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**Research Area: CBC**

**Project Title: Management of Fusarium Head Blight with Biological Control Agents.**

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**PROJECT 1 ABSTRACT**

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A field-screening trial for the effectiveness of bacteria acting as biological control agents in managing Fusarium head blight (FHB) will be conducted. Treatments will compare several bacterial strains used as biological control agents (BCAs) applied at various stages of crop development to an untreated control and a fungicide (Folicur) standard. A variety of BCAs will be cultured and applied from investigators in Illinois, Nebraska, and New York as part of a uniform BCA trial conducted in these other states as well. Because it is difficult to guarantee FHB occurrence, the trial will be planted on sites with spring wheat residue and the site will be challenge inoculated with *Fusarium graminearum* conidia. Plots will be mist-irrigated to increase the likelihood of disease development. Foliar application of cells of the bacterial BCAs will be used in the field at flowering. Greenhouse trials using a ground bed will also be conducted involving both foliar spray application of selected BCAs at anthesis.

Laboratory studies with pure cultures of the BCAs isolated from South Dakota wheat residue and foliage will examine the production of antibiotics by the BCAs in a limited number of growth media. Possible suppression of antibiotic production by specific growth medium components will be examined, as well as effect of incubation time on antibiotic production and ability of the BCA inoculum to control FHB. This work is needed to optimize a growth medium and incubation time to optimize antibiotic production by BCAs whose antagonism of FHB relies at least in part on antibiotic production. These bacteria may belong to a previously unidentified endospore-forming species.

Bacterial BCAs may offer a more environmentally friendly control option for plant diseases than some chemical fungicides. Questions of health risks to the consumer are minimized with suitable BCAs. By using bacterial BCAs isolated from wheat in a local environment, compatibility of the agent with the crop or success in establishing the agent on the crop should be more reliable. Results of this study will provide guidance in how best to use the agents in a commercial wheat production system and how effective the BCAs may be in field situations.