

FY16 USWBSI PROJECT ABSTRACT

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Project ID: FY16-SW-003

ARS Agreement #: 59-0200-3-007

Research Category: VDHR-SWW

Duration of Award: 1 Year

Project Title: Development of FHB-Resistant Wheat Cultivars for the Midsouth.

PROJECT 1 ABSTRACT

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The Arkansas Wheat Breeding Program has a strong history of developing wheat lines with a high level of resistance to Fusarium head blight (FHB). Notable lines identified in 2015 included AR06024-7-2 (AR800-1-3-1/VA01W-476) which performed well for yield in the SunWheat nursery tested across the southeastern region (15th of 83 entries) and was highly resistant to FHB in the Uniform Southern Scab Nursery (USSN), ranking 3rd for both severity and index. AR06024-7-2 contains *Fhb1* (likely from VA01W-476) and Jamestown_1B based on marker analysis. Overall, the Arkansas program has the 1st, 2nd, 3rd, 6th and 7th most resistant entries for severity in the 2015 USSN.

The specific objectives of this proposal are; 1) Develop and release high yielding, FHB resistant cultivars adapted to Arkansas and the mid-south, 2) Increase breeding efficiency through collaborative phenotyping, marker development and introgression of new genes using marker assisted selection (MAS), and 3) Screen and report the reactions of breeding lines and currently grown commercial cultivars to FHB using misted inoculated nurseries.

To meet objective 1 and 2, 300-400 crosses or top crosses will be made each year which directly target FHB resistance. MAS will be used on the most promising populations that have known QTL with diagnostic markers (2DL, 3BS and 5AS_{Ning}, 3BSc, 5A_{Emie}) and new QTL (derived from Jamestown, Neuse and Bess). We will continue to evaluate new sources of resistance, in particular lines which have been developed through the USWBSI funded project "Double Haploids to Expedite Cultivar Development and Enhance FHB Resistance in SRW Wheat" that have 3+ known QTL/genes for resistance to FHB. All material will be evaluated for resistance in an inoculated, misted FHB nurseries at both Fayetteville and Newport for FHB severity, FDK and DON level (Objective 3). We continue to work on developing and improving our in house MAS pipeline in order to select for known QTL/genes more efficiently. In fall 2015, a graduate student will begin working on an association mapping and genomic selection project for FHB resistance within the Arkansas breeding program.

Future work will focus on releasing identified lines as varieties and a more targeted focus on introgression and pyramiding of genes and QTL for FHB resistance for continued development of resistant germplasm and cultivars.