

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

Cover Page

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| Fiscal Year: | 2008 |
| USDA-ARS Agreement ID: | NA |
| USDA-ARS Agreement Title: | Molecular Marker Evaluation of International Spring Wheat Nurseries. |
| FY08 USDA-ARS Award Amount: | \$ 4,965 |

USWBSI Individual Project(s)

| USWBSI Research Category* | Project Title | ARS Adjusted Award Amount |
|----------------------------------|--|----------------------------------|
| VDHR-SPR | Development, Evaluation and Distribution of International Fusarium Spring Wheat Nurseries. | \$4,965 |
| | Total Award Amount | \$ 4,965 |

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

(Form FPR08)

Project 1: *Development, Evaluation and Distribution of International Fusarium Spring Wheat Nurseries.*

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

The Chinese cultivar, Sumai 3, has been the common source of genetic resistance against Fusarium head blight (FHB) used by wheat breeders, particularly in the spring wheat growing regions. To avoid relying on a single resistance source, breeders have been seeking and exploiting various resistance sources, including the landraces and wild relatives. To facilitate the exchange of useful and novel sources of resistance against FHB throughout the world, the International Maize and Wheat Improvement Centre (CIMMYT) has recently established two spring wheat nurseries to evaluate the performance of elite cultivars and germplasm contributed from the wheat breeding programs in 14 different countries including the U.S.. To better understand the resistance sources submitted to CIMMYT, these entries were subjected to DNA marker genotyping using the tagged DNA markers that were found closely linked to the resistance genes previously identified. By comparing and investigating genetic diversity based on marker data and phenotypic data, the new and novel resistance sources can be identified and distributed to the breeding programs.

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: In this study, altogether 18 DNA markers located on chromosomes 2D, 3A, 3B, 4B, 5A and 6B were used to investigate the genetic diversity among the entries tested and distributed through CIMMYT. These markers were associated with resistance genes of Sumai 3 origin and other putative resistance genes derived from Frontana, Chinese lines CJ9306 and Wuhan 1, and *T. dicoccoides*. Of the 262 lines genotyped, 50 were selected from the 1st Fusarium International Elite Spring Wheat Nursery, and 28 were from the 1st Fusarium International Preliminary Spring Wheat Nursery. These lines were selected based on the field performance and DON content evaluation in Mexico during 2007. The remaining 184 lines were selected from the 2nd Elite and Preliminary Spring Wheat Nurseries to be used for future evaluations.

Impact: Based on both DNA marker data and phenotypic data evaluated and collected at CIMMYT, the new and novel resistance sources have been identified. These new sources will provide the U.S. spring wheat breeders with an access to the international elite germplasm collections.

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.

Detailed analysis and results were presented by CIMMYT collaborators.

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.

Not Applicable.