

**USDA-ARS/
U.S. Wheat and Barley Scab Initiative
FY09 Final Performance Report
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Cover Page

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Fiscal Year:	2009
USDA-ARS Agreement ID:	59-0206-9-079
USDA-ARS Agreement Title:	Development of FHB Resistant Wheat Genotypes Adapted to the Gulf Coast.
FY09- USDA-ARS Award Amount:	\$ 34,321

USWBSI Individual Project(s)

USWBSI Research Category*	Project Title	ARS Adjusted Award Amount
VDHR-SWW	Development of FHB Resistant Wheat Genotypes Adapted to the Gulf Coast.	\$ 34,321
	Total Award Amount	\$ 34,321

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
 DUR-CP – Durum 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: *Development of FHB Resistant Wheat Genotypes Adapted to the Gulf Coast.*

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

Fusarium Head Blight (FHB) occurs across the Gulf Coast and causes significant loss of yield and quality in some environments. The climate and disease spectrum of the region are unique and most varieties developed outside of the region perform poorly. The LSU AgCenter wheat breeding program and its Sungrains partners (Universities of Florida, Georgia, Clemson, and NC State) release high-yielding disease-resistant varieties that account for most of the wheat acreage in the Gulf Coast and Southeastern states. There is very little resistance to FHB in varieties currently produced by growers in the region, which raises the likelihood of having toxin-contaminated wheat from the Gulf Region enter the export market through large grain elevators on the Mississippi River. It is important that these programs develop and release highly productive, scab resistant varieties that are embraced and produced by growers. Information on scab reaction of available varieties should be included in performance trial reports so growers can choose those with the most scab resistance for production.

Objectives will be accomplished by: (1) participating in regional screening nurseries, (2) evaluating entries in statewide variety trials and uniform nurseries for FHB resistance in scab nurseries, (3) conducting a breeding program to develop elite varieties with local adaptation and resistance to FHB, and (4) participating in cooperative mapping studies.

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:

The 54 entries in the statewide wheat variety trials were screened in two inoculated, misted nurseries during the 2009-2010 growing season. The spring of 2010 was extremely dry across Louisiana in 2010 and as a result there was very little scab reported in grower fields. Scab development was minimal at both locations. A third misted location (Baton Rouge) did develop a significant scab epidemic and useful data was collected on entries in two regional nurseries (USSN and USSRWWN) and eight LSUAC breeding nurseries.

Impact:

Screening varieties and germplasm in dedicated scab nurseries permits evaluation of the reaction of locally-adapted material to Fusarium Headblight (FHB). Ratings from these trials are used in crossing decisions to combine different resistance genes for development of varieties with greater levels of resistance. The variety trial and regional nursery data is published on the LSU AgCenter variety trial web site where it is used by growers and consultants when choosing varieties for commercial production.

Accomplishment:

The LSUAC breeding program emphasized FHB resistance in all aspects of breeding from parental selection to testing procedures. There were 99 crosses made (of 246 total crosses) in April 2010 specifically to incorporate FHB resistance genes into locally adapted germplasm. A similar number (99 and 61) of F2 and F3 populations were FHB specific crosses. Over 250 FHB advanced lines were evaluated in observation and replicated yield plots. Many additional early-generation FHB crosses were screened in headrows or spaced plant populations. FHB breeding lines in advanced yield trials and regional nurseries were increased in seed blocks at Winnsboro. F5 headrows of crosses with 'Jamestown' were harvested for use in a collaborative association mapping project. Additional F2 populations were harvested for development of marker populations for potential studies in the future.

Impact:

This program is primarily focused on the development of productive varieties with good disease-resistance that are adapted to the Gulf Coast region. The LSUAC wheat breeding program has released five varieties since 2002 and accounted for a large proportion of wheat production in Louisiana in the past five years. There are no FHB-resistant varieties currently grown in Louisiana and very little information is available on FHB reaction of varieties that are produced in the region. The development of FHB resistant varieties will positively impact wheat production economics and should allow growers in the distressed rice producing region of southwest Louisiana where FHB is a significant problem to expand wheat production.

FY09 (approx. May 09 – May 10)
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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.

No varieties or germplasm formally released.

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.

None