

PI: Steven S. Xu**PI's E-mail:** xus@fargo.ars.usda.gov**Project ID:** 0506-XU-103**FY04 ARS Agreement #:** NA**Research Area:** GIE**Duration of Award:** 1 Year**Project Title:** Evaluation of Tetraploid Wheat Germplasm for Resistance to Fusarium Head Blight.

PROJECT 1 ABSTRACT

(1 Page Limit)

Fusarium head blight (FHB) is one of the most destructive fungal diseases of tetraploid durum wheat (*Triticum turgidum* L. subsp. *durum*) and hexaploid bread wheat (*T. aestivum* L.). Resistant sources in bread wheat and its wild relative species have been identified and used in various breeding programs. However, resistant sources of durum wheat have not been discovered yet and attempts to transfer resistance from hexaploid wheat and wild relative species have met with limited success. In addition to durum wheat, tetraploid wheat (*T. turgidum* L.) with AABB genomes has six other cultivated sub-species, including Persian wheat (*T. turgidum* subsp. *carthlicum*), cultivate emmer wheat (*T. turgidum* subsp. *dicoccum*), Polish wheat (*T. turgidum* subsp. *polonicum*), oriental wheat (*T. turgidum* subsp. *turanicum*), Georgian emmer wheat (*T. turgidum* subsp. *paleocolchicum*), and poulard wheat (*T. turgidum* subsp. *turgidum*). The USDA National Small Grains Collection (NSGC) currently maintains 1364 accessions of these tetraploid wheats, which have not been evaluated for resistance to FHB. We have obtained the seed of 653 accessions including 93 accessions of Persian wheat, 195 cultivated emmer wheat, 3 Georgian emmer wheat, 77 Polish wheat, 79 oriental wheat, and 206 poulard wheat. The objective of this project is to identify the best possible sources of FHB resistance for durum wheat breeding programs by systematically and extensively evaluating these cultivated tetraploid wheat collections for reactions to FHB. We will perform preliminary screening for all the accessions for Type II resistance (resistance to spread in a spike) in the first season in the greenhouse by inoculating multiple spikes per plant (three plants/accessions) and multiple florets per spike (the central ones on both sides of the spike) to achieve a rigorous test without use multiple replicates. Then, only the accessions exhibiting an overall average of less than 30% infection will be further evaluated for Type II resistance in the second season in the greenhouse using three replicates with randomized entries. All the accessions with putative resistance will be evaluated for Type I resistance (resistance to primary infection) in field nursery. We expect that the tetraploid wheat accessions with a high level of FHB resistance can be identified and will eventually be used for developing durum wheat cultivars resistant to FHB.