

# Discovering and finally understanding the functions of genes that underlie major agricultural traits in soybean

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## Principal Investigator

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## Overview of project objectives

The heart of this project focuses on developing soybean mutant genetic resources that will increase our understanding of the genes that underlie traits of agronomic importance. The development of these resources has been designed to overcome factors that have limited similar projects in the past such as issues with seed sources, seed purity, mutagenesis source, genotyping, phenotyping and seed storage. The new mutant resources will allow researchers to identify mutant stocks for their genes of interest by simply searching a genomic database that will be developed with this project. This will provide an unparalleled public resource in which researchers can quickly identify the mutations, order mutant seeds, and test the agricultural function and importance of genes.

## Key results

This project addresses the goal of gene discovery and germplasm development for traits critical to soybean growers, namely yield enhancement and seed composition improvement. The project provides a new mutant genetic resource for public use, including breeding and gene discovery efforts. The advantages of having already identified mutations in specific genes will enable researchers to do targeted breeding and discovery work on genes with previously predicted or known functions.

To-date, some developments include:

- 4,300 M2-generation mutant plants have been phenotyped; M3 seed has been harvested and stored
- 50 plants have been sequenced at the whole-genome scale to identify all new mutations
- 220 new M2 plants with the MN1312CN background were grown to expand the size of this mutant population to provide greater genetic diversity. Researchers will be able to order seeds from this population in the future.

## Benefit to farmers

The goal of this project is to develop enabling resources for gene discovery and germplasm development for traits critical to soybean growers, namely yield enhancement and seed composition improvement. The long-term benefit of these resources will be to enable breeding capacities to more effectively and efficiently improve soybean varieties for farmers.

## Links

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*USB National Soybean Checkoff Research Database*