USDA-ARS/
U.S. Wheat and Barley Scab Initiative
FY12 Final Performance Report
July 16, 2013

Cover Page

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Fiscal Year:	FY12
USDA-ARS Agreement ID:	59-0206-9-053
USDA-ARS Agreement Title:	Management of Fusarium Head Blight of Wheat in Maryland.
FY12 USDA-ARS Award Amount:	$ 15,796[*]

USWBSI Individual Project(s)

USWBSI Research Category[**]	Project Title	ARS Award Amount
MGMT	Integrated Management of Fusarium Head Blight in Maryland.	$ 15,796
	Total ARS Award Amount	**$ 15,796**

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Principal Investigator Date

[*] Partial funding for this research is under ARS agreement # 59-0206-0-059

[**] 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: *Integrated Management of Fusarium Head Blight in Maryland.*

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

The MD cultivar by management trials are part of the coordinated project on FHB integrated management. Trials across multiple grain classes and multiple regions provide a broader view of successful management strategies. To date, neither cultivar resistance nor fungicide application independently, has proved to be adequate in seasons highly favorable for disease development. Furthermore, some of the more highly resistant cultivars have had lower yield potentials than other highly adapted but susceptible cultivars and thus lose favor among producers after seasons with low disease development. The effectiveness of the best available fungicides has been primarily tested with highly susceptible varieties and disease-conducive environments. Thus their overall contribution to and possible interaction in a management package is not adequately understood. An integrated approach primarily testing locally adapted cultivars ranging from highly susceptible to moderately resistant combined with the best available fungicide is being tested and demonstrated in this project under various debris management and rotation schemes at multiple locations throughout the state.

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 environmental conditions were favorable for moderate disease development at several locations producing vomitoxin levels on susceptible cultivars at 2-3 ppm. In general, disease reductions were accomplished by both cultivar resistance and fungicides independently. As expected at moderate to low disease pressure the highest level of resistance was sufficient in reducing disease and vomitoxin levels without the addition of the fungicide tactic. Fungicides reduced disease and vomitoxin levels most dramatically on highly susceptible cultivars. However, the integration of fungicides with moderate resistance provided the greatest reduction of disease. A greater range of available cultivars based on degree of resistance to scab can produce a marketable yield with the proper use of fungicides. Cultivars with relatively good resistance levels to FHB still require fungicides under high disease environments to ensure that DON levels are acceptable.

Impact:

The combination of resistance and fungicide treatment is currently necessary to manage FHB outbreaks to produce a saleable product. This management research, has been instrumental in demonstrating and providing hard evidence that neither tactic alone is adequate in a severe epidemic year. Acceptance of integrated management with scab forecasting appears to have increased especially for moderately resistant cultivars that do not appear to have any significant yield drag associated with physiological costs of resistance in non-disease years.

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

Grybauskas, A.P. Field crop disease management. Presentation made at the annual meeting of the Maryland Crop Improvement Association, January 22, 2013, Grasonville, MD.

Grybauskas, A.P. Field crop disease management. Presentation made at the grain club meeting of Queen Anne's County, January 22, 2013, Church Hill, MD.

Grybauskas, A.P. Field crop disease management. Presentation made at the Winter Agronomy meeting for Queen Anne's County, March 1, 2013, Queenstown, MD.

Grybauskas, A.P. Field crop disease management. Presentation made at the Mercer Small Grain Field Tour, May 30, 2013, Frederick, MD.