Genetic improvement of Colored Cotton in China

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Abstract: The genetic improvement of the yield, fiber quality, disease and insect resistance of color cotton in China has got some breakthrough by using Interspecific cross, hetorosis, transgene biotechnology in near 20 years. 21 new colored cotton varieties and more than 50 lines were bred in China in recent year. The yield of color cotton lines such as B2K8, CCRI 51and S9B11 reached that of write cotton. The fiber quality of color cotton have improved with 10.0-15.0% increased fiber length and 25.0-45.0% higher fiber strength .The fiber length and strength of some convientional colored cotton line can reached 30.9 mm and 33.5 CN/tex respectively. The lint percentage have reached more than 37.0%, 8% higher than the color cotton germplasm. Some Bt transgene colored cotton varieties and lines including CCRI 51,B2K8,G88,Zong 970818,TC-03,Bingcai No.1 and Bingcai No.2 were got successfully. Zongxu No.1 was the first new color lines in China . It provoked the spring and waving of color fiber after it was bred and used in the production. Now China was the largest country for color cotton breeding, production and textile making.

The stability of fiber cotton was studied based on the wax content. Carl M. Conrad(1941) reported wax content of white cottons was 0.4－0.7％， but that of green reached 14－17%. There was a positive correlation between fiber brightness and the wax content of cotton fiber surface (Shi et al.,1998, Qiu 2002). High wax affect the fiber color and the quality of fabrics. So it was necessary to analysis the wax contents for green cotton genetic improvement. 48 colored cotton lines and F1 hybrids were studied on the wax, cellulose contents and fiber quality in our lab. The wax of green cotton was highest , and then dark brown cotton which two times greater than that of white cotton. However , we found some green lines with relative lower wax content.

The genetics of different color cotton were studied . The results indicated that the inheritance of brown lint and brown fuzz was controlled by two pairs of major genes independently, and the recessive gene of fuzz inhibited the expression of dominant brown lint gene; The inheritance of green lint and fuzz were controlled by two pairs of major genes independent . One pair controlled fuzz, the other control lint. There exist genetic interaction between lint and fuzz green genes. I.e., The recessive gene of fuzz inhibited the expression of dominant green lint gene. We also found that the fiber color was not only controlled by the dominant color fiber genes, but also affected by the dominant white fiber genes, and different white fiber lines and varieties contained different pairs of dominant genes, the more major genes with white fiber, the whiter the fiber was.

The genetic diversity of colored cottons were analysis based on the SSR markers. It showed that the genetic diversity of brown cottons was higher than that of green cottons. 23 specific loci from 9 primers related brown fiber were found, and 4 specific loci from 2 primers related green fiber were found.

Key words: colored cotton, genetics, breeding

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