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Project Title: Fusarium Head Blight Resistant Soft White Wheat Variety Development for the Northeastern US.

PROJECT 1 ABSTRACT

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Fusarium head blight has been endemic to the northeastern US for many decades due to the humid, wet conditions and high inoculum load normally present during flowering time.

Our long term goal for this project is to develop an elite soft white winter wheat gene pool that is homozygous for at least 3 or 4 major QTL (3BS-Sumei3, 5AS-Sumei3 or Ernie, and 3AL-Frontana or 6BS-Sumei3) for resistance to FHB. This project will continue the activities established in previous USWBSI-funded projects as well as the IFAS (MASWheat) project and add a comprehensive, FHB marker assisted backcross breeding project for the northeastern US wheat production region. This expanded project was initiated this past summer (2006).

Objectives:

- 1) Continue evaluation of adapted wheat varieties and elite germplasm for resistance to FHB in the NUWWSN and our FHB Advanced Line nursery.
- 2) Pyramid FHB resistance genes by hybridizing FHB resistant elite lines and varieties to new sources of FHB resistance.
- 3) Select and evaluate advanced lines possessing desirable agronomic traits and superior resistance to FHB.
- 4) Continue MAS for FHB resistance by using markers and germplasm for the 3BS, 5AS, and the 6BS FHB resistance QTL and make crosses to sources of the Frontana resistance on 3AL.
- 5) Continue MAS for FHB using elite lines and varieties from Michigan, New York, and Canada as recurrent parents or in forward selection schemes, population enrichment and top-crossing.

Five major activities constitute this project 1) evaluation of the Uniform Northern Winter Wheat FHB Nursery and the Cornell FHB Advanced Line nursery, 2) selection and hybridization of elite lines and varieties to FHB resistant lines (including Sumei3 and Frontana derived lines and Ernie) 3) generation of enriched, elite populations segregating for FHB resistance to be used in variety development, 4) screening for polymorphism for FHB resistance markers on 3AL, 3BS, 5AS, and 6BS and 5) marker assisted selection for 3BS, 5AS, and 6BS QTL using Michigan, Canadian and New York elite lines and varieties as recurrent parents.

This project is relevant to the goals of the U.S. Wheat and Barley Scab Initiative in that breeding FHB-resistant wheat varieties maximizes the likelihood of success in our effort to minimize the threat of FHB to farmers, millers, bakers and consumers of wheat.