

**U.S. Wheat and Barley Scab Initiative
 FY00 Final Performance Report (approx. May 00 – April 01)
 July 30, 2001**

Cover Page

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Grant Title:	Fusarium Head Blight Research
2000 ARS Award Amount:	\$112,195

Project

Program Area	Project Title	Requested Amount
Variety Development & Uniform Nurseries	Facilitate international germplasm and information exchange through CIMMYT.	\$115,000.00
	Requested Total	\$40,000.00¹

 Principal Investigator

 Date

¹ Note: The Requested Total and the Award Amount are not equal.

Project 1: Facilitate international germplasm and information exchange through CIMMYT.

1. **What major problem or issue is being resolved and how are you resolving it?** The overall goal of this collaboration is to increase genetic resistance to Fusarium Head Blight (FHB) in commercially grown US wheat varieties and thus significantly increase the production and yield stability of wheat in the United States of America. Specifically, the objectives of the project area:
- To provide agronomically suitable FHB resistant germplasm to US collaborators through pre-breeding activities using synthetic wheat and major US cultivars;
 - To conduct a world-wide search for and acquisition of suitable FHB resistant germplasm and to make this available to the US Wheat and Barley Scab Initiative;
 - To test germplasm through the International Testing Nursery; and
 - To provide elite germplasm pre-breeding activities, FHB resistant germplasm and International Nursery Testing for barley.

2. What were the most significant accomplishments?

Pre-breeding: Fifty-eight BC1F1 and F2 populations derived from crosses between five commercial USA recurrent spring wheat cultivars (Ivan, Reeder, Russ, Verde and Wheaton) with 12 scab resistant donor parents have been advanced. Screening at Toluca, Mexico with subsequent backcrossing is currently underway. In addition, over 2000 advanced lines screened during the past five years, during the reporting period the best 100 lines were characterized for resistance types I, II and IV, with the a sub-set of 72 lines further characterized for type III resistance. CIMMYT's collection of 800 D-genome synthetic hexaploids (SH) has been screened for type II resistance to FHB. Targeted for durum wheat improvement, sets of A-genome (AAAABB, 194 entries) and B-genome (AABBBB, 54 entries) SH were screened for FHB. Doubled haploids (DH) derived from FHB mapping populations Mayoer/SH(222)// Flycatcher (160) have been supplied to Rick Ward for molecular analysis. DH's derived from FHB mapping populations Frontana/Inia66 (117), Fukuho-komugi/Oligoculm 380 (110), Emblem/Saikai165 (104) and Catbird/Milan (100) are undergoing phenotypic resistance analysis (types I, II and III) in Toluca.

World-wide germplasm: FHB resistant wheat germplasm, which has undergone subsequent FHB resistance confirmation by CIMMYT scientists, has been obtained from: Argentina (127), Brazil (15) and Japan (15). Third-year resistance confirmation has been conducted for 37 CIMMYT-China shuttled derived bread wheat advanced lines. New *Aegilops tauschii* accessions have been obtained from Australia and WGRC to be used for primary SH production.

International Testing Nursery: The 6th International Scab Resistant Screening Nursery has been distributed to 30 international institutional cooperators in 19 countries. Targeted screening, under supervision of CIMMYT scientists, is being conducted in Argentina, Brazil, China, Mexico, Paraguay, Romania and Uruguay.

Barley: One hundred and five cross populations were generated using the following sources of FHB resistance were used in the ICARDA/CIMMYT barley breeding program during the reporting period: Six-row types: Chevron, Chamico/Tocte//Congona, PFC88209, MNBrite, MNS1. Two-row types: Atahualpa, Azafran, Gobernadora, Shyri, Svanhals, Zhedar1, Zhedar2.

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.

- Gilchrist, L., C. Velazquez, and H. Vivar. 1999. Evaluación de resistencia a Fusariosis de la espiga en la población de haploides doblados RECLA. Resúmenes del III Congreso Latinoamericano de Cebada . 5-8 de Octubre de 1999.
- Gilchrist, L., S. Rajaram and J. Crossa. 2000. New sources of scab resistance and breeding progress at CIMMYT. Proceedings of the International Symposium on Wheat Improvement for Scab Resistance. 5-11 May 2000 Suzhou and Nanjing, China.
- Gilchrist, L. and C. Velazquez .2000. Pathogenicity and virulences of eight *Fusarium graminearum* isolates originating in four regions of Mexico. 2000 National Fusarium Head Blight Forum. Cincinnati. December 10-12.
- Gilchrist , L. 2001. Perspectives on Fusarium Head Blight Resistance in Barley. In: H. Vivar and A. McNab (eds.). Breeding Barley in the New Millennium: Proceedings of an International Symposium. Mexico, D.F.:CIMMYT. pp: 61-71
- He, Z.H., M. van Ginkel, L. Gilchrist and S. Rajaram. 2000. Progress of China /CIMMYT Shuttle Breeding and germplasm exchange aimed at combining high yield potential with scab resistance. 2000 National Fusarium Head Blight Forum. Cincinnati. December 10-12.
- He, Z.H., S. Rajaram, Z.Y. Xin and G.Z. Huang (eds.). 2001. A History of Wheat Breeding in China. Mexico, D.F.: CIMMYT.
- Mujeeb-Kazi, A., L. Gilchrist, R.L. Villarreal, and R. Delgado. 2000. New synthetic hexaploid and a set of bread wheat / synthetic hexaploid derivatives as sources for scab resistance. Annual Wheat Newsletter. 46: 81-82.
- Velazquez, C., L. Gilchrist and J. Burgueño. 2000. Importance of spike growth stage for evaluating Fusarium Head Blight resistance in wheat. A supplement to Proceedings of the International Symposium on wheat improvement for scab resistance. 5-11 May 2000 Suzhou and Nanjing, China.
- M. van Ginkel, L. Gilchrist and C. Velazquez. 2000. Newly Accumulated Resistances in CIMMYT Bread Wheat Germplasm. 2000 National Fusarium Head Blight Forum. Cincinnati, OH. December 10-12, 2000.