

**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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Year:	FY2000 (approx. May 00 – April 01)
Grant Number:	59-0790-9-074
Grant Title:	Fusarium Head Blight Research
2000 ARS Award Amount:	\$304,511

Project

Program Area	Project Title	Requested Amount
Executive Committee	U.S. Wheat and Barley Scab Initiative Networking & Facilitation Office.	\$199,304.00
Variety Development & Uniform Nurseries	To enhance development of scab resistant varieties.	\$77,433.00
	Requested Total	\$276,737.00¹

Principal Investigator

Date

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

Project 1: U.S. Wheat and Barley Scab Initiative Networking & Facilitation Office.

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

Scab affects the industries and people involved in virtually every stage of the production, processing, and distribution systems of five market classes of wheat and barley across the U.S. The Networking and Facilitation Office (N&FO) was established in 1999 to minimize the barriers to the U.S. Wheat & Barley Scab Initiative's success arising from the administrative burdens and communication challenges that are involved in working with over 72 researchers across 22 states. The N&FO is addressing this problem by 1) helping scientists and all interested parties, who in the past may have problems communicating with each other, to learn from each other by facilitating communications and communication system development; 2) identifying and implementing an internet-based communication and collaboration mechanisms; and 3) acting as a center of accountability and a rapid clearing house of scab-related information. The NF&O also provides administrative support to the various committees and associated conferences associated with the Initiative, including annual resolution of a comprehensive national research plan and budget.

2. What were the most significant accomplishments?

The fifth, sixth and seventh issues of the "Scab Newsletter" have been published. The call for pre-proposals for the FY2002 research plan has gone out, and a final performance reports for the FY2000 projects are being completed by researchers and will be forwarded to ARS in early August. The 4th National Fusarium Head Blight Forum was held in December 2000 in Erlanger, Kentucky. This has been the most successful forum to date with 170 participants in attendance. Planning for the 2001 National Scab Forum is well underway. The N&FO organized two Steering Committee meetings, and four Executive Committee conference calls. A workshop for the Epidemiology and Disease Management research area, and also a tour of the transformation labs in Manhattan, Kansas and Lincoln, Nebraska, by researchers from the Biotechnology research area, was funded with resources from this office. A part-time web designer hired in September has made vast improvements to the Initiative's website (<http://www.scabusa.org>). The web-based database will soon be integrated with the static website. One of the main objectives of the NFO is to create a seamless "real-time" network that allows individuals to search all of the Initiative's available information; to contact various scientists that are involved in scab research; to interact with fellow producers, processors, and consumers of wheat and barley; and to post information on the web in multiple media forms. This increase in communication through the Scab website should hasten and improve the results of the scientists' research activities.

Project 2: To enhance development of scab resistant varieties.

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

FHB rendered the 1996 Michigan soft white winter wheat (SWWW) crop unusable by the processing industry. To date, no SWWW varieties are available that express resistance to this disease. Resolution of this deficiency is being addressed through a combined greenhouse and field breeding program employing conventional techniques of hybridization and selection. To that end, we are enhancing our capacity to screen for FHB reaction, and increasing the relative contribution and diversity of FHB resistant parents in our breeding crosses. More precisely, 30 resistance resources were introduced into our breeding program. Most of these materials are new improved germplasm from China, such as highly-resistant W14, CJ 9306, CJ 9311; high yielding and scab resistant CJ 9403, CJ 9815, CJ 9807, CJ 8809, TFSL 037; white-grained SH 19089, Shaan 85-2, CJ 9602; and so on. W14, CJ 9807, CJ 9804, TFSL 037, CJ 9306, CJ 9815, CJ 9602, CJ 9403 and SH 19089 were used resistant parents to cross with US winter wheat varieties. We have also refined our single floret inoculation greenhouse based screening system. Field screening of all advanced yield trial materials is also supported with these funds.

2. What were the most significant accomplishments?

Greenhouse and field screening of lines in the advanced and preliminary yield tests identified five soft white winter wheat lines (D6234, D9070, E0009, E0010, E0039) which combine favorable agronomic, quality and FHB reaction traits. The crosses from which these lines derive were made prior to adoption of FHB resistance as a major priority of the program. Their resistance to FHB is consequently moderate at best. Preliminary yield tests in the fall of 2001 will include for the first time lines which derive from crosses involving known FHB resistant parentage. 70 crosses (including backcrosses) were made in the greenhouse. 25 were made to transfer the resistance from Chinese germplasm into the local varieties; 21 resistant to resistant were made to pyramid resistance genes. In summary, the MSU white wheat breeding program now has FHB resistance germplasm at all levels of development. Our physical capacity to screen in both the field and greenhouse has been enhanced during this funding cycle.

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.

Ward, Richard, T. Sayler, and S. Canty. Spring 2001. Scab News. U.S. Wheat & Barley Scab Initiative. Volume 4, Issue 1.

Ward, Richard. March, 2001. The U.S. Wheat and Barley Scab Initiative. North American Millers' Association Milling Quality Grains Division Meetings, San Antonio, Texas.

Ward, Richard. March, 2001. The U.S. Wheat and Barley Scab Initiative. Warren E. Kronstad Symposium, CD. Obregon, Sonora, Mexico.

Ward, Richard. January, 2001. History of the U.S. Wheat and Barley Scab Initiative. Proceedings from the 33rd Barley Improvement Conference, San Antonio, Texas. pp 1-5.

Ward, Richard, and S. Canty. 2000. Proceedings from the 2000 National Fusarium Head Blight Forum, Erlanger, Kentucky.

Ward, Richard, T. Sayler, and S. Canty. Fall 2000. Scab News. U.S. Wheat & Barley Scab Initiative. Volume 3, Issue 2.

Ward, R. et al. Michigan State Wheat Variety Trial Results. July, 2000. Distributed through extension offices and published in the August 30 issue of the Michigan Farm Bureau's Michigan Farm News. [FHB data included]

Ward, Richard, T. Sayler, and S. Canty. Summer 2000. Scab News. U.S. Wheat & Barley Scab Initiative. Volume 3, Issue 1.

Ward, Richard and Tracy Sayler. May, 2000. U.S. Wheat and Barley Scab Initiative: An Unprecedented University, Government and Industry Collaboration Focused on Accelerated Research of a Serious Cereal Disease Problem. International Wheat Scab Symposium, Suzhou, China.

Lewis, Janet, Richard Ward, and L. Patrick Hart. 2000. Sites of Action of Type II Resistance to FHB in Wheat: Ning 7840 Retards Spread of *F. graminearum* within Rachis. Int'l. Wheat Scab Symposium, Suzhou and Nanjing, China.

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Van Sanford, David, J. Anderson, K. Campbell, J. Costa, P. Cregan, C. Griffey, P. Hayes, and R. Ward. 2001. Discovery and Deployment of Molecular Markers Linked to FHB Resistance: An Integrated System for Wheat and Barley. *Crop Science*. 41: 638-644