

UNIFORMITY OF COTTON PLANT AGE AND GROWTH AFFECTED BY PLANTING SEED SIZE

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Abstract

Larger sizes of planting seed may produce larger, more vigorous seedlings than smaller sizes, and sized seed may produce more “even-aged” and equal sized seedlings than a normal seed lot. Our objectives were to determine effects of seed sizing on growth, vigor, and uniformity of cotton plant age and growth within stands. Commercial seed lots of two cultivars (DP 458 B/RR, and PM 1220 BG/RR or PM 1218 BG/RR) were fractioned by size using slotted screens. The five size fractions and the original (composite) seed lots comprised the six size treatments for each cultivar. These treatments were planted in seven locations (AR, AZ, LA, MO, MS, SC, TN) in a RCB factorial arrangement in 1999, and in a RCB split-plot in 2000. Seedling emergence was recorded on 2- to 3-day intervals in 10-ft row segments of each plot. Plant age uniformity was evaluated as differences in time of emergence between seed size treatments. Plant growth (height and node) data were collected at seedling (4-node) and squaring (8-node) growth stages on 10 to 20 consecutive plants/plot. Uniformity of plant growth and vigor of plants within plots was measured by the coefficient of sample variation (CV).

Seed size and variety significantly influenced plant height, node number and height-to-node ratio (HNR). Across locations and varieties, larger seed sizes produced significantly taller plants with more nodes at seedling and early squaring stages than smaller sizes in 1999 and 2000. Average height of plants grown from the largest fractions was 13% and 10% higher at the 4- and 8-node stages, respectively, than those grown from the smallest size fractions. Average plant size from original “composite” seed lots were similar to those from intermediate seed sizes. Height-to-node ratio increased with seed size in 2000 only. Plant height, nodes, and HNR were higher in PM 1220 BG/RR and PM 1218 BG/RR than in corresponding size classes of DP 458 B/RR. There were few variety-by-size interactions. Although there were differences in plant age within plots, plant age did not vary due to differences in seed size, as indicated by the lack of interaction between size and time of emergence (interaction $P=0.99$). Across locations and varieties, seed size did not significantly affect uniformity (CV) of plant height, nodes, or HNR at the 4- or 8-node stages in either year. Height tended ($P=0.06$) to be more uniform at early squaring of plants grown from intermediate seed sizes (CV=16%) than from smallest sizes (CV=19%) in 2000. Height, nodes, and HNR were more uniform in PM 1218 BG/RR and PM 1220 BG/RR than in corresponding size classes of DP 458 B/RR. There were few variety-by-size interactions for uniformity. Results suggest that sizing of cotton seed for planting does not consistently improve the uniformity of plant age and growth within stands, although the largest size fractions produced larger plants with more nodes than the smallest size fractions.

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