

**U.S. Wheat and Barley Scab Initiative
 FY02 Final Performance Report (approx. May 02 – April 03)
 July 15, 2003**

Cover Page

PI:	Justin D. Faris
Institution:	USDA-ARS
Address:	Northern Plains Cereal Crop Research P.O. Box 5677 State Univ. Station Fargo, ND 58105
E-mail:	farisj@fargo.ars.usda.gov
Phone:	701-239-1339
Fax:	701-239-1369
Year:	FY2002 (approx. May 02– April 03)
Grant Number:	NA
Grant Title:	Fusarium Head Blight Research
FY02 ARS Award Amount:	\$ 17,869

Project

Program Area	Project Title	USWBSI Recommended Amount
BIO	Molecular mapping of Fusarium head blight resistance genes in tetraploid wheat.	\$18,316
	Total Amount Recommended	\$18,316

 Principal Investigator

 Date

Project 1: Molecular mapping of Fusarium head blight resistance genes in tetraploid wheat.

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

Fusarium head blight (FHB) is one of the most devastating diseases of wheat. Resistant sources of hexaploid bread wheat have been identified and are currently being employed in breeding programs, but development of resistant tetraploid durum wheat has met with less success. Resistance has been identified in *Triticum dicoccoides*, a wild tetraploid relative, which readily hybridizes with durum wheat. A resistant accession of *T. dicoccoides* was used to create disomic chromosome substitution lines in the Langdon durum background. Screening of the substitution lines for FHB resistance indicated that chromosomes 5B and 7A contain resistance factors. Using Langdon and the 5B (LDN-DIC 5B) and 7A (LDN-DIC 7A) substitution lines as parents, recombinant inbred chromosome line (RICL) mapping populations will be produced. The populations will be subjected to FHB inoculations and genetic maps of chromosomes 5B and 7A will be generated using molecular markers such as RFLPs, AFLPs, and microsatellites. Quantitative trait loci (QTL) analysis will be performed to identify genomic regions associated with resistance. Putative QTLs will be further targeted to identify markers tightly linked to them. The most informative markers will be converted to user-friendly PCR-based markers and freely distributed to interested breeders and geneticists. The diagnostic markers should expedite the introgression of *T. dicoccoides*-derived resistance genes into elite durum lines using marker-assisted selection. Combining the FHB resistance genes identified from this project along with genes identified by others from different sources should lead to a highly resistant durum cultivar.

2. What were the most significant accomplishments?

It is essential to construct immortal segregating populations for mapping of complex quantitative traits such as resistance to Fusarium head blight. Recombinant inbred lines are selfed to homozygosity and thus can be used for unlimited numbers of replicated experiments. Toward this goal, we advanced RICL populations derived from LDN x LDN-DIC 5B and LDN x LDN-DIC7A to the F6 generation during FY02. Each population consists of approximately 150 RICLs. Thus, within FY02 we were able to advance the two populations very near to completion. In addition, we obtained 32 microsatellite primer sets specific for chromosome 5B and 20 microsatellite primer sets specific for chromosome 7A. A total of 35 of these primer sets have been used to screen the parents for polymorphisms, and 24 of the 35 revealed polymorphisms and will be useful for mapping.

FY02 (approx. May 02 – April 03)

PI: Faris, Justin D.

Grant: NA

FY02 Final Performance 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.