PI: David Schisler **PI's E-mail: David.Schisler@ars.usda.gov**

Project ID: FY09-SC-026 **FY09 ARS Agreement #: NA**

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

Project Title: Efficacy and Characterization of Fungicide and *Cryptococcus flavescens* Mixtures.

PROJECT 1 ABSTRACT

(1 Page Limit)

The use of integrated pest management practices to reduce Fusarium head blight (FHB) and deoxynivalenol (DON) contamination of wheat and barley is recognized as the most effective management strategy for the disease. The goal of the research proposed herein is to determine how to most effectively integrate biological control agent *Cryptococcus flavescens* OH 182.9 with the fungicide prothioconazole in the management of FHB and to determine the physio-chemical surface properties of the wheat head and their influence on wheat head colonization by biocontrol agent OH 182.9. Recently, we have isolated and begun characterizing naturally occurring prothioconazol-tolerant variants (PTCT) of our patented biocontrol strain *Cryptococcus flavescens* OH 182.9. In the 2001 Uniform Fungicide Trial of the USWBSI, unformulated biomass of wild type (WT) OH 182.9 reduced FHB disease severity and, importantly, DON contamination of seed by nearly 30% across 17 field sites. With the development of PTCT variants of yeast strain OH 182.9, the integrated treatment of wheat with this fungicide and strain OH 182.9 is now possible with minimal deleterious effect to fungal antagonist OH 182.9. Objectives for the second year of this two year research project proposed herein are 1) to evaluate the influence of spray order and timing of application of prothioconazole, wild type (WT) strain OH 182.9 and PTCT OH 182.9 on FHB and DON (three field locations), 2) for each application protocol, to enumerate WT and PTCT OH 182.9 colonization of wheat head infection courts (two field locations) and 3) to characterize infection court surface properties and surface property changes associated with prothioconazole and OH 182.9 application (one field location). Field studies using susceptible and/or resistant wheat varieties will be utilized in meeting the listed objectives. Wheat head tissues will be evaluated separately in colonization and surface property studies which will include characterization of basic surface chemistry and roughness and epicuticular wax morphology. It is anticipated that the proposed research will provide key missing data in understanding how to best integrate fungicide and biocontrol treatments to reduce FHB/DON and provide baseline knowledge on understanding why successful treatments work by relating successful integrated treatments to the microbiological and physiochemical environments encountered on wheat head infection courts.