer cooperator partnerships. In addition to soybean variety trials at multiple Virginia locations, additional research will be conducted on-farm to address producer identified challenges and evaluate management strategies. Results will be summarized in an Extension publication and distributed at producer meetings in the winter of 2022.

Development of Improved Soybean Varieties and Germplasm Adapted to Virginia

Project Leader: Bo Zhang

Total Budget: $63,229

Total Amount Funded: $50,000

Climate change and unexpected weather make it more difficult for farmers to predict yield and yearly income due to the highly variable response of currently available varieties and hybrids. Soybean varieties specifically bred, developed, and selected by breeders for Virginia will perform better under Virginia's ever changing weather conditions. Consequently, commercial soybean cultivars released by private companies may be poorly adapted to Virginia since Virginia is not their breeding selection location. The long-term goal of Virginia Tech's public soybean breeding program is to release superior cultivars to fulfill the growers' need and reduce their seed cost in order to increase their farming income.

Study in the USA-Palouse (Washington State)

Project Leader: Dr. Ozzie Abaye

Total Budget: $7,000

Total Amount Funded: $7,000

In order to expose students to a much-needed experiential learning experience prior to graduation from Virginia Tech, Mark Reiter and I will be taking students to the Palouse Region of Washington State. We will leave Blacksburg on the first week of May 2022 for 10 days. The students can experience agricultural production in vastly different agroecosystems to round-out their agronomic program. Differing experiences allows students to connect the dots between classroom learning, experiences already learned within Virginia and a new cropping system that varies drastically.

Virginia FFA Agronomy, Crops, Proficiency & International State Officer Experience

Project Leader: Jennifer Armstrong

Total Budget: $7,500

Total Amount Funded: $7,500

The Agronomy Career Development (CDE) offers FFA the opportunity to see our mission in action, by providing over 70 students the chance to gain knowledge and experience as they pursue careers in the field of agronomy. By networking with industry experts, judges, extension specialists and each other, the junior and senior agronomy CDE participants are exposed to the latest developments in the field of agronomy while developing team-building skills. This event demonstrates the value of pursuing a career in production agriculture.

Applied Soybean Production Research for Virginia

Project Leader: David Holshouser

Total Budget: $59,875

Total Amount Funded: $59,875

An online, virtual, and easy-to-access digital platform that contains a full catalog of soybean production information is necessary to communicate research-based, up-to-date to soybean farmers in a timely manner. Identification of which uncontrolled, more-permanent field characteristics are less affected by year-to year variation should allow better prediction of yield zones within fields. There has been little effort to-date to compare yield and profitability of controlled traffic farming (CTF) to standard practices. To have the most impact, research comparing rotational systems must be conducted over many years. Varieties commonly used by farmers need to be included in the soybean variety tests. Worthy projects conducted by other researchers need assistance from my program. I bring value to Virginia by learning and network with farmers, Extension, and researchers at numerous in-person and virtual meetings. I leverage Virginia checkoff dollars with other checkoff dollars to develop more powerful and meaningful datasets and results. Good communication and involvement with the Virginia Soybean Board and Virginia Soybean Association is necessary.

Development of Soybean Varieties and Germplasm with High Protein Digestibility Using both Genome Ed

Project Leader: Bo Zhang

Total Budget: $65,660

Total Amount Funded: $45,000

Soybean meal has been widely used in animal feed including swine, poultry, cattle, and even fish. However, soybean has several anti-nutritional factors such as trypsin inhibitors, phytic acid, raffinose family of oligosaccharides, and antigenic factors that prevent animals' protein digestibility. Processing of soybean meal requires precise control of moisture content and temperature in order to denature those anti-nutritional factors. Those extra processing steps add cost to soybean meal production. . This proposed study will help to increase Virginia soybean growers' feed market share since VA farmers will firstly have access to the value-added varieties adapted to Virginia.

Improving Efficiency and Accuracy of Soybean Breeding Selection using Remote Sensing Technology

Project Leader: Dr. Joseph Oakes

Total Budget: $13,549

Total Amount Funded: $10,000

Through the newly formed Center for Advanced Innovation in Agriculture (CAIA), the Virginia Tech College of Agriculture and Life Sciences is committed to fostering informed decisions using agricultural technologies and analytics for growth and research opportunities. This proposed project will emulate the vision of the CAIA by exploring the use of sensors to automate data collection in soybean breeding plots. Three of the co-PI's in this project (Dr. Oakes, Dr. Balota, and Dr. Li) are CAIA affiliate faculty and are already using sensors in their current research. The goal of this project is to collect soybean phenotypic data (plant height, plant lodging, and maturity) that has traditionally been collected manually, with a sensor that is affixed to a drone. Manual data collection is both time-consuming and subjective depending on who is collecting the data. Therefore, using remote sensing technology and computer programs can make selection automated, faster, and more accurate