

**U.S. Wheat and Barley Scab Initiative
 FY00 Final Performance Report (approx. May 00 – April 01)
 July 30, 2001**

Cover Page

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Grant Number:	59-0790-9-057
Grant Title:	Fusarium Head Blight Research
2000 ARS Award Amount:	\$73,171

Project

Program Area	Project Title	Requested Amount
Variety Development & Uniform Nurseries	Improvement of soft winter wheat for resistance to FHB.	\$77,765.00
	Requested Total	\$77,765.00¹

Principal Investigator

Date

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

Project 1: Improvement of soft winter wheat for resistance to FHB.

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

Current soft winter wheat cultivars that are adapted to Indiana and the eastern United States are susceptible or have little resistance to *Fusarium graminearum*, the causal fungus of Fusarium Head Blight (FHB) or wheat scab. FHB has become frequent and severe during the last 15 years, coinciding with the widespread adoption of reduced soil tillage for soil conservation. In seasons with favorable weather conditions for development of the disease, significant production and wheat grain quality losses have occurred. Wheat germplasm lines and/or cultivars from other parts of the world that have effective resistance to Fusarium have been identified. Thus, research to transfer Fusarium resistance to improved cultivars adapted to Indiana and surrounding regions is being supported by this grant.

2. What were the most significant accomplishments?

Breeding. Previous to year 2000 a number of partially adapted soft winter wheat lines were developed at Purdue University that have Fusarium resistance from several source lines including Ning7840, 201R, Freedom, Patton, Ernie, Bizel, and low Fusarium incidence from cultivar Goldfield. In March 2000 over 300 three-way, backcross, and double crosses were effected to transfer Fusarium resistance of these intermediately adapted lines to improved adapted lines and to combine Fusarium resistance from multiple sources. The adapted lines were carefully chosen to have resistance to other important fungal diseases, viruses, and the insect pest, Hessian fly.

The hybrid seeds were seeded in early May at Colon, Argentina and mild selection for resistance to *Fusarium*, *Puccinia recondita*, and *Septoria tritici* was made in the segregating F1 populations. F2 seeds from selected F1 plants were seeded at Evansville, IN in mid November 2000 and selection for resistance to *Fusarium*, *P. recondita*, *S. tritici*, and *Stagonospora nodorum* was made in the F2 populations in April-May 2001. F3 seeds from selected F2 plants will be seeded at Lafayette, IN in early October 2001 to continue the development of adapted *Fusarium*-resistant wheat lines. The misting system established in 2000 was expanded to cover an area of 1.5 acre to enhance screening of breeding nursery populations and the Cooperative Fusarium Nursery. The misting system resulted in enhanced severity of other important diseases as well as Fusarium, allowing more effective selection for resistance.

Genetics. Six benches in greenhouses were outfitted with an overhead fine misting system to enhance screening for FHB resistance. Development of recombinant inbred populations from the crosses: Bizel (FHB-resistant) X Patterson (FHB-susceptible), and 201R (FHB-resistant) X Patterson was completed to F6:7 and screening of the populations was begun in greenhouse and field testing by single floret inoculation to identify type 2 resistance. Screening of these populations will be continued to develop reliable characterization for resistance and DNA markers closely associated with FHB resistance QTLs will be identified. Screening of the N894037 (FHB-resistant) X Alondra (FHB-intermediate resistant) F8:9 recombinant inbred population was completed and DNA markers closely associated with resistance QTLs has been initiated. Thesis research characterizing FHB resistance and DNA marker identification of resistance of Ning7840, Patton, and Freedom is being completed and publication of results is expected in 2002.

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.

Drake, D.R. and H.W. Ohm. 2000. Fusarium head blight resistance in wheat cultivars Ning7840 and Freedom. p. 252. *In* R. Ward et al. (eds.) Proc. 2000 National FHB Forum. University Printing, East Lansing, MI.

Ohm, H.W. 1999. 'Winter nursery' for winter wheat. p. 181-182. *In* J. Wagester et al. (ed.) Proc. 1999 National FHB forum. University Printing, East Lansing, MI.

Shen, X. and H.W. Ohm. 2000. Fusarium head blight resistance of wheat line Ning894037. p. 281. *In* R. Ward et al. (eds.) Proc. 2000 National FHB Forum. University Printing, East Lansing, MI.