

[Home](#) » [Volume 4 / 2000](#) » [Issue 2](#) »

Cotton Fiber Growth and Development 2. Changes in Cell Diameter and Wall Birefringence

Authors: Robert W. Seagull, Vito Oliveri, Kim Murphy, Andrew Binder, and Sushma Kothari

Pages: 97-104

Molecular Biology and Physiology[Full Text PDF](#) (155K)

Cotton (*Gossypium hirsutum* L, and *G. barbadense* L.) fiber perimeter is an important textile trait that directly affects quality properties, such as fiber length, strength, and micronaire. The literature is contradictory regarding whether or not fiber diameter changes during development. Changes in maximum fiber diameter, fiber length, and cell wall birefringence were measured throughout development in four cotton genotypes (*G. hirsutum*, cultivars MD51ne, DP50, and DP90; and *G. barbadense*). All genotypes exhibited significant increases in fiber diameter during the first 30 d of fiber development. The *G. hirsutum* genotypes all had similar final diameters; whereas, *G. barbadense* had a significantly smaller final diameter. The *G. hirsutum*, cv. DP90, exhibited the smallest change in diameter (only 33%), compared with the other genotypes examined (MD51ne, 42%; DP50, 62.5%; and *G. barbadense*, 35%). All genotypes started secondary wall synthesis by 20 d post anthesis, as indicated by significant increases in wall birefringence. Simultaneous increases in fiber diameter and wall birefringence between 20 and 30 d post anthesis indicate that the secondary cell wall of cotton fibers is not rigid and is capable of expansion. These data indicate that fiber perimeter is a dynamic fiber property that changes significantly throughout a long period during development. This long window of opportunity during which fiber diameter and, thus, perimeter, can be modulated may provide a new avenue for changing fiber growth and development for the improvement in textile properties of cotton.