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Research Area: VDUN

Duration of Award: 1 Year

Project Title: Accelerating the Development of FHB-Resistant Soft Red Winter Wheat Varieties.

PROJECT 1 ABSTRACT

(1 Page Limit)

The overall goal is to release FHB - resistant SRW wheat varieties that will reduce the negative economic consequences of FHB epidemics for farmers, millers, bakers, and consumers who require a safe food supply. The supporting objectives are to: (1) identify new sources of resistance through extensive screening of adapted and exotic breeding lines and cultivars; (2) incorporate resistance through recurrent family and simple mass selection in populations which are segregating for the Sumai 3 FHB resistance and other quantitative sources of resistance, and to advance resistant plants and families into the variety development track; (3) evaluate the effectiveness of the Sumai 3 molecular markers in heterogeneous populations; and (4) screen diverse lines, cultivars, and populations for genetic variation in DON content. The plans to accomplish the project goals are to: (1) conduct extensive field screening in misted nurseries at two locations using scabby corn as inoculum; several hundred advanced breeding lines and early generation populations will be screened in misted nurseries at Lexington and Princeton, KY; (2) carry out extensive greenhouse screening using air brush inoculation to mimic field conditions; most entries from the FHB field nurseries noted above will be screened in the greenhouse in this fashion; (3) evaluate progress from within and among family selection in three populations segregating for Sumai 3 resistance at two locations in misted field nurseries; (4) evaluate the effectiveness of the molecular markers linked to the Sumai 3 resistance alleles by comparing sister lines with and without the Sumai 3 resistance; efforts will also be made to quantify the magnitude of the non-Sumai resistance; (5) carry out simple mass selection for non-scabby kernels in numerous diverse populations; and (6) screen cultivars, lines and populations for genetic variation in DON content. Breeding FHB-resistant wheat varieties is relevant to the U.S. Wheat and Barley Scab Initiative because it offers the greatest opportunity to minimize the threat of FHB to producers, processors and consumers of wheat.