

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

Cover Page

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Year:	FY1999
Grant Number:	59-0790-9-033
Grant Title:	Fusarium Head Blight Research
Amount Granted:	\$92,683.00

Project

Program Area	Objective	Requested Amount
Germplasm	Maintain a germplasm center.	\$25,000
Variety Development	To enhance variety development of scab resistant varieties.	\$70,000
	Requested Total	\$95,000¹

Principle Investigator

Date

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

Project 1: Maintain a germplasm center.

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

Fusarium head blight has been seriously attacking the spring, winter, and durum wheat crop in 12 states in the midwest area. Economic losses in wheat have been in billions of dollars from 1993-1999. Two states, North Dakota and Minnesota, account for two third of these dollar losses. North Dakota is the number one producing durum wheat state in the U.S. These losses are disastrous to the farm economy and has direct national impact as alternative sources of supply are sought by importing countries. The search for sources of resistance is essential to insure the development of Fusarium head blight (FHB) resistant durum cultivars. Identified sources of resistance will be incorporated to the currently susceptible durum wheat germplasm to develop resistant cultivars. These cultivars will insure the stability of good quality durum wheat production for the producers, domestic pasta industry, and the international export market.

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

The main objective of this project is to identify sources of resistance to FHB. Several durum wheat genotypes including durum accessions from the world collection were evaluated for FHB resistance at Prosper, ND and Shanghai China. Identified resistant genotypes will be re-tested in the in the greenhouse to confirm their resistance.

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

In 1998, durum wheat from the world collection tested at prosper ND were lost because they were out of their adaptation area and were very susceptible to foliar diseases such tan spot *Pyrenophora tritici-repentis* and *Spetoria Spp*. Therefore the accessions were tested only in China and France in 1999. Greenhouse evaluations of identified potential sources of resistance from China is delayed because of quarantine requirements.

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

A total of 500 accessions were sent to the Academy of Agricultural Sciences, Plant Protection Institute (AASPPI) Shanghai, China to be evaluated for FHB in the 1998-99 growing season. Also 50 accessions were sent to Groupment Agricole Essonnois (GAE) in France for evaluation. These evaluations at various sites will allow germplasm exchange and provide international evaluation to a large array of Fusarium strains to determine the effectiveness of incorporated resistance in the germplasm. The 500 accessions were successfully evaluated at AASPPI. A variation in infection existed

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among these genotypes, few lines had a very moderate level of resistance to FHB. Two thousand new accessions will be evaluated at AASPPI in the 1999-00 growing season.

Project 2: To enhance variety development of scab resistant varieties.

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

Fusarium head blight has been seriously attacking the spring, winter, and durum wheat crop in 12 states in the midwest area. Economic losses in wheat have been in billions of dollars from 1993-1999. Two states, North Dakota and Minnesota, account for two third of these dollar losses. North Dakota is the number one producing durum wheat state in the U.S. These losses are disastrous to the farm economy and has direct national impact as alternative sources of supply are sought by importing countries. Fungicides may reduce the effect of FHB on durum wheat. However, the most economically feasible and “environmentally friendly” means of providing resistance to FHB is through host plant resistance. The search for sources of resistance is essential to insure the development of Fusarium head blight (FHB) resistant durum cultivars.

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

The main objective of this project is to develop FHB resistant cultivars that can maximize the economic return to the producers and provide good quality durum wheat for the domestic pasta industry and the international export market. Classical and accelerated breeding schemes were used to accomplish our stated objectives. However, no FHB resistant or tolerant cultivars were released this year.

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

Developing and releasing durum wheat cultivars is a lengthy process that requires 10-12 years of research. In 1996 we identified *Triticum dicoccoides* a wild relative of durum wheat to have some level of resistance to FHB. We have been using this source of resistance since 1996, a FHB resistant cultivar is not expected to be released before 2005.

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

In the summer of 1999 we planted 3000 hill plots from various crosses in the durum FHB nursery at Prosper, ND. An artificial epidemic of *Fusarium graminearum* was created by spreading infected corn kernels on the ground. A good epidemic was created and disease ratings were recorded for all lines in the screening nursery. Selected lines from the various crosses will be re-evaluated in the Fall of 1999-00 greenhouse. Also some of the selected lines and the world collection will be evaluated at the Academy of Agricultural Sciences, Plant Protection Institute, (AASPPI) Shanghai, China . In addition to the above material lines from crosses with Chinese spring wheat Sumai-3 were evaluated at AASPPI. Few of these lines

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showed to have some level of resistance. These lines we be re-evaluated in the greenhouse and AASPPI to confirm their resistance.

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