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Project Title: Development of FHB Resistant Wheat Genotypes Adapted to the Gulf Coast.

PROJECT 1 ABSTRACT

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The LSU AgCenter wheat breeding and variety development program develops and releases wheat varieties that are marketed commercially and are widely grown across the Gulf Coast region. Fusarium Head Blight (FHB) occurs frequently in the rice growing area of Louisiana and can be important across the Gulf Coast region. The most economical and effective means to prevent grower's losses and export market contamination from FHB is to develop and release high-yielding FHB-resistant varieties for the region. Our goal is to accelerate development of FHB resistant wheat varieties adapted to the unique environment of the Gulf Coast.

Objectives of the LSU AgCenter (LSUAC) wheat breeding program, Fusarium Head Blight project are: 1) to develop and release disease resistant, high-yielding wheat varieties adapted to the Gulf Coast region that are FHB resistant and contribute to reduced DON in export grain; 2) to increase efficiency of coordinated breeding programs through development of marker populations, collaborative phenotyping of populations for marker development, and introgression of useful genes, and 3) to evaluate varieties and advanced breeding lines in the USSN, statewide variety trials, and other regional nurseries to determine FHB reaction and provide that information to growers and breeders.

The USFHBN regional nursery, entries in the statewide variety trials, and all advanced LSUAC breeding lines will be evaluated in northeast and south central Louisiana under controlled field conditions with corn/sorghum-based inoculation and timed misting; and in the scab-prone rice region of southwest Louisiana without misting. Two replications of 'headrows' in a RCBD will be grown at each location. Data on heading date, foliar diseases, and FHB will be collected from these trails and samples will be submitted for toxin analysis. Several replicated yield trials (AR and LSU trials) non-replicated observation yield trials will be conducted at two locations for advanced lines derived from FHB-specific crosses. All entries in these trials will be also evaluated in misted, inoculated nurseries at three locations and tested for the presence of major QTL for FHB resistance.

Crosses to incorporate FHB resistance are made in the greenhouse and field each year. FHB resistant lines selected from the USFHBN will be crossed to adapted lines that have high yield and good resistance to leaf and stripe rust. Two-way F1 plants with a FHB resistant parent will be topcrossed with elite LA lines in the greenhouse to set up F1 population enrichment via MAS next fall.

Breeding lines in replicated FHB yield trials will be increased in breeder strips and blocks at two locations. Numerous early-generation populations and headrows will be evaluated for agronomic adaptation and disease resistance in Baton Rouge and Winnsboro.

A Catbird mapping population will be increased in the summer (off-season) nursery to produce seed for regional phenotyping. Additional mapping populations will be phenotyped if requested by VDHR members. The project will cooperate extensively with Dr. Gene Milus, pathologist at the University of Arkansas, with the SUNGRAINS breeders, and with other scientists. Several additional doubled haploid populations have been created that contain effective FHB resistance genes and lines form these will be field-evaluated for resistance and agronomic potential.