COMPARISON OF TWO TYPES OF TILLAGE SYSTEMS FOR VEGETABLE PRODUCTION

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Introduction

Today's vegetable producers are faced with many challenges. Price instability requires growers to continue to lower production costs while maintaining yields. Wherever possible inputs must be reduced and at the same time, efficiency increased.

Moldboard ("bottom") plowing is common practice in much of the state for vegetable production. Deep turning to 8 inches prepares a smooth seedbed that is weed free and residue free for transplanting vegetables. Fertilizer and post incorporation of chemicals are applied. Then bed rows are laid off and subsequent fumigation for disease and weed control. Disking after moldboard plowing tends to re-compact the soil and should be avoided. Either plastic mulch is laid on the formed bed or left bare. One disadvantage to this system is the hard pans can develop. Root growth can be restricted if there is a hard pan, compacted layer or heavy clay zone. Vegetables such as pepper, eggplant, tomato, and etc. that are considered to be moderately deep rooted and under favorable conditions, roots will grow beyond 12 inches.

Subsoil and bed land preparation has been used for many years with row crop production in the Southeast. The single greatest benefit of row crop bedding is to allow planting into moisture; that is, pre-formed beds can be knocked down at planting to allow seed placement into moist soil. In addition, raised beds tend to be warmer and may offer a slight advantage when planting under marginally cool conditions. This also reduces the number of trips across the field.

Objective

The objective for this study was to evaluate the effects of yield and disease on cantaloupe and egg plant for moldboard plowing and subsoil shanks and bedding types of tillage.

Methods and Materials

The test was conducted at the Tifton Vegetable Park, University of Georgia, Tifton, GA spring and fall 2006. The test area was 0.19 acres divided into two sections. The area was disc twice and then a field cultivator was used to smooth off the field. One side was subsoil and bed rows laid out by the equipment in figure 1. Two subsoil shanks were spaced 24 inches apart on the center of a 72 inch plant bed. The chisel point of each shank was modified to have wings welded projecting 3 inches outward from the point. Depth of operation was approximately 12-14 inches to disrupt the hard pad. The other half of the plot was plowed with a moldboard as show in figure 2 to a depth of 8-10 inches. Bed rows were laid off with a tillovator with bed shapers. Fertilizer (10-10-10) at 300 lbs/acre and DAP at 200 lbs/acre was broadcast prior to bedding to both treatments. Beds were shaped and plastic applied with a methyl bromide applicator.

Figure 1. One pass subsoil and bed equipment.

Figure 2. Bottom plow and tillovator preparing row beds..

Cantaloupes (Athena) were transplanted on March 30, 2006. Plots consisted of one row of cantaloupes planted on raised beds that were spaced six feet apart (from center to center). In-row spacing was 24 inches per plant. Plots were each 90 feet long and were replicated 6 times. They plots were sprayed on weekly basis for insect and disease prevention. Additional fertilizer was applied through the drip irrigation system. Cantaloupe was harvested on June 6, 9, 13 and 16, 2006 and data collected on yield.

Egg plants were transplanted on July 25, 2006. Plots consisted of one row of egg plants planted on raised beds that were spaced six feet apart (from center to center). In-row spacing was 24 inches per plant. Plots were each 90 feet long and were replicated 6 times. They plots were sprayed on weekly basis for insect and disease prevention. Additional fertilizer was applied

through the drip irrigation system. Egg plants were harvested on September 18 and 25, October 5 and 20, and November 16, 2006 and data collected on yield.

Results and Discussion

Results are presented in tables 1 and 2. The yield on spring cantaloupe table 1 shows that there was no difference between the two treatments. But the moldboard plow treatment showed fruit to be 8.5 percent larger which reflects that the subsoil bed produce more fruit per acre (8.7 percent).

When eggplants were planted the second season yield for the subsoil and bed showed an increase of 14.6 percent. The subsoil and bed treatment showed an slight increase in fruit size and also produced more fruit per acre by 8.7 percent.

The increase in yield for the eggplant could be attributed to eggplants being a deep rooted plat as apposed to cantaloupe which is shallower rooted. This test will be conducted in 2007 to verify these results.

Table 1. Yield data for tillage comparison Cantaloupe Spring 2006

Tillage Method	Yield/Acre (lbs)	Average Fruit Weight (lbs)	Fruit Count per Acre
Subsoil and Bed	40303	3.9	10366
Moldboard Plow	40524	4.3	9532
Change (%)	-0.5	-8.5	8.7

Table 2. Yield data for tillage comparison on Eggplant Fall 2006

Tillage Method	Yield (Cartons)*	Average Fruit Weight (grams)	Fruit Count per Acre
Subsoil and Bed	749	557	17101
Moldboard Plow	654	542	15340
Change (%)	14.6	2.8	11.5

*28 pounds/carton