USDA-ARS/
U.S. Wheat and Barley Scab Initiative
FY07 Final Performance Report (approx. May 07 – April 08)
July 15, 2008

Cover Page

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Fiscal Year:	2007
USDA-ARS Agreement ID:	59-0790-4-110
USDA-ARS Agreement Title:	Saturation Mapping of the Chromosome 2(2H) Fusarium Head Blight Resistance QTL.
FY07 ARS Award Amount:	$ 48,780

USWBSI Individual Project(s)

USWBSI Research Area*	Project Title	ARS Adjusted Award Amount
HGG	Fractional Analysis of Chromosome 2(2H) Fusarium Head Blight Resistance QTL.	$48,780
	Total Award Amount	**$ 48,780**

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Principal Investigator Date

* CBCC – Chemical, Biological & Cultural Control
EEDF – Etiology, Epidemiology & Disease Forecasting
FSTU – Food Safety, Toxicology, & Utilization of Mycotoxin-contaminated Grain
GET – Genetic Engineering & Transformation
HGR – Host Genetics Resources
HGG – Host Genetics & Genomics
IIR – Integrated/Interdisciplinary Research
PGG – Pathogen Genetics & Genomics
VDUN – Variety Development & Uniform Nurseries

Project 1: *Fractional Analysis of Chromosome 2(2H) Fusarium Head Blight Resistance QTL.*

1. What major problem or issue is being resolved 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 facilitate this, we have isolated recombinant lines with introgressed small chromosome 2(2H) bin 10 genomic segments in a susceptible genomic background and we have developed Bacterial Artificial Chromosome (BAC) contigs for all molecular markers mapping to this region. We have also developed 6-rowed recombinants in the resistant CI4196 genomic background. To further facilitate development of agronomically acceptable barley cultivars with FHB resistance, we have undertaken to modify the resistant line CI4196 by mutagenesis. Mutants with desirable traits such as semi-dwarf, early and 6-rowed are easily selected. These provide improved FHB resistant parent material that can be rapidly incorporated in breeding programs.

2. List the most important accomplishment and its impact (how is it being used?). Complete all three sections (repeat sections for each major accomplishment):

Accomplishment:
1. Development of BAC clone contigs for a significant portion of the FHB QTL
Impact:
1. Development of BAC contigs will result in a complete physical map of the FHB QTL, development of new molecular markers for the region, sequencing of the region and identification of candidate FHB resistance genes
As a result of that accomplishment, what does your particular clientele, the scientific community, and agriculture as a whole have now that they didn't have before?:
1. Additional molecular markers targeted to the FHB resistance QTL region are needed for molecular marker assisted selection of FHB resistant cultivars. Physical contigs of the FHB QTL allow the scientific community a better understanding of the physical size of the QTL leading to improved strategies for cultivar development.

Accomplishment:
2. Development of recombinants combining 6-rowed phenotype with FHB resistance
Impact:
2. The 6-rowed FHB resistant phenotype is desired by the malting industry
As a result of that accomplishment, what does your particular clientele, the scientific community, and agriculture as a whole have now that they didn't have before?:
2. Breeders have access to improved FHB resistant parents for breeding cultivars

Accomplishment:
3. Isolation of mutants in FHB resistant CI4196 genomic background with improved stature, earliness and 6-rowed trait
Impact:
3. FHB resistant parents with improved agronomic traits available for breeders

As a result of that accomplishment, what does your particular clientele, the scientific community, and agriculture as a whole have now that they didn't have before?:

3. .Breeders have access to improved FHB resistant parents for breeding cultivars.

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 (2007) Barley chromosome 2(2H) bin 10 Fusarium Head Blight resistance QTL: mapping and development of isolines. In: Canty, S., A. Clark, D. Ellis and D. van Sanford (Eds), Proceedings of the 2007 National Fusarium Head Blight Forum; Dec. 2-4, 2007; Kansas City, Missouri. pp 170-172.