

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

Cover Page

PI:	Richard Frohberg
Institution:	North Dakota State University
Address:	Plant Science Dept. Fargo, ND 58105
Email:	frohberg@prairie.nodak.edu
Phone:	701-231-8143
Fax:	701-231-8474
Year:	FY1999
Grant Number:	59-0790-9-036
Grant Title:	Fusarium Head Blight Research
Amount Granted:	\$68,293.00

Project

Program Area	Objective	Requested Amount
Variety Development	Accelerate development of resistant varieties.	\$70,000
	Requested Total	\$70,000¹

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?

The major problem is reduced yield levels and quality characteristics of hard red spring (HRS) wheat induced by Fusarium head blight (FHB). This problem is being resolved by the development and selection of breeding populations to incorporate diverse genetic resistance to FHB with the desired agronomic and quality traits for a HRS wheat cultivar adapted to ND. The selection and introgression of several types of genetic resistance to FHB from diverse germplasm sources should provide a long-term solution to the control of FHB in HRS wheat.

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

Experimental breeding lines (early generation on through elite genotypes) were field evaluated in nursery trials for agronomic traits and field tested in an inoculated FHB nursery. Small seed increases were made of selected genotypes with FHB resistance derived from Chinese germplasm. Parental and elite genotypes plus germplasm sources were evaluated for FHB by single floret inoculation in the spring greenhouse test. Selected European winter wheats and South American spring wheats were used as parents with adapted HRS wheat parents for F2-generation populations in 1999 field nurseries and single-seed-descent populations in the 1999-2000 greenhouse crops. Grain from inoculated genotypes was analysed for ergosterol content to determine Fusarium colonization (Item 4).

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

Although the work proposed was for one year only 3 ½ months have elapsed since funds became available, therefore all the work could not be done. The 1999 spring greenhouse test proposed in our work plan and described above was not supported by this grant because funds were not released until June 1999.

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

Over several years we have identified HRS wheat genotypes showing an unusual relationship between DON and tombstone kernels in infected wheat. Extent of kernel colonization by Fusarium may explain this relationship. A set of genotypes was inoculated with *F. graminearum* in the greenhouse. Grain was harvested and tombstone kernels counted, the grain was milled and analysed for DON and for ergosterol. Ergosterol content of the milled grain accounted for the non-tombstone-correlated DON level in some but not all genotypes.

Breeding lines were identified that combine FHB resistance and leaf spotting resistance with acceptable breadmaking quality.

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Segregating populations were developed from crosses with selected European and South American genotypes.

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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.

Hansen, J. M., R. W. Stack, and R. C. Frohberg. 1999. Maintaining Fusarium head blight resistance in spring wheat through successive breeding cycles. *Phytopathology* 89(6 supplement): 32 (abstr).

Hansen, J. M., R. W. Stack, and R. C. Frohberg. 1999. Maintaining Fusarium head blight resistance in spring wheat through successive breeding cycles. Poster Presentation at APS/CPS joint National Meeting, Montreal. QUE. Aug 1999.