

PI: McMullen, Marcia

PI's E-mail: marcia.mcmullen@ndsu.edu

Project ID: FY09-MC-037

FY08 ARS Agreement #: 59-0790-4-114

Research Category: MGMT

Duration of Award: 1 Year

Project Title: Greenhouse Studies of DON in Wheat as Influenced by Environment and F.g. Isolate.

PROJECT 1 ABSTRACT

(1 Page Limit)

Controlled greenhouse inoculation studies of a very susceptible spring wheat cultivar, at Cornell University, indicated that FHB severity was highest when inoculated near flowering, but DON levels were highest with inoculations at watery ripe stages (Del Ponte, et al., 2003). ND greenhouse studies indicated that multiple inoculations on hard red spring wheat and durum wheat increased DON, but spring wheat and durum wheat reacted differently to times of inoculation (McMullen, et al., 2007). These 2007 results also indicated that DON derivatives were rare and only associated with very high DON levels. North Dakota greenhouse studies in 2008 indicated that increased durations of moisture at late growth stage inoculations had larger impacts on durum infection than in hard red spring wheat (data summarized in Progress report). North Dakota studies also indicated that cultivar resistance interacted with post-flowering moisture duration. The effects of late season moisture on DON in durum cultivars closely parallel results with field studies in 2006 and 2007 with soft white wheat, where FHB severity and DON increased significantly as duration of post-flowering misting increased (Cowger and Median-Mora, 2007).

Overall project goal: to continue to gather data on differential effects of moisture duration, growth stage at inoculation, and Fusarium isolate on FHB and DON development in susceptible and moderately resistant hard red spring wheat and durum cultivars, in controlled greenhouse inoculation experiments.

Project Objective: 1) test 4 inoculation timings, 3 moisture duration regimens, and two to three *F. graminearum* isolates on two grain classes and two cultivars of each grain class to determine effects on FHB, DON, and DON derivatives. To determine if there are interactions between grain class or susceptibility of cultivar and moisture duration, growth stage and/or isolate.

Expected Outcome: We will increase the data base for verification of 2008 and 2009 results and provide direction for year two on isolate choice and possible management and breeding evaluation schemes to address late season infections and how they may differ between the two grain classes studied

The proposed project addresses the following priority area of the Management Research Area:

Develop a full understanding of specific environmental and biological factors influencing infection and toxin accumulation that can be used to develop the next generation of disease forecasting and DON risk assessment systems.