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**ARS Agreement #:**

**Research Category: MGMT**

**Duration of Award: 1 Year**

**Project Title: Integrated Management of Fusarium Head Blight and DON in Wisconsin.**

## **PROJECT 2 ABSTRACT**

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The Objectives of this FHB Integrated Management (IM) Coordinated Project are to: 1) Evaluate the integrated effects of fungicide 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; 3) Develop “*best-management practices*” for FHB and DON; and 4) generate data to advance the FHB and DON risk prediction effort. The project has the following working *hypothesis*: Fungicide and variety resistance will serve as complementary management approaches to consistently provide higher percent reduction of FHB and DON than that achieved by either approach used alone.

The field experiment will be conducted at the Arlington Agricultural Research Station, Arlington WI (Dane-Columbia County). The proposed experimental design for the Wisconsin trial is a split-plot arranged in a randomized complete block design. The whole plot factor will be wheat cultivar. The sub-plot factor differs from the proposed split-split design in that we will use a factorial combination of inoculation and fungicide treatment at the sub-plot. Our reason for this approach is both practical for planting and spray purposes as well as providing more degrees-of-freedom in the sub-plot level to statistical tests and comparisons. This trial will be managed according to the standard agronomic practices for each grain class and location. We will follow the proposed protocol for inoculations: a spore suspension (40,000 spores/ml or no spray inoculation). We will use a mixture of isolates of *Fusarium graminearum* that have been collected from different trials in Wisconsin or regionally as needed. Within the sub-plot combination of treatments, we will randomly assign fungicide treatment as the second factor, Prosaro (6.5 fl oz/A + 0.125 NIS%) or untreated. A single fungicide application will be made on the time of early anthesis (Feekes GS 10.5.1) for each variety using a sprayer equipped with paired Twinjet or flat fan XR8001 nozzles, mounted at an angle (30° from the horizontal) forward and backward and calibrated to deliver at a rate of 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 calculated as previously described and used in our trials. At the time of fungicide application, we will estimate the incidence and severity of any foliar diseases and will also make an estimate of post-spray disease incidence and severity on the flag leaf at Feekes 11.2. 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 one of the USWBSI-funded DON Testing Laboratories for DON analysis.

Overall, this trial will improve our knowledge of the use of foliar fungicides for control of FHB and DON.