

Genetics and Expression of the Brown Lint Gene in Colored Cotton

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The major cotton grown commercially in the world is white lint, but recently many people prefer to have garments made by natural colored cotton. This can be used directly in textile industries, avoiding the complicated and unsafe processes of bleaching and dyeing, and thus it is eco-friendly. However, little is known about the heredity of the colored lint gene in colored cotton. In the present study, we constructed two F₂ groups of brown lint cotton with one color cotton, Z128, and two white cotton varieties, KT94-4 and L96-23-30. One incomplete dominant major gene and modifier minor genes were found to control the brown lint. Brown fuzz gene affected the express of brown lint gene. There was an interaction between lint and fuzz colored genes. Brown lint gene was mapped on the chromosome with SSR markers, which was linked with Sloc9, SlocA, and Sloc7. The distance of linkage was 18.4 cM between the target gene and Sloc7. Brown lint gene was expressed after 15 days post anthesis (DPA). Through microarray analysis, we found that 649 genes were significantly up regulated or down regulated after 15 DPA, and 219 genes were found affecting on the lint color. Eight genes had the key function during the fiber color production. Flavonoid 3'-hydroxylase (F3'H) was activated by the other seven genes that had effects on the flavonoid.