

GROWTH AND DEVELOPMENT COMPARISON IN TILLED AND NO-TILLED COTTON

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ABSTRACT: Two tillage systems were evaluated for plant growth and development. Plants were dug and portioned into leaves, stems, roots, squares, and bolls starting two weeks after planting and continuing until the sixteenth week after planting. When dry weight was expressed as a percentage of the whole plant; the highest percentage of the dry weight was in the leaves for the first twelve weeks after planting. At twelve weeks after planting the stem dry weight and the square dry weights reached their peaks. Dry weights of the no-till plants and conventional tilled plants were nonsignificant for leaves, stems, roots and squares for the first twelve weeks after planting. Total dry weights at the end of the growing season were higher for the no-till than the conventional tilled cotton. The boll dry weight for the conventional tilled and no-tilled cotton was nearly identical at the end of the growing season, which was reflected in the yield.

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MATERIALS AND METHODS: In the fall of 2000, old cotton stalks were shredded immediately after harvest. The no-till plots were left undisturbed through the winter. In the spring, the tilled plots were chiseled, disked, hipped, and smoothed with a field conditioner. Both the tilled and no-till plots consisted of four 38-inch rows. Roundup (glyphosate) 1.0 lb ai/ac was sprayed over the entire no-till area in the last week of March. Four hundred pounds of 17-17-17 (N-P-K) were broadcast with a spin spreader in mid-April by a custom applicator. Cotton variety DPL 451 BG/RR was planted on May 4 with four seed per foot of row. Orhtene 90 S (Acephate) at 4 oz. per 60 pounds of seed was used as a hopper box treatment. Cotoran + Graxomone (fluometuron + paraquat) at 1.0 lb ai/ac + 0.625 lb ai/ac were broadcast behind the planter. Roundup at 1.0 lb.ai/ac was sprayed over the entire plot area two weeks after emergence. Staple (pyrithiobac) .06 oz ai/ac was mixed in 20 gallon of water and sprayed broadcast over the entire plot area six weeks after planting. Bladex (cyanazine) 0.75 lb ai/ac and MSMA (MSMA) 1.5 lb. ai./ac. was post-direct sprayed over the entire plot area as a layby treatment on June 25. Cotton was defoliated on September 11 with Superboll (ethephon) 1.5 lb. ai/ac + DEF 6 (tribufos) 1.5 lb ai/ac in 20 gpa. Harvesting of plots was done on October 3 with a plot picker retrofitted with load cells and monitor weighing system. Starting at two weeks after planting, plants were cut at the soil line in the conventional and no-till plots and placed in a cooler and transported to the laboratory. Plants were processed in the laboratory by removing the leaves, squares, and bolls from the stem. Green weights were made of each of the component parts of the plant before plants were dried in a forced air oven at 110 degrees centigrade. After three days of drying, the plant parts were weighed and returned to the oven. On the fourth day, the plants were removed and weighed a second time. If the plant weight had not changed more than one percent, the last weight was used as the final dry weight. If weight was more than one percent, the plants were returned to the oven and the process continued until the last weight was one percent or less of the previous days' weights.

RESULTS AND DISCUSSION: Approximately eighty percent of the plants' dry weight was in the leaves at two weeks after emergence (Figure 1). The leaf dry weight percentage had a gradual decline from the two weeks after planting until twelve weeks after planting, however, at the same time the total weight of the leaves was increasing as the plants were growing and developing. Dry weight of the stem had a gradual increase in percentage of the total weight until the tenth week (Figure 2). Root and square dry weight was increasing during the period of time (Figure 3 and 4). Dry weight percentages of stems dropped about ten percent from the tenth week and the twelfth week, leaf dry weight dropped about twenty percent and of the percentage total dry weight the boll dry weight increased about thirty percent (Figure 5). Total dry weight

yields were slightly higher for the no-till at the end of the growing season (Figure 6). Yields were not influenced by preplant tillage (Table 1).

Figure 1. Leaf dry weight of cotton plant in a tilled and no-tilled management system.

