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PROJECT 1 ABSTRACT

(1 Page Limit)

Fusarium head blight (FHB) is a disease which significantly reduces grain yields and quality and results in economic loss to U.S. spring wheat (*Triticum aestivum* L.) growers. The development and deployment of resistant varieties has been successful in minimizing those losses. However, despite the fact that growers have embraced using more resistant varieties, there continue to be significant losses due to FHB, underscoring the need for a higher level of resistance and a more durable type of resistance. We continue to use molecular markers to genes for resistance and marker-assisted selection to achieve the goals of 1) pyramiding genes for FHB resistance originating from Sumai 3, *T. dicoccoides*, and Frontana, 2) assessing the level of resistance conferred by pyramiding different gene sources and 3) rapidly advancing genotypes with pyramided sources of resistance to release as germplasm lines or varieties. This project will focus on identifying and selecting spring wheat germplasm lines and varieties which are likely to have several sources of resistance to FHB. Existing synthetic hexaploid x Alsen backcross lines which were previously identified to have markers for both the *T. dicoccoides* and Sumai 3 sources of resistance will be hybridized to disomic 6A and 7A chromosome lines of Frontana,. The disomic Frontana lines have also been previously shown to express some level of resistance to FHB. Subsequently, doubled-haploid (DH) lines will be produced using F_1 seed from these hybridizations. DH lines will be examined for the presence of molecular markers for the different sources of resistance, and lines identified as possibly having all three sources of resistance will be extensively evaluated for their level of resistance in replicated greenhouse and field trials. Since selection and advancement of these lines will be based on the agronomic and end-use quality standards established for spring wheat, we anticipate that this approach will lead to the rapid release of improved FHB resistant spring wheat germplasm lines and varieties.