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PROJECT 1 ABSTRACT
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The identification of effective chemical and biological controls for managing Fusarium head blight (FHB) remains a challenge. This project will examine two possible solutions that incorporate both biological and chemical approaches. As one solution, the bacterial biocontrol agent *Lysobacter enzymogenes* C3 will be used in combination with a commercial fungicide tebuconazole. C3 has some advantages when used in combination with a fungicide, the most notable being the multiple direct and plant-mediated mechanisms it can bring to bear, in complement to fungicide action, against FHB. The C3 plus tebuconazole combination was shown in a previous field test to provide better control of FHB than the biocontrol agent or the fungicide alone. The combination will be tested in two field locations is this project to confirm that the combination is effective in different environments. In addition, treatments will be tested at a high volume rate, which conferred efficacy in the previous test, and at a low volume rate that is more typical of commercial spray application practices.

The second solution to be investigated in this project involves the use of new biotic agents that can activate systemic host resistance, a mode of action unique from any existing scab fungicide or biological control agent. These agents will include killed mycelia of specific fungal strains ('autoclaved fungal biomass' or AFB) already found to reduce scab severity in greenhouse tests conducted at USDA-ARS NCAUR, Peoria. Also to be investigated will be strains of bacteria that have been effective in inducing resistance to other pathosystems and currently being evaluated against FHB. While attempts to control FHB using chemical elicitors have failed, biotic elicitors have not yet been evaluated for field control of FHB. Biotic elicitors have advantages over conventional biocontrol agents and fungicides in that the action of elicitors is less constrained by population numbers, coverage or timing. At the same time, elicitors may be compatible with other types of biocontrol agents and fungicides. AFB and bacterial strains will be tested in two locations to determine whether microbial elicitors of systemic resistance can provide effective field control of FHB on spring and winter wheats.

This project addresses the research priority in the Chemical and Biological Control research area: *development and evaluation of biological agents that have been shown to be effective in preliminary tests*. The potential immediate significance of this project is the identification of effective and practical tools for managing FHB that can be easily integrated with other existing and new practices.