Identification of Soybean Seed Oil QTLs with Little or No Impact on Seed Protein

Yu-Kai Sun*, Joseph Jedlicka, Dr. George Graef, Dr. perry Cregan, Dr. David Hyten, Dr. James Specht
University of Nebraska, USDA-ARS

The USA soybean seed contains 18.7% oil and 35.3% protein, and provides cooking oil and protein for livestock. Concurrent genetic improvement of seed protein (pro) and oil content has been difficult to achieve because of a negative genetic correlation of the two traits. It could be due to (1) a single pleiotropic pro & oil QTL, or (2) a tightly linked pro QTL and oil QTL with a repulsion-phase. Our lab is interested in oil QTLs with minimal effect on protein. Two high oil breeding lines were mated to the current cultivar Williams 82 and to each other. The three F2 populations were grown (along with the parents) in the greenhouse. A two-replicate NIR analysis was conducted on the F2.3 seed progenies and parental seed. The F2.3 seed were planted into progeny rows to obtain F2.4 seed that will be subjected to another two-replicate NIR analysis. After parent-offspring regression is used to estimate the heritability of seed oil content, the F2 parental DNA of progenies falling into the high and low decile tails of seed oil distribution will be assayed with 1536 SNP markers. This “selective genotyping” analysis is expected to identify SNP markers linked to segregating seed oil QTLs.