B-196

Field performance of high oleic soybeans with mutant FAD2-1A and FAD2-1B genes in Tennessee

*Vince Pantalone**, Department of Plant Sciences, University of Tennessee, Tennessee, USA
Laren Darr, Department of Plant Sciences, University of Tennessee, Tennessee, USA
Hem Bhandari, Department of Plant Sciences, University of Tennessee, Tennessee, USA
Feng Chen, Department of Plant Sciences, University of Tennessee, Tennessee, USA

Soybean [*Glycine max* (L.) Merr.] oil with high oleic acid (>80%) has increased oxidative stability and health benefits that are valuable for food, fuel, and industrial products. It has been determined that two naturally occurring mutations in genes FAD2-1A and FAD2-1B can combine to produce high oleic soybeans. The objective of this study was to test the effect of these mutant alleles on seed yield and oil and protein concentration. Molecular markers assisted in the creation of a population of 48 $BC_3F_{2:4}$ lines (93.75% expected genome commonality). Each line was classified into 1 of 4 genotypic groups where both FAD2-1A and FAD2-1B genes were either homozygous wild-type or mutant, respectively. Twelve lines for each genotypic group were evaluated in 3 replications at 3 locations across Tennessee. There was no seed yield difference between the genotypic groups, the recurrent parent, and high yielding checks ($p < 0.05$). On the other hand, there were differences in fatty acid profiles and oil and protein concentrations. In combination, the mutant FAD2-1A and FAD2-1B alleles produced a mean of 804 ± 1g kg^{-1} oleic acid. This is on average 490g kg^{-1} more oleic acid compared to soybean lines with only one mutant FAD2-1 allele. The high oleic double mutant group had more total oil (240 ± 1g kg^{-1}) and protein (400 ± 1g kg^{-1}) compared to all other genotypic groups ($p < 0.05$). Overall, this specific combination of mutant FAD2-1A and FAD2-1B alleles appears to be able to create conventional high oleic soybeans without yield drag.