FY19 USWBSI Project Abstract

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Project ID: FY18-NW-010
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
(1 Page Limit)

Overall project goal(s): The overall goal of this project is to mitigate the adverse effect of FHB in soft red winter wheat region by developing high yielding and superior quality varieties that are resistant to FHB disease. To achieve that goal, we conduct genetic studies and breeding activities. According to the funding letter, it appears that RC suggests that PI must align more with VDHR objectives. Objectives:

1. FHB screening activities (field and greenhouse) will result in identification of resistant and moderately resistant lines. These lines will be used in breeding crosses and germplasm exchange. The loci identified during genetic mapping studies can be converted to breeder's friendly markers, to facilitate selection of superior progeny.
2. A collection of 432 Purdue-bred lines, derived from 123 unique crosses made between 1986 and 2010 will be used for genome-wide association studies (GWAS). The Purdue panel was genotyped using genotyping-by-sequencing (GBS) technique. The mapping will be conducted by using two years of phenotypic data.
3. Purdue lags behind in the development of genome-wide predictive breeding strategies. We will phenotype the collection of 432 Purdue-bred lines for FHB resistance and agronomic traits for two years. To begin developing predictive breeding pipeline, we will evaluate the prediction accuracy of a genome-wide prediction approach for FHB resistance and other agronomic traits such as grain yield.
4. The proposed research will contribute to education and research skills of graduate students in our program. The research data will be communicated in conferences and published as journal articles.

Plans to accomplish project goal(s): By the end of the second year of the project, we will have completed 2 years of field cycles of FHB phenotyping and agronomic trait assessment. By the end of the first year, we will have sufficient trait data to establish data analysis pipeline and troubleshoot. This allows a timely analysis of data after the second year data becomes available.

Statement of Mutual Interest: The lines we will produce becomes varieties or parents of breeding crosses. This increases the acreages of FHB resistant and moderately resistant in the US and mitigates the adverse effects of FHB disease for growers and millers