USDA-ARS/
U.S. Wheat and Barley Scab Initiative
FY08 Final Performance Report (approx. May 08 – April 09)
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Cover Page

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Fiscal Year:	2008
USDA-ARS Agreement ID:	59-0790-4-108
USDA-ARS Agreement Title:	Enhancement of Scab Resistant Wheat Cultivars Adapted to the Southeast.
FY08 USDA-ARS Award Amount:	$ 31,456

USWBSI Individual Project(s)

USWBSI Research Category*	Project Title	ARS Adjusted Award Amount
VDHR-SWW	Enhancement of Scab Resistant Wheat Cultivars Adapted to the Southeast.	$31,456
	Total Award Amount	**$ 31,456**

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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: *Enhancement of Scab Resistant Wheat Cultivars Adapted to the Southeast.*

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

The major problem is that Fusarium head blight (FHB) epidemics in Georgia and the Southeast are resulting in reduced grain yield and in marketing difficulty of grain due to high DON concentrations. We are resolving the problem by: developing and releasing improved soft red winter wheat varieties and germplasm with improved FHB resistance combined with leaf rust and stripe rust resistance and evaluating FHB nurseries and regional nurseries for FHB level of resistance. In the 2009 season, 113 single, three-and four-way crosses were made involving one or more source of native and exotic FHB resistance (Truman, INW0411, IL00-8530, IL00-8641, IL98-182, OH02-12678, MO 050699, MO 050146, B030543) with elite Georgia lines that have moderate resistance to scab. 92 F1 crosses were also advanced to F2 generation and about 1000 headrows with F2-6 generations were evaluated in misted scab nursery. The Uniform Southern FHB nursery, southeastern breeding nurseries, and selected entries from Georgia State Performance Trials were evaluated in replicated misted, inoculated nursery.

Marker Assisted Selection is also being employed to accelerate the development of adapted FHB resistant cultivars by the assistance in the selections within populations containing 3BS and 5AS in the UGA molecular lab and in cooperation with Gina Brown-Guedira, USDA Genotyping Center. In other cooperation with the Regional Genotyping Center and with breeders within the southern region, backcross populations (BC2F3) from NC (Neuse *2/VA 476) and SS 8641// Neuse*2/VA476) and MD (SS8641//McCormick*2/Ning 7840) were evaluated for both good scab resistance and agronomic type. Several other backcross populations are being developed with Truman as source of FHB resistance. Samples from the Uniform Southern FHB nursery grown in Georgia were submitted for DON testing.

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:

Several wheat germplasm from both native and exotic sources with FHB resistance have been transferred into elite lines that are adapted to the Southeast. Breeding lines have been identified with moderate scab resistance. These lines are being increase with the intention for release. MAS with SSR markers were used to accelerate the development of scab resistance from 3BS and 5AS into elite lines. We released Baldwin (GA981622-5E34) that has moderate scab resistance and have increase acreage of GA991371-6E12 for possible release.

Impact:

Wheat lines from diverse origin with moderate FHB resistance are available that are adapted to the Southeast. Both native and exotic sources of scab resistance are also being incorporated into adapted lines with good agronomic performance. Baldwin (GA981622-5E34) and GA991371-6E12 are varieties that have moderate level of scab resistance when compared to other Georgia releases, such as AGS 2000.

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.

Jerry Johnson, Zhenbang Chen, James Buck, and Lilian Miranda. 2008. Development of scab resistance in soft red winter wheat. National FHB Forum, Indianapolis IN

J.W. Johnson, L. Miranda, and Z. Chen. 2008. Wheat Coordinated Agricultural Project (CAP). Small Grain and Soybean Expo, Statesboro, GA.

Jerry Johnson, Zhenbang Chen, Lilian Miranda, Yong Seo. 2008. Marker assisted selection of soft red winter wheat for pest resistance. 5th International Crop Science Congress & Exhibition. International Convention Center, Jeju, Korea. p. 101

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.

Baldwin was developed and released in 2008-2009 that has moderate level of scab resistance.