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Research Category: VDHR-NWW

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Project Title: Coordinated Evaluation of FHB Resistance of Advanced Soft Winter Lines and Cultivars.

PROJECT 4 ABSTRACT

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Objectives: 1) Phenotype advanced breeding lines that are candidates for release. 2) place FHB and other agronomic, disease resistance, and quality data in database, 3) report on purification and seed increase of the best lines.

Rationale: Strong FHB resistance must be combined with high-yield to impact the Eastern US wheat industry. Each year the seven breeding programs in this CP generate breeding lines that are in the advanced stages of development. Multi-location testing is needed to determine the FHB resistance of these lines, as well as their yield, quality, agronomic value, and resistance to other diseases. The breeders in this CP use a series of coordinated nurseries to achieve this objective (Table 1). We propose to screen the entries in these tests for FHB resistance.

The NUWWSN and PNUWWSN tests were created to specifically test FHB resistance of up to 120 entries and are coordinated by Ohio State University. The entries in these tests come from the seven breeders in this project as well as other public and private winter wheat breeders. In addition to the seven institutions of this CP, the NUWWSN is also evaluated by additional breeders in IN, VA, MD, NE, OH, Ontario, and Romania while the PNUWWSN is evaluated by additional breeders in Ontario and IN. In addition to the FHB data, the NUWWSN and PNUWWSN are also evaluated for quality by the USDA Soft Wheat Quality Lab and are assessed for other diseases as they occur. The USDA SWQL also assess the quality (traits listed in Table 2) of entries in the uniform scab test conducted in the SWW-CP and all funding for the SWQL work is sought in the NWW-CP.

Our most advanced lines are also tested specifically for yield and other traits in a series of uniform tests. Some of these are coordinated by Harold Bockelman of the USDA (Uniform Eastern Soft Red Winter Wheat, Uniform Southern Soft Red Winter Wheat) while others are coordinated by breeders. The FHB resistance of the entries in these tests is evaluated by several of the breeders in this coordinated project, though on a more limited scale than the entries in the P+NUWWSNs.

Each state has an Official Variety Test (OVT) of released cultivars that are available to growers. Most breeders in this coordinated project evaluate the FHB resistance of the entries in their respective OVT and make that information available to growers through the state extension service.

The coordinated testing of advanced lines in the various uniform trials and OVTs plus the summarizing of data for lines that are candidates for release is an efficient method to determine the FHB resistance of nearly all germplasm that is currently released, or likely to be released in the near future. We anticipate that all data from the trials of breeding lines will be placed in the database that we are developing. The lack of a single coordinator for the OVTs limits our ability to place this data in a database.

Each breeder in this coordinated project has breeding lines with improved levels of FHB resistance and other traits that warrant their release. The purification and seed increase of these lines is funded by non-USWBSI sources. We propose to summarize the information that supports the release of the advanced lines and to make that information available to all breeders and extension personnel when appropriate.