RE-VISITING THE SKIP-ROW CONCEPT AND THE NEW ULTRA-WIDE-ROW (72-INCH) SYSTEM FOR NC COTTON

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Abstract

Skip-row patterns have previously been evaluated for cotton production in North Carolina, and in several other states, for multiple reasons, although skip-row systems have rarely been utilized in North Carolina. Interest in skip-row patterns is largely associated with mitigating risks due to increased seed costs or high front-end costs/risks associated with cotton production, potentially improving harvest efficiency, and ultimately preserving some yield potential while offsetting production costs and extending operating funds, thereby improving profitability and sustainability. Interest in these production systems is more common when market prices for cotton fiber are relatively low, and/or when growers encounter low yields across multiple consecutive years due to drought, hurricanes, etc. In some regions of the U.S. cotton belt, skip-row patterns are utilized for maximizing water use efficiency, however, this is not a primary concern for growers in NC. Recent interest in skip-row patterns in NC has more-so been driven by testimonies from growers in other states claiming to maintain yield potential while reducing production costs. The ultra-wide-row system (60-76-inch row patterns) has recently received attention in multiple press articles from other cotton-producing states, and as a result, some growers in NC have inquired about the advantages/disadvantages and utility of such systems in NC. The objectives of this research were to determine if skip-row production systems (including the newer ultra-wide-row system) can be beneficial for NC cotton producers, and to quantify economic value of such systems.

During 2021, both early-planted (April 27-28, 2021) and late-planted (May 20, 2021) field experiments were conducted at the Upper Coastal Plains Research Station in Rocky Mount, NC, and the Peanut Belt Research Station in Lewiston, NC. Stoneville 4550 GLTP was planted at 43560 seed/A on 36-inch rows. Within-row seeding rates were not changed when the four treatments mentioned below were implemented and evaluated. Individual plots consisted of eight rows by 100 feet long at each location. Treatments consisted of 1. Solid-planted cotton (36-inch rows), 2. a 4 & 1 skip-row pattern, 3. a 2 & 1 skip-row pattern, and 4. a 1 & 1 skip-row pattern (ultra-wide-row, 72-inch rows). Seed and harvest costs were calculated to be \$100/A and \$70/A, respectively for solid-planted (36-inch row) cotton, \$80/A and \$52.50/A, respectively for the 4 & 1 skip-row pattern, \$67/A and \$35/A, respectively for the 2 & 1 skip-row pattern, and \$50/A and \$46.90/A, respectively for the ultra-wide-row (1 & 1 skip-row, 72-inch-row) pattern. Cotton was harvested using a 4-row John Deere spindle harvester, and lint percentage was calculated from 7-8 lb seedcotton samples ginned at the University of TN Microgin. Statistical analysis was conducted using A.R.M. software and means for lint yield lbs/A, lint yield lbs/planted A, and lint value at both \$0.95 and \$0.65/lb cotton lint prices (lint lbs/A adjusted for seed/harvest costs) were separated using the LSD test at $p \leq 0.05$.

Cotton planted on all skip-row patterns resulted in lower yields than solid planted cotton at Rocky Mount (early planted) and Lewiston (late planted). The 4 & 1 skip-row pattern at Rocky Mount (late planted), and both the 4 & 1 and 2 & 1 skip-row patterns at Lewiston (early planted) resulted in similar yields to the solid-planted cotton. Across all four trials, the 4 & 1 skip-row pattern yielded 92% of the solid-planted cotton with 78% of the seed/harvest costs, the 2 & 1 pattern yielded 84% of the solid-planted cotton with 60% of the seed/harvest costs, and the ultra-wide-row (72-inch row) pattern yielded 75% of the solid-planted cotton with 57% of the seed/harvest costs. Lint yield per planted row increased as the percent of skipped area increased, with the highest yield per planted row resulting from the ultra-wide-row pattern (1 & 1 skip-row, 72-inch-row). For both \$0.95/lb and \$0.65/lb lint prices, the value (lint lbs/A adjusted for seed/harvest costs) of the 4 & 1 and the 2 & 1 skip-row patterns were similar to that of the solid planted cotton at Rocky Mount (early and late planted) and Lewiston (early planted). At Lewiston (late planted), all skip-row patterns resulted in less value than solid planted cotton at lint prices of \$0.95/lb, and the 2 & 1 and 1 & 1 skip-row patterns resulted in less value than solid planted cotton at lint prices of \$0.65/lb. In 3 of 4 trials, the ultra-

wide-row (1 & 1 skip-row, 72-inch-row) pattern resulted in less value than solid planted cotton, regardless of lint price.

In conclusion, data suggested that the 2 & 1, and more commonly, the 4 & 1 skip-row pattern often resulted in a similar value to that of solid-planted (36-inch row) cotton, while reducing the investment in seed and mitigating early season investment risks. The ultra-wide-row (1 & 1 skip-row pattern, 72-inch row) pattern was not competitive with solid-planted cotton in 2021 in terms of lint value adjusted for reduced seed and harvest costs in 3 of the 4 trial sites. Anecdotal observations, along the with trends observed in yield per planted area, suggests that fertilizer costs may not be reduced, and perhaps should be increased. Weed control, planting date as it relates to crop maturity in some years, and longevity of insect management should also be considered. Future experiments should be conducted in lower yielding environments, marginal soils, and with other varieties and also investigate yield response to multiple N & K rates (banded and broadcasted) with similar skip-row patterns.

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