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Project ID: FY21-EC-001

ARS Agreement #: 59-0206-1-205

Research Category: EC-HQ

Duration of Award: 1 Year

Project Title: FHB Germplasm Research, Development, and Preservation in Winter Wheat

PROJECT 1 ABSTRACT

(1 Page Limit)

Fusarium head blight (FHB; caused by *Fusarium graminearum*) continues to be a significant problem throughout the Midwest and resistant varieties remain the most economical approach for addressing this problem. At the University of Missouri I have primarily worked to incorporate, through conventional breeding, “native” resistances into Missouri soft red winter wheat varieties. The FHB resistance in most of the Missouri lines builds on the resistances in the Truman/Bess family, Ernie, and the MO 030291 family of lines (that includes MO 080104). These lines and others derived from them have been released from the Missouri Agricultural Experiment station either as public varieties with PVP or as licensed varieties and have been widely grown in Missouri and surrounding states. Several of our lines (Truman, Bess, Ernie) also serve or have served as resistant check varieties in the Northern and Southern Uniform FHB Nurseries. Our basic hypothesis over almost 30 years of working with FHB was that the use of native resistances as a base for improving FHB resistance should accelerate the release of resistant cultivars into the market by eliminating many of the negative linkages associated with more exotic germplasm.

The resistance in Truman is highly penetrant and so progeny from crosses involving this line often carry comparable resistance. All of the native resistances in use in the Missouri program are broad based with low severity and incidence, good kernel quality retention (low Fusarium damaged kernels; FDK), and low toxin (DON). Our advanced germplasm often combines our own native sources of FHB resistance with lines carrying exotic or genetically diverse sources of resistance from other soft red winter wheat breeding programs as well as sources from Asia, South America, Eastern Europe, and CIMMYT.

In September of 2019, I retired from my breeding position at the University of Missouri and FHB germplasm developed over my tenure at Missouri was put in cold storage (-4 degrees) at MU. Because the timeframe for my replacement is unknown, the preservation of our germplasm is critical. The main objectives of this proposal therefore are to: (1) catalogue, increase, and purify superior FHB lines in soft red winter wheat backgrounds and make those directly available for crossing to interested breeders in the US Wheat and Barley Scab Initiative and (2) to enter a subsample of each of the best lines into the National Plant Germplasm wheat collection at Aberdeen Idaho.