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PROJECT 1 ABSTRACT
(1 Page Limit)

Fusarium Head Blight (FHB) continues to be a concern in many wheat and barley production regions of North America. Invaluable information regarding factors influencing inoculum levels and dispersal and FHB development are being gathered through field and laboratory experiments. This has led to the development and deployment of a weather-driven, Web-based risk assessment model that is currently being used to predict economic FHB risk potential in 23 states. Further investigations are needed to account for factors not included in the model that may be responsible for the variations observed in FHB intensity within a given regions. In addition, investigations are needed to determine the influence of environmental and cultural factors on FHB development on barley and to assess the performance of the model on this crop. As part of a multi-state project involving researchers from ND, SD, IN, and PA, we propose to investigate the influence of crop residue, fungicide, flowering date, and cultivar resistance on the development of FHB. A similar protocol will be used at every location. It entails the planting of two susceptible wheat cultivars of different maturity and a resistant cultivar similar in maturity to one of the susceptible cultivars in plots with either 0 or 80% maize residue. Plots will be planted on a single planting date and a single application of tebuconazole fungicide (Folicur) will be made at flowering (Feekes growth stage 10.51) to one plot of each cultivar/residue combination. Adjacent to the wheat plots, a cultivar of barley will be planted in plots with (80%) and without residue. Results from 2004 indicated significant difference in FHB intensity between plots with 0 and 80% residue, however, the magnitude of this difference varied among locations, suggesting that weather may influence this relationship. We will again monitor the environmental parameters and quantify inoculum density in the air and on wheat spikes at each location in 2005. Key variables associated with inoculum levels on wheat spikes have been identified and will be used to refine the risk model through the incorporation of an inoculum density sub model. Results from the proposed study will indicate the relative importance of cultural practices on the development of FHB on both wheat and barley under a range of environmental conditions. Our second object is to determine the importance of a within-field source of inoculum and the role of rain splash in the dispersal of *Gibberella zeae* from this source. In the first part of this study, we determined that inoculum of *G. zeae* was dispersed at spike height (~ 1 m) by rain splash and the extent to which this occurred depended on rainfall intensity. We have expanded this study to relate the number of propagates splash-dispersed to distance and direction from the source of inoculum. We will also determine inoculum density and FHB intensity on wheat spikes relative to distance from the source of inoculum. The relationship among inoculum density, disease intensity, and distance from inoculum will help to elucidate the contribution of rain to inoculation under field condition and the strength and importance of a local source of inoculum in an area with background inoculum levels.