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Research Area: EDM

Duration of Award: 1 Year

Project Title: Effect of Inoculum, Host Resistance, Fungicide and Weather on FHB.

PROJECT 2 ABSTRACT

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The major goal of this project is to investigate the effects of inoculum abundance, weather, host resistance, and fungicide use on development of *Fusarium* head blight under natural field conditions. We wish to determine how a fungicide and partial resistance perform under weather conditions that differ in favorability for head blight. Now that cultivars with partial resistance and fungicides that can suppress head blight development are available to wheat producers, weather-based risk models need to be expanded to account for these additional factors. Additional data sets that include not only head blight severity in the field, but also abundance of airborne inoculum, severity of *Fusarium*-damaged kernels, and DON concentration in grain are needed to develop more reliable risk models.

Three soft red winter wheat cultivars will be planted at the Purdue agronomy research farm (ACRE) in Tippecanoe County, Indiana in a split-split plot design. Main plots will be presence or absence of corn residue on the soil surface, sub plots will be treatment or no treatment with Folicur fungicide at onset of flowering, and sub-sub plots will be cultivar. One cultivar (Patterson) is relatively early flowering. The other two are later flowering and one of these, Hopewell, is susceptible to FHB whereas the other, Truman, is moderately resistant. Adjacent to this wheat experiment we will plant McGregor barley. Half of these plots will receive either no corn residue; the other half will have residue at the same density as in the wheat experiment (80%) ground cover. Airborne inoculum will be quantified each day by capturing spores of *Gibberella zeae* with Burkard spore samplers (one in each residue treatment), and by washing and quantifying propagules from wheat heads each day in each residue treatment. Head blight incidence and severity will be monitored in each plot. Temperature, rainfall, relative humidity, wind speed and direction, and plant surface moisture will be monitored at 30 min. intervals throughout the growing season with a Campbell weather data logger. Grain will be harvested for yield, test weight, and assessment of incidence of *Fusarium*-damaged kernels, asymptomatic infection, and DON content. We will also monitor head blight development in wheat cultivar trials at 5 locations around Indiana (about 25 entries per location). The same grain characteristics mentioned above will be determined for each plot. Each of these locations has a Campbell weather station that records hourly temperature, precipitation, and relative humidity. Data from these experiments will be used to explore the relation between head blight intensity, grain quality traits, and DON content. All of these data sets will be used in the cooperative effort to refine weather-based risk prediction models.