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PROJECT 2 ABSTRACT
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The shift to conservation tillage methods of crop production was a major contributor to destructive epidemics of *Fusarium* head blight (FHB) of wheat and barley in the U.S. in the 1990s. Susceptibility of widely grown cultivars also contributed to epidemics. Bringing FHB under control will require multiple disease management strategies, based on understanding its epidemiology. Crop rotation or tillage to reduce the amount of residue that harbors the pathogen might contribute to a disease management program, but the effects of these practices on reducing inoculum levels are poorly understood.

In this study, we hypothesize that local inoculum abundance, in addition to weather, exerts control over the incidence of FHB. The limiting effect of inoculum abundance will most likely be evident under weather conditions only moderately conducive for disease. To test this hypothesis we will sow 3 wheat cultivars of different maturities at 2 planting dates in order to create a range of flowering dates in the experiment. Three densities of corn residue will be used to create different levels of primary inoculum (perithecia and ascospores of *Gibberella zeae*). The experiment will be a split-split plot design with 3 blocks. Main plots will be planting date, sub-plots will be density of corn residue, and sub-subplots will be cultivar. Strips 30-ft wide of wheat cultivar Goldfield, moderately resistant to FHB, will separate subplots and main plots from each other. Corn stalks will be applied to achieve 0, 15%, and 80% ground cover. In the spring we will monitor air temperature, relative humidity, plant surface wetness, soil surface wetness, and wind speed and direction with a Campbell automated weather station that records values at half-hourly intervals. We will monitor airborne propagules of *Fusarium* with Burkard spore samplers (one in each residue treatment) and by direct assay of wheat heads. We will monitor the increase in FHB incidence and severity over time in one cultivar-planting date combination over the 3 residue treatments, and will assess incidence and severity in all treatments at the late milk and early dough stages of grain development.

We will also evaluate FHB incidence and severity in state variety trials at 5 regional farms. Grain from these trials, as well as those from the residue density study will be evaluated for visibly damaged kernels, frequency of infection by *F. graminearum*, and for DON.

The goal of this work is to quantify the effect of primary inoculum abundance on FHB development and may lead to recommendations for residue management as one means to reduce the risk of FHB. Results will allow refinement of weather-based disease risk models and allow us to incorporate DON levels into these risk models.