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PROJECT 1 ABSTRACT
(1 Page Limit)

Fusarium head blight (scab) is a disease of wheat and barley that can cause reduction both in crop yield and grain quality. In our previous studies, one polyketide synthetase gene *PKS1* was found to be important for plant infection. The *GPMK1* MAP kinase gene has also been shown to play critical roles in reproduction and plant infection in *F. graminearum*. Functional analyses of the upstream kinases and one downstream transcription factor of *GPMK1* are currently under the way. The goal of this study is to utilize the recently available genome sequence to further characterize the *GPMK1* pathway and the role of *PKS1* during plant infection. Objective 1 of this proposal is to determine the function of two G-protein coupled receptor (GPCR) genes. These two GPCR genes may function above the *GPMK1* MAP kinase pathway and recognize various signals for sexual differentiation or fungal-plant interactions in *F. graminearum*. The second objective is to examine the expression pattern of *PKS1*. The expression and function of three genes located near *PKS1* will also be studied. Some of these genes may be associated with *PKS1* for synthesizing phytotoxic metabolites. Overall, the proposed research will improve our knowledge about signaling pathways and secondary metabolism involved in fungal developmental processes and pathogenesis in *F. graminearum*. In the long run, further characterization of the *GPMK1* pathway and *PKS1*-related metabolism will be helpful to develop novel targets for fungicide screens or disease control strategies.