AGRONOMIC EVALUATION OF EIGHT ELITE PIMA LINES POSSESSING SUPERIOR FIBER QUALITY

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Abstract

Genetic variability available for the improvement of fiber strength and length within Pima cotton often occurs in genetic backgrounds that are unimproved or unadapted. The objectives of this project were to develop agronomically improved germplasm lines possessing high strength and long length fiber, and document the performance of these lines. A corollary objective was to expand the Pima genetic base through the introduction of Sea Island germplasm. Crossing was performed between the high fiber strength Pima germplasm line 8810 and the Sea Island cultivar 'NMSI 1601', followed by individual plant selection within the F_2, F_3, and F_4 generations and progeny selection in the F_5 generation. Eight progeny lines, along with two commercial check cultivars and two high fiber quality check lines, were selected for evaluation in replicated tests at Maricopa, AZ, Shafter, CA, Westside, CA, and Las Cruces, NM in 2005 and 2006. Analyses of data revealed significant variation among entries for plant height, yield, boll weight, and fiber length, strength, micronaire, and elongation. Although there was significant variation between years and among locations for plant height, yield, fiber length, strength, and micronaire, there was little entry by location or entry by year variation for these traits. Across years and locations, three of the test entries were found to produce lint yields not differing from the commercial check cultivars, Phytogen 800 (1255 lbs./ac) and Pima S-7 (1222 lbs./ac). All eight test lines produced fiber lengths (range 1.46 to 1.48 in.) and strengths (range 47.4 to 53.8 g/tex) greater than the two commercial check cultivars. Whereas all eight test lines produced fiber elongation values lower than that of the Phytogen 800 check, six lines had elongation values equivalent to that of Pima S-7. Fiber micronaire varied considerably among the test lines, with three lines having values lower than either commercial check, and four lines possessing micronaire values exceeding that of Phytogen 800. None of the test lines possessed lint percentages equal to that of Pima S-7, and only two lines were equivalent to Phytogen 800. Among the test lines**,** two (010004-2-5 and 010011-1-3) appear to be suitable candidates for release as germplasm for the improvement of fiber quality in commercial Pima.