

Effects of Shading on Boll Development and Fiber Quality in Field Grown Cotton

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Abstract: Four cultivars were grown in the field under three light treatment (shading 25% and 50% with density of 60×10^3 plants \cdot hm⁻², the controls of no shading were CK1 with density of 60×10^3 plants \cdot hm⁻² and CK2 (high density) with density of 262×10^3 plants \cdot hm⁻²) in Shihezi in 2002 and 2003. The results showed that both shading and high density could cause the decreasing of boll number and the increasing of immature and rotten bolls per plant. The values of final boll weight (K) of 25% SH reduced 17.9% and 12.2%, and 50% SH reduced 38.7% and 34.5%, compared with CK1 and CK2. The values of maximum accumulation rate of boll dry matter (G_{max}) of 25% SH decreased 34.7% and 33.1%, and 50% SH reduced 50.5% and 49.3%, compared with CK1 and CK2. The values of relative growth rate (B) decreased with shading and density increasing. The weight of

cotton hull, seed and fiber reduced significantly but no significant decreasing of seeds per boll with shading and density increasing. The seeds of 25% SH reduced 1.6 and 1.3 grain per boll, and 50% SH decreased 6.3 and 6.0 grain per boll, compared with CK1 and CK2. The values of seed weight of 25% SH decreased 7.5% and 5.7%, and 50% SH reduced 30.1% and 28.7%, compared with CK1 and CK2. The values of hull weight of 25% SH decreased 4.5% and 2.6%, and 50% SH reduced 17.1% and 15.4%, compared with CK1 and CK2. The values of fiber weight of 25% SH decreased 12.4% and 7.9%, and 50% SH reduced 42.6% and 39.5%, compared with CK1 and CK2. The rank of contribution of shading to the boll components were fiber weight, seed weight and hull weight, successively. It was found that the fiber length increased, and strength and micronaire value reduced with shading increasing, and with no significant impact of shading on fiber uniformity and elongation. High density (CK2) increased fiber length and decreased fiber strength.

Key words: shading; fiber quality; boll growth; cotton