Project Abstract

Project Title:	Development of Scab Resistant SRW Wheat Varieties and Cooperative Phenotyping	
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Breeding for resistance to Fusarium head blight (FHB) as well as other important traits needs to continue and accelerate in order for wheat to remain profitable in Illinois and neighboring states. In line with research priorities one and three of USWBSI Action Plan, this project aims to:

1) Increase and document the number of varieties with improved FHB resistance and high grain yield and grain quality that are tested in statewide variety trials and available to farmers, and
2) Implement new and underutilized breeding techniques/technologies to further enhance short term and long-term improvement of both FHB resistance and grain yield.

To achieve these objectives, this project will continue the FHB resistance breeding efforts already underway at the University of Illinois to continue providing wheat farmers in Illinois and surrounding states with varieties that are resistant to FHB, higher yielding and with appropriate maturity and end-use quality. This project will also integrate new and underutilized breeding techniques/technologies in the overall breeding strategy to improve breeding efficiency. These techniques/technologies include partially replicated trial designs, multi-trait best linear unbiased prediction (BLUP), genomic selection, high-throughput phenotyping, and selection indices. We will utilize a new web-based breeding data management system developed by The Triticeae Toolbox (T3) project to enable implementation of these strategies. Each year this project will:

1) Release 10 new wheat lines with FHB resistance, high yield, and test weight to the private seed sector for potential variety release.
2) Release 8 new wheat breeding lines with FHB resistance, high yield, and test weight to cooperative nurseries.
3) Release data on FHB resistance and DON levels of varieties available in Illinois disseminated to farmers.
4) Make all new breeding program data, including FHB resistance, available on the T3 database.
5) Make computer code for new breeding techniques/technologies being implemented available in an online repository.

Stakeholders of this work include wheat farmers, millers, other breeding programs, and researchers. Wheat farmers in Illinois and surrounding states will benefit because they will have access to better and more FHB resistant wheat varieties. More FHB resistant varieties being grown by farmers will benefit millers by reducing DON in the wheat supply. Other breeding programs will benefit from using our breeding lines as parents and also from the computer code for implementing new breeding techniques/technologies. Lastly, researchers will benefit because they may use our data to develop and validate new analysis methods.