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

PROJECT 1 ABSTRACT

(1 Page Limit)

The LSU AgCenter wheat breeding develops and releases wheat varieties that are marketed commercially and are widely grown across the Gulf Coast region. Fusarium Headblight (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 this project are: 1) development of disease resistant, high-yielding wheat varieties that are FHB resistant and contribute to reduced DON in export grain; 2) evaluation of varieties and advanced breeding lines in the USSN, Gulf-Atlantic, and other regional nurseries to determine FHB reaction and production, and 3) to evaluation of entries tested in the preliminary and statewide performance trials for FHB reaction so growers have that information when choosing varieties.

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-based inoculation and timed misting; and in the scab-prone rice region of southwest Louisiana without inoculation. 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. A replicated yield trial and a non-replicated observation yield trial 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 (scabby corn) 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 in north Louisiana. Numerous early-generation populations and headrows will be evaluated for agronomic adaptation and disease resistance in Baton Rouge and Winnsboro.

A Jamestown mapping population consisting of 275 entries will be evaluated in misted nurseries at two locations as part of a collaborative project led by Carl Griffey. The project will cooperate extensively with Dr. Gene Milus, pathologist at the University of Arkansas, with the SUNGRAINS breeders, and with other scientists.