

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

**Cover Page**

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<b>Fiscal Year:</b>	FY13
<b>USDA-ARS Agreement ID:</b>	59-0206-9-062
<b>USDA-ARS Agreement Title:</b>	An Integrated Approach for Developing Scab Resistant Barley.
<b>FY13 USDA-ARS Award Amount:</b>	\$ 189,378

**USWBSI Individual Project(s)**

<b>USWBSI Research Category*</b>	<b>Project Title</b>	<b>ARS Award Amount</b>
BAR-CP	Developing 6- and 2-rowed Malting Barley Cultivars with Enhanced FHB Resistance and Reduced DON Accumulation.	\$ 189,378
	<b>FY13 Total ARS Award Amount</b>	<b>\$ 189,378</b>

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Principal Investigator

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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 6- and 2-rowed Malting Barley Cultivars with Enhanced FHB Resistance and Reduced DON Accumulation.*

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

This project falls under the Variety Development and Host Resistance of the Barley CP. We will assist others in the CP working to achieve this goal by growing the North American Barley Scab Evaluation Nursery (NABSEN) at one location, growing and evaluating advanced breeding lines from the University of Minnesota and Busch Agricultural Resources (BAR) breeding programs in yield trial experiments at seven sites in ND and eastern MT, and collecting data on cultivars and advanced breeding lines grown in FHB nurseries in Langdon and Osnabrock. Each year about 1,200 lines are evaluated in replicated yield trials. Finally, data from our work will allow for identification of SNP markers associated with improved FHB resistance and reduced DON accumulation.

**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:**

- We grew, evaluated, and harvested advanced breeding lines from the University of Minnesota, Busch Ag, and NDSU breeding programs in our FHB nurseries in Langdon, ND.
- Grew and harvested the NABSEN trial in Casselton, ND.
- Evaluated and harvested advanced breeding lines from the NDSU breeding program with improved FHB resistance in replicated yield trials at six locations in North Dakota (Fargo, Carrington, Langdon, Minot, Ray, and Williston).
- Candidates for the American Malting Barley Association's (AMBA) Pilot Scale Evaluation Program with improved FHB resistance were grown at two locations in North Dakota. Three of the four candidates accumulated at least 25% less DON than Robust and all of the two-rowed candidates accumulated similar to less DON than Conlon.
- The two-rowed line 2ND25276, which accumulates less DON than Pinnacle, was rated as satisfactory in AMBA Plant Scale evaluation. Compared to Pinnacle, 2ND25276 has a higher yield potential, better resistance to foliar diseases, and lower malt beta-glucan concentration. Pinnacle is the most widely grown two-rowed cultivar in North Dakota. 2ND25276 could be released as early as January 2015.

**Impact:**

- 78% of the two-rowed barley acres sown in North Dakota were done using NDSU barley cultivars. Two-rowed barley has a lower likelihood being rejected for malting barley compared to six-rowed barley due to its plumper kernels, and lower grain protein and DON accumulation.

**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.**

None

**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.**

Non-refereed

Daba, S., R.D. Horsley, P.B. Schwarz, and F. Capettini. 2013. Phenotypic characterization of barley genotypes from Ethiopia, Kenya, ICARDA, and the U.S. for adaptation traits. <https://scisoc.confex.com/crops/2013am/webprogram/Paper78379.html>. *In* Agronomy Abstracts, Tampa, FL, 3-6 Nov. 2013. American Society of Agronomy.

Jung, R., R. Brueggeman, S. Mamidi, A.T. Negeri, and R.D. Horsley. 2013. Population structure and genome wide association mapping for disease resistance in NDSU barley lines. <https://scisoc.confex.com/crops/2013am/webprogram/Paper78418.html>. *In* Agronomy Abstracts, Tampa, FL, 3-6 Nov. 2013. American Society of Agronomy.

Presentations

- Presented an invited talk at the Carrington Research Extension field day in July 2013.
- Co-hosted and provided multiple lectures at the 2013 Craft brewer/maltster field class in July 2013.
- Presented an invited talk to the Minnesota Research and Promotion Council in September 2013.
- Presented an invited talk at the 2013 Prairie Grains Conference in December 2013 in Grand Forks, ND.
- Presented an invited talk at the 2014 North Dakota Barley Day in March 2014 in Osnabrock, ND.