

Cotton Molecular Improvement in China

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Cotton production plays a very important and irreplaceable role in the national economy of China, which has over 10% output value of cotton industry worldwide, with only 3% of total crop plant area. Except for a series of varieties with *Bt*, *Bt* and *CpTI* genes, great advances were made in traditional cotton breeding with main characteristics such as high-yield, high-quality, low gossypol, early-maturity, resistance to disease and pest, tolerance to drought and salinity, chilling, and high temperature, and colored lint types. Through the "973" national high-tech key project on functional genomics of cotton fiber quality and its molecular genetic improvement launched in 2004, new methods to efficiently separate proteins for proteomic analysis of developing cotton fibers were developed to clarify the regulatory mechanism controlling the cotton fiber cell. A simplified model was established to depict the regulatory mechanism controlling formation of cotton fiber. A high-density genetic linkage mapping was constructed with a perennial F_2 population of *Gossypium hirsutum* \times *G. barbadense*. High performance transgenic technology systems have been constructed including *Agrobacterium* transformation, pollen-tube mediation, and gene-gun bombardment systems. A series of genes, such as SOD and GhCYSP encoding a cysteine proteinase, were isolated from senescent cotton. Related to fiber development, some functional genes were cloned, 7 of which were associated with fiber quality.

Key words: cotton; molecular improvement; China