

**USDA-ARS/
U.S. Wheat and Barley Scab Initiative
FY13 Final Performance Report
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Cover Page

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Fiscal Year:	FY13
USDA-ARS Agreement ID:	59-0206-9-078
USDA-ARS Agreement Title:	Managing FHB Through Integrated Practices and within-field Inoculum Sources.
FY13 USDA-ARS Award Amount:	\$ 11,685

USWBSI Individual Project(s)

USWBSI Research Category*	Project Title	ARS Award Amount
MGMT	Evaluation of Integrated Management Strategies for Fusarium Head Blight.	\$ 11,685
	FY13 Total ARS Award Amount	\$ 11,685

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: *Evaluation of Integrated Management Strategies for Fusarium Head Blight.*

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

This research project addresses the need of identifying the best management methods for FHB/DON or good farming practices for FHB/DON management through integrated management studies. Needs addressed also include the evaluation of potential disease reductions through combinations of host resistance and fungicides, the documentation of the impact of crop sequence on disease risk and its potential role as part of the integrated management of FHB/DON and the development of outreach materials and opportunities for exchange of information with clientele.

The proposed research project very clearly mirrors Goal #1 of the FHB Management Action Plan, i.e. “Validate integrated management strategies for FHB and DON”. It also contributes to the goals of developing the next generation of management tools for FHB/DON control and enhancing communication and end user education/outreach by providing valuable research results on best management practices to clientele.

2012-2013 was the seventh year for the Integrated Management of Fusarium Head Blight and Deoxynivalenol study in Missouri. The recommended treatments were applied to five soft red winter wheat varieties. Ratings were made at the appropriate times and data for the seven years of the study has been analyzed and summarized.

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:

Weather conditions were conducive for the development of FHB in all five varieties in both crop sequence trials during the 2012 season. In the corn residue trial all main and interaction effects were statistically significant for both yield and DON. Yields in the corn residue were lower than in the soybean residue and DON levels were higher in the corn residue than in the soybean residue. These results confirm the importance of crop rotation and variety selection as management tools for both FHB and DON. Fungicide application improved yield and reduced DON levels with a greater impact on moderately resistant varieties.

Impact:

This research has shown the importance of crop sequence or residue type on the level of FHB and DON in the subsequent wheat crop. Crop rotation as a management tool for both FHB and DON management needs to be stressed. In general, the greatest reductions in FHB intensity and DON accumulation were observed when moderately resistant varieties were used with crop rotation and fungicide application. Resistant varieties had lower levels of

both FHB and DON in both residue types and with or without fungicide application. Under high disease pressure, a three tier management approach of crop rotation with a non-host, moderately resistant to resistant varieties and fungicide application was required to achieve < 2ppm DON.

This research project has provided data that can be used by producers to manage both FHB and DON levels in wheat. The importance of crop rotation, variety selection and the use of fungicide applications as the wheat flowers if weather conditions are conducive to the development of FHB are viable options for producers trying to manage FHB and reduce DON levels.

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.

Proceedings:

Bergstrom, G.C., J.A. Cummings, K.D. Waxman, C.A. Bradley, S.N. Wegulo, A.L. Hazelrigg, D.E. Hershman, M. Nagelkirk, and L.E. Sweets. 2013. Effects of local corn debris management on FHB and DON levels in seventeen U.S. wheat environments in 2011-2013. Proceedings of the 2013 National Fusarium Head Blight Forum, Milwaukee, WI, December 3-5, 2013. P. 92-93. Abstract in proceedings and poster at forum. (10% contribution) (published).

Paul, Pierce, G. Bergstrom, C. Bradley, E. Byamukama, J.A. Cummings, A. Grybauskas, L. Madden, G. Milus, K. Ruden, J.D. Salgado, L. Sweets, S. Wegulo and K. Wise. 2013. FHB integrated management: a 2013 update. Proceedings of the 2013 National Fusarium Head Blight Forum, Milwaukee, WI, December 3-5, 2013. P 110-111. Abstract in proceedings and poster at forum. (10% contribution) (published).

Extension Manuals:

Bradley, Kevin, Laura E. Sweets, Wayne C. Bailey, and J. Allen Wrather. 2012. 2013 Missouri pest management guide: corn, grain sorghum, soybean, winter wheat, rice and cotton. University of Missouri Extension publication M171. 200 pp.

2013 Newsletter Articles: All articles published in the University of Missouri's Integrated Pest and Crop Management Newsletter, V. 23. Similar contributions made in previous years.

Sweets, L. E. Check wheat fields for early season diseases- March 29

Sweets, L.E. Continue checking for wheat diseases- May 31

Sweets, L.E. Black wheat heads- June 28

Sweets, L.E. Seed-borne wheat diseases to consider before using saved seed for planting this fall- July 31