



EFFECTS OF DEEP TILLAGE OF COTTON ROWS ON COTTON YIELD

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Abstract

Due to the belief that "the more cotton is grown between rows, the better the cultivation (chisel)", the deeper the softening of the rows will continue during the flowering period.

Keywords: Cotton, soil, tilling, chiseling, seed, moisture, cultivation, root, row spacing.

The advancement of science and the introduction
of modern technologies for the sustainable
development of agriculture will continue to be our priorities.
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Introduction

In the further developments of cotton production in our country, especially in the production of high-quality cotton, deep tillage of the rows (23-25 cm chisel) is very important. Due to the implementation of this agronomic approach, the agrophysical, agrochemical, agrobiological and water properties of the 23-25 cm layer, where the root system of cotton is most concentrated, will change for the better.

This measure has been used in agricultural production since the 75s of the last century. That is, it is done without any scientific basis.

Deep loosening of cotton fields has been studied by many researchers (2; 3; 4; 5; 6). However, these researchers did not study the interval between cotton rows, but the effect of field chiseling. We conducted an experiment on this issue in 2018-2019 and could learn only how to do deep tillage of cotton rows before sowing in rows of 23-25 cm, and found out that this agronomic measure had a positive effect on cotton.

In practice, however, cotton farmers continue cultivation between the rows during the flowering period because of the belief that "the more cultivation (loosening, chisel) between rows, the better yield." Therefore, in our recent studies (2016-2018), we studied the optimal number and duration of chiseling between cotton rows.

In our opinion, the theoretical basis for deep tillage is as follows:

-Storage of soil moisture, preparation of land for sowing, sowing of seeds, watering of seeds, after that, the cultivation involves at least 5 times per field. As a result, the density of the 0-25 cm layer,

in which the cotton root is more widespread, increases, the porosity decreases, and a slightly unfavorable soil environment is created for the cotton root to grow and develop.

According to scientific data, damaged or cut root of the cotton does not fully recover(1) even though there grows small roots on those damaged areas.

Based on the data, we studied the effect of deep tillage on cotton yields.

In the study, we first identified the formation of the root system at the beginning of the cotton growing season (Table 1).

According to the data, in light gray soils, from the seed-growing stage to the boll development stage, the tap root reaches 14.5-51.3 cm length. The number of lateral branch roots become almost 40.

Table 1 Growth and development of cotton root system

Bap. №	Stages of development	Length of tap roots, cm	Number of primary lateral roots, pcs	Width of distribution of primary lateral roots, cm
1	Seedling	14,5	16,6	3,8
2	1-2 leaf formation	25,6	32,5	9,4
3	3-4 leaf formation	39,1	37,7	28,9
4	Boll development	51,3	39,4	37,3

This means that the lateral branch roots of the cotton grow almost 40 cm to the side during growth and development. This should be taken into account when doing deep cultivation between the rows of cotton.

Therefore, we conducted a field experiment on the farm "Navbahor Pakhtakori 2020" in the territory of Navbahor MMTP, Toshloq district, Fergana region, in the following order.

Case 1. All surface tillage (cultivation) was carried out at 14-16 cm, no deep tillage was carried out (controlled).

Case 2. A number of rows were cultivated, the first being 17-18 cm and the rest 14-16 cm according to the stratification of the cotton rows.

Case 3. After stratification of rows was done, deep chiseling of 23-25 cm depth was carried out before cultivation.

Case 4. Deep loosening of 23-25 cm was carried out after cultivation.

Case 5. Deep chiseling of rows was carried out during boll development.

Observations, calculations and determinations of the research were carried out on the basis of the former UzPITI "Methods of conducting field experiments" (2007), BA Dospekhov "Methodology of field experiments" (1983).

The soil of the experimental station is light gray, has been irrigated for long time, unsalted, mechanically heavy sand, humus content of the driving layer is 1%. Groundwater is located at a depth of 5-7 meters below the ground. The rate of cotton irrigation is 70-70-60% compared to ChDNS.

The study found the following: deep tillage of 23-25 cm between rows of cotton will undoubtedly have a negative effect on its root system, as shown in Table 1. In particular, 2 lateral roots in case 3, 5 in case 4, and 7 in case 5 were cut and damaged. This, of course, negatively affected the growth and development of cotton. In particular, in controlled case, cotton stem grew by 84.1 cm by



August 1, by 85.2 cm in case 3, and by 84.9 cm in case 5. So, deep chiseling of cotton rows during the branch development stage when the plant produces 4-5 leaves, resulted in damage of lateral branch roots.

Deep tillage of cotton rows also affected the development of cotton. This was ultimately reflected in the cotton harvest (Table 2).

Table 2 Cotton yield, quintal / ha

Bap. №	the years			average, quintal/ha	difference \pm ,quintal/ha
	2021	2022	2023		
1	30,3	29,4	28,7	29,5	-
2	32,7	31,6	33,8	32,7	+2,2
3	34,1	34,6	33,4	34,0	+4,5
4	32,8	33,0	34,5	33,4	+3,9
5	30,2	31,3	32,4	31,3	+1,8

$NSR_{05} = \pm 1,96$ quintal/ha

In particular, 29.5 quintal / ha of cotton was harvested in case 1 (controlled), 33.4 quintal / ha in case 3 and 34.0 quintal / ha in case 4. 31.3 quintal / ha was harvested in case 5 only.

Thus, based on the results of the study, the following conclusions can be made:

- deep chiseling of 23-25 cm of cotton rows during the period of boll development has a negative impact on plant growth, development and yield of cotton, increases the number of cut and damaged primary lateral roots.
- deep chiseling of 23-25 cm of cotton rows is most effective before or after cultivation.
- deep chiseling of 23-25 cm of cotton rows during boll development has a negative impact on the growth, development and yield of cotton.

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