

**USDA-ARS/  
U.S. Wheat and Barley Scab Initiative  
FY08 Final Performance Report (approx. May 08 – April 09)  
July 15, 2009**

**Cover Page**

<b>PI:</b>	Mark Sorrells
<b>Institution:</b>	Cornell University
<b>Address:</b>	Department of Plant Breeding 252 Emerson Hall Ithaca, NY 14853
<b>E-mail:</b>	mes12@cornell.edu
<b>Phone:</b>	607-255-1665
<b>Fax:</b>	607-255-6683
<b>Fiscal Year:</b>	2008
<b>USDA-ARS Agreement ID:</b>	59-0790-4-124
<b>USDA-ARS Agreement Title:</b>	Development of Fusarium Head Blight Resistant Wheat Varieties - Cornell.
<b>FY08 USDA-ARS Award Amount:</b>	\$ 36,102

**USWBSI Individual Project(s)**

<b>USWBSI Research Category*</b>	<b>Project Title</b>	<b>ARS Adjusted Award Amount</b>
VDHR-NWW	Genetics and Breeding of FHB Resistant Soft White Winter Wheat for the Northeastern U.S.	\$36,102
	<b>Total Award Amount</b>	<b>\$ 36,102</b>



7/9/09

Principal Investigator

Date

\* MGMT – FHB Management  
 FSTU – Food Safety, Toxicology, & Utilization of Mycotoxin-contaminated Grain  
 GDER – Gene Discovery & Engineering Resistance  
 PBG – Pathogen Biology & Genetics  
 BAR-CP – Barley Coordinated Project  
 HWW-CP – Hard Winter Wheat Coordinated Project  
 VDHR – Variety Development & Uniform Nurseries – Sub categories are below:  
 SPR – Spring Wheat Region  
 NWW – Northern Winter Wheat Region  
 SWW – Southern Sinter Wheat Region

**Project 1:** *Genetics and Breeding of FHB Resistant Soft White Winter Wheat for the Northeastern U.S.*

**1. What major problem or issue is being resolved relevant to Fusarium head blight (scab) and how are you resolving it?**

Several major issues in the evaluation protocols for both plots and single plants were resolved last year. For several years, the capacity of our irrigation system was limited by the lack of adequate water supply to the field where the evaluations are carried out. We resolved this issue by purchasing a large reservoir tank that could store enough water so that we were able to double the size of our misting system. Unfortunately, we had to also purchase a much more powerful pump to deliver sufficient water pressure to the system. The new system worked well this year and we had an excellent evaluation nursery. We advanced about 1100 backcross-derived lines with FHB resistance to headrows for selection to put in preliminary trials. We also made about 50 new FHB crosses with adapted lines. Another major issue is that the inheritance of native resistance is unknown. We have two new sources of native resistance and are currently attempting to complete the mapping of one of them. The preliminary data suggests that there are resistance QTL on chromosomes 1A and 2D.

The other major issue is that, prior to this project, there were no FHB resistant wheat varieties in New York. We now have one soft white winter and one soft red winter FHB-resistant variety available that are being grown commercially by farmers. Because there are no state surveys available, we do not have an estimate of the percentage of the acreage occupied by these varieties. One major concern is that a large number of “Branded” varieties have come into New York in the past two years and they are being marketed before they can be evaluated. Also, some of the varieties are not available for testing because the companies will not enter them in our tests. Legally, we are not allowed to evaluate wheat varieties that are not entered by the companies.

**2. List the most important accomplishment and its impact (i.e. how is it being used) to minimize the threat of Fusarium head blight or to reduce mycotoxins. Complete both sections (repeat sections for each major accomplishment):**

**Accomplishment:**

Our greatest accomplishment is the release and successful commercialization of an FHB resistant soft white winter wheat variety for New York.

**Impact:**

The two greatest threats to successful production of soft white winter wheat in New York are FHB and preharvest sprouting. The successful commercialization of Jensen soft white winter wheat addressed both of these threats because it has resistance to FHB and preharvest sprouting. Because most of the DON is in the bran FHB resistance in white wheat is more important than for red because white wheat bran is widely marketed to the food industry for use as an additive in high bran food products. It is impossible to place a dollar value on this accomplishment because of the lack of variety surveys and the proprietary use of the products.

**Accomplishment:**

A somewhat less important accomplishment to the public but significant for us, was the doubling of our capacity to evaluate wheat lines for FHB resistance. This resulted from a re-design of our misting system and improved phenotyping protocol.

**Impact:**

The doubling of our capacity to evaluate wheat for FHB resistance will allow us to continue evaluating the cooperative nurseries, our regional nurseries, our native resistance mapping, and at the same time expand into cooperative research experiments with other wheat breeders in this region. The net impact will be more rapid and more accurate evaluation of more wheat lines leading to the release of superior wheat varieties with FHB resistance.

**Accomplishment:**

This year we released three new soft white winter wheat lines with FHB resistance. They are currently in the seed increase phase and will be commercially available in 2010.

**Impact:**

The release of three additional wheat lines with FHB resistance will give the seed companies more options for marketing and promoting FHB resistant wheat varieties. It is expected that this will result in a larger percentage of the wheat acreage being planted to FHB resistant wheat.

**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.**

We have not published any peer-reviewed journal articles, however we publish our FHB testing results each year in a mailing to about 200 people. We also publish the results on our web site (<http://smallgrains.cit.cornell.edu>) . In addition, I have prepared descriptions of our new FHB resistant releases that I distributed at field days and extension workshops.

**Presentations:**

11/12 - Extension Agent Training School

“Small Grains Variety Recommendations - New Fusarium Resistant Wheat Varieties”

6/7 – Aurora, NY

Small grains management field day

“Three new Soft White Winter Wheats with Fusarium Head Blight Resistance for New York”

7/8 – Ithaca, NY

Seed grower’s field day

“Cornell Wheat Breeding Program and Three new Soft White Winter Wheats with Fusarium Head Blight Resistance for New York”

**If your FY08 USDA-ARS Grant contained a VDHR-related project, include below a list all germplasm or cultivars released with full or partial support of the USWBSI. List the release notice or publication. Briefly describe the level of FHB resistance. If this is not applicable (i.e. no VDHR-related project) to your FY08 grant, please insert ‘Not Applicable’ below.**

Release Notice for NY88046-7088: This variety is moderately resistant to FHB and is comparable to Jensen.

Release Notice for NY03180FHB-10: This variety is moderately resistant to FHB and is comparable to Jensen. In OH 2009 it was not significantly different from the low check.

Release Notice for NY03179FHB-12: This variety is moderately resistant to FHB and is comparable to Jensen.