**USDA-ARS/**
**U.S. Wheat and Barley Scab Initiative**
**FY13 Final Performance Report**
**July 15, 2014**

# Cover Page

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| **PI:** | Richard Mason |
| **Institution:** | University of Arkansas |
| **Address:** | Dept. of Crop, Soil and Environmental Sciences<br>115 Plant Sciences Bldg.<br>Fayetteville, AR 72701 |
| **E-mail:** | esten@uark.edu |
| **Phone:** | 479-575-5725 |
| **Fax:** | |
| **Fiscal Year:** | FY13 |
| **USDA-ARS Agreement ID:** | 59-0200-3-007 |
| **USDA-ARS Agreement Title:** | Developing Double Haploids to Expedite Mapping and Enhance FHB Resistance in SRWW. |
| **FY13 USDA-ARS Award Amount:** | $ 5,842 |

**USWBSI Individual Project(s)**

| USWBSI Research Category* | Project Title | ARS Award Amount |
|---|---|---|
| VDHR-SWW | Developing Double Haploids to Expedite Mapping and Enhance FHB Resistance in SRWW. | $ 5,842 |
| | **FY13 Total ARS Award Amount** | **$ 5,842** |

7/11/2014

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 Soft Winter Wheat Region
SWW – Southern Soft Red Winter Wheat Region

**Project 1:** *Developing Double Haploids to Expedite Mapping and Enhance FHB Resistance in SRWW.*

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

   Developing wheat varieties that combine resistance to FHB with the yield potential of currently grown varieties remains a bottleneck for plant breeders. Through the work of the USWBSI, breeding lines are now available which are adapted, have competitive yield and contain known genes for resistance to FHB. Utilizing double haploids for wheat inbred line production can reduce the breeding process by 5-7 years compared to traditional inbreeding. With respect to the USWBSI, utilizing double haploids allows for combining multiple resistance genes together in an adapted background in the shortest amount of time possible, resulting in the highest probability for developing FHB resistant varieties.

2. **List the most important accomplishments and their impact (i.e. how are they being used) to minimize the threat of Fusarium Head Blight or to reduce mycotoxins. Complete both sections; repeat sections for each major accomplishment:**

   **Accomplishment:**

   $F_1$ seed from two crosses (detailed in the table below) were sent to Heartland Plant Innovations (Manhattan, KS) for double haploid production.

| Female | Pedigree | Female Parent Traits | Male | Pedigree | Male Parent Traits |
|---|---|---|---|---|---|
| **MD08-26-H2-7-12-9** | **SS8641//McCormick*2/Ning7840** | Rht2, Photo-Insens, Qyrva.vt-2AS, Lr37, Sr24/Lr24, **Fhb1, FHB5AS**, **FHB2DL**, SBMV, 2+12 | **GA041323-11E63** | **GA961565-2E46 / GA961591-3E42** | Rht2, Photo-Insens, **Qyrva.vt-2AS**, **Lr37**, **Yr5**, Het_H13, SBMV, Ax2, 2+12 |
| **MDC07027-12-24** | **SS8641//McCormick*2/Ning7840** | Rht2, Photo-Insens, Qyrva.vt-2AS, Lr37, Sr24/Lr24, **Fhb1, FHB5AS**, **FHB2DL**, SBMV, 2+12 | **KY04C-2004-1-2-1** | **Roane / Allegiance** | Rht2, Photo-Insens, **Qyrva.vt-4BL, Qyrva.vt-2AS, Lr46, Yr5**, SBMV, Ax2, 2+12 |

The female parents both contained the gene Fhb1 and QTL FHB5AS, and FHB2DL for FHB resistance and were combined with adapted lines containing complimentary genes and QTL for other importance agronomic and resistance traits. Seed of 190-200 double haploid lines from each population should be returned for increase and evaluation in Fall 2014. In addition, 64 FHB resistant double haploids developed by the University of Maryland as part of the USWBSI were screened for stripe rust resistance in inoculated nurseries in Fayetteville AR during the 2013-2014 season (still ongoing in FY14).

**Impact:**

Double haploid lines developed from these and other crosses within the USWBSI will be cooperatively phenotyped throughout the region in order to identify those lines having a combination of FHB resistance and high yield potential that can be released as varieties.

**Include below a list of all germplasm or cultivars released with full or partial support of the USWBSI during the FY13 award period. List the release notice or publication. Briefly describe the level of FHB resistance.**

Nothing to report

**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 FY13 grant. Please reference each item using an accepted journal format. If you need more space, continue the list on the next page.**

**Mason R.E.** [*], Miller R.G. [†], Bond R.D., Milus, E.A., Kelly J.P. Arkansas Wheat Cultivar Performance Tests 2012-2013. Arkansas Agriculture Experiment Station Research Series 611.