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PROJECT 1 ABSTRACT

(1 Page Limit)

Fusarium Head Blight (FHB) continues to be a yield-limiting factor in many wheat and barley production regions of the world. Efforts to minimize the impact of this disease have been based on the use of management strategies such as host resistance, crop rotation, tillage, and fungicide application. However, under favorable weather conditions, none of these practices used alone have been fully effective against FHB and DON. As part of a collaborative effort involving researchers from major wheat-growing regions in the US, we propose to conduct experiments to demonstrate that the integration of multiple management strategies is the most consistent, effective, and economically sound means of reducing losses due to FHB and DON. The specific objectives are: **1**) evaluate the integrated effects of fungicide and variety resistance on FHB and DON, and perform an economic analysis of integrated and chemical management approaches and **2**) evaluate the influence of fungicide coverage and flowering synchrony as affected by planting density and row spacing on the overall efficacy of fungicide application for FHB and DON control. For objective 1, field experiments will be conducted by cooperators in major US wheat-growing regions following a standard protocol established by the CBCC RAC. The experimental design will be a split plot with 6 replicate blocks. Whole plots will consist of six soft red winter wheat varieties - "Cooper" and "Pioneer 25R47", susceptible; "AG101" and "Hopewell", moderately susceptible; and "Truman" and "McCormick", moderately resistant. There will be two adjacent plots of each variety in each block. Sub-plot treatments will be established by applying Prosaro to one plot of each variety at the flowering date (Feekes' GS 10.5.1) of the variety and leaving the other plot untreated. For objective 2, plots of soft red winter wheat variety "Hopewell" will be planted at two locations in Ohio. The experimental design will be a split-split plot with 3 replicate blocks. Whole plots will consist of two row spacings: the standard 7.5-inch rows and 15-inch rows (used in relay intercropping); sub plots of three seeding rates (18, 23, and 28 seeds per foot of row); and sub-sub plot of fungicide treatments (with and without Prosaro applied at GS 10.5.1). FHB, yield, grain quality, and DON content will be assessed in all experiments. For Objective 2, stand and spike counts will be done during the fall and spring. For Objective 1, data will be combined from all experiments and analyze to determine the overall effect of integrating resistance and fungicide for FHB and DON control. In addition, using these data, data from 9 years of uniform fungicide trials, and a survey of wheat prices, FHB-related discounts, and wheat production-related costs for the last 9 years for each region, an economic analysis of chemical and integrated control strategies will be performed. For Objective two, we will used percent control (reduction in FHB in treated plot relative to untreated plot for each treatment and treatment combination) to determine whether planting density and row spacing (directly or indirectly) contribute to more effective chemical control of FHB and DON.