PI: Milus, Eugene **PI's E-mail: gmilus@uark.edu**

Project ID: FY08-MI-070 **FY07 ARS Agreement #: 59-0790-4-115**

Research Category: **VDHR-SWW** **Duration of Award: 1 Year**

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

PROJECT 1 ABSTRACT

(1 Page Limit)

The best hope for growers to overcome Fusarium Head Blight (FHB) is through resistant varieties. However resistant varieties are useless if they are too costly in terms of yield reduction. This project focuses on development of wheat varieties that are not only FHB-resistant but also contain the necessary attributes to make them competitive with other varieties on the market. Six new lines will be entered in the 2007-08 Uniform Southern Scab Nursery. In addition, AR 97124-4-1, AR 97002-10-2, and AR 97002-2-1 will be retested since the FHB index values were 11, 16 and 11, respectfully. AR 97124-4-3 which had been tested for multiple years in the Uniform Southern Scab nursery and has a grain yield comparable to Pat in yield trials conducted in Arkansas has been entered in both the Uniform Southern and Eastern Nurseries. Parents for crossing will be genotyped for markers linked to FHB resistance genes, and subsequent segregating populations will be enriched using MAS.

To provide breeders with new sources of FHB resistance in adapted backgrounds and with resistance to other important diseases, 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 wheat breeding program at Louisiana State University has collaborated closely with this project, and this collaboration has been mutually beneficial. Markers for the 3BS and 5A resistance genes will be used to select and pyramid these genes as appropriate for particular populations and lines

To assist southern breeders with developing FHB-resistant varieties, this project will evaluate the Southern FHB Nursery for type I resistance in the greenhouse and FHB resistance and mycotoxin level in inoculated, irrigated field nurseries at two locations. Advanced lines from the Arkansas and Louisiana breeding programs developed for resistance to FHB also are included in these field nurseries.

To provide clientele with FHB resistance ratings for local varieties, this project will evaluate the Arkansas Variety Test for FHB resistance in the field at two locations and report the results on the Variety Testing website.

Graduate student research that is part of this project will be conducted on a susceptible check and 15 adapted FHB-resistant lines with diverse sources of resistance and similar flowering dates. This research will focus on three questions pertinent to the development of wheat varieties with resistance to the mycotoxins associated with FHB. 1) Can a field test for resistance to late blighting identify lines that are resistant to kernel infection and mycotoxin accumulation near harvest time? 2) Are wheat lines selected for resistance to DON-producing strains also resistant to nivalenol-producing strains that have emerged in the Midsouth? 3) What is the relationship among components of FHB resistance and current molecular markers in the 15 resistant lines?