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PROJECT 2 ABSTRACT

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Sub-project 1: Minnesota Component of the FHB Integrated Management Coordinated Project.

Previous integrated management projects, have established that the integration of multiple management strategies is the most efficacious approach to minimize losses to Fusarium head blight (FHB) and deoxynivalenol (DON). The best combinations of integrated management strategies however are not sufficient to minimize yield and quality losses when conditions are favorable for infection. For instance, under wet, humid conditions, a fungicide with 70% control and moderately resistant germplasm may still not be sufficient to reduce DON below 2 ppm and Fusarium damaged kernels (FDK) below 1%. Fungicide-treated fields, even those planted with moderately resistant cultivars, still suffer yield losses and have grain prices discounted because of to poor grain quality. Additional integrated management studies are needed to incorporate new knowledge to better manage FHB and DON. The efficacy of "late" or "post-anthesis" fungicide applications raises several questions that warrant further investigation that will be addressed in this proposal. "Will an fungicide application at anthesis followed by a later application be more effective than either single application?" and "Are two fungicide applications for FHB and DON management economically feasible?" As the Minnesota component of this project we will conduct two inoculated field experiments, using three cultivars of hard red spring wheat and three cultivars of spring barley, respectively, with different levels of resistance to FHB and at least six fungicide treatments at each of two locations. Fungicide treatments will including: 1) an untreated check; 2) Prosaro at anthesis; 3) Prosaro at anthesis and Caramba 4 days later; 4) Caramba at anthesis and tebuconazole 4 days later; 5) Proline at anthesis and tebuconazole 4 days later; and 6) an untreated, non-inoculated check. FHB, DON, VSK, foliar diseases severity, yield, and test weight data will be collected in these trials.

Sub-project 2: Risk-based Fungicide Decision-making for FHB and DON Management in Wheat

The goal of this project is to facilitate the practical utilization of the web-based FHB risk assessment system. This study will add to studies at other locations to provide a range of environments where risk scenarios will vary based on whether the fungicide application is made when FHB risk is low, moderate, or high. Strips/plots (minimum 5 x 20 ft) of 4-5 cultivars will be planted at four locations across Minnesota. Half of each strip of each cultivar will be treated with Prosaro at 6.5 fl. oz/acre at early anthesis and the other half will be left untreated. Applications will be made using a sprayer equipped with paired Twinjet or flat fan XR8001 or XR8002 nozzles, mounted at an angle (30-45^{o} from the horizontal) forward and backward (or forward only) and calibrated to deliver at a rate of 10 to 20 gallons per acre. Scab risk will be evaluated at the time of each application, and each cultivar x flowering date x location combination will be assigned a code based on the predicted risk of FHB. A single application will be made to each cultivar and the code assigned to the treatment will be a function of local weather and cultivar susceptibility.

Data from all trials will be compiled using meta-analysis. Based on findings from these studies, we anticipate being able to identify combinations of management techniques that are effective, yet robust enough to allow growers more flexibility when managing FHB and DON.