

Identification of Introgressed Lines by the SSR Markers and Agronomic Traits

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The wild cotton cultivars and species have abundant genetic polymorphisms, and they possess lots of excellent genes, such as drought resistance, insect resistance, fine and strong fiber, and so on. So cotton breeding experts have widely carried out interspecific hybridization and obtained more than 20 types of advanced generation hybrids with good quality and stable traits between wild resources and upland cotton. We called these upland cotton lines as introgression lines of interspecific hybridization. But they have not been completely exploited, especially lacked of theoretical research in the past. In our research, we used some agricultural and economic traits, and SSR molecular markers to detect the genetic components of wild cotton species in the introgression lines, and to find the genomic or phenotype varieties, exploration, and utilization of the benefits of cotton interspecific hybridization. We used 87 pairs of polymorphic SSR (Simple Sequence Repeats) and EST-SSR markers, fifty-seven introgressed lines from interspecific hybridization and their six parents were evaluated. Totally, 540 alleles were observed, and 98.5% were polymorphic. The average polymorphism information (PIC) was 0.748, with the range from 0.533 to 0.937. The two cluster dendrograms of SSR and agronomic characters were conducted by the unweighted pair group method of arithmetic means (UPGMA). The average paired similarity coefficient among germplasm lines was 0.748, with the range from 0.533 to 0.937. It's implied that the introgressed lines with abundance germplasms possessed high genetic diversity. A total of 41 pairs of SSR markers located in 24 chromosomes of cotton, reflected a wide range of variation in the genomic structure of the introgressed lines; 63.9% of the total variation of the EST-SSR also showed that some of the functional genes might have mutated. The SSR cluster analysis fit basically with their pedigrees, but was inconsistent with the agronomic characters results. Because cotton often cross-pollinates and easily hybridizes, just the pedigree and agronomic identification was not enough. The results of this study also illustrated this point. Triple-hybrid (*Gossypium hirsutum*, *G. arboreum*, *G. thurberi*) introgressed lines showed potential for improving fiber quality, however, the PD and Acala varieties from the United States were superior to other introgressed lines in the strength and length. The triple hybrid (*G. hirsutum*, *G. arboreum*, *G. barbadense*) introgressed lines contributed more for wilt improvement. We found that introgressive hybridization between different wild species had different impacts, but the introgressed lines with intermitting may be more effective, the authors speculate that it is possible because introgressed lines possess different elements of good fiber quality, or are caused by the gene mutation.