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PROJECT 3 ABSTRACT
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Fungicides available to protect small grains from FHB act either as protectants or are locally systemic. Because they don't translocate widely in the plant, it is crucial to deliver the fungicides to the grain spike, the site of infection. But grain spikes are difficult targets for application - they have a vertical architecture, are often waxy, and generally have awns that interfere with fungicide deposition and retention. Methods to improve ways of getting the fungicides to the target site began in North Dakota in the summer of 1998 and have continued with field and greenhouse studies. Funds from an initial USDA scab initiative grant built a semi-permanent greenhouse which is home to an experimental track sprayer used for fungicide application studies. Optimum spray pressures for various nozzles, optimum gallons/acre for each crop studied and the optimum application timings for spring wheat and barley were examined. Summer field tests helped validate greenhouse results and further examined spray pressures and nozzles, and compared an experimental air assist (Spray Air) sprayer to other sprayer types. Forward and backward nozzles angled toward the grain head consistently provided the best head coverage in trials.

More recent field and greenhouse studies have shown that some types of adjuvants perform better with certain fungicide chemistries and rate of adjuvant is also important. The most promising adjuvants are experimentals; further validation of their performance is needed to assure availability to producers in the future by the manufacturers. Greenhouse tests in the winter of 2003-2004 will be designed to further evaluate these promising adjuvants not only with Folicur and Tilt fungicides, but also with some of the promising experimental fungicides or biological agents identified in 2001 and 2002 uniform field tests. Field trails in 2002 with adjuvants indicated that one particular adjuvant has consistently provided improved control of FHB when used with Folicur than has other adjuvants. Adjuvant testing with the promising experimental compounds is now needed.

In addition, optimum timing for application, as determined in greenhouse and field studies, has been validated under commercial field conditions for spring wheat. However, producer fungicide applications for control of FHB in durum have not always been successful, although timing of application was generally considered optimal. Similar problems have been observed in barley, and optimum control in durum and barley may warrant more than a single application at split rates. Tests in the greenhouse in the winter of 2003-2004 will be designed to further evaluate timing of application of fungicides in relationship to growth stage, time of infection, duration of infection events, duration of favorable environments, and use of split rates. The greenhouse environment will also house some further experiments examining the use of an air-assist type sprayer, a technology increasingly being used by ND producers. Additional testing in the greenhouse will also look at individual components of grain quality with various fungicide products. In the summer of 2004, best application techniques determined in the greenhouse will then be field tested at Fargo. The project is relevant to the US Wheat and Barley Scab Initiative because it addresses immediate concerns about control of the disease and provides information on optimal techniques to improve fungicide efficacy.