

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

Cover Page

PI:	Shahryar Kianian
Institution:	North Dakota State University
Address:	Dept. of Plant Sciences 470G Loftsgard Hall Fargo, ND 58105
Email:	kianian@badlands.nodak.edu
Phone:	701-231-7574
Fax:	701-231-8474
Year:	FY1999
Grant Number:	59-0790-9-048
Grant Title:	Fusarium Head Blight Research
Amount Granted:	\$19,512.00

Project

Program Area	Objective	Requested Amount
Biotechnology	Develop "breeder friendly" markers based on cloned disease resistance loci linked to FHB resistance.	\$20,000
	Requested Total	\$20,000 ¹

Principle Investigator

Date

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

Project 1: Develop "breeder friendly" markers based on cloned disease resistance loci linked to FHB resistance.

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

The ultimate goal of this project is to apply PCR primers based on Resistance Gene Analogs (RGAs) to develop "breeder friendly" markers to accelerate the process of germplasm development and time to variety release.

Specific objectives of the project are to:

- a) identify markers closely linked to FHB resistance loci;
- b) develop a PCR-based marker system for screening of large populations segregating for FHB;
- c) show the utility of these markers in populations developed by various breeding programs; and
- d) open avenues of research into the mechanism of resistance to FHB.

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

The funding for this project became available on 5/14/1999 and the progress since is reported here. The funding for this project (0.3) was combined with additional support at NDSU to recruit a postdoctoral scientist who can be dedicated full-time to wheat FHB research. This position was nationally advertised and Dr. Isabel Alicia del Blanco, a recent graduate from Oregon State University, was hired on 8/15/1999. Alicia has extensive experience in wheat breeding and FHB research.

Objectives a & b) We have obtained the following materials for identifying markers closely linked to FHB resistance loci: 1) Lines derived from the ND wheat breeding program headed by Dr. Froberg carrying Sumi#3 derived FHB resistance and their susceptible parental and sister lines; 2) Langdon durum *T. dicoccoides* recombinant inbred chromosome lines segregating for resistance to FHB; 3) Populations developed from durum x Chinese sources of resistance; 4) Backcross wheat populations from crosses to *T. dicoccoides* lines resistant to FHB; 5) A recombinant inbred hexaploid wheat population from a cross of FHB resistant x FHB susceptible line developed by Dr. Froberg; and 6) Wangshuibai x wheat recombinant inbred population. We have been screening these populations with 9 sets of RGA of primers. One of these primers, CLRR, has proved very useful in detecting polymorphic fragments. Once verified we plan to clone the linked fragments and develop longer, locus specific primers for use in screening of large populations segregating for FHB. We have additional RGA primers available and are in the process of screening them.

Objectives c & d) We are collecting leaf samples from doubled haploid lines developed by the Durum Breeding program at NDSU (Dr. Elias, project leader) using a *T. dicoccoides* line resistant to FHB for screening with linked primers once they are available. Additionally, we have provided all our RGA primers to the barley genetics program at USDA-ARS in Fargo (Dr. Dahleen, project leader) for their use in identifying linked markers.

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

We have made satisfactory progress for the four months since funding became available. The drive toward achieving the stated objectives is accelerating now that project is fully staffed. Additional funding for supplies would help in this direction.

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

Fully staffing the project

Identification and screening of material for resistance to FHB

Identification of candidate markers linked to FHB 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.

Nothing to date; however, we anticipate publications on marker identification and use in the coming years as the project develops.