

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

Cover Page

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Year:	FY1999
Grant Number:	59-0790-9-034
Grant Title:	Fusarium Head Blight Research
Amount Granted:	\$68,293.00

Project

Program Area	Objective	Requested Amount
Variety Development	Enhance resistance to Fusarium in 2-row barley.	\$70,000
	Requested Total	\$70,000¹

Principle Investigator

Date

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

Project 1: Enhance resistance to Fusarium in 2-row barley.

- 1 What major problem or issue is being resolved and how are you resolving it?
Barley growers in North Dakota need two-rowed barley cultivars having some resistance to Fusarium head blight (FHB), incited primarily by *Fusarium graminearum*, and acceptable malt quality. These cultivars must also have better leaf spot resistance, lower grain protein, good straw strength, and better yield stability than currently grown cultivars. To achieve this goal, (1) FHB screening two-rowed barley breeding material has been enhanced and (2) recurrent selection for FHB resistance is being conducted in two-rowed barley population. Random mating in the population is facilitated using the *msg1* gene for genetic male sterility. Both approaches are designed to accumulate genes for FHB resistance that were identified previously in plant introductions.
- 2 Please provide a comparison of the actual accomplishments with the objectives established.
Electrical power and water connections were made to establish a permanent FHB screening site in an area protected by trees from the drying effect of wind on the Langdon Research Extension Station at Langdon, ND. Inoculated nurseries were grown at Langdon and Hangzhou, China to evaluate breeding lines for their FHB reactions. Lines having low FHB readings in both nurseries were identified. However, yield trial data from other nurseries indicated the lines lacked acceptable combinations of genes for resistance to other pathogens and desirable agronomic characteristics. Seedling tests of greenhouse reactions to spot blotch (*Bipolaris sorokiniana*) and net blotch (*Pyrenophora teres*) will be conducted on the best lines this fall. Seed of the best lines will also be submitted for malt quality tests to identify lines with low grain protein, high malt extract, and good amylase activity. The best lines will be intercrossed this fall to produce progenies segregating for FHB resistance and for resistance to septoria leaf blotch (*Septoria passerinii*), barley yellow dwarf virus (BYDV), leaf rust (*Puccinia hordei*), and powdery mildew (*Erysiphe graminis*). The first cycle of screening for resistance to FHB in the male-sterile facilitated random mating population was completed this summer.
- 3 What were the reasons established objectives were not met? If applicable.
Established objectives within the present time frame were met. The level of FHB resistance observed was not as high as expected, but the number of other desirable traits present in the best lines were greater than anticipated. A severe natural infection of BYDV compromised the progress made in identify lines with good agronomic traits and some FHB resistance. But, lines with the *Ryd2* gene for BYDV resistance and some FHB resistance were identified.
- 4 What were the most significant accomplishments this past year?
The data accumulated this year strongly suggests that utilization of FHB screening nurseries in both China and North Dakota will shorten the time required to develop FHB resistant two-rowed barley cultivars for North Dakota.

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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.

None.