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Research Area: VDUN

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

PROJECT 2 ABSTRACT

(1 Page Limit)

Although some wheat cultivars developed in other regions have been adapted to the Midsouth, the unique combination of biotic and abiotic stresses found in the region prevents most cultivars from attaining their genetic potential for yield and quality. These unique constraints to profitable wheat production, the potential for devastating FHB epidemics, and the more than two million acres of wheat grown annually in the region justifies incorporating FHB resistance into cultivars specifically adapted to the Midsouth. Two breeding strategies are being employed in this project: i) to release resistant cultivars as soon as possible, lines from crosses between various adapted wheats and sources of FHB resistance are being selected for both agronomic traits and FHB resistance, and ii) to provide breeders with sources of resistance to FHB and other important diseases in lines adapted to the Midsouth and to form the basis for a recurrent selection program to obtain higher levels of FHB resistance, lines from the germplasm enhancement program have been selected for agronomic traits, and for resistance to FHB and contemporary races of leaf rust, stripe rust, and *Septoria tritici* blotch. The best of these lines have been tested in the Southern Uniform FHB Nursery. The wheat breeding program at Louisiana State University has collaborated closely with this project, and this collaboration has been mutually beneficial.

As a service to breeders, this project evaluates the Southern FHB Nursery for type 2 resistance in the greenhouse and for resistance in inoculated, irrigated field nurseries at two locations. This project also evaluates the Northern FHB Nursery for resistance to stripe rust.

The addition of a graduate student to this project will allow research to be conducted on resistance to kernel infection and DON. Although these two mechanisms are reported to be independent of other resistance mechanisms, there appears to be no definitive data showing that they are independent of resistance to initial infection and spread. This research will contribute to a better understanding resistance to kernel infection and DON and to methodologies for incorporating these types of resistance into cultivars. This project also will include FHB-resistant wheat lines from Hungary and the Slovak Republic that were evaluated by a USWBSI project.