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

## Cover Page

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| **Year:** | **FY2001 (approx. May 01 – April 02)** |
| **Grant Number:** | **59-0790-0-062** |
| **Grant Title:** | **Fusarium Head Blight Research** |
| **FY01 ARS Award Amount:** | **$ 43,249** |

## Project

| Program Area | Project Title | Requested Amount |
|---|---|---|
| Variety/Uniform | Development of scab resistant wheat cultivars for Kansas | $ 44,428 |
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| | **Total Amount Requested** | **$ 44,428** |

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Principal Investigator Date

**Project 1: Development of scab resistant wheat cultivars for Kansas**

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

Serious Fusarium head blight (scab) epidemics have occurred in Kansas in 1982, 1990, 1993, and 1995 with most of the losses occurring in the eastern quarter of the state. Since 1980, wheat acreage in the eastern quarter of Kansas has declined by two thirds mostly due to farmer aversion to the risk of scab. Scab also has the potential to become more prevalent in central Kansas due to decreasing tillage and increasing cultivation of corn, the main reservoir for inoculum. The best long-term solution to the problem is to produce winter wheat cultivars that have high levels of resistance to scab. Until involvement in the USDA Scab Initiative, there was virtually no effort for identifying sources of resistance in Kansas breeding programs. The Initiative has resulted in the development of greenhouse and field screening nurseries that provided accurate ratings for current cultivars in Kansas, advanced breeding lines, and participation in the Regional Scab Nursery. Respectively, these nurseries allowed dissemination of information to growers on the reaction of current commercial cultivars, selection for scab resistance in breeding lines, and identification of additional sources of resistance from other breeding efforts in the region.

2. What were the most significant accomplishments?

Because of the scab screening efforts, a new column for reaction to Head Scab was added to the popular extension publication *Wheat Variety Disease and Insect Ratings* for the fall, 2000 issue, updated for the 2001 issue, and will be updated in subsequent issues. For the first time, this has allowed producers in Kansas to use the reaction to scab to help select cultivars for planting. Additionally two commercial cultivars in Kansas (Hondo and Heyne) were identified in 2000 (and confirmed in 2001 and 2002) as having good levels of resistance (3 and 4 on the 1-9 scale where 1=immune and 9=highly susceptible). During the past few years, these cultivars have averaged 13 and 16% scab, respectively compared with about 50% in highly susceptible cultivars. Similarly, the newly-released cultivar Lakin has shown moderate levels of resistance with 26-34% scab. Five other commercial cultivars have also displayed moderate levels of resistance. Therefore, there are genes for scab resistance already present in cultivars adapted to Kansas that can potentially be used in the development of future cultivars. Finally, both KSU wheat breeders and the USDA wheat geneticist have been involved in the project by having their breeding lines evaluated for resistance to scab.

The objective to develop scab resistant cultivars for Kansas has just begun. It normally takes about 10 years to produce a cultivar from initial crosses until release. Even though two Kansas cultivars have been identified with good levels of resistance, five of the six most popular commercial cultivars (Jagger, 2137, TAM 107, Ike, and 2163), representing 70% of the seeded acreage, are susceptible. Clearly, a long-term effort in providing resistance-screening nurseries is needed to help breeders select and release cultivars that have acceptable resistance to scab.

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.

1. Bowden, R. L. and Brooks, H. L. 2000. Wheat Variety Disease and Insect Ratings 2000. Kansas State University Agricultural Experiment Station and Cooperative Extension Service bulletin #MF-991, 4 pp.

2. Davis, M. A., Bowden, R. L., and Bockus, W. W. 2000. Reaction of selected winter wheat accessions to Fusarium head blight, 1999. Biol. Cult. Tests Control Plant Dis. 15:132.

3. Bockus, W. W. June 2000. Fusarium head blight nurseries. Demonstration of field plots to participants of the Western Coordinating Committee WCC-97 (*Cereal Diseases*) annual meeting at Manhattan, KS.

4. Bockus, W. W. August 2000. Fusarium head blight. Radio talk for the *Agriculture Today* program on KKSU, AM 580 radio station.

5. Davis, M. L., Bockus, W. W., and Bowden, R. L. 2000. Reproducibility of results form field and greenhouse evaluations of resistance to Fusarium head blight on winter wheat. Proceedings of the 2000 National Fusarium Head Blight Forum. p. 251.

6. Bowden, R. L. and Brooks, H. L. 2001. Wheat Variety Disease and Insect Ratings 2001. Kansas State University Agricultural Experiment Station and Cooperative Extension Service bulletin #MF-991, 4 pp.

7. Bockus, W. W., McKenzie, S. A., and Bowden, R. L. 2001. Reaction of selected Kansas winter wheat cultivars to Fusarium head blight, 2000. Biol. Cult. Tests Control Plant Dis. Vol. 16 (only published online at www.scisoc.org/online/B&Ctests/2001/top.htm).

8. Davis, M. A., Bockus, W. W. and Bowden, R. L. 2001. Reaction of selected winter wheat accessions to Fusarium head blight, 2000. Biol. Cult. Tests Control Plant Dis. Vol. 16 (only published online at www.scisoc.org/online/B&Ctests/2001/top.htm).

9. Bockus, W. W., Davis, M. A., and Bowden, R. L. 2001. Rankings of wheat cultivars after using different times and methods to rate Fusarium head blight. Proceedings of the 2001 National Fusarium Head Blight Forum. p. 227.

10. Bockus, W. W., Jedlicka, B. G., and Bowden, R. L. 2002. Reaction of selected winter wheat cultivars to Fusarium head blight, 2001. Biol. Cult. Tests Control Plant Dis. Bol. 17 (only published online at www.scisoc.org/online/B&Ctests/2001/top.htm).

11. Davis, M. A., Bockus, W. W., Bowden, R. L., and Brown-Guedira, G. L. 2002. Reaction of selected winter wheat accessions to Fusarium head blight, 2001. Biol. Cult. Tests Control Plant Dis. Vol. 17 (only published online at www.scisoc.org/online/B&Ctests/2001/top.htm).

12. Bockus, W. W. May 2002. Progress and prospects for obtaining resistance to Fusarium head blight. Talk and discussion leader for "Diseases besides rust" at the "Wheat Retreat" in Kansas City which was for all KSU researchers working on wheat.