

**U.S. Wheat and Barley Scab Initiative
 FY00 Final Performance Report (approx. May 00 – April 01)
 July 30, 2001**

Cover Page

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Grant Number:	59-0790-9-028
Grant Title:	Fusarium Head Blight Research
2000 ARS Award Amount:	\$56,098

Project

Program Area	Project Title	Requested Amount
Variety Development & Uniform Nurseries	Improving white spring and specialty wheat germplasm for resistance to FHB.	\$69,938.00
	Requested Total	\$69,938.00¹

 Principal Investigator

 Date

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

Project 1: Improving white spring and specialty wheat germplasm for resistance to FHB.*1. What major problem or issue is being resolved and how are you resolving it?*

We are continuing our effort to incorporate resistance to *Fusarium* head blight into white spring and specialty wheat germplasm adapted to North Dakota. In FY 2000, North Dakota adapted red spring wheat cultivars with the ‘Sumai 3’ source of resistance were hybridized to advanced white wheat germplasm lines. Hybrid plants were pollinated with maize to produce haploids, and these were chemically treated to double the chromosome number. Homozygous, double-haploid lines will be increased in a winter off-season nursery and subsequently screened for resistance in a mist-irrigated nursery in Langdon, ND and a newly established mist-irrigated nursery at Fargo, ND. Lines produced from crosses involving *Fusarium* head blight resistant Brazilian germplasm and adapted North Dakota specialty wheats are being evaluated for *Fusarium* head blight resistance in the Langdon and Fargo nurseries this season.

In collaboration with Dr. Shahryar Kianian, a postdoctoral scientist working under our direction used a microsatellite marker for *Fusarium* head blight resistance to screen North Dakota germplasm lines derived from the ‘Sumai 3’ source of resistance. This marker promises to be useful in following *Fusarium* head blight resistance as it is incorporated into the white and specialty wheat germplasm lines.

A new source of *Fusarium* head blight resistance in a durum wheat substitution line is being incorporated into white and specialty wheat germplasm lines by first producing a synthetic hexaploid wheat. Hybridizing the substitution line with various *Triticum tauschii* accessions, which are also reported to have some resistance to the tan spot and *Septoria* leaf diseases, produced the synthetics after treatment with colchicine. Seed of the synthetics will be increased in the greenhouse this fall and in a winter off-season nursery. Synthetics will be evaluated for resistance to *Fusarium* head blight in 2002 field nurseries.

2. What were the most significant accomplishments?

Synthetic hexaploids, which may express resistance to *Fusarium* head blight, were produced. Production of these synthetics is significant because we plan to use them as a “bridge” to transfer resistance into white and specialty spring wheats. Furthermore, since the resistance represents a new source, different than ‘Sumai 3’, it may eventually complement the type II resistance presently expressed in adapted North Dakota spring wheats.

In FY 2001, a graduate student was added to our project to produce the synthetics and subsequently screen them for resistance. A molecular marker for resistance is being used to follow transfer of resistance to the white and specialty wheat lines, and additional useful markers are being sought. In collaboration with Dr. Len Francl, addition of a new mist-irrigated scab nursery for screening white and specialty wheat lines is significant because more material can now be evaluated within their region of adaptation.

Production of double-haploid white and specialty spring wheat lines promises to expedite the release of *Fusarium* resistant germplasm and cultivars. In turn, we hope to make these materials available for other white and specialty spring wheat breeders as soon as is possible.

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.

Del Blanco, I.A., R.C. Frohberg, R.W. Stack, S.F. Kianian, and W.A. Berzonsky. 2000.

Detection of QTL linked to FHB resistance in Sumai 3-derived lines. *Agron. Abstr.* 92:184.

Del Blanco, I.A., R.C. Frohberg, R.W. Stack, S.F. Kianian, and W.A. Berzonsky. 2000.

Detection of QTL linked to FHB resistance in Sumai 3-derived lines. p. 2000 In: *Proceedings National Fusarium Head Blight Forum*. Cincinnati, OH, Dec. 10-12.

*Otto, C.D., S.F. Kianian, E.M. Elias, R.W. Stack, L.R. Joppa, and E.T. Doehler. 2000.

Mapping of a major Fusarium head blight resistance QTL in a RICL population of tetraploid wheat. *Agron. Abstr.* 92:183.

* The marker described in this abstract is being used to follow the transfer of FHB resistance from *Triticum dicoccoides* to white and specialty wheat germplasm lines.