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Project Title: Development and Validation of FHB and DON Prediction Models for Barley.

PROJECT 4 ABSTRACT

(1 Page Limit)

This research is needed because barley producers currently do not have disease severity and/or mycotoxin (DON) forecasting models on the Penn. State Fusarium Head Blight Risk Assessment Tool. If such models were available, growers would have additional information that could be used in the integrated management of FHB. Specifically, fungicide application decisions could be made that would reduce the risk of severe disease development and/or high DON levels for a crop. This would help maintain grower profitability and help reduce further erosion of barley acreage in the region.

This collaborative research effort are uniquely capable of conducting this project because the three states where this research will occur (Minnesota, North Dakota, and South Dakota) are, or were, major producers of malting barley in the US and regularly experience the environmental conditions required for significant epidemics of FHB to occur. Within these three states, we have a significant precipitation gradient that usually results in plot locations having a range of disease severities and/or DON concentrations. As a result, there is an increased chance that we can generate data necessary to identify the environmental factors which impact disease and/or DON in barley. Overall, we also have considerable experience working with diseases in barley, and FHB in particular. The Co-PIs for this collaboration are integral members of the wheat FHB modeling effort, have conducted research on the epidemiology of *Gibberella zeae*, and are very familiar with the nuances of this pathosystem.

The University of Minnesota will test three malting barley entries at two locations. We will collect disease and plant growth stage data to support development of the barley FHB forecasting effort. We will collect weather data, FHB incidence and severity from 50 spikes if symptoms are present, and send grain to the St. Paul mycotoxin lab for DON analysis. Post harvest data will include yield, protein, and test weight.