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Research Area: VDUN

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 unless 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. This is an on-going project so there are lines in various stages of development from breeder seed increase to hybridization. Currently AR97124-4-2 has FHB resistance equal to 'Ernie' and yields higher than the U of A release 'Pat.'

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. Currently, 37 F₇ selected lines will be increased for potential entry in the Southern FHB Nursery.

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

To provide growers, consultants, and county agents with FHB resistance ratings for local varieties, this project will evaluate the Arkansas Variety Test for FHB resistance in the field at two locations.

Graduate student research that is part of this project will be conducted on 11 adapted FHB-resistant lines with diverse sources of resistance and similar flowering dates. This research will focus on five questions pertinent to the development of wheat varieties with resistance to the mycotoxins associated with FHB. 1) Can the DON-bleached-floret method be used to detect the 3BS QTL and to identify other genes that confer resistance to DON? 2) Can a field test for resistance to late blighting identify lines that are resistant to kernel infection and DON accumulation near harvest time? 3) Are wheat lines selected for resistance to DON-producing strains also resistant to nivalenol-producing strains that have emerged in the Midsouth? 4) Are aggressive strains that produce high levels of either DON or nivalenol capable of eroding FHB resistance? 5) Which strains are best for evaluating lines and segregating populations for FHB resistance?