

# Protein Yield Stability of Soybean Breeding Lines

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In Africa soybeans (*Glycine max*) serve as a dietary source of protein via soymilk and soy flour. Africa currently produces ~1.5 million tons of soybeans, less than 1% of world production, and imports a similar amount. Increased soybean production has been proposed as a partial solution for malnutrition in Sub-Saharan Africa. Development of soybean cultivars maximizing protein production per hectare (protein yield) may be part of this solution. Because crop production in Africa is often limited by unpredictable environmental constraints, protein yield would need to be stable across environments. Previous studies have evaluated genotype-by-environment interaction (GEI) and stability of yield for soybean cultivars, finding that high yields are often associated with high yield instability. However, there has been little research on GEI of protein yield. As one step in evaluating the utility of soybean cultivars with high protein yield, we are investigating the relationship between protein yield and the stability of protein yield. This study aims to determine seed protein content, protein yield, yield, and their correlations (positive, negative, or neutral) with the stability of each of these traits. To do so, three replicates of 115 breeding lines were grown in four Ohio environments. Seed protein content (determined by Near Infrared Radiation), protein yield, and yield were assessed. Stability indices will be generated using the Eberhart-Russel method and indicate levels of stability of each cultivar across environments. Finally, protein content, protein yield, and yield will be correlated with stability indices to determine the relationship between increased protein yields and stability. A neutral or negative relationship would indicate that increasing protein yield may be a viable component to solving malnutrition in Africa, warranting further research.