

**USDA-ARS/
U.S. Wheat and Barley Scab Initiative
FY14 Final Performance Report
July 15, 2015**

Cover Page

PI:	Lynn Dahleen
Institution:	USDA-ARS
Address:	Northern Crop Science Lab P.O. Box 5677 SU Station State University Station Fargo, ND 58105
E-mail:	lynndahleen@tds.net
Phone:	(608) 862-3102
Fax:	
Fiscal Year:	FY14
USDA-ARS Agreement ID:	NA
USDA-ARS Agreement Title:	Transgenic Barley for FHB Resistance.
FY14 USDA-ARS Award Amount:	\$ 30,000

USWBSI Individual Project(s)

USWBSI Research Category*	Project Title	ARS Award Amount
BAR-CP	Crossing and Field Tests of Transgenic Barley.	\$ 30,000
	FY14 Total ARS Award Amount	\$ 30,000

Michael C. Edwards for Lynn Dahleen 7/1/15
Principal Investigator Date

* MGMT – FHB Management
FSTU – Food Safety, Toxicology, & Utilization of Mycotoxin-contaminated Grain
GDER – Gene Discovery & Engineering Resistance
PBG – Pathogen Biology & Genetics
EC-HQ – Executive Committee-Headquarters
BAR-CP – Barley Coordinated Project
DUR-CP – Durum Coordinated Project
HWW-CP – Hard Winter Wheat Coordinated Project
WES-CP – Western 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: *Crossing and Field Tests of Transgenic Barley.***1. What major problem or issue is being resolved relevant to Fusarium head blight (scab) and how are you resolving it?**

Multiple candidate genes that may reduce FHB and/or DON have been identified through USWBSI-funded research, using Physcomitrella and VIGS in wheat. Transgenic approaches were used to insert and express these genes in barley. Backcrossing is being used to determine whether transgenes can boost the FHB resistance or lower DON in resistant lines developed by the breeding programs. Homozygous lines are being developed and tested in the ND and MN transgenic FHB nurseries.

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:**

Multiple transgenic lines were tested in replicated field trials in ND and MN. These included lines developed from crossing transgenics previously identified as having low DON in field trial with Quest or ND20448. One of these lines showed less DON than Quest in this first year of FHB testing. Further testing is planned.

The PI on the project resigned in October 2014. The technician funded by the grant remained on the project until March 2015, when her term ended. This allowed the completion of transgenic experiments in progress and allowed the growing plants to reach maturity.

Putative transgenic seeds from the project were transferred to Drs. Phil Bregitzer and Frances Trail for continued analyses. Drs. Bregitzer and Brueggeman will continue ND field trials in 2015.

Impact:

Results from testing crosses between transgenic lines with lower DON and lines with resistance from the barley breeding programs suggests that there may be additive effects between the two routes to lower DON. Additional testing is required to confirm these effects.

Training of Next Generation Scientists

Instructions: Please answer the following questions as it pertains to the FY14 award period. The term “support” below includes any level of benefit to the student, ranging from full stipend plus tuition to the situation where the student’s stipend was paid from other funds, but who learned how to rate scab in a misted nursery paid for by the USWBSI, and anything in between.

- 1. Did any graduate students in your research program supported by funding from your USWBSI grant earn their MS degree during the FY14 award period? No**

If yes, how many?

- 2. Did any graduate students in your research program supported by funding from your USWBSI grant earn their Ph.D. degree during the FY14 award period? No**

If yes, how many?

- 3. Have any post docs who worked for you during the FY14 award period and were supported by funding from your USWBSI grant taken faculty positions with universities? No**

If yes, how many?

- 4. Have any post docs who worked for you during the FY14 award period and were supported by funding from your USWBSI grant gone on to take positions with private ag-related companies or federal agencies? No**

If yes, how many?

FY14 (approx. May 14 – May 15)

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USDA-ARS Agreement #: NA

Include below a list of all germplasm or cultivars released with full or partial support of the USWBSI during the FY14 award period. List the release notice or publication. Briefly describe the level of FHB resistance. *If not applicable because your grant did NOT include any VDHR-related projects, enter N/A below.*

N/A

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 FY14 grant. Please reference each item using an accepted journal format. If you need more space, continue the list on the next page.

Dill-Macky, R., Elakkad, A.M., Muehlbauer, G.J., Li, X., Dahleen, L.S., Skadsen, R.W., Bregitzer, P.P., McLaughlin, J.E., and Tumer, N.E. 2014. Testing Transgenic Spring Wheat and Barley Lines for Reaction to Fusarium Head Blight: 2014 Field Nursery Report. In: S. Canty, A. Clark, N. Turcott, and D. Van Sanford (Eds.), *Proceedings of the 2014 National Fusarium Head Blight Forum* (pp. 52-53). East Lansing, MI/Lexington, KY: U.S. Wheat & Barley Scab Initiative.