

**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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Year:	FY2000 (approx. May 00 – April 01)
Grant Number:	59-0790-9-036
Grant Title:	Fusarium Head Blight Research
2000 ARS Award Amount:	\$78,049

Project

Program Area	Project Title	Requested Amount
Variety Development & Uniform Nurseries	Development of hard red spring wheat cultivars resistant to scab.	\$70,000
	Requested Total	\$70,000¹

 Principal Investigator

 Date

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

Project 1: Development of hard red spring wheat cultivars resistant to scab.

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

The major problem is reduced yield levels and quality characteristics of hard red spring (HRS) wheat induced by Fusarium head blight (FHB). This problem is being resolved by the development and selection of elite lines, parental genotypes, and breeding populations to incorporate diverse genetic resistance to FHB with the desired agronomic and quality traits for a HRS wheat cultivar adapted to ND. The selection, introgression and combination of several types of genetic resistance to FHB from diverse germplasm sources should provide a long-term solution to the control of FHB in HRS wheat.

2. What were the most significant accomplishments?

Advanced breeding lines were tested that have FHB resistance derived from germplasm sources other than Sumai 3 and its derivatives.

Analysis of ergosterol and DON in grain from inoculated tests showed that most of the variation in DON is due to differences in Fusarium colonization in the kernels.

A mapping population for FHB resistance was developed from a cross with a selected Hungarian parental line.

Monosomic analysis indicates a major gene for FHB type 2 resistance in chromosome 5A of ND2710. Mapping of this gene by DNA marker techniques has not been reported.

A HRS wheat cultivar, Alsen, was released by North Dakota State University. Alsen has FHB resistance derived from Sumai 3.

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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

Publications:

1. Anderson, J. A., B. L. Waldron, B. Morello-Sevilla, R. W. Stack, R. C. Frohberg. 2000. DNA markers for a Fusarium Head Blight Resistance QTL in Two Wheat Populations. p. 105-110 IN: W. J. Raupp, et al., eds. Proc. Int Symp. on Wheat Improv. for Scab Resist. Nanjing, China.
2. Stack, R. W. and R. C. Frohberg. 2000. Inheritance of Resistance to Fusarium Head Blight in Spring Wheat F-1 Hybrids. p. 94-97. IN: W. J. Raupp, et al., eds. Proc. Int Symp. on Wheat Improv. for Scab Resist. Nanjing, China.
3. Munkvold, G. P., J. M. Shriver, R. W. Stack and R. C. Frohberg. 2000. Evaluation of hard red spring wheat lines for resistance to Fusarium head blight in Iowa 1999. Biol. Cult. Tests for Control of Plant Dis. 15:131.

Non-peer reviewed articles and published abstracts:

4. R. W. Stack, R. C. Frohberg, and J. M. Hansen. 2000. Maintaining Fusarium Head Blight resistance in spring wheat through successive breeding cycles. Proc. 3rd National Wheat Industry Research Forum. p. 74-75. (<http://www.wheatworld.org/Proceedings 2000>)
5. R. W. Stack, R. C. Frohberg, J. Mitchell-Fetch and J. M. Hansen. 2000. Fusarium head blight reaction in F2 and F3 generations of a spring wheat recombinant population. Phytopathology 91: (6 supplement) S179-80 (abstr).

Presentations:

1. Nat'l Association Wheat Growers - National Wheat Industry Research Forum. Feb. 10-11, 2000, Las Vegas, NV Poster: Stack et al, (#4 above).
2. American Phytopathological Soc., North Central Division, Ann Mtg. Columbus, OH, June 18 - 20, 2000. Poster: Stack et al. (#5 above).

National FHB Forum, Cincinnati, OH, December 2000.

3. Del Blanco, I.A., R.C. Frohberg, R.W. Stack, S.F. Kianian, W.A. Berzonsky. 2000. Detection of QTL linked to FHB resistance in Sumai3-derived lines. Proc. 2000 Nat'l Fusarium Head Blight Forum p200.
4. R.W. Stack, R.C. Frohberg, and J. M. Hansen. 2000. Maintaining Fusarium Head Blight Resistance in Spring Wheat Through Successive Breeding Cycles. Proc. 2000 Nat'l Fusarium Head Blight Forum p283.
5. R.W. Stack and R.C. Frohberg. 2000. Inheritance of Resistance to Fusarium Head Blight in Spring Wheat F-1 Hybrids. Proc. 2000 Nat'l Fusarium Head Blight Forum p226.
6. R.W. Stack, R.C. Frohberg, J. Mitchell Fetch, and J.M. Hansen. 2000. Fusarium Head Blight in the F-2 and F-3 Generations of a Spring Wheat Recombinant Population. Proc. 2000 Nat'l Fusarium Head Blight Forum p282.
7. R.W. Stack, C.E. Wolf-Hall, H.H. Casper and J.M. Hansen. 2000. DON Level in Grain from Wheat Inoculated with *F. graminearum* is Not Correlated to the DON Producing Potential of Individual Cultures. Proc. 2000 Nat'l Fusarium Head Blight Forum p. 198.

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