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Relating Bundle Strength to Mantis Single Fiber Strength Measurements

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Relationships between cotton (*Gossypium hirsutum* L.) fiber structure/morphology and strength have been examined for a wide range of physical and genetic properties. In particular, the relationships between the single fiber (Mantis) strength and various bundle strength measurements including stelometer and high volume instrument (HVI) were determined. In addition, relationships between single fiber strength and fiber physical/dimensional properties as obtained from the advanced fiber information system (AFIS) and image analysis were determined. Both the stelometer tenacity (T1, $R^2 = 0.952$) and HVI breaking strength ($R^2 = 0.783$) can be expressed by a multilinear relationship that includes the Mantis breaking load and projected fiber ribbon width. Both the stelometer tenacity ($R^2 = 0.907$) and HVI breaking strength ($R^2 = 0.720$) are linearly proportional to the ratio of the Mantis breaking load to the square of the projected ribbon width determined by the Mantis electro-optical sensor.

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