0203-BU-049 Pathways of Infection and Pathogenesis in Fusarium Head Blight.

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PROJECT ABSTRACT
(1 Page Limit)

Toward the goal of understanding invasion pathways and pathogenesis in Fusarium head blight, fungal development and host response will be followed histologically in barley florets and leaf segments inoculated with *Fusarium graminearum.* Experiments will be directed toward four objectives: 1) to define the pathways that the head blight fungus follows to gain access to the interior surfaces of florets; 2) to learn where and how the fungus penetrates the cuticle and epidermal layer of the interior surfaces of the lemma, palea and young caryopsis; 3) to investigate histologically and physiologically the role of DON in induction of chlorosis and necrosis in colonized floret and leaf tissue; and 4) to determine sites of floret vulnerability to lesion formation under field conditions. This research continues that previously funded by USWBSC. Toward the four objectives, a battery of histological methods (previously developed) will be used including use of a GFP (green fluorescent protein) mutant of *F. graminearum* which allows the fungus to be viewed in living plant tissue by epifluorescence microscopy. Several methods for fixing and staining both whole and sectioned tissues will also be used. Scanning and electron microscopy will be employed to view selected host response phenomena, such as sites of fungal attachment to the plant surface and the condition of chloroplasts treated with deoxynivalenol. The experiments will be carried out with susceptible Robust barley. Several isolates of *F. graminearum* will be utilized (in addition to the GFP strain), including tox+ and tox- minus mutants differing in ability to produce trichothecene toxin. Understanding invasion pathways and pathogenesis will provide an improved basis for head blight research including investigation of disease development and spread in the field, factors influencing fungicide effectiveness, and factors important in the design of genetically engineered resistant plants.