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Project Title: Integrated FHB Management of Winter Barley in the Mid-Atlantic.

PROJECT 1 ABSTRACT

(1 Page Limit)

Winter barley cultivation is increasing in the mid-Atlantic and southeast U.S., especially in response to the upsurge of craft brewing and distilling. North Carolina boasts the largest number (70) of craft breweries in the American South. More breweries of regional and national distinction are being built: for example, Sierra Nevada and New Belgium are opening new breweries in Asheville, NC. Small malt houses are also springing up in the region. Tolerance for DON in malting barley is extremely low; thus, DON-free barley is key to providing a local grain supply to this rapidly growing industry.

The current proposal will seek to fill gaps in both breeders' and producers' knowledge. The first objective of this project is to provide data to enhance the selection of Mid-Atlantic barleys with FHB resistance. To date, barley breeding in the southeastern U.S. is conducted exclusively in Virginia and North Carolina. Several Mid-Atlantic barley nurseries should be screened for FHB resistance. Both two- and six-row barleys are accepted in all the nurseries. Currently, most entries are six-row. The P.I. will collaborate with David Marshall and the Virginia Tech team to provide replicated screening data on 3 uniform regional nurseries in a misted, corn-spawn-inoculated nursery in Raleigh. Data provided will include disease symptom data and DON.

The second objective of this project is to generate management information useful to barley producers. Although there is interest in the Mid-Atlantic states in organic barley, the warm, moist growing conditions and low tolerance for DON in malting barley make this method of production risky and challenging. Producers often have little alternative to using fungicides.

No work has been done in this region on the optimum timing for a fungicide application to barley specifically to minimize DON concentrations. The optimum stage for applying fungicides to protect the glumes of barley from FHB infection is when the spike is fully emerged from the boot (recommendation from NDSU, www.ag.ndsu.edu/cpr/plant-science/timing-of-fungicides-for-scab-control-in-wheat-and-barley-06-27-13). A Japanese group found that the critical time for FHB infection and mycotoxin accumulation is different for different barley cultivars, and that closed-flowering (cleistogamous) cultivars were resistant at anthesis but susceptible after spent-anther extrusion (SAE), which is around 10 days after anthesis (2). This group recently determined that the best time to apply a fungicide for scab and DON reduction in cleistogamous barley is at SAE (1).

A small set of representative two-row and six-row barley cultivars that are adapted to North Carolina and Virginia conditions will be grown in replicated one- or two-row plots in the misted, inoculated nursery in Raleigh. Prosaro will be applied in separate treatments consisting of two different fungicide timings, along with an unsprayed control. The likely comparison is the North Dakota timing vs. the Japanese timing.

The possibility of having a parallel, organic trial at a known nearby on-farm location will be explored. This will enhance the likelihood of a peer-reviewed publication.