

EVALUATION OF COVER CROPS FOR COTTON PRODUCTION

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ABSTRACT: Cover crops are a vital tool in conservation tillage. Cover crops in some cases serve as a source on nitrogen. In other cases, cover crops can serve as nitrogen scavengers removing nitrogen from the soil in order to prevent pollution of the waterways. In our study we evaluated Crimson Clover and native cover crops for cotton production. We monitored the plant growth and development during the growing season to determine adverse plant behavior from the cover crop. The plots having a clover cover crop showed no difference in growth and development during the growing season compared to the native vegetation. However, at the end of the growing season the boll weight was significantly higher for the clover crop compared to the native vegetation. Yields were the highest for the cotton grown after a clover crop and incorporated; highest for the native cover crop not incorporated.

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MATERIALS AND METHODS: In the fall of 2000 after cotton harvest and shredding of stalks, Crimson Clover was seeded in the plots designated for clover. Seeding was accomplished using a small seeding attachment on a Tye Drill with front coulters. Plot design was a split plot with four replications. Main plots were clover and native vegetation. Subplots were conventional and no-tillage. Roundup (glyphosate) at 1.0 lb ai/ac was sprayed over the no-till plot area in late March. The tilled plot area was disked in late March and redisked in the second week of April before the plots were hipped. Rows were on thirty-eight inch centers. Five hundred pounds of 0-20-20 fertilizer was broadcast across the entire plot area in April prior to planting. Both conventional and no-till plots were planted on May 4 with a John Deere 7300 no-till planter. DPL 451BG/RR cotton was planted at four seed per foot, Orthene 90 S (Acephate) 4 oz. per 60 pounds of seed was used as a hopper box seed treatment for early season control of cutworms, aphids and thrips. Cotoran (fluometuron) 1.0 lb. ai./ac.+ Staple (pyrithiobac) .06 oz.ai./ac. were broadcast over the tilled area. Cotoran +Graxomone (fluometuron + paraquat) 1.0 lb ai/ac + 0.625 lb ai/ac and Staple (pyrithiobac) .06 oz.ai./ac. were broadcast over the no-tilled plots behind the planter. Roundup at 1.0 lb/ai/ac was sprayed over the entire plot area two weeks after emergence. Plots without a clover cover crop were sidedressed with 60 lb N ac before squaring. Bladex (cyanazine) at 0.75 ai/ac and MSMA (MSMA) at 1.5 lb.ai./ac. was direct sprayed over the plot area as a layby treatment. Destructive samples were taken from the nonharvest rows starting at two weeks after planting and continuing until the sixteenth week after planting. Cotton was defoliated on September 11 with Superboll (ethephon) 1.5 lb ai/ac + Def 6 (tribufos) 1.5 lb ai/ac. Weights from the two center rows of each plot was taken on October 2.

RESULTS AND DISCUSSION: The year 2001 was an excellent year for cotton production. Dry weight of the plant was partitioned into stems, leaves, fruit and roots during the growing season. At two weeks after planting, most of the plant dry weight was in the leaves, with the stems and roots making up a very small portion of the plant. As the plant matured a smaller percentage of the overall dry weight was concentrated in the plant leaves (Figure 1). Stems had a steady increase in percentage of dry weight up until the plant had completely cut out (Figure 2). Bolls began to form about eight weeks and a greater portion of the energy went into fruit production and less went into leaves, roots, and stems (Figure 3). The energy of the plant going to form leaves, stems, roots, and bolls was similar for all the management systems. Yields were highest in the tilled systems and native cover crop.

