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

PROJECT 1 ABSTRACT

(1 Page Limit)

Variety development is complicated by the fact that adaptation involves tolerance to biotic and abiotic stresses which are controlled by complex genetic systems. Resistance to FHB has become a critical trait in the northeastern US that can determine the success of a variety. This project has allowed us to integrate effective selection and evaluation activities into our conventional breeding program that would otherwise be too costly to implement. We have made hundreds of crosses with sources of FHB resistance, some of which are being used for both marker assisted selection and conventional breeding. Early generation materials are integrated into our bulk breeding program where selections are made and then tested over years and locations for all important agronomic traits. Experimental lines that exhibit consistently high grain yield, adequate milling and baking quality, and resistance to FHB are advanced in our regional trials. In addition, our white wheat varieties must have some level of resistance to preharvest sprouting, which is less of a problem in red wheat because of the association of seed dormancy with red kernel color. We have continued to improve the accuracy of our evaluation and selection techniques in ways that also limit cost. This past growing season our improved inoculation methods resulted in a high level of uniform infection thoughout our advanced FHB and our Uniform FHB Cooperative nurseries. As a part of our educational mission, we hire students for the summer and they gain practical experience in plant breeding and learn about national projects such as the USWBSI. This past year we invested in a backpack sprayer system and that, combined with our mist system, resulted in excellent disease development. In addition, we have increased the capacity and reliability of the mist system. It is completely portable and currently we rotate two field locations for the FHB nurseries so that we can plant a cover crop in alternate years to reduce pressure from other pathogens. We have also developed several MAS (3B) backcross inbred populations using popular varieties. Three of those marker-assisted selections are in our New York State Variety trials for 2005-6. In addition, five new lines showing good resistance in our advanced FHB nursery were entered in the NUWWSN.