U.S. Wheat and Barley Scab Initiative
FY01 Final Performance Report (approx. May 01 – April 02)
July 15, 2002

Cover Page

PI:	**Richard C. Frohberg/Mohamed Mergoum**
Institution:	**North Dakota State University**
Address:	**Dept. of Plant Sciences** **Loftsgard Hall, P.O. Box 5051** **Fargo, ND 58105-5051**
Email:	**Mohamed.mergoum@ndsu.nodak.edu**
Phone:	**701-231-8478**
Fax:	**701-231-8474**
Year:	**FY2002 (approx. May 01 – April 02)**
Grant Number:	**59-0790-9-036**
Grant Title:	**Fusarium Head Blight Research**
FY01 ARS Award Amount:	**$ 77,682**

Project

Program Area	Project Title	Requested Amount
Variety/Uniform	Development of hard red spring wheat cultivars resistant to scab	$ 79,800
	Total Amount Requested	**$ 79,800**

Mohamed Mergoum/ Richard C. Frohberg

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Principal Investigator Date

(Form – FPR01)

Project 1: Development of hard red spring wheat cultivars resistant to scab

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

   Fusarium Head Blight (FHB) is causing a major problem for Hard Red Spring Wheat (HRSW) in North Dakota (ND) by significantly reducing grain yield levels and quality characteristics. In the past years, FHB had tremendous implications on HRSW producers, uses and export market particularly in ND. This problem have been resolved by the development and selection of elite parental genotypes, elite lines and breeding populations to incorporate diverse genetic resistance to FHB with desired agronomic and quality traits into a HRSW cultivar adapted to ND. The combination of several types of genetic resistance to FHB from diverse germplasm sources into adapted cultivars should provide a strategic long-term solution to the control of FHB not only in ND but in the entire HRSW growing region.

2. What were the most significant accomplishments?

   New advanced breeding lines derived from population involving new sources of resistance to FHB other than the Chinese source Sumai-3 were tested and screened for their resistance to FHB under field and greenhouse conditions.

   Type I resistance to FHB was investigated in a 3 way cross population with two parents supposedly having type I resistance and breeding lines with significantly reduced incidence were obtained.

   Advanced lines selected from two populations involving a Hungarian source of resistance to FHB (different from Sumai-3) with level of resistance similar to those obtained from Sumai-3 crosses (ND2710) were identified.

   The transfer of resistance to FHB located on the 3A chromosome of Durum wheat was accomplished and the F4 population is being screened this crop cycle.

   A breeding line with FHB resistance similar to Alsen variety (registered in 2000 as the first cultivar that has FHB resistance from Sumai-3) was presented for a pre-release ND committee.

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.

a. Papers published in Ref. J.

Anderson, J.A., R.W. Stack, S. Liu, B.L. Waldron, A.D. Fjels, C. Coyne, B. Moreno-Sevilla, P.B. Cregan, and R.C. Frohberg. 2001. DNA markers for Fusarium head blight resistance QTL's in two wheat populations. Theor Appl. Genet. 102:1164-1168.

b. Abstracts published in Ref. J.

Dill-Macky, R., R.W. Stack, and J.V. Wiersma. 2001. Comparison of two methods for estimating scabby kernels in Fusarium-infected spring wheat. Phytopathology 91(6-suppl):S23.(abstr).

Stack, R.W., R.C. Frohberg, J. Mitchell-Fetch and J.M. Hansen. 2001. Fusarium head blight reaction in F2 and F3 generations of a spring wheat recombinant population. Phytopathology 91:(6-suppl):S179-180.(abstr).

Stack, R.W., R.C. Frohberg, J.M. Hammond, and J.N. Hansen. 2001. Combining ability of Fusarium head blight resistance from different spring wheat sources. Phytopathology 91(6-suppl):S84.(abstr).

Stack, R.W., C.E. Wolf-Hall, H.H. Casper and J.M. Hansen. 2001. No correlation between Fusarium head blight in wheat and DON production by cultures of Fusarium graminearum. Phytopathology 91(6-suppl):S84.(abstr).

c. Other Abstracts published.

Froberg, R.C., R.W. Stack, and S. S. Maan. 2001. A Fusarium Resistance Gene on Chromosome 5A of a Hard Red Spring Wheat and an Awn Promotor are Linked. Agronomy Abstracts 2001 (electronic publ.).

d. Reports in Proceedings.

Dill-Macky, R., R.W. Stack, and J.V. Wiersma. 2001. Comparison of two methods for estimating scabby kernels in Fusarium-infected spring wheat. Proc. 2001 Nat. FHB Forum p111.

Miller, J. D. and R.W. Stack. 2001. Stem rust resistance in spring wheat germplasm resistant to Fusarium head blight. Proc. 2001 Nat. FHB Forum p259

Stack, R.W., R.C. Frohberg, J.M. Hammond, and J.N. Hansen. 2001. Combining ability of Fusarium head blight resistance from different spring wheat sources. Proc. 2001 Nat. FHB Forum p207.