PI: Xu, Jin-Rong **PI's E-mail: jinrong@purdue.edu**

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PROJECT 1 ABSTRACT

(1 Page Limit)

Fusarium head blight or scab is an extremely destructive disease on wheat and barley. Losses are due to reduction in yield and contamination of infected grain with mycotoxins. Although structural genes for deoxynivalenol (DON) biosynthesis have been well characterized, fungal regulatory genes and plant factors controlling trichothecene synthesis in infested wheat kernels are not well understood. In the previous study, a cyclin C-lke gene, *CID1*, was found to be important for DON production and plant infection in *F. graminearum*. In this project, we aim to identify *CID1*-regulated genes and plant factors that affect trichothecene synthesis. The first objective is to identify and characterize *CID1*-regulated genes that are required for DON production and wheat infection by microarray analysis. Some of these *CID1*-regulated genes may play critical roles in plant infection or DON production and are suitable as targets for developing DON- or scab-controlling compounds. For the second objective, we will examine the effects of different kernel developmental stages and seed components on DON accumulation in the wild-type and *cid1* mutant strains. Results from these experiments will determine whether wheat kernels have developmental stage- or tissue-specific factors that influence DON production in *F. graminearum*.

Overall, the objectives of this proposal are directly relevant to the FY07 research priorities of the Pathogen Biology and Genetics (PBG) research areas on 'characterize genetic variation in the pathogen population with regard to aggressiveness toward plants and mycotoxin potential' and 'develop new strategies for reducing the impact of FHB and associated mycotoxin contamination'. Results from this study will provide important information for identifying fungal regulatory genes and plant factors that influence or control DON accumulation in infected wheat tissues, and may ultimately lead to novel approaches for controlling DON contamination and scab disease.