

**EFFECT OF ROW SPACING, LEAF MORPHOLOGY AND PLANT POPULATION ON LIGHT INTERCEPTION AND YIELD OF COTTON****Ranjit Riar****Guy Collins****James Lanier****Gary Hamm****Andrew Hunt****Gary Little****Keith Edmisten****Randy Wells****North Carolina State University****Raleigh, NC****Abstract**

Cotton yield is affected by crop geometry which is a function of row spacing, plant population and leaf morphology. Field experiments were conducted at two locations in 2007 to evaluate the effect of plant population, row spacing and leaf morphology on canopy closure, light interception, yield and fiber quality of cotton. Okra-leaf and normal-leaf varieties were planted in both 38 and 15 inch row widths at three populations of 35,000; 70,000 and 105,000 plants per acre. Light interception was determined using one meter line quantum sensor at the top and bottom of crop canopy. Canopy closure was determined by taking pictures with a digital camera mounted on a stand at a fixed height above ground. These images were analyzed using Adobe Photoshop and Pixel Counter to determine crop area from non-crop area. Lint yield was determined after ginning subsamples from each plot for percent lint and fiber quality was tested using HVI.

Plant population had no significant effect on final lint yield. However there was a numerical increase in lint yield with increasing population in normal-leaf cotton at 15-inch row spacing. Leaf morphology and row spacing had significant effect on lint yield. Normal-leaf cotton had significantly higher lint yield versus okra-leaf cotton. Cotton grown at 15-inch row spacing has significantly higher yield compared to cotton grown at 38-inch row spacing. Similarly light interception and canopy closure was significantly higher in 15-inch row spacing and for normal leaf-type compared to 38-inch row spacing and okra-leaf type. Increasing plant population caused significant increase in light interception and canopy closure early in the season for both row spacing and leaf types. However, with time, these differences were reduced and at the last observation, there were no differences in light interception and canopy closure due to plant population. Light interception and canopy closure were highly correlated with each other over time and treatments, with  $r^2$  ranging from 0.8 to 0.9. These data indicate that narrow rows result in positive yield responses when compared to wide-row situations. These yield results in turn appear related to the increased canopy closure and associative increases in light interception in narrow rows than found in wide rows.