

FY20 USWBSI Project Abstract

PI: Steve Harrison

PI's E-mail: SHarrison@agcenter.lsu.edu

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ARS Agreement #: 59-0206-8-206

Research Category: VDHR-SWW

Duration of Award: 1 Year

Project Title: Double Haploids to Expedite Development of FHB Resistant Soft Winter Wheat Varieties

PROJECT 2 ABSTRACT

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A major objective of the VDHR research area is to increase the efficiency of coordinated project breeding programs in developing and releasing FHB-resistant varieties. Doubled haploids (DH) shorten variety development time in fall-sown small grains by three to four years and allow efficient marker assisted selection and gene pyramiding.

Wheat DH production is expensive and can only be carried out on selected populations but has the potential to significantly increase breeding efficiency and genetic gain by reducing the breeding cycle by three to four years. This approach has been successfully used by SunGrains breeders and the VDHR-SWW (Southern Winter Wheat region) through the efforts of the breeding program at NCSU (Murphy).

We plan to expand the use of this technique for the whole Southern Winter Wheat region by the coordinated development of five breeding populations through DH production followed by collaborative phenotyping across the region once the DH lines are developed and seed is being increased for testing. DH lines selected by each program will also be shared with the other programs, which maximizes return on investment and prevents loss of good DHs that may not be ideally adapted to the target environment of the originating breeder. This proposal fits into the overall Coordinated Project because it will quickly provide inbred breeding lines having several diverse FHB resistance genes (exotic and native) to five breeding programs for testing in the Southern Winter Wheat (SWW) region.

The LSU program has created and evaluated numerous DH populations in the past four years through several channels and funding mechanisms. There are 29 DHs from 2014 and 2015 crosses currently in advanced yield trials for the 2020 harvest season and many more in observation plots and headrows. Several DH populations were developed through collaborative efforts of the southern breeders from topcross F1 plants that were screened for presence of desired QTL. F1 derived DHs from Heartland are scheduled for evaluation in 2020-21 as part of a collaborative VDHR-SWW project.