Fiber quality and textile performance of some Australian cotton genotypes

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Abstract

Improving the quality of Australian cotton fiber is essential for maintaining industry viability. Two field experiments were conducted to assess the fiber quality and yarn performance of Australian bred cotton (five Gossypium hirsutum L. and one G. barbadense L.) genotypes. The work included the novel measurement of fiber maturity ratio, fiber linear density, and fiber diameter (ribbon width). The strongest yarns were produced using genotypes with the longest and finest fiber, for example, the strength of 20 tex yarns for the G. barbadense L. cultivar Sipima 280 (length = 36.6 mm, linear density = 143 mtex, ribbon width = 13.7 μm) was 25.4 cN tex⁻¹ cf. the G. hirsutum L. cultivar Sicala 350B (length = 32.5 mm, linear density = 185 mtex, ribbon width = 14.5 μm) yarn strength of 18.1 cN tex⁻¹. Micronaire was an inferior indicator of yarn performance, for example, the G. hirsutum L. breeding lines CHQX12B and CHQX377 each had micronaire values of 4.4, but CHQX377 spun stronger yarns due to its finer and more mature fiber. Lint cleaning had the greatest influence on nep (fiber knot) generation for G. hirsutum L. genotypes, generating on average 104 neps g⁻¹ per lint cleaner passage. There was a negative association between fiber quality and yield, and a cost benefit analysis showed that fiber yield was the dominant economic factor compared to price premiums for better fiber quality. Alternative methods of determining fiber fineness will improve the value of Australian cotton.

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The resistant cultivars must also have superior fiber quality and yield traits. Therefore, the current study was aimed at screening some of the identified simple sequence repeats (SSR) markers for VW resistance and fiber quality traits of cotton genotypes in Turkey. Fifty different cultivars were screened with 30 SSR markers. Polymerase chain reaction (PCR) was conducted to amplify the SSR markers. Cotton (Gossypium hirsutum L.) is the most important natural textile fiber crop grown worldwide. Several biotic and abiotic stress factors affect cotton yield due to lower genetic diversity for the traits of particular interest. Verticillium wilt (VW) is one of the major factors incurring huge cotton yield losses. However, some protections still exist in international markets and Chinese textiles and clothing exporters have to face competition from other developing countries. It will be interesting to see how this industry will evolve in the future.

3. Performance of Major Textile and Clothing Categories. According to Figure 3.1, we can see that cotton fabrics, garments and chemical fabrics jointly accounted for 80% of total after-tax profits of the textile and clothing industry in 2000. In terms of textile exports in 2002, cotton and chemical fiber products jointly accounted for 70% of the textile industry’s exports. Accordingly, in this section, we analyze the performance of garments, cotton and chemical fabrics.

12. 21% Cotton.