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Project Title: Enhancing Resistance to Fusarium Head Blight in Wheat Using Alien Species.

PROJECT 2 ABSTRACT

(1 Page Limit)

Fusarium head blight (FHB) has caused significant economic losses for wheat production in the United States and threatened the safety of wheat grains for human and animal consumption. Effective measures need to be developed to control this devastating disease in wheat as quickly as possible. Host resistance has been the most practical and effective means to combat diseases in plants. However, lack of effective resistance sources to FHB has hindered development of wheat cultivars highly resistant to the disease. Relatives of wheat represent a rich gene pool for wheat improvement. A number of genes conferring desirable traits, such as disease and insect resistance and tolerance to adverse conditions, have been identified from alien species and transferred to wheat. We have identified 74 wheat-alien species derivatives exhibiting resistance to the spread of FHB infection. This project will characterize chromosome constitutions of these resistant derivatives using C-banding and fluorescent genomic *in situ* hybridization (FGISH). In the meantime, we will eliminate unwanted alien chromatin from the resistant derivatives and induce wheat-alien chromosome translocations through chromosome manipulation. This will allow for identification of alien chromosomes carrying FHB resistance genes and production of wheat-alien chromosome translocation lines that are resistant to FHB and do not carry a significant linkage drag. The ultimate goal of this project is to allow wheat to gain novel FHB resistance genes from relatives of wheat and enhance resistance of wheat to FHB. The specific objectives of this project are to:

- 1) **Determine chromosome constitutions of the wheat-alien species derivatives resistant to FHB;**
- 2) **Eliminate unwanted alien chromatin from the wheat-alien species derivatives resistant to FHB;**
- 3) **Develop breeder-friendly germplasm resistant to FHB.**

Implementation of this project will provide breeders an access to alien resistance genes in relatives of wheat. Pyramiding of the novel resistance genes identified from wild species with the resistance genes currently existing in wheat will enhance FHB resistance of wheat and make the resistance of wheat to FHB more durable.