Project Abstract

Project Title:	Development of FHB resistant wheat varieties for Michigan and the Great Lakes Region	
Principal Investigator:	Eric Olson	Michigan State University

The goals of this project are 1) FHB resistant soft red and white winter wheat varieties will be made available to wheat farmers in the Great Lakes region and the soft wheat milling industry will be supplied with a more consistent supply of high-quality grain, and 2) Developing and releasing FHB-resistant varieties will support and improve the agricultural economies of Michigan and states in the Great Lakes region.

Objectives and Approaches

1. Population Development
   Two crossing cycles will be completed annually to develop 600 populations per year focused on FHB resistance. Populations will be generated that segregate for both FHB resistance and important agronomic traits including high grain yield.
2. Genomic Selection
   Each year, genomic estimated breeding values (GEBVs) for FHB resistance and grain yield will be developed for 1,900 to 2,850 inbred lines. A set of 500-700 lines with high predicted grain yield low predicted DON and FHB index will advanced and evaluated in an irrigated disease nursery.
3. Marker-Assisted Selection
   Marker-assisted selection for *Fhb1* among inbred lines advanced from ~200 populations with *Fhb1* donor parents will be used to advance lines into replicated yield testing. Dwarfing genes and photoperiod sensitivity genes will also be used as selection criteria.
4. FHB Phenotyping
   A misted and inoculated FHB nursery will be used each year to phenotype 500-700 new breeding lines, 30-40 advanced breeding lines, the Uniform FHB nurseries, MI commercial variety trial and collaborator nurseries.
5. Replicated Yield Testing
   Phenology, visual FHB resistance and plant type will be used to advance 275-300 new lines to replicated yield testing at four locations in MI and test 30-40 lines at 18+ locations across the Great Lakes Region.
6. Outreach
   Data on FHB resistance in soft winter wheat varieties will be generated and communicated to Michigan wheat growers and agribusiness at meetings, field days and in extension publications.