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PROJECT 4 ABSTRACT

(1 Page Limit)

Knowledge of the relative contribution of within-field inoculum sources of *Gibberella zeae* to infection of local wheat and barley is important for developing and/or excluding strategies for managing FHB. Our experimental objective is to quantify the relative contribution of within-field corn debris as an inoculum source of *Gibberella zeae* for Fusarium head blight and DON contamination in 20 variable wheat or barley environments over two years, all in regions where corn is the predominant crop in the agricultural landscape and corn debris is left on the land surface over large areas. Our research is based on the hypothesis that spores of *Gibberella zeae* that are deposited on wheat spikes and that result in Fusarium head blight come primarily from well-mixed, atmospheric populations in an area. Our results should provide a realistic range of estimates for the scab and DON reduction benefits to be realized by avoiding cereal planting into corn stubble. It will also suggest the magnitude of FHB/DON reduction to be expected from tillage or other direct debris management techniques in a single field of wheat or barley within a larger corn production region. Building on techniques perfected in New York and Virginia in 2007-2008, we will use a marked (AFLP) isolate, release-recapture experimental approach to assess relative contribution of localized clonal inocula to infection of cereal heads at the source and at more than 100 feet from the source in commercial wheat and barley fields otherwise lacking corn or cereal debris. We expect that concentrated clonal inoculum may overestimate the contribution of local inoculum to FHB and DON, so we are also employing replicated microplots in each experimental field with naturally overwintered corn debris collected from sources close to those same wheat and barley fields. The research will be conducted in two commercial-scale wheat or barley fields per season in Illinois, Missouri, Nebraska, New York, and Virginia. All field sites are in regions with considerable acreage of over-wintered corn residues nearby. Our research addresses Goal #3, to develop a full understanding of specific factors influencing infection and toxin accumulation that can be used to develop the next generation of scab and DON risk assessment measures. Specifically we will (1) elucidate the contribution of local inoculum sources to the temporal and spatial development of FHB epidemics, and this knowledge will, in turn, (2) help refine models for FHB risk assessment. Results from this study will increase our understanding of the spread of *G. zeae* from a local source of inoculum and will be of immediate value in determining the relative risk of infection of wheat by *G. zeae* from within-field sources of inoculum. Ultimately, our efforts will aid in developing and/or excluding strategies for managing FHB and will help refine forecasting/risk assessment models for FHB.