

**USDA-ARS/
U.S. Wheat and Barley Scab Initiative
FY05 Final Performance Report (approx. May 05 – April 06)
July 14, 2006**

Cover Page

PI:	Eugene Milus
Institution:	University of Arkansas
Address:	Department of Plant Pathology 217 Plant Science Bldg. Fayetteville, AR 72701
E-mail:	gmilus@uark.edu
Phone:	501-575-2676
Fax:	501-575-7601
Fiscal Year:	2005
FY05 ARS Agreement ID:	59-0790-4-115
Agreement Title:	Management of FHB in Arkansas.
FY05 ARS Award Amount:	\$ 76,114

USWBSI Individual Project(s)

USWBSI Research Area*	Project Title	ARS Adjusted Award Amount
CBC	Chemical and Biological Control of FHB on Wheat in Arkansas.	\$ 6,829
VDUN	Developing FHB-Resistant Wheat Cultivars for the Midsouth.	\$ 69,285
	Total Award Amount	\$ 76,114

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: *Chemical and Biological Control of FHB on Wheat in Arkansas.*

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

The major objective has been to identify the most effective fungicides and biological control agents for reducing FHB in the field and DON in harvested grain. I have participated in the planning, implementation, and analyses of the Uniform Fungicide and Biological Control Trials that are coordinated by the CBC. Treatments that were believed to be effective were tested at multiple locations, and I conducted the test in Arkansas. I also contacted plant pathologists in Europe who evaluate fungicides for efficacy against FHB on wheat and barley to determine the most effective treatments in Europe.

**2. List the most important accomplishment and its impact (how is it being used?).
Complete all three sections (repeat sections for each major accomplishment):**

Accomplishment:

Prosaro fungicide was the most effective in Europe and in the Uniform Trials and is always more effective than Folicur fungicide that has been used in several states to manage FHB under Section 18 permits.

Impact:

Bayer Crop Science, the owner of Prosaro, is attempting to get this fungicide registered for use on wheat and barley in the US as quickly as possible.

As a result of that accomplishment, what does your particular clientele, the scientific community, and agriculture as a whole have now that they didn't have before?:

There is hope that a more effective fungicide soon will be available to wheat and barley growers in the US. At this point, the issue rests with the US EPA.

Project 2: *Developing FHB-Resistant Wheat Cultivars for the Midsouth.*

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

The major problems are that wheat cultivars currently grown in the region have little or no resistance to FHB and that levels of DON in harvested grain sometimes exceed the allowable level.

The Arkansas program is resolving this by developing several wheat lines with more competitive yield potential and moderate to high levels of resistance to FHB and other diseases that are important in the region.

The Arkansas program also assisted other breeding programs by evaluating the Southern FHB Nursery for resistance to FHB and stripe rust and by evaluating the Northern and Preliminary Northern FHB Nurseries for resistance to stripe rust.

A Ph. D. graduate student was recruited to conduct research to identify and select resistance to DON in harvested grain.

**2. List the most important accomplishment and its impact (how is it being used?).
Complete all three sections (repeat sections for each major accomplishment):**

Accomplishment:

Of lines submitted to the Southern FHB Nursery by the Arkansas program, several have been among the most resistant to FHB and have resistance to other important diseases.

Impact:

These lines have been used as resistant parents in crosses to develop varieties.

As a result of that accomplishment, what does your particular clientele, the scientific community, and agriculture as a whole have now that they didn't have before?:

Advanced lines that are much closer to varieties are currently being evaluated.

Accomplishment

The graduate student has designed research projects to identify resistance to DON by inoculating florets with purified DON in the greenhouse and to identify resistance to late blighting (little or no FHB symptoms in the field but unacceptable DON levels in harvested grain) in special field nurseries.

Impact

It is too early for this research to have any impact.

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.

There were no FHB publications from the Arkansas program in 2005 because nearly all greenhouse and field research for the year were a total loss. A technician hired by Milus to do greenhouse and field work in August 2004 was incompetent. No useful results were obtained from greenhouse tests for type II resistance. FHB nurseries in the field did not match the planting plan or field book. Mist systems for the FHB fungicide tests and nurseries were not functional until late in the season, and little or no FHB symptoms developed. Therefore lines and segregating populations could not be accurately evaluated for resistance even if the nurseries and tests had been planted correctly. The technician chose to resign on 1 May 2005 rather than be fired. It was a bad year for all involved.

A new technician was hired in August 2005. A former technician, who left the program to farm full time in 2004, returned on a part-time basis to help with field and greenhouse work during the 2005-2006 season. This former technician has also helped train the new technician. FHB research went well in 2006, and the Arkansas program will have publications for 2006.