

**NARROW ROWS IN COTTON: WHAT GOOD ARE THEY****Randy Wells****Keith Edmisten****North Carolina State University****Raleigh, NC****Abstract**

Previous work in North Carolina has shown consistent yield responses to narrow rows (<20 inches) when compared with conventional rows (>30 inches). Many other areas in the cotton growing regions of the United States show responses to narrow rows less often or not at all. Since temperature is such an important factor in determining cotton growth and development, the thirty-year mean heat units (degree-day 60s) were examined from 20 total locations from four regions based on latitude (greater than 35°, 33 to 35°, 31 to 33°, and less than 31° latitude). Five locations from each region were selected. The total degree-day 60s accumulated throughout the season were totaled for each location at the end of each month starting with May and ending with October. Regression analyses were performed for the relationship between the monthly accumulated seasonal DD-60s and latitude of the twenty locations. All relationships were highly significant and resulted in r-squares of -0.88 or greater. When the slopes of the six monthly relationships were plotted on the same graph, it was apparent that the compression of the DD-60 values in the more northern latitudes was the greatest at either end of the season. During the months of May and June, Suffolk VA received only 66, 60, and 47% of the heat units found at Stoneville, MS, Andalusia, AL, and Harlingen, TX, respectively. The lower accumulated heat units in the northern cotton producing region during the months of May and June affects the rate of canopy closure, and hence, the resulting canopy photosynthesis rates. Canopy photosynthesis was linearly associated with canopy closure prior but not after the attainment of canopy closure ( $r^2 = -0.73$ ,  $P < 0.01$ ). Canopy photosynthesis observed after appreciable rate reductions were not associated with a loss of canopy cover. The loss of the canopy closure/photosynthesis relationship after closure is reached indicates that once light-harvesting capacity is maximized, other rate-limiting processes are of greater importance (i.e. leaf aging, mutual leaf shading, seasonal radiation decreases). Positive yield responses to narrow-rows in the northeastern cotton producing region can certainly be tied to assured canopy closure and the associative greater photosynthate production by the canopy. This canopy closure, while seemingly tied to differences in heat units during the “first forty days”, would also be influenced by any environmental factors that would hamper canopy development (i.e. water availability, soil type, cloudy conditions).