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Research Category: **GDER** **Duration of Award: 1 Year**

Project Title: A Rapid Assay System for Trangenes that Confer Resistance to DON and FHB.

PROJECT 1 ABSTRACT

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We have developed a rapid and versatile assay system for genes that confer resistance to DON and FHB. This system is based on the recombinogenic plant *Physcomitrella patens* and allows for early functional assessment of genes that confer resistance to DON and FHB infection. We will use the Physcomitrella rapid assay system to characterize genes whose manipulation confers resistance to FHB. Genes effective against FHB will be put into the pipeline for deployment in wheat and barley.

We will use this approach to:

1. Determine how plant genes involved in cellular stress responses affect susceptibility to FHB.
2. Define novel plant gene targets for trichothecin and FHB resistance.
3. Define and manipulate mechanisms of plant inducible immunity against FHB.

These studies will be conducted using a combination of transcriptional profiling to identify novel gene targets, followed by the creation of gene knockout plants and transgenic plants that over-express genes. These plants will be assayed for altered susceptibility and resistance to FHB.

These studies will define novel stress mechanisms involved in FHB susceptibility and provide novel targets for genetic or chemical manipulation in crop plants.

This project fulfils the goals of the Gene Discovery and Engineering Resistance (GDER) research area (RA) to identify "candidate genes for resistance from wheat, barley and other plants." The Physcomitrella rapid assay system fulfills the criterion of the GDER to support the use of non-cereal systems for "rapidly screening potential anti-*Fusarium* genes." The project goals are in accordance with GDER FY09 Research Priorities for "increased efficiency of identification of candidate genes for resistance against FHB and reduced DON accumulation". The project will "characterize the genetic function of novel loci for FHB resistance" and provide genes to "develop effective FHB resistance through transgenic strategies."