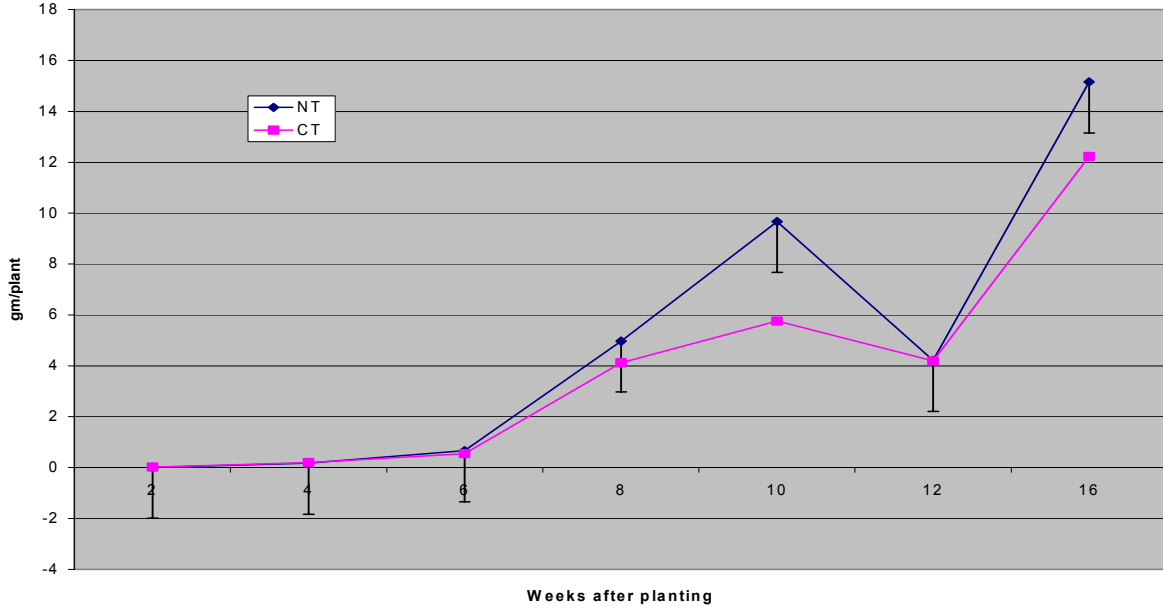


Figure 2. Stem dry weight of cotton plants in a tilled and no-tilled management system

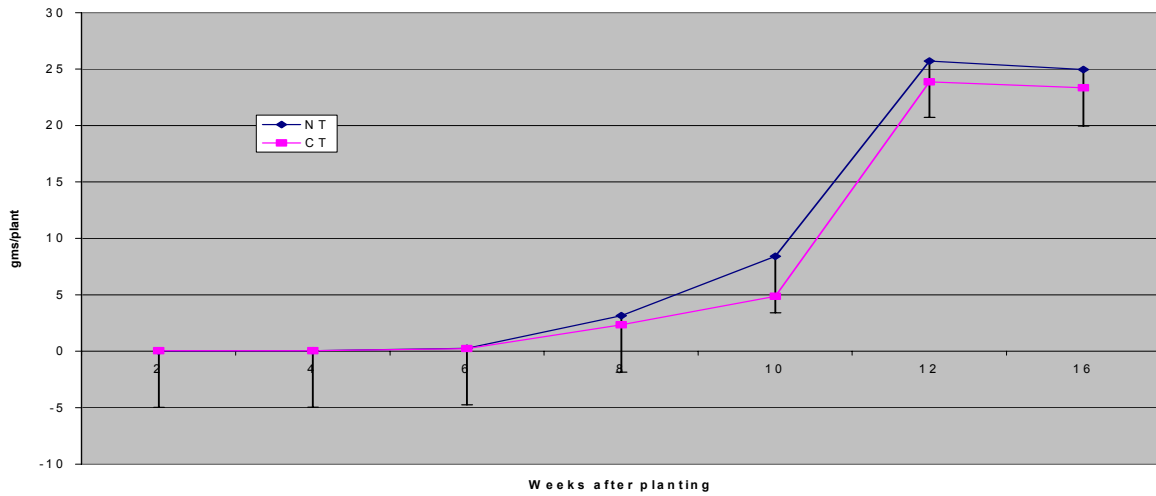


Figure 3. Root dry weight of cotton plant in a tilled and no-tilled management system.

