PROGRESS IN DEVELOPMENT OF RENIFORM RESISTANT GERMPLASM DEVELOPED FROM BARBREN 713

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Abstract

Following the release of new reniform nematode (*Rotylenchulus reniformis* Linford and Oliveira) resistant upland cotton (*Gossypium hirusutm* L.) germplasm lines, such as BARBREN-713, breeding efforts were initiated in 2011 with the goal of improving both yield and fiber quality performance in reniform resistance germplasm. Populations were developed from crossing *G. barbadense* derived reniform resistant upland germplasm lines with susceptible breeding lines and obsolete varieties. Marker assisted selection (MAS) within segregating F_2 populations was employed to identify individual plants possessing resistance genes Ren^{barb1} and Ren^{barb2}. Plants with a low lint percentage (<35%) were discarded prior to planting each F_2 plant to a progeny row the following year. In F_3 and later generations (F_3-F_6), the best looking plants possessing resistance genes Ren^{barb1} and Ren^{barb2} within each progeny row were bulked, ginned, and evaluated for fiber quality. Bulk selections provided sufficient seed for replicated yield testing in subsequent generations (F_4-F_6). In 2016, 11 F_6 reniform resistant breeding lines, 5 conventional susceptible commercial varieties, and resistant germplasm line BARBREN-713 were evaluated in a replicated yield trial at Mississippi State University. Reniform resistant breeding line MSU1113-2459 produced a significantly greater yield than any other entry in the trial. Four resistant breeding lines produced yields significantly greater than BARBREN-713. Lint percentage, fiber length (UHM), and fiber strength for all breeding lines were significantly higher than BARBREN-713. When compared to the commercial varieties, average fiber length of resistant breeding lines was lower, suggesting that future selections should concentration on improvements in fiber length. Fiber testing of individual (MAS) plant selections in the next generation will be undertaken in the effort to develop a reniform resistant germplasm line with competitive agronomic traits.

Acknowledgements

This work, as well as the breeding program at Mississippi State University would not be possible without the generous support provided by Cotton Incorporated. In addition, without the cooperation of USDA-ARS scientists Dr. Sally Stetina and Dr. Jodi Scheffler, as well as the staff of the USDA-ARS Genomics and Bioinformatics Research Unit (GBRU), Stoneville, MS, nematode assays and molecular marker work would not be possible.