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

Cover Page

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Year:	**FY1999**
Grant Number:	**59-0790-9-061**
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	$70,000[1]

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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 blight (FHB) is a disease that is devastating barley production in the Midwest barley-growing states of Minnesota, North Dakota and South Dakota. Developing FHB resistant barley varieties will be a key component of an overall strategy to manage this disease. Our research program has focused on breeding FHB resistant barley varieties and developing and enhancing technologies that will improve our ability to breed for FHB resistance.

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

Identify new sources of resistance. We have evaluated 7 new sources of resistance that are parents of populations that will be grown in FHB nureries in the summer of 2000.

Expand greenhouse screening. We have planted our first greenhouse screening and will plant three additional screens between now and March, 2000.

Evaluate first cycle breeding populations. We have evaluated five first cycle breeding populations in replicated field trials at one or two locations. These populations are derived from crosses between a new source of resistance to the program and an elite Minnesota breeding line.

Introgress resistance into an elite background. We have evaluated seven second or third cycle breeding populations in replicated field trials at either one or two locations. These populations involve crosses between a selected FHB resistant progeny from a first or second cycle breeding population and an elite Minnesota breeding line. Progeny from these crosses are more likely to produce an acceptable variety. We have also evaluated 21 lines from advanced cycles of FHB resistance breeding in yield trials this summer to assess their agronomic and malting quality properties.

Phenotypic evaluation of genetic mapping populations. We have evaluated two genetic mapping populations (Frederickson/Stander and Frederickson/M81//Stander) in replicated field trials at one or two locations this summer. We collected data on scab severity, heading date and plant height. We have sent grain samples to be evaluated for deoxynivalenol (DON). These data will be used to conduct a quantitative trail locus (QTL) analysis with the genetic marker data and linkage map currently under development in collaboration with Gary Muehlbauer.

Marker assisted selection. We have hired a new technician for our project whose primary responsibility is to evaluate and use DNA marker technology to enhance the breeding programs effort to improve FHB resistance. Thus far this technician has set up lab facilities and begun screening parents for polymorphisms using simple sequence repeat (SSR) markers. We are collaborating with Gary Muehlbauer in developing near isogenic lines for FHB related QTL identified in the Chevron/M69 population (de la Pena et al. 1999, TAG 99:561-569). We are also using markers to follow FHB related QTL in populations dervived from MNBrite or other Chevron progenies and reported on this progress this summer at the American Barley Researchers Workshop.

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

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

We were able to obtain good quality disease data from our field screening nurseries to provide a basis for selection.

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.

Presentations:

Canci, P.C., K. Smith, R. Dill-Macky, G.J. Muehlbauer and D.C. Rasmusson. 1999. Genetic relationship between Fusarium head blight, kernel discoloration, and grain protein. 16th American Barley Researchers Workshop, p. 18.

Smith, K.P. 1999. Barley Breeding Program. Summer Station Day, University of Minnesota - West Central Research and Outreach Center, Morris MN.

Smith, K.P. 1999. Barley Scab Breeding Program. Crookston Field Day, University of Minnesota - North Central Research and Outreach Center, Crookston, MN.