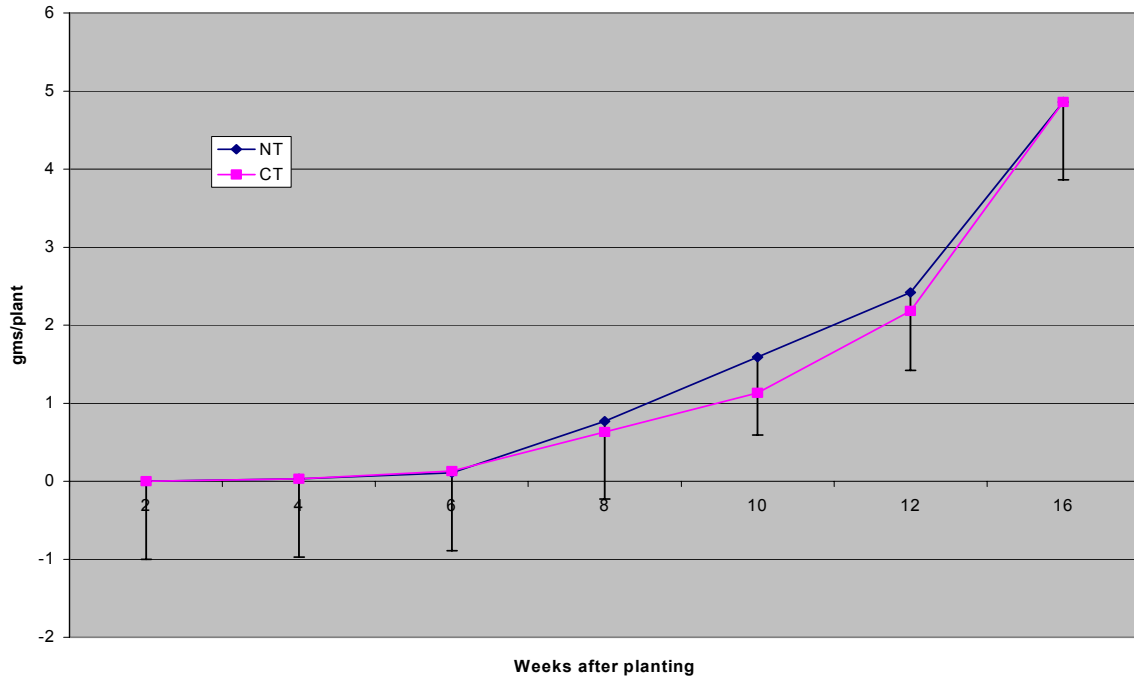


Figure 4. Square dry weight of cotton plant in a tilled and no-tilled management system.

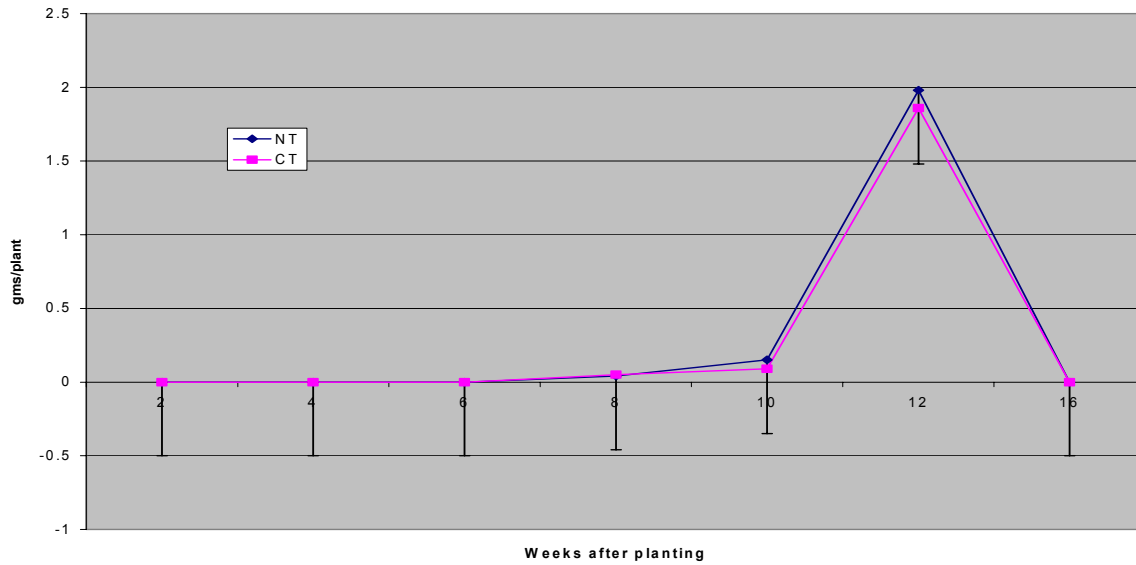


Figure 5. Boll dry weight of cotton plant in a tilled and no-tilled management system .

