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Project Title: Factors Influencing the Accumulation of DON in Fusarium-Infected Wheat.

PROJECT 1 ABSTRACT

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This collaborative pre-proposal has two major objectives: (1) examine the effects of post-anthesis moisture and delayed infection on DON accumulation in wheat; and (2) investigate the cultural implications of a delay in harvest of two weeks on the DON content of mature grain.

Inoculated, mist irrigated field experiments examining FHB development and DON accumulation will be established at the Minnesota Agricultural Experiment Station in St Paul, MN and the Cunningham Research Station in Kinston, NC. Two field experiments will be conducted. The first, which will be planted in both NC and MN, will examine the effects of post-anthesis moisture and late infections on DON accumulation in spring and winter wheat cultivars. The goals of this experiment are to confirm previous findings on the influence of host resistance, pathogen aggressiveness and moisture on the development of FHB symptoms and accumulation of DON in wheat; to illuminate the influence of host-pathogen genotype interactions on fungal colonization and DON production in different tissues; and to detect differences in the relative ranking of cultivars under different infection-timing-by-mist-duration treatments. The second experiment, to be planted in NC, will investigate the cultural implications of our findings on DON development during the grain-fill period under different durations of post-anthesis moisture. Main plots in this experiment will be 0 and 21 days of post-anthesis misting, and sub-plots will be different durations of moisture during the harvest period. The purpose of this experiment is to explore our finding that grain DON decreases near normal harvest time, to increase the precision with which this trend is estimated, and to determine how the trend is affected by different numbers of moist days during the harvest-delay period.

In addition, a greenhouse experiment will be conducted in MN. This experiment is designed to confirm the effect of moisture (using wetting events applied between 7 and 28 days after inoculation) on the development of FHB symptoms and the accumulation of DON in wheat floret tissues. The impact of wetting events applied both before and after the full expression of symptoms will be determined.

The proposed research is directly aimed at MGMT's core goal of developing effective management practices that reduce FHB severity and DON in harvested grain.