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Research Area: VDUN

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

PROJECT 1 ABSTRACT

(1 Page Limit)

Fusarium Head Blight (FHB), or Scab, caused by *Fusarium graminearum* and related fungi has become a major concern to U.S. wheat producers and is becoming more of a problem along the Gulf Coast. During the spring of 2003 a severe epidemic of FHB occurred in non-inoculated fields at the LSU AgCenter Rice Research Station. Conditions favorable for FHB development are common along the Gulf Coast. Most wheat production along the Gulf Coast enters the export market through large grain elevators along the Mississippi River that process a fourth of the total US wheat crop. There is a need for development of FHB resistant varieties adapted to this region, as well as evaluation of resistance levels and FHB levels in current varieties.

The overall objective of the project is to accelerate development of wheat varieties and germplasm adapted to the Gulf Coast that are resistant to FHB. The Gulf Coast is a unique wheat-growing region that is not suitable for most wheat varieties due to low vernalization and high disease pressure. Objectives will be accomplished by: (1) Participating in the a) Uniform Southern Soft Red Winter Wheat FHB nursery (USFHBN); (2) Initiating a recurrent selection program based on MS₃ male sterility and conventional crossing; and (3) Incorporating FHB resistant lines into the LAES breeding program using a modified pedigree selection system, and (4) Releasing locally adapted FHB resistant varieties to southern seedsmen.

The project involves cooperation of pathologists and breeders. The FHB regional nurseries will be evaluated in northeast (Winnsboro) and south (Baton Rouge) Louisiana under controlled field conditions with inoculation and mist systems. A RCBD with three reps will be grown at each location. Advanced LAES breeding lines will also be evaluated and superior lines will be incorporated into the wheat crossing program. The breeding effort will evaluate headrows and advanced lines, representing multiple populations containing sources of FHB resistance. A replicated yield trial will be conducted at Baton Rouge consisting of advanced lines derived FHB crosses. The same material will concurrently be evaluated in a misted-inoculated trail at Baton Rouge and Winnsboro for evaluation of scab resistance. Segregating populations will be selected under conditions conducive to FHB development. All screening will be conducted under a mist system and inoculated with a corn-based inoculum. These populations in this include parentage of diverse background and are not all based on the traditional Chinese sources of resistance. They were developed from crosses made by the LAES wheat breeding program and by Dr. Gene Milus of the Univ. of Arkansas. They have been selected in Louisiana for adaptation and resistance to other diseases. The headrows will be evaluated in the field at Baton Rouge. Advanced breeding lines will be evaluated as 3-row and 6-row headrow plots at both locations and also in replicated yield trials at Baton Rouge. Seed increases will be grown of promising lines for inclusion in the USFHBN. Additional crosses will be made to incorporate new resistance sources. The project will cooperate extensively with Dr. Gene Milus, pathologist at the University of Arkansas and with other breeders in the southern US.