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Research Area: VDUN

Duration of Award: 1 Year

Project Title: Accelerating the Development of FHB-Resistant Soft Red Winter Wheat Varieties.

PROJECT 1 ABSTRACT

(1 Page Limit)

The overall goal of this project is to release FHB-resistant SRW wheat varieties to ameliorate economic consequences for farmers whose crop is at risk for FHB infection, and for millers, bakers, and consumers who require a safe supply of wheat. For the past two crop seasons, the Kentucky wheat industry has been very hard hit by FHB. Millers have had difficulty sourcing low toxin grain from Kentucky, and farmers have been severely discounted. To meet our overall goal, we have identified the following objectives: (1) identify new sources of resistance through extensive screening of a diverse set of breeding lines and achieve more accurate phenotyping by establishing varying levels of disease pressure by using nonirrigated hill plots along with an irrigated nursery; (2) carry out recurrent family selection in populations which are segregating for the Sumai 3 FHB resistance and other quantitative sources of resistance; (3) Accelerate the deployment of the 3BS QTL in new wheat varieties; (4) select for low deoxynivalenol wheats in populations. The plans to accomplish the project goals are to: 1) conduct extensive field screening in misted nurseries at two locations using scabby corn as inoculum; advanced breeding lines and early generation populations will be screened in misted nurseries at Lexington and Princeton, KY, and in non-irrigated bagged hill plots at Lexington, KY; 2) carry out extensive greenhouse screening for Type II resistance; 3) recombine selected lines from the recurrent selection populations; 4) genotype individuals in one population with respect to the 3BS QTL, then quantify the effect of the QTL in near-isogenic lines differing for the QTL ; 5) Select for low DON types in breeding lines and populations using ELISA based methods in combination with a GC/MS instrument in a departmental lab. The relevance of this project to the U.S. Wheat and Barley Scab Initiative is that breeding FHB-resistant wheat varieties offers the maximum likelihood of success in our effort to minimize the threat of FHB to producers, processors and consumers of wheat.