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

Cover Page

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Year:	**FY1999**
Grant Number:	**59-0790-9-067**
Grant Title:	**Fusarium Head Blight Research**
Amount Granted:	**$82,927.00**

Project

Program Area	Objective	Requested Amount
Epidemiology	Investigate the FHB host resistance genes in barley.	$35,000
Germplasm	Maintain a germplasm Center.	$50,000
	Requested Total	$85,000[1]

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Principal Investigator Date

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

Project 1: Investigate the FHB host resistance genes in barley.

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

FHB threatens the existence of the barley industry in the Upper Midwest. Deployment of resistant cultivars is the most effective and environmentally sound means of managing this disease. Sources of resistance to *Fusarium graminearum* and its toxin have been identified in barley; however, very little is known about the reaction of these resistance sources to the three other *Fusarium* species (*F. poae*, *F. avenaceum*, and *F. sporotrichioides*) causing FHB on barley in the Midwest. To effectively manage FHB using host resistance, it is essential that cultivars be bred with resistance to all four FHB pathogens. Therefore, one of the objectives of this research was to evaluate *F. graminearum* resistant barley genotypes with the three other *Fusarium* species.

A second objective was to study the infection process of *F. graminearum* and lesion development in individual kernels of resistant and susceptible barley genotypes.

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

We evaluated the FHB severity of the resistance sources Chevron, CI 4196, Zhedar 2, Imperial, and Svanhals to four species of *Fusarium* (*F. graminearum*, *F. poae*, *F. avenaceum*, and *F. sporotrichioides*) in the field. Overall, *F. graminearum* produced the highest FHB severity and *F. poae* produced the lowest FHB severity on the resistance sources. This study will be repeated during the summer of 2000.

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

The second objective of studying the infection process of *F. graminearum* in barley kernels was not completed because funding was not received until after the end of the greenhouse season. This experiment will be conducted during the upcoming autumn/winter 1999-2000 greenhouse season.

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

A significant host line x *Fusarium* species interaction was detected in the experiment suggesting that the severity of FHB infection on the resistance sources depends on the infecting *Fusarium* species.

Project 2: Maintain a germplasm Center.

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

In general, six-rowed barleys are more susceptible to FHB than two-rowed barleys. Unfortunately, six-rowed barley cultivars are the preferred type for malting in the Upper Midwest. Our objective was to evaluate accessions from the National Small Grains Collection (NSGC) to identify sources of FHB resistance in a six-rowed background.

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

Approximately half (about 4000) of the six-rowed accessions in the NSGC were evaluated for FHB resistance in the field at Langdon and Osnabrock, North Dakota in 1999. The second half of the collection will be evaluated during the summer of 2000.

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

Not applicable

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

Twelve six-rowed accessions were identified that had infection levels of less than 10%. These accessions have been distributed to barley breeders in the Upper Midwest.

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