Sclerotinia Stalk Rot & Head Rot of Sunflower: Development of Resistant Germplasm and Evaluation of Commercial Hybrids

Tom Gulya and Jerry Miller
USDA Sunflower Research Unit, Fargo, ND

ABSTRACT

Sclerotinia diseases continue to be the major diseases affecting U.S. production in 2005, with head rot and stalk rot found in 20% and 27% of fields surveyed in seven states, respectively, and affecting 1.1% and 2.3% of the U.S. crop. Regarding germplasm development, two oilseed maintainer lines (HA 451 and 452) and three oilseed restorer lines (RHA 453, 454, 455) with improved tolerance to Sclerotinia head rot and stalk rot were released in the spring of 2005. The lines were derived from Russian and French sources, and thus will expand the diversity in Sclerotinia resistant germplasm. The lines in testcross hybrids had Sclerotinia head rot infection ranging from 8 to 23%, when compared with the check hybrid SF 270 which had 73% infection. Additional oilseed releases of two maintainer and three restorer lines are planned for the spring of 2006. A new breeding program has been initiated to incorporate Sclerotinia head rot and stalk rot resistance into the large-seeded confection sunflowers, with initial germplasm releases projected for the fall of 2006. To provide information for growers and private breeders, 89 experimental and released commercial hybrids were tested for resistance to Sclerotinia stalk rot at five locations in North Dakota and Minnesota using artificial inoculation (as well as being tested for head rot reaction by Dr. Robert Henson, PI of another project). Three locations gave statistical sound stalk rot ratings, with disease incidence of individual hybrids at maturity ranging from 10 to 71%. An experimental hybrid, using USDA lines developed for Sclerotinia resistance (HA 412 x RHA 408), was the sixth best entry with 16% stalk rot, averaged over three locations. Among the top ten entries were one released confection hybrid and two released NuSun hybrids. Reseeds of the 20 best entries from 2004 trials at five locations for stalk rot and two locations for head rot confirmed that a few commercial hybrids were consistently good for both head and stalk rot.

Acknowledgements

The authors thanks Scott Radl, Nikolay Balliashev and Dale Rehder for technical assistance in this project, and the many undergraduate students who help in greenhouse and field experiments. We also acknowledge the help of the NDSU Carrington Experiment station and several sunflower seed companies, including CHS, Crepland Genetics, Interstate and Mycogen.