

0203-WI-010 Evaluation of varietal responses to different fungicide management strategies in spring wheat.

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PROJECT ABSTRACT

(1 Page Limit)

Cultivars of hard red spring wheat (*Triticum aestivum* L.) differ genetically in their response to one or more of the economic important fungal pathogens. Broad spectrum, systemic fungicides like tebuconazole or propiconazole, can provide excellent control of the residue born, foliar diseases (*Septoria* spp., *Bipolaris* spp.) as well as provide suppression of fusarium head blight (*Fusarium graminearum*). Due to the presence of one or all the aforementioned diseases in the production system during any given year, the decision to spray a fungicide and the timing of one or more applications is complex, but extremely important to ensure an economic return of the inputs. The tools available to assist HRSW producers in Minnesota and North Dakota to make fungicide decisions include a decision support system and a spore sampling network and disease forecasting system that predicts the likelihood of an infection of the economic important foliar pathogens and quantifies the presence of *Fusarium graminearum* spores. These decision aids do not take into account the genetic differences in resistance to one or more of the economic important diseases. Previous research has shown that significant cultivar by fungicide interactions exist. Furthermore, research has indicated that the optimum timing for control of leaf diseases is at flag leaf emergence while optimum timing for suppression of FHB is at anthesis. Others have indicated that, because of the numerous cultivar by management interactions, it difficult was to formulate useful management guidelines for individual cultivars. By grouping cultivars, the authors found that various management inputs tended to have similar effects across cultivar types. The objectives of this research are to:

- 1) Evaluate whether cultivars can be grouped in classes such that fungicide management decisions can be made to optimize economic returns of the application of one.
- 2) Evaluate which fungicide management strategy is most economic given a cultivars' characteristics.

To address the stated objectives, the following experiment is proposed: a factorial design with one factor the cultivars grouping and as the second factor, the different fungicide management strategies. The grouping of cultivars is as follows: Susceptible to both foliar diseases and FHB, Susceptible to FHB but resistant to foliar diseases, Susceptible to foliar diseases but resistant to FHB, and Resistant to both FHB and foliar diseases. The fungicide management approaches used are: No fungicides applied, One application at Feekes 5, One application at Feekes 10.51, One application at Feekes 5 and one at Feekes 10.51, and one or two applications based on the available decision support systems. This factorial will be replicated six times using a randomized complete block at one location and over three years. Plot size will be 5 x 25-ft using solid seeded plots and planted in wheat stubble to increase the chances for development of diseases. The fungicides will be applied at recommended rates and volumes using a backpack sprayer. Variables measured include disease ratings for foliar diseases and FHB at 21 days after heading, grain yield, test weight, and grain protein. Economic returns will be calculated using figures based upon Minnesota Farm Business Management Education's cost estimates. The proposed research is another step in the continued effort of evaluating the usefulness of fungicides to suppress FHB. Previous work clearly indicated that fungicides play a role in combating and controlling FHB and other foliar diseases. The proposed research attempts to address the decision points during the growing season and the likelihood of an economic return given a cultivar's characteristics.