

**U. S. Wheat and Barley Scab Initiative  
Annual Progress Report  
September 18, 2000**

**Cover Page**

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<b>Year:</b>	<b>FY2000</b>
<b>Grant Number:</b>	<b>59-0790-9-036</b>
<b>Grant Title:</b>	<b>Fusarium Head Blight Research</b>
<b>Amount Granted:</b>	<b>\$80,000.00</b>

**Project**

<b>Program Area</b>	<b>Objective</b>	<b>Requested Amount</b>
Variety Development & Uniform Nurseries	Accelerate development of resistant varieties.	\$70,000.00
	<b>Requested Total</b>	<b>\$70,000.00<sup>1</sup></b>

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Principal Investigator

Date

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<sup>1</sup>Note: The Requested Total and the Amount Granted are not equal.

**Project 1: Accelerate development of resistance varieties.**

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. Please provide a comparison of the actual accomplishments with the objectives established.

Seed increases of selected HRS genotypes with FHB resistance (derived from Chinese germplasm) were produced in ND and in NZ. Advanced breeding lines were field evaluated in nursery trials for agronomic traits and selections based on those trials were quality tested. An inoculated FHB nursery was used to field test these advanced lines plus early-generation populations and parental germplasm sources. Harvested grain samples were analyzed for DON. Parental and elite genotypes were evaluated for FHB by single floret inoculation in greenhouse tests. Segregating populations derived from crosses with parents showing reduced FHB incidence were tested in the field FHB nursery. Phenotypic data for a monosomic analysis of the FHB resistance of ND2710 (derived from Sumai 3 cross) was obtained from the FHB nursery. Analysis of ergosterol and DON in grain from inoculated tests showed that most of the variation in DON is due to differences in Fusarium colorization in the kernels.

3. What were the reasons established objectives were not met? If applicable.

Not applicable.

4. What were the most significant accomplishments this past year?

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

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 ND2710 not mapped by DNA marker techniques.

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

Year: 2000

Progress Report

PI: Richard Frohberg

Grant: 59-0790-9-036

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. 3<sup>rd</sup> National Wheat Industry Research Forum. p. 74-75. (<http://www.wheatworld.org/Proceedings2000>)
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 90: (in press) (abstr).

Presentations:

Nat'l Association Wheat Growers - National Wheat Industry Research Forum. Feb. 10-11, 2000, Las Vegas, NV Poster: Stack et al, (#4 above).

American Phytopathological Soc., North Central Division, Ann Mtg. Columbus, OH, June 18 - 20, 2000. Poster: Stack et al. (#5 above).