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Germplasm enhancement of soybean through EMS mutation

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Soybean is an important oil-producing crop under *Fabaceae* family and is utilized in various industries. With increasing demands for soybean oil and other soybean products, its production must be increased. Genetic improvement of the crop is important to meet the increasing demands for soybean. A new soybean mutant population was generated through induced Ethyl methanesulfonate (EMS) mutagenesis using the newly released germplasm, JTN-5203 (maturity group V). Initially, EMS concentration was optimized to get the suitable concentration. Seeds were treated with different concentrations of EMS varying from 0 to 150 mM. The optimum concentration obtained was used to treat bulk JTN-5203 seeds. A total of 1,820 M2 population was produced from 15,000 treated seeds. The M2 population were planted in the field and DNA were extracted from 6,400 individual plants. Extracted DNA were quantified, standardized, and pooled to create a mutant library for high throughput TILLING. Phenotypic variations were recorded in the M2 generation including changes in leaf morphology, plant architecture, and chlorophyll contents, seed compositions and final plant yield. The EMS mutant population will be used for further studies including screening for various traits including genes in fatty acid and amino acid pathways, allergens phytic acids and other important soybean agronomic traits. Beneficial traits from these mutants can be exploited for future soybean breeding programs. This germplasm can also be used for discovering novel mutant alleles and for functional gene expression analysis using reverse genetics tools such as TILLING.