

China Project "973" -Molecular Improvement of Cotton Fiber

YU Shu-xun

(Cotton Research Institute, Chinese Academy of Agricultural Sciences; Key Laboratory of Cotton Genetic Improvement, Ministry of Agriculture, Anyang, Henan 455000, China)

Cotton is the main cash crop in China, and plays a very important and irreplaceable role in the national economy. With only 3% of total crop plant area, China accounts for over 10% of the output of the cotton industry. Except for a series of varieties with BT, BT and CPTI genes, great advances have been made in cotton breeding for main characteristics such as high-yield, high-quality, low gossypol, early-maturity, resistance to diseases and pests, tolerance to drought and salinity, chilling, high temperature, and colored lint types. In 2004, the "973" national high-tech key project on functional genomics of cotton fiber quality and its molecular genetic improvement was launched. New methods to efficiently separate proteins for proteomic analysis of developing cotton fibers were developed to identify a simplified model of the regulatory mechanism controlling cotton fiber cell. A simplified model was established to depict the regulatory mechanism controlling formation of cotton fiber. A high-density genetic linkage map was constructed with perennial F₂ population of *Gossypium hirsutum* × *G. barbadense*. High performance transgenic technology systems were constructed that included the agro-bacterial transformation system, the pollen-tube mediation system, and the gene-gun bombardment system. A series of genes such as *SOD* and *Ghcysp*, encoding a *cysteine* proteinase, have been isolated from senescent cotton. Related to fiber development, several functional genes were cloned, 7 of which were associated with fiber quality.

Key words: "973"project; cotton; fiber; molecular improvement; china