PI: Sneller, Clay **PI's E-mail: sneller.5@osu.edu**

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PROJECT 2 ABSTRACT

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Host resistance is essential for control of Fusarium Head Blight (FHB). The soft red winter wheat (SRWW) gene pool has significant amounts of FHB resistance such that phenotypic selection can be very effective in improving FHB resistance. This resistance could be complemented with exotic genes to further improve resistance. Our objectives are :

1. Evaluate the FHB resistance of all breeding lines in Ohio State University program that are candidates for release, and develop populations from which FHB resistant cultivars can be developed in the future.
2. Backcross FHB resistance QTLs into promising OSU breeding lines in early stages of their evaluation.
3. Coordinate a uniform nursery for evaluating FHB reaction in SWW adapted to the northern US.

We are proposing to screen 1,570 SRWW breeding lines for FHB resistance in an inoculated and misted field nursery. From this effort we hope to identify 800-900 SRWW with at least moderate resistance to FHB.

The phenotypic selection described above will uncover considerable moderate resistance. This resistance could be complemented with QTL for FHB resistance from exotic source, primarily Asian sources. We will implement an aggressive and efficient marker-assisted selection program to backcross these QTL into promising OSU breeding lines that have good agronomics, quality, yield and moderate resistance to FHB. The backcrossing will be initiated at an early stage of evaluation to produce a timely release of the improved cultivar. The addition of the QTL should produce resistance cultivars at the same rate in which we develop standard cultivars. We anticipate that we will achieve this output using just 240 DNA isolations and 2,300 marker data points per year.

Regardless of how a breeding line is developed, its FHB resistance must be evaluated in multiple environments due to the sporadic nature of the disease, its environmental sensitivity, and genotype by environment interaction. To ensure this will be accomplished in a timely fashion to facilitate cultivar release we will coordinate two uniform scab nurseries for soft winter wheat that is adapted to the northern and eastern US.