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Project ID: FY20-BA-016

ARS Agreement #: 59-0206-0-174

Research Category: BAR-CP

Duration of Award: 1 Year

Project Title: Establishing a Winter Barley Fusarium Head Blight Screening Nursery in Ohio

PROJECT 1 ABSTRACT

(1 Page Limit)

Our overall project goal is to:

Identify winter barley lines possessing resistance to *Fusarium graminearum* toxin accumulation and incorporate that genetic resistance into modern elite two-row winter malting barley cultivars.

Our specific objectives for this project are to:

- 1) Establish a uniform winter barley scab nursery consisting of a core set of 20–30 lines, and test this set for resistances to Fusarium Head Blight (FHB) and fungal toxin accumulation.
- 2) Assess a mapping population derived from a FHB-resistant parent for resistances to FHB and fungal toxin accumulation.
- 3) Assess lines in the Ohio Winter Malting Barley Breeding Program for resistances to FHB and fungal toxin accumulation.

Our Expected Outcomes are that:

- 1) Winter barley germplasm will exhibit variation for FHB disease severity that is observable at the visual level, and that lines exhibiting resistance can be identified.
- 2) Winter barley germplasm will exhibit variation for its ability to support and enable *F. graminearum* to produce DON and other fungal toxins, and that there will be a genetic basis for resistance to toxin accumulation.
- 3) Genetic characterization of populations showing variation for resistance to toxin accumulation will enable marker-assisted technologies to enhance resistance to toxin accumulation in our breeding populations.

Plans to accomplish project goal(s) within period of proposed work:

Identifying lines having resistance to toxin accumulation will require multiple years of testing and multiple testing environments. Establishing a winter barley screening nursery in Ohio will be a first step towards this long-term goal. Our plan for the first year is to assess the genetic variation present in material of common interest to the entire barley community, as well as our own breeding program, and for the second year to repeat these analyses and expand upon the set of material assayed within budgetary and field space constraints. The first year's experimental results will be used to guide how we carry out the second year's experiments, so as to build upon our capacity to test lines and maximize accuracy in the data obtained.

Statement of Mutual Interest:

Identifying winter barley lines that are resistant to toxin accumulation and incorporating that resistance into modern cultivars will provide farmers and malting barley producers with the best, most-effective means to combat this devastating disease when this genetic resistance is used in conjunction with cultural practices that reduce FHB disease.