

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

Cover Page

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Year:	FY2000
Grant Number:	59-0790-9-028
Grant Title:	Fusarium Head Blight Research
Amount Granted:	\$57,500.00

Project

Program Area	Objective	Requested Amount
Variety Development & Uniform Nurseries	Accelerate the development of FHB resistant germplasm.	\$69,938.00
	Requested Total	\$69,938.00¹

Principal Investigator

Date

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

Project 1: Accelerate the development of FHB resistant germplasm.

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

There is great interest in producing hard white spring wheat and specialty red wheat varieties in the North Central U.S. However, in order to be a viable option for many farmers in the region, hard white spring wheat and specialty red varieties must have FHB resistance. We are attempting to transfer FHB resistance to hard white spring wheat and specialty red wheat varieties from adapted red spring wheats and from *Triticum dicoccoides*. The source of resistance in the adapted red types is 'Sumai 3' and the resistance from *Triticum dicoccoides* is a novel source, which has not previously been transferred to hexaploid bread wheat. We are hybridizing white and specialty wheat lines to adapted North Dakota red wheat lines and attempting to identify molecular markers to follow the transfer of resistance genes. We are hybridizing a 'Langdon' 3A *T. dicoccoides* chromosome substitution line to *Triticum tauschii* to produce a synthetic line with FHB resistance. This synthetic will be used as a germplasm "bridge" to transfer the new source of resistance into hexaploid wheat.

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

Adapted lines with the 'Sumai 3' source of FHB resistance have been hybridized to hard white and specialty wheat lines. Microsatellite markers and resistance gene analog (RGA) markers have been used to screen the adapted lines for resistance. Two microsatellite markers located to chromosomes 3B and 7B appear associated with FHB resistance QTL. We are continuing to produce the backcross populations and trying to screen new markers for transferring FHB resistance.

A graduate student has been hired, and he is producing synthetic hexaploids by crossing the 'Langdon' 3A substitution line with various *T. tauschii* accessions, which were selected for their additional resistance to *Septoria* and tan spot. A useful microsatellite marker was identified, which is being used to follow the transfer of FHB resistance from *T. dicoccoides* chromosome 3A to white and specialty wheat varieties.

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

We face constraints with respect to limited greenhouse and growth chamber facilities. Although we hope to still meet the stated objectives, these limitations have delayed the transfer of FHB resistance to white and specialty wheats, and they have delayed testing for resistance.

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

In cooperation with Dr. Shahryar Kianian, finding a useful microsatellite marker for following the transfer of FHB resistance from *Triticum dicoccoides* was a significant accomplishment, as was screening adapted ND lines with markers. Obtaining hybrids from our initial crosses represents an initial step in transferring a new source of FHB resistance into white and specialty wheats. Maize x wheat crosses with F₁ hybrids involving adapted, FHB resistant red wheats and white wheats were made. We are presently producing double-haploid seed from these crosses in an attempt to expedite the release of white wheat varieties with FHB resistance.

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.

- I.A. Del Blanco, R.C. Froberg, R.W. Stack, S.F. Kianian, and W.A. Berzonsky. 2000. Detection of QTL linked to FHB resistance in Sumai-3 derived lines. *Agronomy Abstracts: In press*.
- C.D. Otto, S.F. Kianian, E.M. Elias, R.W. Stack, and LR. Joppa. 1999. Molecular mapping for FHB resistance in a RICL population of tetraploid wheat. Proc. National FHB Forum. Sioux Falls, SD. pg. 34.
- C.D. Otto, S.F. Kianian, E.M. Elias, R.W. Stack. 1999. Molecular mapping for FHB resistance in a RICL population of tetraploid wheat. *Agronomy Abstracts* 91:159.