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Research Area: **HGG** **Duration of Award: 1 Year**

Project Title: Development of a Virus-Induced Gene Silencing System for the Identification of Genes Contributing to Fusarium Head Blight Resistance.

PROJECT 1 ABSTRACT

(1 Page Limit)

Identification of gene products contributing to resistance to Fusarium Head Blight is greatly hindered by the lack of a rapid assay for gene function in the spike tissues of wheat and barley. To date the best option has been to go through the lengthy process of creating transgenic plants that either over-express or silence the gene of interest. However, systems for virus-induced gene silencing (VIGS) have recently been developed for wheat and barley and their utility for identifying genes involved in disease resistance in the leaves of wheat and barley have been demonstrated. In this proposal, we provide preliminary results demonstrating our VIGS assay for silencing genes in the floral tissue of wheat. Additionally, we propose to silence, in lines resistant to FHB, a set of at least 10 genes that are candidates for encoding critical functions in the resistance mechanism of to FHB, based on their differential expression during resistant and susceptible interactions. The multiple florets in the heads in which silencing has been established will be inoculated with *Fusarium graminearum*, and then the outcome of the interaction will be scored. Increases in susceptibility would be strong preliminary evidence for the silenced host gene having a significant role in the FHB resistance mechanism.

The objectives of this proposal are:

1. Optimize the VIGS assay for the analysis of gene function in wheat heads.
2. Use the VIGS assay to test which of the 10 or more selected genes make detectable contributions to FHB resistance.

The proposed work would support the following objectives of the USWBSI Host Genetics and Genomics program:

1. Identify genes encoding effective ant-Fusarium proteins
2. Characterize molecular mechanisms of host-pathogen interactions as it relates to the host to identify potential resistance genes.
3. Determine signaling pathways that could be used to enhance host resistance.