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# PRELIMINARY STUDY OF COTTON PYRAMIDING BREEDING BY MOLECULAR MARKER ASSISTED SELECTION

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## Abstract

In order to explicit the effect of molecular marker assisted selection to cotton fiber strength and pyramid the high strength and the resistance to budworm into the commercial variety, high strength line 7235, high yield cultivar Tai 121, transgenic bollworm-resistant cotton cultivars SGK321 and SGK9708 were crossed, backcrossed, and self-crossed into two populations: (Tai 121 x 7235) x SGK321 BC1F2; (Tai 121 x 7235) x SGK9708 $BC_1F_2$, which were planted in the Anyang experiment field in 2003. One leaf of plant was rubbed in 0.3% Kanamycin in seedling stage. After 5 days, the plant whose leaf color was changed into yellow was uprooted (no transgenic bollworm-resistant cotton), and the plant whose leaf color was not changed was remained. Each Individual DNA was extracted in seedling stage by CTAB micro-extracting method. And agronomic characters of each individual were investigated. 307 plants were harvested. Pesticides were not sprayed in all the time of growth. Fiber samples from each plant were tested in the Supervision, Inspection and Test Center of Cotton Quality, Ministry of Agriculture, China. 2 SSR markers (S1521, S2961) tightly linked to high strength fiber QTL were used to screen the 307 plants from the two crosses $BC_1F_2$ generations. The results showed the normal distribution for fiber strength. The fiber strength mean of plants with and without the S1521 marker were 29.74 cN/tex and 28.03 cN/tex, their difference was significant and prominently. The results of S2961 marker was the same as S1521. The averaged fiber strength in 2004 for lines with marker SSR1521 and no marker from part of 2003 individuals were 30.98cN/tex and 27.76 cN/tex, which indicates very significant difference. The results revealed that the major QTL of fiber strength associated with the two makers was inherited steadily in different genetic backgrounds and segregating generations. It was concluded that to increase fiber strength is possible efficient through the MAS in seedling stage. We had attained 10 plants with resistance to budworm, high yield and super fiber. In conclusion, pyramiding breeding by MAS and other technologies was new breeding method, which helped to achieve the cotton variety with high yield, super fiber quality and resistance rapidly, prominently and efficiently. Though there were not many successful examples of cotton breeding by MAS, the primary success exploited broad prospect for MAS used in cotton breeding. With the improvement of bio-technology and cotton molecular map, the role of MAS in cotton breeding will be important more and more.