

**U.S. Wheat and Barley Scab Initiative
Annual Progress Report
September 15, 1999**

Cover Page

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Year:	FY1999
Grant Number:	59-0790-9-037
Grant Title:	Fusarium Head Blight Research
Amount Granted:	\$78,049.00

Project

Program Area	Objective	Requested Amount
Variety Development	Accelerate development of resistant varieties.	\$70,000
Variety Development	To screen varieties for scab resistance in a uniform nursery.	\$10,000
	Requested Total	\$80,000¹

Co - Principle 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?

Fusarium head scab is a serious disease of wheat in Ohio causing a total on-farm income loss of \$180 million during the 1995 and 1996 growing seasons. The development of scab resistant cultivars appears to be an achievable option for control of this disease. The purpose of our work is to accelerate the development of scab resistant varieties by using disease screening procedures. In the field, epidemics are created through the use of inoculation and moisture enhancement to evaluate germ plasm for improved levels of resistance. Secondly, we are screening domestic as well as exotic germ plasm for scab resistance in order to obtain improved levels of resistance, ultimately for incorporation into soft red winter wheat adapted to Ohio and the Great Lakes region. We are also attempting to develop varieties with resistances to multiple head and leaf diseases. Our aim is to develop varieties with improved partial resistance to *Stagonospora nodorum* as well as to *Fusarium graminearum*.

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

Scab resistance screening was accomplished using a number of different field nurseries and greenhouse inoculation screening tests. All the advanced lines from the Ohio State University wheat breeding program were evaluated for resistance to head scab in the field. Additionally, a series of three nurseries were used to establish early generation scab resistance selections in: 1) F3 bulk populations, 2) head row selections and 3) progeny from crosses between Fusarium head scab resistance sources and *Stagonospora glume blotch* resistance sources. Lastly, germ plasm from Yugoslavia were also screened for resistance in the field and in the greenhouse.

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

All objectives were met.

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

The main objective was to eliminate the most susceptible lines out of the advanced breeding material in the Ohio State University Wheat Breeding program. We were also able to make significant progress in selecting the most resistant material from early generation breeding lines and material from head row nurseries. Continued introgression of resistance from exotic germ plasm appears likely, with the increased possibility of incorporating resistance to *Stagonospora nodorum* as well.

Project 2: To screen varieties for scab resistance in a uniform nursery.

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

The widespread nature of Fusarium head scab and the regional adaptation of wheat varieties requires many scab resistant wheat cultivars to be developed across the winter wheat growing regions of the US. Since scab does not occur in all regions each year, wheat breeders need to have their most promising lines evaluated at numerous locations before releasing them for commercial production. A nursery was established for screening the most elite lines from contributing breeding programs throughout the winter wheat growing region.

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

Twenty four breeding lines and cultivars were submitted for testing from seven different breeding programs in six states (Indiana, Ohio, Virginia, Illinois, New York, and Kentucky). The lines submitted for testing was organized in to a nursery at Ohio State University and seed was distributed to each of the cooperators for evaluation. At this time cooperators are submitting results from this years trials which will be collated into a report for distribution to cooperating programs.

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

The report for this year could not be completed at this time due to delays in submission of test results from each location. This obviously resulted in delays in analysis of data and distribution of data to cooperators.

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

The establishment of the Uniform Winter Wheat Scab Nursery furthered the assessment of elite breeding lines for resistance to Fusarium head scab and various agronomic characteristics, including yield. This information is useful to the breeding programs in assessing which lines to release for commercial production as well as providing the more resistant germ plasm to breeders in other locations for incorporation into their breeding programs.

Year: 1999

Progress Report

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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.

Campbell, K. G. 1999. Data from the 1998 Cooperative Winter Wheat Fusarium Head Blight Screening Nursery, The Ohio State University, OARDC, Wooster, OH

Campbell, K. G. 1999. 1998 Cooperative Winter Wheat Fusarium Head Blight Screening Nursery. The Ohio State University, OARDC. <http://www/oardc.ohio-state.edu/smgrain/>