## Project Abstract

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| **Project Title:** | **Screening Winter NABSEN at a High-performance North Carolina Barley FHB Nursery** | |
| **Principal Investigator:** | **Christina Cowger** | **USDA-ARS** |

This project will contribute to a multi-location screening effort to help identify new sources of resistance in winter barley germplasm. This project fits with the BAR-CP's first toolbox tool: varieties with enhanced resistance to FHB and DON. It matches Objective 1 under FY22 Research Priorities, increasing and documenting the number of released barley varieties, and Objective 2, increasing efficiency of coordinated barley breeding programs.

In the longstanding USDA-ARS FHB screening nursery in Raleigh, we will include the Winter NABSEN, planting three replicate blocks of randomly assigned entries in two-row plots.

Plots will be protected from BYDV with insecticide to avoid stunting that can delay maturity. They will be inoculated in March with corn spawn, in three batches at one-week intervals to ensure that all maturities are equally inoculated, without escapes by early or late genotypes. Mist irrigation will be applied 2 minutes in each 20-min interval, for 3 hours in the morning and 3 hours in the afternoon, unless conditions dictate longer intervals. These conditions are ideal to maintain a humid environment without soil saturation, as barley readily suffers from root rot due to “wet feet.”

Notes will be taken on heading date and disease to calculate index. At physiological maturity, normally we hand-harvest the entire plot, because we consider that especially with small plots, obtaining the maximum volume of harvested grain tends to protect against bias from stunted plants, etc. We can alter this for the Winter NABSEN lines if another sampling protocol is desired.

Heads will be hand-threshed, retaining all light-weight grain. Samples will be debearded and cleaned; test weight measured; and a 100-g subsample taken, avoiding skewing toward light or heavy kernels. This subsample will be milled with a flour mill and samples submitted to U. Minnesota for DON analysis.

Other projects in this nursery are screening advanced breeding lines and DH populations, and testing integrated management with varieties and fungicides. A portion of this grant will make it possible to screen the Winter NABSEN in a proven, successful FHB screening nursery. Operating the nursery effectively to produce reliable data is quite laborious. This includes packaging of seed, planting, pesticide applications, production of corn spawn inoculum, establishment of the misting system, application of the inoculum, note taking, harvest, and multiple steps of sample processing. The budget helps defray these expenses in order to conduct a robust trial for the Winter NABSEN.