

PI: Aaron Lorenz

PI's E-mail: alorenz2@unlnotes.unl.edu

Project ID: FY14-BA-007

ARS Agreement #: 59-0206-1-115

Research Category: BAR-CP

Duration of Award: 1 Year

Project Title: Genomic Selection for FHB Resistance in Midwest Six-row Barley.

PROJECT 1 ABSTRACT

(1 Page Limit)

Previous QTL mapping studies prompted us to initiate a genomic selection (GS) strategy where we train a prediction model using a training panel of breeding lines that is genotyped with genome-wide markers and phenotyped in field trials to predict the phenotype of breeding lines using only marker data. Since implementing GS in our program, we have reduced our traditional breeding cycle time from four years to one year per cycle. Preliminary assessments of the realized gains from selection from cycle 1 are promising (Smith, unpublished). The overall goal of this project is to implement and assess genomic selection for improved FHB resistance and lower DON. The specific objectives are to: (1) conduct two cycles of (GS) within the two year funding cycle; (2) empirically evaluate gain from genomic selection for cycles 1, 2, and 3; (3) investigate changes in marker allele frequencies in response to genomic selection; and (4) evaluate methods to optimize training populations to improve prediction accuracy. The major tasks to be carried out will be advancing populations to the F2 and F3 generations, updating a GS prediction model, genotyping F3s with 384 SNPs, estimating breeding values with the GS model, crossing of selected parents, and evaluating GS model accuracy and gain from selection.