BREEDING FOR RESISTANCE TO WHITE MOLD IN SOYBEAN

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White mold of soybean continues to be an important disease of soybean. The boom or bust nature of white mold is problematic for developing a management plan for this disease. Defensive trait packages have improved dramatically for soybean varieties the past 10 to 20 years. However, this is not the case for white mold. Complete and stable resistance white mold has yet to be incorporated into a commercial soybean variety. There are several factors that contribute to this situation. First, not all seed companies consider white mold as a primary defensive trait. Although numerous sources of resistance are available, most sources are ancestral varieties and are primitive for yield and other agronomic traits. A major bottleneck appears to be the difficulty of moving white mold resistance into high yield potential varieties. Lastly, many varieties are rated as tolerant to white mold, but few provide a consistent performance from field to field in years with high white mold potential.

The Wisconsin Soybean Marketing Board and the North Central Soybean Research Program currently funds a project designed to provide methods and soybean germplasm to contribute to the effort to make available soybean varieties with complete and stable resistance to white mold.

An ancestral variety was identified in field and greenhouse trials to express a high degree of resistance to white mold. The ancestral variety was crossed with improved public lines and currently 902 progeny lines are in the program.

Progeny lines were selected for agronomic traits in field nurseries, but all selection for white mold resistance has occurred in a greenhouse environment. White mold field nurseries are inconsistent and not conducible for selecting white mold resistant plants for advancement. White mold field nurseries are needed for final evaluations but not for selection of individual plants to advance as breeding lines.

Individual plants have been selected and advanced at each of 8 generations. Most commercial soybean breeders stop selecting individual plants at 3 generations. Thus, our lines are highly inbred whereas commercial varieties are heterogeneous for physiological traits. A line must express white mold resistance at each generation to be advanced. Susceptible lines have been advanced and will be used in genetic studies.

Most programs inoculate plants prior to flowering in greenhouse white mold trials. We have determined the R1 (flowering) growth stage to be best for inoculating with the white mold fungus. In addition, most methods call for ratings 14 days after inoculation.

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We record final ratings at the R6 growth stage. Plants within a line may express high resistance 14 days after inoculation but express susceptibility as the plants reach later growth stages.

The expected outcome of the project is the release of soybean lines with complete resistance to white mold and genetic markers to assist breeders with selection for this defensive trait.