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

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

PROJECT 1 ABSTRACT

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The wheat breeding project at the University of Kentucky aims to release high yielding, scab resistant SRW wheat varieties adapted to KY and the southern corn-belt. In epidemic FHB years, the Kentucky wheat industry has been decimated by scab. Millers have had trouble locating low DON wheat in the state and farmers have paid severe economic penalties. Widespread use of resistant varieties will reduce economic risk for farmers and will also help millers and bakers who require low DON wheat. A key result of this strategy is that consumers will have a safe, dependable food supply.

Our project activities fall into four areas, each of which has a set of sub-objectives (1) crossing and selection: combining superior agronomic parents with FHB-resistant parents, selecting resistant progeny based on phenotype as well as genotype, and confirming selections by repeated multi-location testing in scab nurseries and yield trials. Parents with native quantitative resistance along with those carrying exotic QTL are both used extensively in the breeding program. Inheritance studies that inform our breeding efforts are carried out by graduate students; (2) screening: rigorous, repeated phenotyping of advanced breeding lines and existing cultivars is carried out in the inoculated, irrigated nursery at Lexington, while advanced breeding lines and wheat varieties are tested with and without fungicide in inoculated nurseries at two locations to provide farmers with information they need; (3) collaboration: this includes growing and screening collaborative nurseries to facilitate germplasm exchange, broaden the diversity of sources used in the breeding program, and provide excellent pre-release multi-location data for candidate varieties. We will also participate in several collaborative projects within our CP, involving cooperative phenotyping, doubled haploid lines and recurrent selection, along with collaborative mapping studies with the southern CP; (4) outreach: through collaboration with our grains extension specialist and extension plant pathologist, we communicate results from fungicide x variety trials (inoculated) to growers, extension agents, consultants and others in the wheat community. This data is ported directly to the Scab Smart website, presented at winter meetings and field days and is available from our breeding project website.

The relevance of this project to the U.S. Wheat and Barley Scab Initiative is that breeding scab resistant wheat varieties offers one of the best chances of success in our effort to minimize the threat of FHB to farmers, millers, bakers and consumers of wheat.