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PROJECT 2 ABSTRACT

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The overall project goal is to accelerate development of adapted and commercially viable scab-resistant SRW wheat varieties by identifying and incorporating diverse sources of resistance into elite genotypes using traditional, backcross, doubled haploid and marker assisted breeding methods. In 2003, approximately 4100 F₄-F₈ lines, 3800 backcross lines of varying generations, and 135 doubled haploid (DH) lines were evaluated in headrows for agronomic traits and resistance to other prevalent diseases at Warsaw, VA. The DH lines, developed from 3-way crosses comprised of diverse scab-resistant parents, were also evaluated for scab resistance at Blacksburg, VA. Among the backcross lines were 180 BC₃F₂ and BC₄F₂ greenhouse selections that were evaluated for agronomic traits and similarity to their recurrent parents at Warsaw, VA and in a FHB-inoculated nursery in Blacksburg, VA. Additionally, the employment of marker-assisted breeding is accelerating the development of near-isogenic FHB-resistant wheat genotypes. Such near-isogenic genotypes have the potential to provide breeding programs with adapted Type II-resistant parents with superior combining ability. Approximately 170 SRW wheat genotypes, including entries in the two Uniform SRW Wheat Scab Nurseries and other commercial cultivars and elite germplasm from public and private breeding programs, will be evaluated for scab resistance in replicated disease assessment tests at Blacksburg, VA. Such tests have led to the identification and release of adapted scab resistant cultivars such as Roane, Ernie, Truman, Tribute and McCormick. Four scab-resistant lines (VA02W-708, VA02W-709, VA02W-713, and VA02W-733) will be evaluated in advance yield trials. Nineteen scab-resistant wheat lines selected from last year's observation yield test will be evaluated in replicated preliminary yield trials at three locations in Virginia. Eleven of these lines also will be evaluated in the Northern Uniform Winter Wheat FHB Nursery or the Uniform Southern FHB Nursery. In addition, 266 scab-resistant wheat lines (124 backcross, 112 topcross and 30 DH) will be evaluated in a replicated disease assessment test at Blacksburg, VA and in non-replicated observation yield trials at Blacksburg and Warsaw, VA. Approximately 4000 topcross and backcross derived lines will be evaluated in headrows for agronomic traits and resistance to other prevalent diseases at Warsaw, VA in 2004; selected lines will subsequently be evaluated under FHB epidemic conditions in a replicated disease assessment test at Blacksburg, VA and in observation yield trials. More than 170 segregating populations developed for incorporating and combining Type II and other types of resistance into SRW wheat backgrounds will be evaluated in an irrigated scab nursery at Mt. Holly, VA this fall. Selection in early generations will involve bulk selection of heads from plants possessing desirable agronomic traits and resistance to scab. Individual head selections in later generations will be planted and evaluated in headrow tests.