USDA-ARS/
U.S. Wheat and Barley Scab Initiative
FY08 Final Performance Report (approx. May 08 – April 09)
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Cover Page

PI:	Andris Kleinhofs
Institution:	Washington State University
Address:	Department of Crop and Soil Science P.O. Box 6420 201 Johnson Hall Pullman, WA 99164-6420
E-mail:	andyk@wsu.edu
Phone:	509-335-4389
Fax:	509-335-8674
Fiscal Year:	2008
USDA-ARS Agreement ID:	59-0790-4-110
USDA-ARS Agreement Title:	Saturation Mapping of the Chromosome 2(2H) Fusarium Head Blight Resistance QTL.
FY08 USDA-ARS Award Amount:	$ 48,397

USWBSI Individual Project(s)

USWBSI Research Category*	Project Title	ARS Adjusted Award Amount
BAR-CP	Genetic and Physical Mapping of the chr. 2H Bin 10 FHB Resistance QTL and Development of Recombinant Lines and Mutants to Facilitate Breeding.	$48,397
	Total Award Amount	**$ 48,397**

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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
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: *Genetic and Physical Mapping of the chr. 2H Bin 10 FHB Resistance QTL and Development of Recombinant Lines and Mutants to Facilitate Breeding.*

1. **What major problem or issue is being resolved relevant to Fusarium head blight (scab) and how are you resolving it?** Development of commercially acceptable cultivars with FHB resistance and good agronomic qualities is the goal of the barley SCAB project. One of the best FHB resistance QTL resides in the chromosome 2(2H) bin 10 region. Our contributions are focused on genetic and physical mapping of this region with the long-term goal of saturating the region with molecular markers and cloning the genes responsible for FHB resistance. To further facilitate development of agronomically acceptable barley cultivars with FHB resistance, we have undertaken to modify the resistant line CI4196 by mutagenesis.

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:
   We have now exploited the Brachypodium sequence to uncover additional molecular markers mapping to the chromosome 2H bin 10 region. These have been also used to identify new BAC clones that extend the contigs. Recombinant lines with small CI4196 genome regions inserted in a susceptible cultivar genomic background have been refined to help pinpoint the region responsible for FHB resistance.

   A vrs1 (6-rowed) mutant has been isolated and characterized and distributed to barley breeders. Early and semi-dwarf mutants were also isolated and are being tested for FHB resistance and agronomic behavior in the Midwest.

   Impact:
   Development of a BAC contig of the FHB resistance QTL will lead to identification of candidate resistance genes. Such genes can then be manipulated to facilitate incorporation into agronomically acceptable cultivars and to inprove the resistance reaction.

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.

Boyd, C. N., R. Horsley and A. Kleinhofs (2008) Towards Rapid Candidate Gene Discovery in the Barley Chromosome 2(2H) Bin 10 Fusarium Head Blight Resistance QTL. Boyd C.N., R.D. Horsley, A. Kleinhofs In: Canty, S., A. Clark, E. Walton, D. Ellis, J. Mundell and D. van Sanford (Eds), Proceedings of the 2008 National Fusarium Head Blight Forum; Dec. 2-4, 2008; Indianapolis, Indiana pp. 144-147.

Boyd C, Horsley R, Kleinhofs A. 2008. A *vrs1* mutant in CIho4196 to facilitate breeding of 6-rowed cultivars with Fusarium Head Blight resistance. BGN 38: 7-9.

If your FY08 USDA-ARS Grant contained a VDHR-related project, include below a list all germplasm or cultivars released with full or partial support of the USWBSI. List the release notice or publication. Briefly describe the level of FHB resistance. If this is not applicable (i.e. no VDHR-related project) to your FY08 grant, please insert 'Not Applicable' below.

Germplasm developed – 6-rowed vrs1 mutant in line CI4196. In two tests in China it has had FHB resistance comparable to CI4196.