Variations in Length, Strength, and Fineness of Cotton Fibers from Bolls of Known Flowering Dates, Locks, and Nodes

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Plant breeders, and other workers on cotton, are confronted with variations in length, strength, and fineness of lint. These variations are due largely to the long fruiting period of the cotton plant, which extends from 5 to 10 weeks throughout most of the Cotton Belt. The fruiting period of cotton is considerably longer than that of corn, small grains, or other crop plants. Environment, therefore, has ample opportunity to affect differentially the cotton inside the bolls.

The long fruiting period developing through varying seasonal conditions, moreover, results in the complex structural growth of the cotton plant. Usually, there are from 8 to 16 fruiting limbs, with from 1 to 6 fruiting nodes on each limb, and 5-lock, 4-lock, and less-than-4-lock bolls growing from the fruiting nodes. Many workers have considered the particular structural growth itself as an expression almost wholly of environmental effects.

It is the purpose of this paper to give measurements of length, strength, and fineness of cotton contained by the bolls in relation to their plant structure, and to make suggestions concerning their sampling which may explain some of the variations.

MATERIAL AND METHODS

The cotton for these studies was harvested in 1932 from bolls of three varieties, Stoneville 2, Trice 90-1, and Wilds 1. Bolls of these varieties harvested in 1933 are at hand, but measurements are not complete. Stoneville 2 and Trice 90-1 represent 1-inch staple cottons of relatively the same maturity but of different boll lock numbers. Wilds 1 is a long-staple cotton of later maturity. Commercial breeders' seed of Stoneville 2 and Wilds 1 was used; seed of Trice 90-1 came from an isolated block of this station and is an S₃ inbred selection from the Trice variety.

These varieties were grown at the West Tennessee Experiment Station, Jackson, and at the main Station at Knoxville, in the East Tennessee Valley, thus, assuring wide differences in soil and climate.

Three-row plots, 60 feet long, of each variety were repeated seven times at Jackson and five times at Knoxville. Bolls were harvested from five plants in the middle row of each plot at Jackson and from seven plants at Knoxville. Hence, each variety is represented by eight groups of five plants each at Jackson and by six groups of seven plants each at Knoxville.

Every flower on the 120 plants at Jackson and the 126 plants at Knoxville was tagged. White tags were used on the first node, red tags on the second, yellow on the third, and green on fourth. Nodes beyond the fourth were marked with green tags. The flowering date was written on the tag at time of placement, and boll-opening date at time all sutures at tip end of boll were cracked. Bolls were harvested when cotton had the fluffy appearance of normal picking time.

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