

**U.S. Wheat and Barley Scab Initiative
Annual Progress Report
September 18, 2000**

Cover Page

PI:	Dave Van Sanford
Institution:	University of Kentucky
Address:	Dept. of Agronomy Lexington, KY 40546
Email:	agr038@pop.uky.edu
Phone:	606-257-5811
Fax:	606-257-2185
Year:	FY2000
Grant Number:	59-0790-9-073
Grant Title:	Fusarium Head Blight Research
Amount Granted:	\$37,000.00

Project

Program Area	Objective	Requested Amount
Variety Development & Uniform Nurseries	Accelerate development of resistant varieties.	\$35,000.00
	Requested Total	\$35,000.00 ¹

Principal Investigator

Date

¹ Note: The Requested Total and the Amount Granted are not equal.

Project 1: Accelerate development of resistant varieties.

1. What major problem or issue is being resolved and how are you resolving it?

The major problem that is being resolved is the lack of resistance to Fusarium head blight in soft red winter wheat. Most of the varieties available today are susceptible to FHB. Wheat farmers are therefore at risk for severe economic losses due to this disease. This is particularly problematic in Kentucky where most of the wheat is planted with minimum or no tillage into corn stubble. Our approach is to first identify diverse and distinct sources of resistance in adapted and exotic germplasm, and then incorporate that resistance into adapted, elite genetic backgrounds.

2. Please provide a comparison of the actual accomplishments with the objectives established.

Objective 1: To screen diverse exotic and adapted sources for resistance to FHB under artificial inoculation in the greenhouse and breeding nursery. In 1999-2000 we screened a total of 1559 lines in the field for Type I resistance and in the greenhouse for Type II resistance to FHB. The field screen included 1420 exotic lines, primarily central and eastern European. Twenty-one of these lines showed enough promise to be retested this coming year. Thus, there is good agreement between actual accomplishments and stated objectives, although screening for FHB will continue.

Objective 2: To evaluate several crossing and selection methods for incorporation of resistance to FHB. Backcrosses, three-way crosses, and modified (F1 x F1) three-way crosses have been made. These crosses typically involve adapted soft red winter wheats and FHB-resistant Chinese spring wheats. The first segregating generations will be grown this year. Thus, we have begun to accomplish this objective in that crosses have been made. Completing this objective will not occur until several segregating generations are evaluated for FHB resistance.

3. What were the reasons established objectives were not met? If applicable.

Objective 1 has been met, but as noted above, this is an ongoing process of identifying new resistance genes. Objective 2 has been met in part because the crosses have been made. Evaluation of the crosses cannot occur until we produce several generations from them.

4. What were the most significant accomplishments this past year?

In terms of the objectives of the project, our most significant accomplishment was the identification of a number of lines which show the potential for FHB resistance based on greenhouse and field screens. Beyond this, we had significant accomplishments related to the methodology and technology of screening for FHB resistance. Our irrigation system was completely revamped and increased in size. Misting nozzles and a programmable solenoid valve led to a more efficient, effective disease screening environment. In the greenhouse, increasing the number of replications to 8 has reduced our error variance and increased our confidence in ratings. Our method of producing inoculum for the field was streamlined and spore development was verified. Our ability to read infected spikes consistently has improved.

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Progress Report

Include below a list of the publications, presentations, peer-reviewed articles, and non-peer reviewed articles written about your work that resulted from all of the projects included in the grant. Please reference each item using an accepted journal format. If you need more space, continue the list on the next page.

Van Sanford, D. A., B. Kennedy, M. Hall, and C. Swanson . 1999. Greenhouse and Field Evaluation of Resistance to Fusarium Head Blight in Soft Red Winter Wheat. 1999 National Fusarium Head Blight Forum, December 5-7, 1999, Sioux Falls, SD.

Van Sanford, David, James Anderson, Kimberly Campbell, Josè Costa, Perry Cregan, Carl Griffey, Patrick Hayes, and Richard Ward. 2000. Discovery and deployment of molecular markers linked to fhb resistance: an integrated system for wheat and barley. *Crop Science* 40: (Accepted)

Kennedy, B., M. Hall, H. Liu, J. Agyris, D. TeKrony, and D. Van Sanford. 2000. Fusarium head blight of wheat: breeding for resistance and assessing seed quality. University of Kentucky All Commodity Field Day, July 18, 2000.

Kennedy. B., D. A. Van Sanford, M. Hall, and C. S. Swanson. 1999. Greenhouse and Field Evaluation of Resistance to Fusarium Head Blight in Soft Red Winter Wheat. University of Kentucky Wheat Science Research Report, 1999.

Swanson, C. S., M. Hall, B. Kennedy, and D. A. Van Sanford. 2000. Resistance to Fusarium head blight: screening in the greenhouse and on selective media. 3rd Annual National Wheat Industry Forum. Feb. 10-11, 2000, Las Vegas, NV.