USDA-ARS/
U.S. Wheat and Barley Scab Initiative
FY06 Final Performance Report (approx. May 06 – April 07)
July 16, 2007

Cover Page

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Fiscal Year:	2006
USDA-ARS Agreement ID:	59-0790-5-F092
USDA-ARS Agreement Title:	ICARDA/CIMMYT FHB Barley Enhancement.
FY06 ARS Award Amount:	$ 20,510

USWBSI Individual Project(s)

USWBSI Research Area*	Project Title	ARS Award Amount
HGR	International Barley Germplasm and Information Exchange Through ICARDA/CIMMYT.	$ 20,510
	Total Award Amount	**$ 20,510**

July 16, 2007

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
PGG – Pathogen Genetics & Genomics
VDUN – Variety Development & Uniform Nurseries

Project 1: *International Barley Germplasm and Information Exchange Through ICARDA/CIMMYT.*

1. What major problem or issue is being resolved and how are you resolving it?

The primary problems that we are working to resolve are the need for identification and acquisition of new sources of FHB resistance in barley which will diversify the current resistance gene pool (with emphasis in 6-row types), and the need for facilitation of distribution of such resistant germplasm identified. 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 CIMMYT International Wheat 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 (how is it being used?). Complete all three sections (repeat sections for each major accomplishment):

Accomplishment:

The major accomplishment was the identification of new putative sources of FHB resistance from materials that were screened (Table 1). Material has been advanced for further testing to confirm resistance and distributed to US breeding programs (North Dakota State University, The University of Minnesota, Busch Agricultural Resources, Inc.), Canada (Agriculture Canada at Brandon, Manitoba) and China. Three nurseries that were deployed were the EGS2007: 282 entries, NABSEN 2007: 8 entries contributed to the nursery, and China Nursery 2007: 100 entries. Germplasm with superior resistance is being used in crosses within the breeding program.

Table 1. Number of nurseries and entries screened at El Batán, México during 2006 and number of putative resistant entries selected for further testing.

Name MV-05	Origin	Entries	Selected
New Germplasm			
ICARDA 2006	Gene Bank ICARDA	1200	198
Palestina 03	Palestina 03	19	6
RCheca	Czech Rep	40	10
Germplasm Introduced from Other Programs			
Alberta FHB 06	CANADA BMZY-06 F.	130	39
BARI 2006	BARI	381	74
Brandon 2006	Canada	100	56
FHB Brandon	Canada	7	3
FHB MN 05	USA	7	2
NABSEN 06	USA	108	7
Germplasm from the Breeding Program			
Preliminar FHB 06	Ensayos y Prelim Y05-06	325	157
Preliminar FHB 06 II	Ensayos y Prelim Y05-06	209	126
Preliminar FHB 05 (= EGS 2006)	Ensayos y Prelim Y04-05	235	123
Prel BARI 2005	F6 GH	194	103
Prel BARI 2	Obregón	144	129
F10CebadaSCX	Obregón	12	8
BARI1FHB05	Obregón	53	41
Prel BARI05 Desn	Obregón	31	9
BARI2004	Obregón	22	18
Total		3217	1109

Impact:

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?

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/CIMMYT 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.

Lewis J.L., Velazquez C., Murakami J., Capettini F., Ban T. and Ward R.W.. 2006. Facilitation of International Fusarium Nurseries and Improvements of FHB Screening System at CIMMYT. 2006 National FHB Forum, US Wheat and Barley Scab Initiative. Sheraton Imperial Hotel & Convention Center, Durham, N.C., December 10-12, 2006.

Capettini, Flavio. 2006. Development of leaf blight resistant barley as part of the ICARDA/CIMMYT Latin American regional program" (keynote speaker), July 23-27 , 3rd International Workshop on Barley Leaf Blights at Edmonton, Alberta, Canada.