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

PROJECT 2 ABSTRACT

(1 Page Limit)

There is no question that the regular occurrence of Fusarium head blight (FHB) epidemics in the Northern Great Plains has negatively impacted both wheat and barley production in the region. Aggressive research and breeding efforts have been underway for the past 10+ years to identify and develop management strategies for FHB in both crops. The three most effective tools are known to be *i*) planting resistant varieties, *ii*) avoidance of high risk cropping systems, and *iii*) timely application of an effective fungicide. Unfortunately, there is still progress to be made in this effort, especially for barley. One of the major limitations in the management of FHB for barley is that there are currently no highly resistant cultivars available and producers have to rely almost exclusively on fungicide application. Crop rotation and tillage reduce the amount of crop residue from which in-field pathogen inoculum can be produced. However, researchers have found that the type (and status) of residue in a field can be irrelevant during high disease pressure seasons because the amount of external airborne spores reaching the plants is enough to cause disease epidemics. In these situations, fungicides are the only management tool work toward managing disease symptoms and DON accumulation in barley. Certain fungicides have been found to suppress FHB symptoms if applied before infection occurs. The best product (Proline) is expensive, if labeled for application on barley, thus making an unnecessary application in low-risk situations an undue economic hardship.

Research plots consisting of adapted 2-row (Conlon) and 6-row (Tradition, Robust, and M-122) spring malting barley varieties will be planted at two locations in Minnesota. Field locations are situated in the Red River Valley to take advantage of different growing environments. Each location will have weather data collection equipment that record hourly air temperature, relative humidity, and precipitation. Cultural information will be collected at each location (e.g. previous crop residue) and no irrigation or artificial inoculum will be provided. The crop stage will be monitored regularly. At 2-3 weeks after heading (approx. dough stage, Feekes 11.2), disease ratings will be taken from at least 50 heads per plot. At harvest, grain will be subsampled from each plot and analyzed for DON concentration.

Results will be shared with Dr. Jeff Stein, South Dakota State University who is the PI of this coordinated barley project.