AN ASSESSMENT OF ALTERNATIVE COTTON FIBER QUALTIY ATTRIBUTES AND THEIR INFLUENCE ON YARN STRENGTH

R. L. Long
M. P. Bange
J. S. Church
G. A. Constable
CSIRO
Australia
C. D. Delhom
SRRC ARS USDA
New Orleans, LA

Abstract

Knowing the yarn strength performance potential of cotton fiber is advantageous to spinners during mill preparation, and to researchers developing new genotypes and management strategies to produce better fiber. Both micronaire, which is a collective measure of fiber fineness and maturity, and bundle tensile properties, are important standard High Volume Instrument (HVI) fiber quality attributes. Two field experiments over two seasons were conducted to assess the fiber and yarn performance of Australian cotton genotypes. The aim was to assess and compare alternative measures for micronaire, and to compare bundle and single fiber tensile measurements, and assess the relative yarn strength predictive performance of these attributes. Specific fiber measurement comparisons were for linear density [double compression Fineness Maturity Tester (FMT) and gravimetric), maturity ratio (FMT, polarized light, calculated and cross sectional), and tensile properties (HVI bundle and Favimat Robot single fiber)]. Multiple linear regression models for yarn strength which included yarn manufacturing variables and standard HVI fiber quality parameters performed well but models performed better when alternatives to micronaire were used; e.g. using gravimetric linear density or using laser photometric determined ribbon width. Yarn strength models were also better when single fiber tensile properties were substituted for bundle tensile properties. The substitution of alternative fineness variables for micronaire or single fiber strength for bundle strength in a simple fiber quality index also improved the prediction of yarn strength.