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Project Title: Epidemiology of Late FHB Infections in Wheat.

PROJECT 1 ABSTRACT

(1 Page Limit)

Susceptibility to FHB infection in wheat appears to decline rapidly between 7 and 14 days after anthesis (daa). An improved understanding of the shift in vulnerability will help us understand the relationship between visual disease ratings in the field and mycotoxin accumulation in harvested grain. This understanding will allow us to more accurately forecast scab epidemics, manipulate both host genetics and environmental factors in order to better manage FHB, and shed light on such issues as why fungicide applications vary in effectiveness.

These experiments will: i) more precisely characterize the window of wheat susceptibility to FHB, i.e., identify how long wheat remain susceptible after anthesis, and how quickly susceptibility declines, ii) relate the decline in susceptibility to growth stage and head physiology, iii) determine the progression of fungal infection and DON during the period from flowering to harvest and precisely relate each measurement of those variables to growth stage, and iv) further our understanding of post-infection precipitation events on toxin accumulation.

To accomplish these goals, the second year of an inoculated mist-irrigated field experiment will be conducted in Raleigh, NC. We will inoculate plots of winter wheat at 0, 3, 5, 6, 7, 8, 9, 11, and 13 daa. Mist-irrigation, provided for 28 daa, will be used to promote disease development. Heads will be sampled at 14, 21, 28, 35, and 42 days after inoculation to determine the effect of infection timing on visual kernel damage, *Fusarium* infestation, and DON contamination**.** Growth stage determinations, based on visual and dry weight measurements, will provide the precision in identifying the window of susceptibility to infection. As we expect temperature and moisture to influence the window of susceptibility, we will monitor environmental parameters using local weather stations. Complementing the field study, a greenhouse experiment will examine the interaction of late infection and post-anthesis moisture on mycotoxin accumulation.

The proposed research is aimed at MGMT's core goal of developing effective management practices that reduce FHB severity and DON in harvested grain. Understanding of the effects of infection timing on FHB development and DON accumulation is critical to optimizing forecasting models, management recommendations, and identifying the implications for resistance breeding.