PI: Bergstrom, Gary **PI's E-mail: gcb3@cornell.edu**

Project ID: FY08-BE-029 **FY07 ARS Agreement #: 59-0790-4-093**

Research Category: **MGMT** **Duration of Award: 1 Year**

Project Title: Relative Contribution of within-Field Inoculum to FHB Infection.

PROJECT 3 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 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. We will use a marked isolate, release-recapture experimental approach to assess relative contribution of localized inocula to infection of cereal heads at the source, at a radius of 10 feet from the source, at a radius of 20 feet from the source and in more distant parts of commercial wheat and barley fields. Corn stalks infected with clonal, fingerprinted isolates of *G. zeae* containing rare alleles (relative to background populations) will be released in replicated areas in wheat and barley fields in each state. We will use Amplified Fragment Length Polymorphisms (AFLPs) of isolates recovered from cereal 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 are able to observe these clones in a mixed/diverse background population containing numerous AFLP haplotypes. We seek a second year of funding for a project that commenced in 2007. The experiment will be duplicated in 2008 in two commercial-scale cereal fields in each of New York and Virginia. To maximize the chances for diverse flowering and post-flowering environments, one field in each state will be winter wheat and a second field will be a spring cereal, either wheat or barley. All field sites are in regions with considerable acreage of over-wintered corn residues nearby. Our goals fall under the MGMT priority to "develop a full understanding of specific environmental and biological factors influencing infection and toxin accumulation that can be used to develop the next generation of disease forecasting and DON risk assessment systems." 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.