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Research Category: MGMT

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Project Title: Integrated Management Coordinated Project, ND.

PROJECT 1 ABSTRACT

(1 Page Limit)

Field experiments will be conducted at multiple locations in ND on multiple spring grain classes, to investigate the effects of variety resistance and fungicide application on FHB and DON accumulation. We will conduct a fungicide x variety interaction on spring wheat at Prosper in Cass County and at another site in Steele Co.; and will conduct a fungicide x variety x previous crop interaction on spring barley at Fargo and on spring durum and spring barley at Langdon. Inoculum will be applied at Langdon, to improve disease levels for differentiation. Experimental design will vary slightly by location, depending on equipment and space available. Four replicates will be standard. Plots will be established on university research farms in fields with a typical cropping sequence of each location. All trials will be managed according to the standard agronomic practices for each grain class and location. A mixture of isolates (9) of *Fusarium graminearum* endemic to ND will be used in the inoculated trials. Plots will be divided into sub-plots, one treated with Prosaro (6.5 fl oz/A + 0.125%) and the other left untreated. A single fungicide application will be made on the time of early flowering (Feekes GS 10.5.1) for each variety of wheat and at early heading in barley (Feekes 10.5) using a sprayer equipped with flat fan XR8001 nozzles, mounted at an angle (30° from the horizontal) forward and backward and calibrated to deliver at a rate of 18 to 20 gallons per acre.

FHB intensity will be assessed in each plot at the soft dough growth stage, Feekes 11.2. At each assessment, FHB severity will be determined visually, and incidence, diseased head severity, and index will be determined. The presence and flag leaf severity (as a percentage) of any foliar diseases also may be determined. Plots will be harvested with a plot combine and yield and test weight determined. Grain from all plots will be rated to determine the percentage of *Fusarium* damaged kernels (FDK). Grain samples from each plot will be sent to the NDSU Veterinary Toxicology Laboratory for DON analysis. For those trials established in previous *Fusarium graminearum* host crops, an estimate of % residue on the soil surface will be provided.

All sites are located near a North Dakota Ag. Weather Network station that provides hourly data on temperature, relative humidity, surface wetness, rainfall, wind speed, and solar radiation data throughout the growing season.

Overall Objectives that meet FHB management area goals: **1)** evaluate the integrated effects of fungicides and genetic resistance on FHB and DON in all major grain classes in different cropping systems; **2)** conduct a quantitative synthesis of the integrated effects of fungicide and resistance on FHB/DON and the influence of region-specific factors on the overall efficacy of this integrated approach; and; **3)** develop best-management-practices for FHB and DON. The data is shared with producers to encourage them to adopt multiple management strategies.