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PROJECT 2 ABSTRACT

(1 Page Limit)

Knowledge of the relative contribution of within-field inoculum sources of *Gibberella zeae* to infection of local wheat is important for developing and/or excluding strategies for managing FHB. Our proposed 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. Where a large, regional source of atmospheric inoculum of *G. zeae* exists, crop rotation or tillage practices may not effectively reduce the risk of FHB in individual fields. Our experimental objective is to determine the relative contribution of within-field, clonal inoculum sources of *Gibberella zeae* to Fusarium head blight in wheat. We propose to use a marked isolate, release-recapture experimental approach to assess relative contribution of localized inocula to infection of wheat heads at the source, at a radius of 5 meters from the source, at a radius of 10 meters from the source and in more distant parts of a commercial wheat field. Corn kernels and stalks infected with clonal, fingerprinted isolates of *G. zeae* containing rare alleles (relative to background populations) will be released in replicated areas in wheat fields in each state. We will use Amplified Fragment Length Polymorphisms (AFLPs) of isolates recovered from wheat spikes to determine the contribution of these within-field area sources of inoculum to Fusarium head blight at various distances from those sources. Since our inoculum sources in Virginia and New York contain clonal isolates that have unique AFLP haplotypes, we will be able to observe these clones in a mixed/diverse background population containing numerous AFLP haplotypes. The experiment will be duplicated in one commercial-scale wheat field on the Musgrave Research Farm in Aurora, NY and in one wheat field on the Kentland Research Farm in Blacksburg, VA. Both field settings are in regions with considerable acreage of over-wintered corn residues nearby. Our goals fall under the EEDF priorities of 'Pathogen Biology and Ecology'. 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 integrated efforts in research and outreach will aid in developing and/or excluding strategies for managing FHB and will help refine forecasting/risk assessment models for FHB epidemics.