Project Abstract

Project Title:	Testing fungicide efficacy & timing in a high-performance North Carolina FHB nursery	
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This project will determine the combined benefits of optimal fungicide timing, highest fungicide efficacy, and variety resistance under a variety of levels of FHB pressure.

The project utilizes the CP-IM protocol for Objective 1: Evaluate the integrated effects of fungicide treatment and genetic resistance on FHB and DON in all major grain classes, with emphasis on a relatively new fungicide, Miravis Ace®.

We have conducted a multi-year field experiment in our misted, inoculated FHB nursery at Raleigh, North Carolina, using three winter barley cultivars with different levels of resistance to FHB: Violetta (MR), Thoroughbred (MR/MS), and Flavia (S). All are medium- to late-maturing malting barley varieties that are in commercial cultivation and are being used in breeding programs. Violetta and Flavia are medium-late two-row varieties, while Thoroughbred is a medium-maturing six-row type that (unusually) has acceptable malt quality. Inoculation will be with *Fusarium*-infected corn spawn applied in three batches at one-week intervals, starting approximately three weeks before anticipated heading of the earliest variety (Thoroughbred).

We will use ten fungicide treatments. The treatments will allow comparisons of the efficacy of Miravis Ace to those of Prosaro® and Caramba®, and comparisons of three fungicide timings (spikes half emerged, spikes just fully emerged, and 6 days after spikes fully emerged). They will also allow estimation of the mean benefits of fungicide application, cultivar resistance, and the combination of the two in terms of yield, test weight, and DON reduction.

Mist irrigation will be applied at a level that optimizes humidity while avoiding soil saturation that can cause root rot in barley. We will record heading date and visual symptoms, and will harvest in a manner that retains all kernels. The grain will be cleaned and debearded; test weight and yield will be measured; and random sub-samples will be pulled for DON analysis and a percent-infected-kernel assay.

This project benefits from and requires infrastructure common to the nursery overall, such as misting system assembly and maintenance, and inoculum production. The budget helps to defray the costs of these infrastructure elements for the entire nursery, which is also used for screening of breeding materials. Output of the nursery includes some of the few ratings of commercial varieties of winter barley in the eastern US (published). It also includes data on which breeders base their selection decisions as they breed both feed and malting barleys for this region.

The project will benefit stakeholders and end-users because it will generate a new set of up-to-date, data-based recommendations on fungicide timing for FHB reduction in winter barley.