

Effect of tillage methods on Eggplant yield in north of Khuzestan, Iran

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ABSTRACT: Eggplant is one of the crops that has transferred from farms to great greenhouses. Its yield has increased from 15 tons when was grown in the field to 75 tons per hectare in greenhouse. Preparing of land is one of the important steps in greenhouse crop production. Two methods of Eggplant including Subsoil and Bed and Disk were applied. The experiment was split plot a completely randomized block design with 4 replications and treatments 8 was conducted. The interaction between tillage could produce 557 grams Eggplant per each plant. 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 a 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 plant as opposed to cantaloupe which is shallower rooted.

Keywords: Tillage, Greenhouse, Eggplant, subsoiler, disk

INTRODUCTION

When farm soils are compacted, the pore volume is reduced, aggregates crumble, and smaller inter-aggregate pores with non - accommodating faces are formed. The major loss of the largest pores caused by soil compaction has the effect of changing the pore size distribution and hence water retention (Pagliai and Vignozzi, 2002). The aim of the tillage is to create the optimum environment from seed germination to root growth and to enable mechanization as well as soil and water management. The set of implements chosen for tillage depends on local customs, soil and crop types and the cultivation system used. Ploughing has been a traditional method of primary soil cultivation during the past centuries all over the world. The mouldboard plough has one of the most complex shapes of tillage implements and has been developing for centuries. Its main advantage over other tillage tools is soil cultivation including soil inverting in order to bury weeds. Ploughing is very effective in controlling weeds, especially perennial weed species. Since the middle of last century various forms of shallow tillage have emerged in order to reduce energy consumption and to increase work rates. Mainly economic

and environmental factors are the reasons why minimum tillage is popular in agriculture (Balafoutis, 2003).

Disk 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 recompact 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 (Bidarigh, 1998). 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 (Bosrotsi, 2007; Noori, 2004).

MATERIALS AND METHODS

The experiment was conducted at Shuoshtar region (49° 14' E and 23° 2' N), 90 Km north of khozestan, province, Iran. In order to determine the physical and chemical properties of soil land which is on the test, before planting in soil samples were taken in depth of 0-30 and 30-60 cm. the electric conductivity (EC) 2 and PH 7.04. Therefore this research was conducted to evaluate the effect of tillage and irrigation methods on Eggplant yield in green house condition. Four different tillage including a disk followed by subsoiler. Two subsoil shanks were spaced 12 inches apart on the center of a 35 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 6-7 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 4-5 inches. Bed rows were laid off with a tillotator with bed shapers. The experiment was split plot a completely randomized block design with 4 replications and treatments 8 was conducted and two types of irrigation water (regular and magnetic) on greenhouse Eggplants and were tested in. The performance characteristics and yield, the number of flowers, fruits, and its weight was measured in 1000 m². Calculations and statistical analysis by SAS software and MstatC and draw charts by Excel 2010 ,and to compare the mean - least significant difference test was used LSD (Mir arab razi, 2005).

RESULTS AND DISCUSSION

When egg plants were planted the second season yield for the subsoil and bed showed an increase of 14.6 percent. The subsoil and bed treatment showed a 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 2012 to verify these results.

Table 1. Yield data for tillage comparison on Eggplant

S.O.V	Yield (Cartons)	Average Fruit Weight (grams)	Fruit Count per Acre
Subsoil and Bed	749	550	17105
disk	654	540	15339
Cv (%)	14.5	2.7	11.3

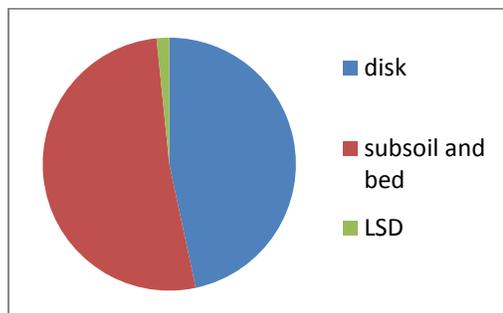


Figure 1. Average weight of fruit harvested per m² on average in the time period of 2 days of cross Interrupt methods of tillage

According to Figure 1 interaction between the methods of soil to, with disk tillage with and subsoiler was 14.5 percent.

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