

PI: Steve Harrison

PI's E-mail: sharrison@agctr.lsu.edu

Project ID: FY18-SW-007

ARS Agreement #: 59-0206-8-206

Research Category: VDHR-SWW

Duration of Award: 1 Year

Project Title: Developing Doubled Haploids to Expedite Variety Development in Soft Red Winter Wheat.

PROJECT 2 ABSTRACT

(1 Page Limit)

One of the main objectives 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 requires a large investment in laboratory equipment, greenhouse space, and expert personnel. This approach has been successfully used in the Southern Winter Wheat region through the efforts of the breeding program at NCSU (Murphy) that distributed over 500 DH lines since 2010 involving crosses with native resistance soft red winter wheat parents such as Bess and Neuse, and lines containing Fhb1 in current variety backgrounds.

We plan to expand the use of this technique for the whole Southern Winter Wheat region by the coordinated development of four 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. 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 three years through several channels and funding mechanisms. LA15099H is a cross between AGS300 (LSU Fhb release) and NC11-22289 (Fhb resistant) that was evaluated in preliminary yield trials in 2018. Several DH populations were developed through collaborative efforts of the southern breeders from topcross F1 plants that were screened for presence of desired QTL. Three additional DH populations with Fhb1 are being increased in an offseason summer nursery and numerous topcross F1 derived DHs from Heartland are scheduled for evaluation in 2018-19.