

0203-SN-009 FHB resistant germplasm adapted to Ohio and coordination of a Uniform nursery

PI: Sneller, Clay; E-mail: sneller.5@osu.edu

Ohio State University, Department of Horticulture and Crop Science, Wooster, OH 44691

Grant #: 59-0790-9-037; \$76,000; 1 Year

Research Area: VDUN

PROJECT ABSTRACT

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Fusarium Head Blight (FHB) is a devastating disease of wheat in Ohio and other soft winter wheat (SWW) growing regions of the US. Cultivar resistance to FHB is a key method of control. Breeding for resistance is complicated as resistance is incomplete and controlled by multiple genes. In addition screening for reaction to FHB requires multiple replications in field or greenhouse assays and expression is affected by the environment, plant development, and multiple mechanisms of resistance. FHB resistance can be enhanced combining genes from diverse sources of resistance, knowledge of the genetics, level, and type of resistance in parents, and efficient selection procedures. The objectives of this research are 1) coordination of a Uniform nursery to characterize resistance of lines derived from northern SWW breeding programs, 2) evaluate adaptation of FHB resistant lines, 3) combine resistance genes from different sources, and 4) determine the efficiency of marker-assisted selection (MAS) for FHB resistance.

OSU will coordinate and participate in a Uniform test of SWW lines adapted to the northern regions of the US. Lines will be tested for FHB incidence, severity, index, seed traits, and DON levels in field and greenhouse assays conducted by scientists in many states. OSU has developed a set of lines with better FHB resistance than 'Freedom', plus good resistance to *Stagonospora*. Most derive resistance from both Freedom and Chinese sources and all have 75% adapted parentage. We plan to evaluate the yield and disease resistance of these lines in 2002 and 2003. High-yielding breeding lines from OSU will also be tested for resistance. We will continue to advance populations from crosses among diverse FHB resistant parents from China and eastern Europe with elite parents. We will initiate populations with new sources of resistance made available by CIMMYT. We plan to evaluate MAS in populations derived from Freedom and Ning 7840 for QTLs mapped to regions on chromosomes 2A, 3B, 5A, and 6B.

This collaborative research will identify adapted breeding lines with high-levels of FHB resistance plus other desirable traits that are essential for developing new resistant cultivars. The research will also identify and combine genes from diverse sources to produce even greater levels of FHB resistance. There will always be a need to breed FHB resistance genes into higher-yielding cultivars. It is hoped that MAS will prove to be a useful tool in breeding for improved FHB resistance, thereby accelerating the rate of release of high-yielding cultivars with good FHB resistance.