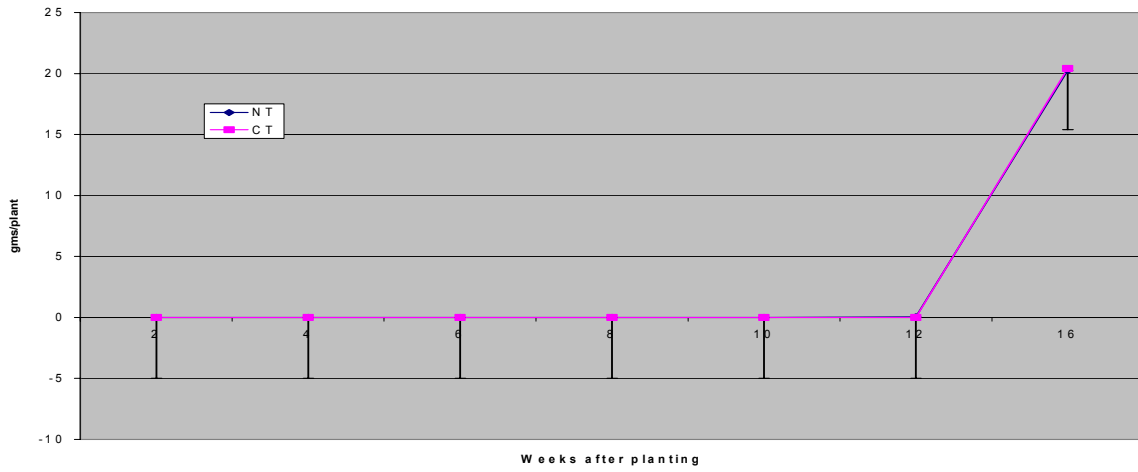


Figure 6. Total dry of cotton plant in a tilled and no-tilled management system .

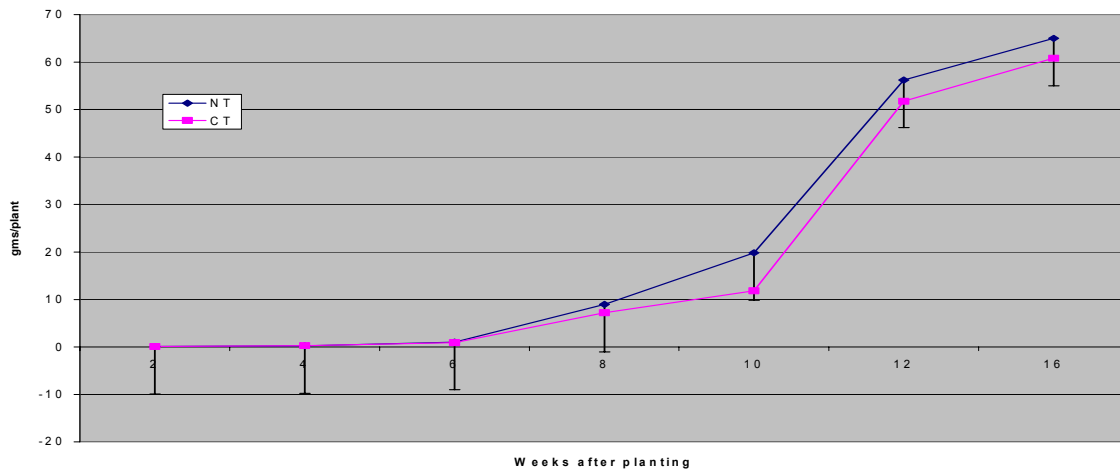


Table 1. Lint yield of cotton in tilled and no-tilled system				
<u>Pounds of Lint per acre</u>				
<u>System</u>				
C.T.			791	
N.T.			799	
LSD 0.05			ns	
% C.V.			15	

