USDA-ARS/
U.S. Wheat and Barley Scab Initiative
FY08 Final Performance Report (approx. May 08 – April 09)
July 15, 2009

Cover Page

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Fiscal Year:	2008
USDA-ARS Agreement ID:	59-0790-8-F085
USDA-ARS Agreement Title:	Screening Hordeum Germplasm for Resistance to Fusarium Head Blight and DON Accumulation.
FY08 USDA-ARS Award Amount:	$ 14,092

USWBSI Individual Project(s)

USWBSI Research Category*	Project Title	ARS Adjusted Award Amount
BAR-CP	Screening Hordeum Germplasm for Resistance to Fusarium Head Blight and DON Accumulation.	$14,092
	Total Award Amount	**$ 14,092**

July 15, 2009

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: *Screening Hordeum Germplasm for Resistance to Fusarium Head Blight and DON Accumulation.*

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

The primary problems that we are working to resolve are the discovery of new sources of FHB resistance in barley which will hopefully enrich the current resistance genes available (with emphasis in 6-row types). We also are introgreesing resistance genes into adapted germplasm through a comprehensive pre-breeding program. We are meeting these needs through the following approaches:

- Screening new FHB resistant barley germplasm through extensive systematic screening activities of the barley genetic resources available at the ICARDA gene bank and making that available to the programs cooperating with the USWBSI.
- Introducing ('highly') resistant barley germplasm from international programs and promoting germplasm exchanges, especially 6-row types, through the ICARDA gene bank and ICARDA & CIMMYT international network that otherwise maybe inaccessible to US researchers .
- Providing agronomically suitable FHB resistant barley germplasm to US collaborators through pre-breeding activities using major USA cultivars.
- Testing USA barley germplasm at CIMMYT-El Batán field station and/or through the ICARDA International Barley Improvement Network.
- Testing preliminary resistant gemplasm identified through other projects searching for novel sources of resistance in order to determine the GxE interaction of such sources.

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:

During the summer a wide screening nursery was established at El Batán, México, with artificial misting and inoculation. Disease levels reached satisfactory severity levels allowing selection of resistant genotypes. The major accomplishment was the identification of new putative sources of FHB resistance from materials that were screened, especially entries from the ICARDA Gene Bank that were never tested before (Table 1). Genotypes tested the year before has been advanced for further testing to confirm resistance and included to the China nursery, as well as entries from the program selected in 2007. Germplasm with superior resistance is being used in crosses within the breeding program.

Nursery Name 2008	Origin	Number	Selected 2008
New Nurseries			
Brandon 2008	Canada	100	39
BARI New 2008	USA	205	118
Alberta BMZY 2008	Canada	194	50
ICARDA FHB 2008	ICARDA Gene Bank, Syria	1569	533
FEGs	UMN, USA	28	15
PrelFHB2008	Program, ICARDA Mexico	398	244
Total 1		**2494**	**999**
Second or More Year(s) of Testing			
EGS 2007	Program, ICARDA Mexico	131	55
Sel Bari 2006	USA	74	19
Alberta Best	Canada	6	4
Palestina Sel	ICARDA Gene Bank, Syria	2	1
F10CebadasCX	Program, ICARDA Mexico	7	7
NABSEN2007	USA	4	3
China 2007	Program, ICARDA Mexico	110	39
Alberta Canada BMZY 2007	Canada	65	18
BARI2007	USA	74	29
Brandon Canada 2007	Canada	28	10
Prel FHB 2007	Program, ICARDA Mexico	120	67
Mat Etiopia Sel	ICARDA Gene Bank, Syria	87	41
ICARDA04	ICARDA Gene Bank, Syria	197	
ICARDA06 (1-1200)	ICARDA Gene Bank, Syria	580	115
Mat ICARDA 2007 (1201-2371)	ICARDA Gene Bank, Syria	352	80
Total 2		**1837**	**488**
Total General		**4331**	**1487**

Impact:

The scientific community is basically obtaining:

1. Putative resistance sources from ICARDA gene bank that was not available before.
2. Advanced lines originated from the ICARDA breeding program with enhanced FHB resistance as well as resistance to several other important diseases in an acceptable agronomic background, many of them in a US-germplasm based lines.

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.

Capettini Flavio. 2008. The ICARDA Program for Breeding FHB Resistance in Barley. 2008 Scab Forum. US Wheat and barley Scab Initiative. Indiana, USA, December 2-4.

Capettini Flavio. 2009. The Contribution of ICARDA to improve the tolerance to *Fusarium* head blight: 20 years of international cooperation". In XVII National Barley Researchers Workshop, Passo Fundo, Brazil, 14-15 April. (in press).

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.