

# SOYGEN3: Building Capacity to Increase Soybean Genetic Gain in Future Environments for Seed Yield and Composition Through Combining Genomics-Assisted Breeding with Environmental Characterization

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## Overview of Project Objectives

The overall goal of this program is to advance genomics-assisted breeding to develop soybean varieties for improved yield and composition. The team will develop better breeding methods and further routine implementation of genomic prediction in public soybean breeding programs. Project objectives include developing and testing methods for predicting cultivar performance in target environments through genomics-assisted breeding models, phenomics, and environment characterization; and discovering and testing structural variants for improved genomic predictions for yield and seed composition.

## Key Results

The team continued to develop the Northern Uniform Soybean Tests (NUST) database by sampling 560 trial lines in the field. Data on over 2,540 assayed genotypes were uploaded to the database. The team also continues to compile and organize NUST phenotypic data for use on the SOYGEN database. Collectively, the information stored in the database comes to more than 100 million genotypic data scores. The team is working to enable public breeders in executing genomic prediction. They established monthly meetings to create solutions to help advance each breeding program. The team is conducting a coordinated performance trial of 1,200 diverse breeding lines to better predict interactions between the environment and genotype.

## Benefit to Farmers

Soybean breeding has a large impact on the efficiency and profitability of agriculture through the development of high yielding new varieties with critical defensive traits and enhanced seed composition. Ensuring that such programs (both private and public) are using state-of-the-art technologies to drive genetic gain in the face of changing environments and narrowing genetic diversity contributes to continual development and release of ever better varieties. Additionally, these efforts help to educate future agricultural scientists and soybean breeders to be prepared to enter the seed industry and develop impactful future products for farmers.

## Links

[SOYGEN3: Building Capacity to Increase Soybean Genetic Gain in Future Environments for Seed Yield and Composition Through Combining Genomics-Assisted Breeding with Environmental Characterization](#)

*USB National Soybean Checkoff Research Database*

[Breeders Continue to improve Tools for Soybean Genetic Gain](#)

*SRIN article*