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Project Title: Spray Application Technology Evaluations for Enhanced Fungicide Efficacy.

PROJECT 1 ABSTRACT

Previous studies have shown improved performance of fungicide control of Fusarium head blight (FHB) by recommending that fungicide applicators angle spray nozzles to spray the side of the grain spike, apply fungicide with specific spray volumes (5 GPA by air and 10 GPA with ground sprayers) and maximizing deposition with a specific drop size range ('large' fine to 'small' medium based on ASABE standard S-572). Further enhancement of fungicide efficacy may be possible if distribution of fungicide on the grain spike can be improved to deposit less of the fungicide on the awns and more on the lemma, palea and glumes of the barley spike. Studies in 2008 will evaluate air stream delivery systems as a tool to enhance fungicide performance for control of FHB. This objective will be achieved by evaluations on barley. Barley was planted on 1.35 million acres in North Dakota in 2007. A study designed as randomized complete block and arranged as a factorial with replication will examine three different air stream speeds (maximum, minimum and median range of the sprayer), orifice angles of 30, 60 and 78 degrees down from horizontal and nozzles that produce 'large' fine, medium, and coarse drop sizes to achieve maximum fungicide deposition and efficacy on small grains for control of FHB. ASAE standard S-572 VMD (.5 volume mean diameter) for fine, medium, and coarse as ranges of 183-280, 281-429, and 430-531 microns, respectively. The sprayer is a plot size sprayer equipped with an air-assist boom. The boom has been modified to allow adjustment of the air orifices forward from vertical to study boom configurations that may improve fungicide efficacy. The evaluation will be made with Prosaro fungicide (421 SC 3.57 lb/gal. formulation of prothioconazole/tebuconazole, 19% +19% w/w, by Bayer Crop Science). Assessments will be made by visually assessing FHB incidence and field severity on 20 heads per plot and by determining yield, test weight, deoxynivalenol concentration, protein and barley plump. Deposition differences among the spray system configurations will be assessed by adding a dye (FD &C blue #1 at 44 grams/acre) to the spray solution, extracting the dye from the 10 spike sample with 80 ml of 90% ethyl alcohol using a wrist action shaker, and assessing deposition using a Jenway photo spectrometer. Statistical analysis of data will be by Analysis of Variance with means comparison using Fisher's protected LSD.