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Research Category: GDER

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Project Title: Rapidly Identify and Test Scab Resistance Genes.

PROJECT 3 ABSTRACT

(1 Page Limit)

Fusarium head blight (FHB, scab), a fungal disease of small grain crops caused by *Fusarium graminearum*, threatens to reduce wheat and barley to economically unviable crops in the United States. During infection the fungus produces trichothecene mycotoxins that have been shown to increase fungal virulence. To complement the current breeding efforts, my laboratory seeks to functionally characterize a large set of genes with the potential to provide resistance to FHB. There are two major objectives in the proposed work including: (1) rapidly test genes for FHB resistance/susceptibility; and (2) develop transgenic wheat with genes with potential to exhibit FHB resistance.

We have conducted a wide array of RNA profiling experiments on barley and wheat during *F. graminearum* infection and identified potential resistance/susceptibility genes, including a large set of regulatory genes. We will test a subset of these potential resistance genes in two functional assays including: (1) virus-induced gene silencing (VIGS); and (2) a yeast screen. From these functional assays we will identify genes that we will use to develop transgenic wheat. These transgenic plants may result in wheat with enhanced resistance.

The proposed research meets the objectives of the USWBSI and fits within the Gene Discovery and Engineering Resistance (GDER) area of research. The proposed research has specific reference to the priorities of characterizing genes that provide FHB resistance, identification of FHB resistance genes and reduced DON accumulation, and developing transgenic wheat exhibiting FHB resistance.