Figure 1. Percentage of total plants dry weight in the leaves

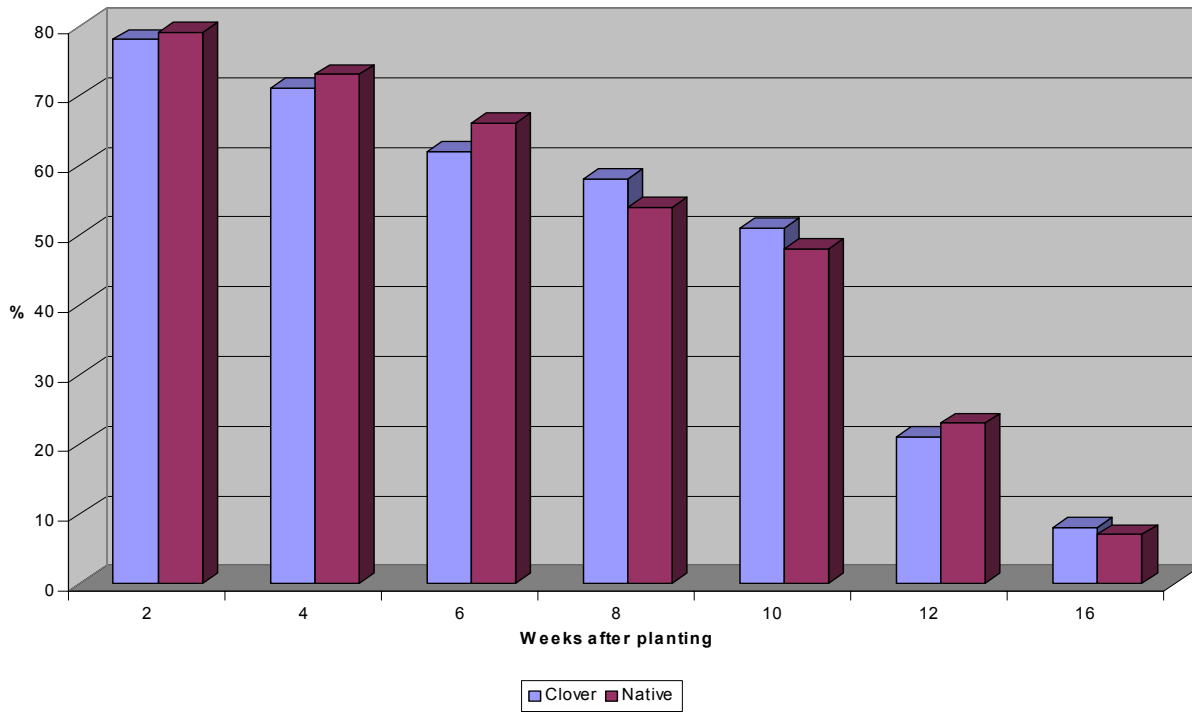


Figure2. Percentage of the Total Plants Dry Weight in Stems

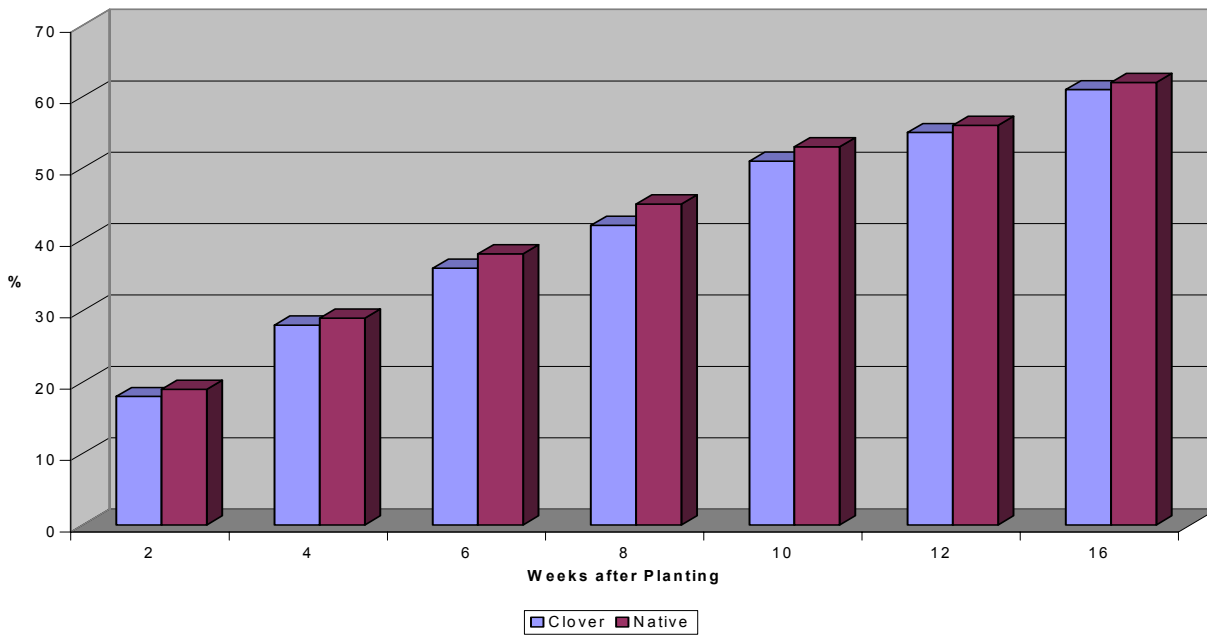


Figure 3. Percentage of the Total Plants Dry Weight in Bolls

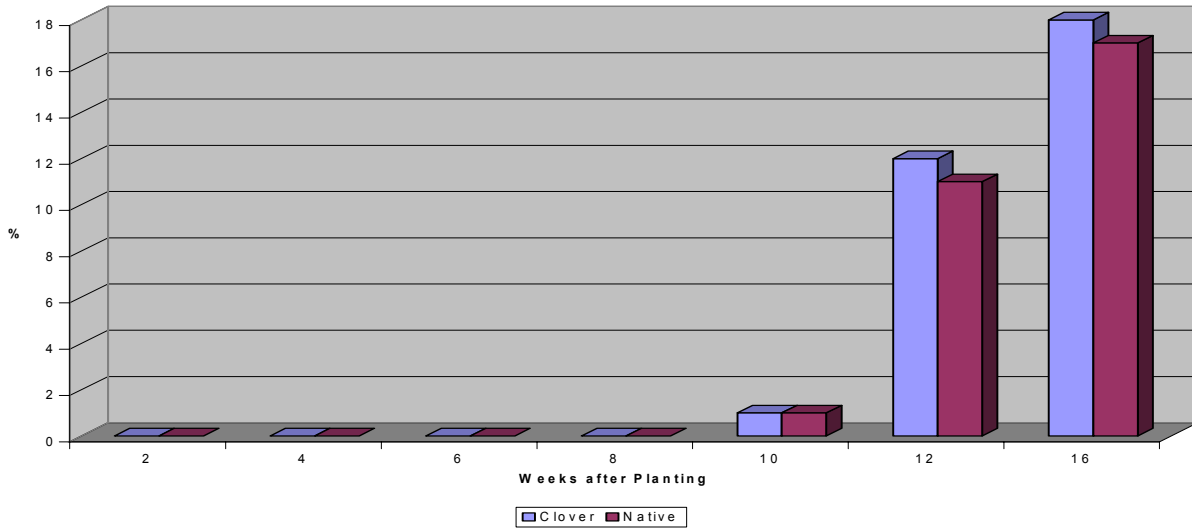


Figure 4. Lint Yields of Cotton grown with a Cover Crop

