USDA-ARS / USWBSI
FY03 Final Performance Report (approx. May 03 – April 04)
July 15, 2004

Cover Page

PI:	**Justin D. Faris**
Institution:	**USDA-ARS**
Address:	**NCSL** **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:	**FY2003 (approx. May 03 – April 04)**
FY03 ARS Agreement ID:	**NA**
FY03 ARS Agreement Title:	**Molecular mapping of Fusarium head blight resistance genes in tetraploid wheat.**
FY03 ARS Award Amount:	**$ 40,098**

USWBSI Individual Project(s)

USWBSI Research Area*	Project Title	ARS Adjusted Award Amount
BIO	Molecular mapping of Fusarium head blight resistance genes in tetraploid wheat.	$ 40,098
	Total Amount Recommended	**$ 40,098**

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Principal Investigator Date

* BIO – Biotechnology
CBC – Chemical & Biological Control
EDM – Epidemiology & Disease Management
FSTU – Food Safety, Toxicology, & Utilization
GIE – Germplasm Introduction & Enhancement
VDUN – Variety Development & Uniform Nurseries

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 chromosome 7A contains resistance factors. Using Langdon and the 7A (LDN-DIC 7A) substitution line as parents, a recombinant inbred chromosome line (RICL) mapping population was produced. The population will be subjected to FHB inoculations and genetic maps of chromosome 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?

The LDN x LDN-DIC 7A RICL population was advanced to the F7 generation and completed. We isolated DNA from the entire population and screened it with polymorphic microsatellite markers. Seventeen markers have been mapped, which formed a linkage group corresponding to chromosome 7A of approximately 140 cM in genetic length. The population was grown in three replications in the greenhouse and inoculated to test for reaction to FHB. However, the experiment was aborted due to heavy infestation of powdery mildew. Appropriate measures have been taken to prevent this from happening again.

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 you grant. Please reference each item using an accepted journal format. If you need more space, continue the list on the next page.

None.