



North Central Soybean Research Program

Development of soybean genotypes with enhanced capacity of nitrogen fixation

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In this study, we aim to overcome the current ceiling in nitrogen (N) fixation of soybean cultivars by generating breeding lines carrying genes for enhanced biological nitrogen fixation (BNF). Our strategy is to generate recombinant inbred line (RIL) populations by crossing divergent materials for traits that directly and indirectly affect BNF in soybeans.

Our primary goal is to release and register new breeding lines and cultivars. Also, our achievements in QTL mapping will be communicated in scientific websites (SoyBase) and scientific journals.

Project Objectives

- Develop high-yielding soybean cultivars that will not rely on inorganic N supply to express their maximum yield potential.
- Identify molecular markers associated with traits that are directly and indirectly related to biological nitrogen fixation.

Results

We developed two genetic populations (n = 190 each) between lines ('Saluki 4313' x 'PI 96171' and 'Davis' x 'Saluki 4313') with distinct traits for BNF. Seeds from all lines have been sent to the winter nursery of the Illinois Crop Improvement Association in Puerto Rico for generation advancement.

When the advanced populations will return, they will be phenotyped for traits that are directly and indirectly related to di-nitrogen fixation and genotyped with SNPs and SSR markers. These data will be analyzed for identifying markers that are closely associated to BNF and will be used for developing improved soybean lines that do not rely on N fertilizers to reach their maximum yield potential using marker-assisted selection.