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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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Our breeding project aims to release high yielding, scab resistant SRW wheat varieties that are 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.

To meet our overall goal, our project activities fall into four areas, each of which has a set of sub-objectives (1) **screening**: accurately characterizing resistance in existing cultivars, advanced breeding lines and populations by evaluating them under a range of disease pressures at two locations; (2) **breeding**: choosing parents, crossing them and selecting resistant progeny based on phenotype as well as genotype. Parents include sources of native quantitative resistance as well as lines carrying exotic QTL that can be tracked with DNA markers and then confirmed phenotypically; (3) **collaboration:** 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 marker assisted selection, genome wide selection and cooperative phenotyping, as well as doubled haploid lines. Additionally we are phenotyping a number of recombinant inbred lines derived from the cultivar Roane in collaboration with the breeding project at Virginia Tech; and (4) **outreach**: Through collaboration with our grains extension specialist and extension plant pathologist, we will screen a set of varieties and elite breeding lines in scab nurseries at two KY locations with and without fungicides. This data will be ported directly to the Scab Smart 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.