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Project Title: Developing More Robust Integrated Management Guidelines to Minimize Losses Due to FHB and DON in Wheat and Barley in MN.

PROJECT 1 ABSTRACT

(1 Page Limit)

Studies that combine a well-timed fungicide application and cultivar resistance provided better results in terms of FHB and DON control than either fungicide application or cultivar resistance alone. However, due in part to practical limitations, producers have not always been able to fully adopt and follow this management recommendation. For instance, FHB develops best, and consequently fungicides are most warranted, when it rains during anthesis. However, the practical constraints of grown-applying treatments under wet, soggy field conditions often prevent producers from applying fungicides at anthesis. This has led to questions being asked about the efficacy of making fungicide applications before or after anthesis. Effective pre- or post-anthesis fungicide applications would provide producers with the flexibility of being able to treat fields a few days before or after anthesis, if rain or some other factor prevents them from doing so at the recommended anthesis growth stage. This served as the impetus for the next round of coordinated integrated management projects (IM_MGMT_CP) to develop management guidelines that are more robust to conditions experienced in commercial fields (Goal # 1 of the Management Action Plan).

For this round of IM_MGMT_CP, cooperators will conduct experiments using at least two cultivars with different levels of resistance to FHB and at least four fungicide treatments. The treatments will be inoculated and non-inoculated untreated checks, application of Prosaro (6.5 fl. oz./A + 0.125% Induce) at 50% anthesis (Feekes 10.5.1), and one or more post-anthesis applications (2, 4, and 6 days after anthesis). Applications will be made using a sprayer equipped with paired Twinjet or flat fan XR8001 nozzles, mounted at an angle forward and backward (or forward alone) and calibrated to deliver 10 to 20 gallons per acre. The experimental design, treatment layout, and plot size will vary among locations depending on equipment and space available. Plots will be established on university research farms or in farmers' fields in areas previously planted with a crop that is representative of the typical cropping sequence of each location, and managed according to the standard agronomic practices for each grain class and location. FHB, DON, FDK, yield, and test weight data will be collected in all trials and analyzed to determine the effect of fungicide and resistance. The untreated check and the anthesis treatment will serve as references for estimating percent control of FHB, DON and FDK for each of the post-anthesis applications. Data from all trials will be compiled and a technique called meta-analysis will be used to conduct a quantitative synthesis of the results. This will allow us to draw conclusions from multiple individual studies and perform a statistical evaluation of study-specific characteristics (wheat type, weather conditions, residue levels, previous crop etc.) likely to influence the efficacy of making post-anthesis fungicide applications as part of an FHB integrated management program. Based on results from these studies, we would be able to identify management combinations that are effective, yet robust enough to allow growers more flexibility when managing FHB/DON.