VARIETAL VARIABILITY FOR COTTON GINNING EFFICIENCY

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Abstract

Energy consumption is one of the largest expenses of a cotton gin. In light of the rising cost of energy, all avenues should be exploited to optimize energy use in modern cotton gins. One option is to study genetic variability within the available germplasm to look for varieties that gin faster and require less energy to gin and exploit this variability to develop commercially acceptable varieties. Thirty-two conventional and transgenic cultivars were planted in the field at Stoneville, MS in 2008. Fifty boll bulk samples were harvested from each entry, and the cotton was ginned on a 10-saw laboratory gin stand to evaluate ginning efficiency. Power consumed by the gin and the time required to gin each variety was recorded. Ginning efficiency was based on measurements of ginning energy (Wh/kg lint) and ginning rate (kg lint/min). Data on fiber length, strength, elongation, micronaire and AFIS fiber traits were determined. Also linters content, lint turnout, seed index, and boll size were determined. Significant differences between the cultivars were observed for ginning energy, fiber quality traits, seed index, boll size, fuzz (linters), and lint turnout. The cultivar AR 9317-26 was identified to have the lowest fuzz (linters), one of the highest ginning rates, and lowest net ginning energy, signifying its good ginning efficiency. This and other cultivars were identified with substantially lower energy requirements. Correlations between all parameters were conducted to establish associations between all traits. Gross energy required for ginning a variety was negatively and significantly associated with ginning rate, lint percent and boll size. However, the associations between gross energy and fuzz weight and nep count were positive and significant.