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**Project ID: FY12-BA-008**

**ARS Agreement #: 59-0206-9-072**

**Research Category: BAR-CP**

**Duration of Award: 1 Year**

**Project Title: Developing Six-rowed Malting Barley Varieties with Enhanced FHB Resistance and Lower DON.**

### **PROJECT 1 ABSTRACT**

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Fusarium Head Blight (FHB) or scab, caused by the fungus *Fusarium graminearum*, is the major factor limiting barley production in the Midwestern United States. The overall goal of this project is to develop malting barley varieties with enhanced resistance to FHB and lower concentration of the mycotoxin deoxynivalenol (DON). To accomplish this goal, we propose a comprehensive FHB breeding effort utilizing greenhouse for crossing and single-seed advance, extensive field trials for FHB evaluation, various uses of markers to improve selection, regional yield and quality testing, and collaborative regional nurseries to evaluate elite breeding lines. Thus, our specific objectives for the FY12 funding period are to 1) Develop breeding populations segregating for FHB resistance; 2) Evaluate early generation (F5), preliminary, intermediate, and advanced breeding lines in replicated field disease nurseries. Field disease trials will be conducted at two locations in Minnesota that utilize overhead mist irrigation and inoculum applied as either grain spawn or as a suspension of conidia with backpack sprayers. We have recently shifted our early generation screening for FHB resistance from replicated field trials to genomic selection (see other project). This has reduced the size of our screening effort, however all of our disease phenotyping beyond early generation remains the same. In addition, we phenotype selected sets of lines to continue to improve our genomic selection model. The most promising lines, based on field evaluation are harvested and the grain sent for DON analysis. Most of our parent selection is done using genomic selection to reduce our breeding cycle to one year. We are maintaining a smaller traditional phenotypic selection system where parents are identified by phenotype at the 2nd year of yield trial testing and crosses are made in the greenhouse, advanced by single seed descent and evaluated in small plot disease nurseries for FHB. These activities should contribute directly to the development of FHB resistant barley varieties that can become components of an integrated strategy to minimize economic losses due to FHB.