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Project ID: FY16-SW-004

ARS Agreement #: 59-0206-4-027

Research Category: VDHR-SWW

Duration of Award: 1 Year

Project Title: Developing Double Haploids to Expedite Variety Development in SRWW.

PROJECT 2 ABSTRACT

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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 created and is evaluating a doubled haploid population from the cross: MD08-26-H2-7-12-21/LA3200E2. LA3200 has excellent yield, H13b Hessian Fly resistance and excellent adaptation. The MD line has the genes: *Fhb1*, 5AS, 2DL, so this cross combines three FHB resistance sources in a good agronomic background.

Two additional DH populations were submitted for DH development. LA15060 combines excellent yield and FHB resistance in LA06146 (release in 2015) with *Fhb1* resistance from NC8170. LA15164 combines excellent yield and agronomic characteristics with the Coker 9511 FHB resistance from NC11-22289. Crosses made in 2016 and used to create DH will combine *Fhb1*, Jamestown, and Coker 9511 FHB resistance.