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Project ID: FY06-KE-033 **FY05 ARS Agreement #: 59-0790-3-081**

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

Project Title: Role of Dioxygenases in Fusarium graminearum Sporulation and Toxic Production.

PROJECT 1 ABSTRACT

(1 Page Limit)

Fusarium head blight (scab) is one of the most devastating diseases of wheat and barley. It is caused by a number of mycotoxin producing *Fusarium* spp. including *F. graminearum*, *F. culmorum*, and *F. sporotrichioides.* The latter two spp. infect primarily by asexual spores (conidia) whereas *F. graminearum*, the principle scab causing fungus infects host plants with both sexual (ascospores) and asexual spores. Impediments to spore production would be useful in controlling this disease. Biochemical and genetic studies suggest that oxylipins, oxygenated derivatives of unsaturated fatty acids, are conserved signaling and structural molecules modulating fungal asexual and sexual spore development. *F. sporotrichioides* mutants lacking an oxygenase responsible for oxylipin production, are severely impaired in asexual spore production compared to that of wild type. Additionally, these mutants do not produce the mycotoxin T-2. T-2 toxin inhibition, aberrations in spore production and reduced aerial growth suggests that this *ppo* gene and/or its products could be a target for control strategies of scab.

Our goal is to test this hypothesis by inactivating four *F. graminearum* genes proposed to be involved in oxylipin biosynthesis. Gene replacement and/or RNAi silencing technology wil be used to knock-out (or down) these genes. We will examine the ensuing mutants for oxylipin content, asexual and sexual spore production, pathogenicity and mycotoxin biosynthesis. These efforts will help in developing efficient control measures to minimize this persistent disease problem and spread in the USA and other parts of the world. This work meets the priorities of the USWBSI research area, pathogen genetics and genomics (PGG).