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

Project Title: Fungal Genes Involved in DON Accumulation in Wheat.

PROJECT 1 ABSTRACT

(1 Page Limit)

Fusarium head blight (FHB) caused by *Fusarium graminearum* leads to yield losses and grains reduced in quality due to deoxynivalenol (DON) contamination. In addition to factors reducing the impact of FHB, novel methods for reduction of toxin accumulation in grain are desirable. The overall project goal of this proposal is the development of such novel methods for DON reduction. In previous studies of the fungal transcriptome during wheat infection, we have found that as DON accumulates in response to infection, all known genes of the *F. graminearum* biosynthetic gene cluster (Tri genes) are coordinately up-regulated. Parallel studies on rice infected with *F. graminearum* have found that little or no DON is produced or accumulates during infection. **The objectives of this project are to 1) identify fungal genes which are differentially regulated during wheat infection (high DON) versus rice infection (no/low DON) and that control accumulation of DON in wheat and 2) identify specific chemical factors in wheat that allow for the induction of trichothecene biosynthetic genes in *F. graminearum* during infection.** In order to accomplish goal one within the two year time period, two differentially regulated candidate genes have been identified by microarray analysis and will be deleted (year one), complemented and assayed for role DON accumulation in wheat (year two). To accomplish goal two, whole plant extracts of rice and wheat will be assayed for DON induction *in vitro* (year one), then fractionated to determine the active compound(s) (year two). The objectives of this proposal are relevant to the FY09 Research Priorities of the U.S. Wheat and Barley Scab Initiative, Pathogen Biology and Genetics (PBG) research area. Both objectives deal mycotoxin biosynthesis on plants and are consistent with PBG Research Priority 3: Develop new strategies for reducing the impact of FHB and associated mycotoxin contamination in barley and wheat.