USDA-ARS/
U.S. Wheat and Barley Scab Initiative
FY09 Final Performance Report
July 15, 2010

Cover Page

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Fiscal Year:	2009
USDA-ARS Agreement ID:	59-0206-9-088
USDA-ARS Agreement Title:	Integrated Managment Studies to Improve Overall Management of FHB and DON in Wisconsin.
FY09- USDA-ARS Award Amount:	$ 14,634

USWBSI Individual Project(s)

USWBSI Research Category*	Project Title	ARS Adjusted Award Amount
MGMT	Integrated Management Studies to Improve Overall Management of FHB and DON in Wisconsin.	$ 14,634
	Total Award Amount	**$ 14,634**

7/12/2010

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: *Integrated Management Studies to Improve Overall Management of FHB and DON in Wisconsin.*

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

Based on discussion with our key stakeholders, including growers, consultants, and the Wisconsin Crop Improvement Association (our main entity that certifies seed in the state), the primary questions being faced in Wisconsin include if and when a fungicide may be needed for control of scab. Many of the growers recognize the wheat varieties that are favorable for other traits like yield or resistance to foliar diseases may be more susceptible to scab when conditions are favorable. Therefore, understanding what factors should be examined to better manage the disease is critical. Given that we do not have a defined wheat breeder in Wisconsin, one of our approaches has been to develop an approach to using the Wisconsin Winter Wheat Performance Testing program that "mimics" a screening approach from the breeding side. For example, we are currently finishing a graduate student project that will develop a way to rank varieties against several diseases, including scab. This approach is based on concepts in GxE (genotype x environment). By ranking relative performance, we feel we can better understand performance across environments instead of the expected differences in potential yield that occurs in different areas. One of the weaknesses we do have in this approach is the inability to obtain mycotoxin testing results and we do not currently feel we could increase fees for varieties entered without the loss of varieties being testing.

Another area that is a key component to our current USWBSI project is the question about the effect of crop rotation on the risk of scab. We have seen in our own trials using the long-term crop rotation studies at Arlington, WI significant increases in yield when we apply foliar fungicides (whether Proline or Prosaro) at flowering in wheat that follows corn for silage. We have also heard reports of such responses in grower fields. Our approach to such a question is multi-fold as we continue our trials at Arlington, WI and have also expanded this to look at the distribution of Fusarium spp. across different rotations and management practices. The latter project involves a Postdoctoral researcher as well as a graduate student will co-major in Plant Pathology and Agronomy, beginning this fall.

As illustrated above one of the central tenets that we have recognized in Wisconsin is the need to integrate more fully in the projects affiliated with the USWBSI especially to improve stakeholder knowledge. Our approach has been proactive in the educational aspect for understanding management decisions related toscab. We developed a winter wheat workshop that has now been presented in five location-years and have developed a blog format to provide real-time observations and information about wheat production, wheat diseases and management (this blog does also discusses issues related to soybean production).

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:

1) Winter Wheat Workshops successfully developed and presented in 2009 and 2010.
2) Provide commentary for the Fusarium Head Blight Prediction Center.
3) Established scab-specific research trials.

Impact:

Impact For 1): Growers feel increasing pressure to spray foliar fungicides when in fact they may not be necessary, especially for scab control. We have used the wheat workshops to try to educate and train stakeholders on the risk factors (including an ability to properly identify growth stages) that drive an increased risk of scab. A simple example of the impact was from a conversation with one grower – this grower indicated they would monitor the website for commentary about the risk of scab and integrate that with active scouting to make a decision on the need for a foliar fungicide.

Impact for 2): Wisconsin joined the list of state's providing commentary for the prediction website. In addition to commentary, we actively provided training on how to use the site. Based on comments, we have been told many look at this as a method to monitor for scab in their areas of Wisconsin, especially to determine if fungicides are needed.

Impact for 3): By participating in scab-specific trials, we have been able to develop a framework to improve management recommendations based on variety selection and the need for a foliar fungicide spray. We will be able to more fully measure the impact of this work in the next year since we hope to more fully roll out an online database on variety response to scab, but wanted to highlight this for the current 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 grant. Please reference each item using an accepted journal format. If you need more space, continue the list on the next page.

Web Resources (Extension):
The Soy Report Blog, http://thesoyreport.blogspot.com (used to provide real-time observastions on FHB risk, etc.)

Extension Presentations:

1) 2010 Winter Wheat Workshops, Locations: Rockford, IL and Brant, WI (65 total participants)
2) 2010 Wheat Production in Central Wisconsin – Wheat Diseases and Fungicide Efficacy (50 participants)
3) 2010 C-Cap Program (Custom Applicators) – Foliar Fungicides for Corn, Soybean, Wheat, and Alfalfa, Locations: Eau Claire and Arlington, WI (35 total participants)
4) 2009 Winter Wheat Workshops, Locations: Janesville, Fond du Lac, and Waldo, WI (120 total participants)
5) 2009 C-Cap Program (Custom Applicators) – Foliar Fungicides for Corn, Soybean, Wheat, and Alfalfa, Locations: Eau Claire and Madison, WI (60 total participants)
6) 2009 Wisconsin Crop Management Conference – Wheat Disease Management (125 participants)

Extension Articles or Publications:

1) Esker, P. 2010. Looking ahead in the wheat crop – Fusarium head blight. Wisconsin Crop Manager 17(11): 49.
2) Esker, P., and R. Proost. 2009. Fungicide resistance management in corn, soybean, and wheat in Wisconsin. UWEX Publication A3646.
3) Esker, P. 2009. Visual Quick Guide – Common wheat diseases in Wisconsin. UWEX Publication A3879-03.
4) Esker, P., and S. Conley. 2009. Check your wheat closely. Wisconsin Crop Manager 16(15): 58.
5) Esker, P., K. Lackermann, J. Gaska, and S. Conley. 2009. Do I need to spray a foliar fungicide in wheat in 2009? Wisconsin Crop Management 16(4): 16-18.
6) Esker, P., C. Grau, S. Conley, and J. Gaska. 2008. Identifying wheat diseases controlled by foliar fungicides. Wisconsin Crop Manager 15(5): 29 (plus 10 page PDF).
7) Esker, P., and S. Conley. 2008. Understanding and using the Fusarium head blight prediction center. Wisconsin Crop Manager 15(7): 36-38.

Conference Proceedings:

1) Lackermann, K., J. Gaska, M. Martinka, S. Conley, and P. Esker. 2009. Effect of variety, location, and environment on development of Fusarium head blight in soft red winter wheat in Wisconsin. Proceedings of the National Fusarium Head Blight Forum, Pages 61-64.

2) Esker, P., and S. Conley. 2009. Integrated management for wheat diseases. Proc. of the 2009 Wisconsin Crop Management Conference, Vol. 48, Pages 43-46.
3) Esker, P. D., J. M. Gaska, and S. P. Conley. 2008. Integrated management for Fusarium head blight of winter wheat in Wisconsin. Proceedings of the 2008 National Fusarium Blight Forum, Page 20.