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

PROJECT 1 ABSTRACT

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The main objective of this project is to release high yielding, scab resistant SRW wheat varieties that are adapted to KY and the southern corn belt. Widespread use of such varieties will reduce economic risk for farmers and millers and bakers who require low DON wheat. It will also ensure that consumers have a safe, dependable food supply. 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.

To meet this overall goal, this breeding pre-proposal has four specific 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 Sumai-3 derived lines whose type II resistance 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 phenotype a set of recombinant inbred lines from a cross with 'Truman' a promising source of native resistance, thus accelerating the mapping of its resistance and putting markers associated with in the hands of breeders; 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. The focus of the study will be to educate growers about the need to grow scab resistant varieties and the need to use fungicides when conditions warrant. Data will be posted on a website and will be presented at field days and grower meetings.

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.