FY20 USWBSI Project Abstract

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Project ID: FY20-NW-003 **ARS Agreement #:** *59-0206-8-214*

Research Category: VDHR-NWW **Duration of Award:** 1 Year

Project Title: Genetics of, and Breeding for, Fusarium Head Blight Disease Resistance in Wheat

PROJECT 1 ABSTRACT

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Fusarium head blight (FHB) is the most devastating disease of wheat and barley in the United States mainly caused by the fungal pathogen *Fusarium graminearum* Schwabe [telemorph: *Gibberella zeae* Schw. (Petch)]. In United States, scab was reported in 1890s and there had been sporadic outbreaks of FHB epidemics since then. Several measures facilitated by rotation, tilling, and fungicide application are used to reduce initial inoculum, dispersal of the inoculum, or to restrict the spread of the infection in the spikes. However, these measures either do not provide enough control to disease or are expensive, reducing the total profits. Use of resistant cultivars is the most effective way to reduce the adverse effect of scab disease on yield and quality

FHB resistant and moderately resistant varieties in combination with management practices can mitigate the adverse effect of FHB disease. The objective of this continuing project is the development of high yielding and FHB resistant varieties for growers in Indiana and producing FHB resistant lines that can be used in breeding as parent.

The PI's first four years in this position were spent on 1) starting crosses between high yielding and FHB moderately resistant lines (based on available data) and 2) two years evaluation of yield and FHB responses of Purdue-bred germplasm. This data will guide us to design new breeding crosses.

The objectives of this proposal are 1) continue developing new genetic variation by crossing high-yielding experimental lines with FHB moderately resistant lines, and advancing segregating progeny for line development; 2) field-based screening advanced lines for FHB resistance; and 3) preliminary and advanced yield trials for assessment of lines in different stages of breeding program. This research will result in developing high-yielding and FHB resistant varieties and advanced lines for germplasm exchange. The FHB resistant lines that will be developed by this project will be shared with other breeding programs to be used as parents in their crossing programs. The research data will be communicated in conferences and published as journal articles. In addition, this research provides an opportunity for hands-on education and research skills of graduate and undergraduate students.