Modern American Journal of Biological and Environmental Sciences
ISSN (E): 3067-7920
Volume 2, Issue 3, March, 2026
Website: usajournals.org

INFLUENCE OF TECHNOLOGY BEFORE SOWING CULTIVATION ON AGROPHYSICAL PROPERTIES OF SOIL

Mamatojiev Sharip Ikromovich
Gaziev Makhamadali Anorbaevich
Kabulov Sakhibjan Sherovich
Yusupova Mokhidil Abdumutalibovna
PhD in Agricultural Sciences, Associate Professors,
Department of Horticulture, Fergana State University

Abstract
The structural state of the cohesive soil is provided by favorable water and air, and, consequently, thermal, biological and nutritional regimes, i.e. create the best conditions for soil fertility. The quality of pre-sowing treatments is determined by the degree of soil crumbling. It is known that pre-sowing cultivation tools must ensure good crumbling of the soil throughout the cultivated layer. It has been established that the water-physical properties of soils, the course of biological processes, the use of applied fertilizers, the growth, development and yield of cotton find their most favorable expression in those cases where the soil density is within optimal limits.

Keywords: Reducing the amount of soil tillage before sowing, increasing the number of passes of tillage machines, tools for pre-sowing cultivation, ensuring favorable agrophysical soil conditions, crumbling soil, agronomic valuable fractions, the cultivated layer, bulk soil mass.

Introduction

Under the conditions of irrigated agriculture, the most important indicator of the water-physical properties of the arable layer, which determines its effective fertility, is the density of soil composition. It has been established that the water-physical

Modern American Journal of Biological and Environmental Sciences
ISSN (E): 3067-7920
Volume 2, Issue 3, March, 2026
Website: usajournals.org

properties of soils, the course of biological processes, the use of applied fertilizers, the growth, development and yield of cotton find the most favorable expression in cases where the density of soil composition is within optimal limits.

The structural state of cohesive soil is provided by favorable water and air, and, consequently, thermal, biological and nutrient regimes, i.e. they create better conditions for soil fertility.

The quality of pre-sowing treatments is determined by the degree of soil crumbling. It is known that pre-sowing tillage implements should ensure good crumbling of the soil in the entire cultivated layer.

With proper cultivation before sowing, the largest amount of favorable, agronomic valuable fractions with a size of 10-0.25 mm is formed [1,2,3].

Methods of conducting the experiment

The study of the possibility of reducing the number of pre-sowing tillages for cotton and their impact on growth, development, some agrophysical properties of the soil, as well as on the yield values was carried out by us in 2023-2024 at the farm named after Nozimakhon Makhmur in the Altyaryk district of the Fergana region.

The scheme of the experiment is given in Table 1.

Table-1 Agrotechnical measures

No-mer vari-anta	Year 2023	Number of Processing Materials	Year 2024	Number of Processing Materials
I	Fertilization + two-tier autumn ploughing for 40 cm + current layout + handicraft burning + flushing + falling off + spring two-fold chiseling for 12-14 cm + two-fold harrowing + thinning (control)	10	Fertilization + two-tier ploughing for 40 cm + current leveling + two-fold spring chiseling + furrow cutting + spare watering + two-fold harrowing (control)	8
2	Fertilization + two-tiered autumn ploughing for 40 cm + current layout + craft of the fire + flushing + dismantling of the fire + cutting furrows + spare watering + harrowing	7	Fertilization + plowing by 20-22 cm + cutting furrows + spare watering + harrowing.	4
3	Fertilization + two-tier winter ploughing for 40 cm + current layout + furrow cutting + spare watering + harrowing	5	Fertilization + two-tier ploughing for 40 cm + current leveling + furrow cutting + spare irrigation + harrowing	5
4	Fertilization + two-tiered winter ploughing for 40 cm + current layout + craft of the fire + flushing + felling + cutting furrows + spare watering + harrowing	7	Furrow cutting + autumn furrow flushing + spare irrigation in spring along old furrows with a rate of 500-600 m3/ha + fertilization + harrowing	3
5	Fertilization + two-tier winter ploughing for 40 cm + current leveling + chiseling with harrowing + furrow cutting + spare furrow irrigation + harrowing	6	Fertilization + ploughing by 20 cm with loosening by 20 cm + furrow cutting + spare watering + harrowing	4

Modern American Journal of Biological and Environmental Sciences
ISSN (E): 3067-7920
Volume 2, Issue 3, March, 2026
Website: usajournals.org

For 2 years, during the growing season of cotton, the following agrophysical studies were carried out on experiments:

a) crumbling of the soil after sowing before sowing cotton at three points of each variant of I and III repetitions. The samples were sifted through a set of sieves with a hole diameter of 100, 50, 10, 0.25 mm;

b) volume mass of soil on samples taken by cylinder at three points at all variants of I and III repetitions after sowing and at the end of the growing season.

The results of our studies have shown that soil crumbling depends on the technology and amount before sowing tillage for cotton (Table 2).

Table 2 Crumbling of the soil, depending on the technology and frequency before sowing for cotton

Variant Number	Fraction size, mm			
	100-50	50-10	10-0,25	0,25
Year 2023				
1	14,7	19,2	50,5	15,6
2	15,2	17,0	56,6	12,2
3	15,6	17,3	58,1	9,0
4	15,5	17,0	58,3	9,2
5	15,7	17,5	56,2	10,6
Year 2024				
1	15,1	18,3	50,0	16,6
2	16,9	18,1	57,5	7,5
3	16,3	17,8	56,6	9,3
4	15,4	18,0	57,0	9,6
5	15,5	17,1	57,7	9,7

When cultivating cotton in the first year (2023), agronomic valuable fractions of 10-0.25 mm in size were more in the var. 2-5 at the minimum pre-sowing treatment consisting of 5-7 operations – 56.2-58.3%, against 50.5% in the control variant 1 at 10 operations. 3-5 additional treatments - chiseling, double harrowing and one thinning, carried out in the control version, had a negative effect on soil crumbling. Under the influence of multiple pre-sowing treatments, the amount of dust particles

Modern American Journal of Biological and Environmental Sciences
ISSN (E): 3067-7920
Volume 2, Issue 3, March, 2026
Website: usajournals.org

with a size of less than 0.25 mm, compared to the minimum treatment, increased by 0.8-1.8 times.

In 2024, when cultivating cotton in the second year, the number of agronomic valuable aggregates with a size of 10-0.25 mm in the var. 2-5 ranged from 57.0 to 57.7% against 50.0% in the control.

Thus, there were more agronomic valuable soil fractions with a size of 10-0.25 mm in the variants of the minimum before sowing cultivation. The amount of dust particles of the soil > 0.25 mm under the influence of repeated before sowing cultivation increases by one or more times compared to the minimum tillage.

Consequently, the use of repeated pre-sowing treatments for two years worsened the structure of the soil and led to its strong spraying.

The volume weight was determined after sowing and at the end of the cotton vegetation before harvesting cotton (Table 3).

Table 3 Effect of minimum pre-sowing tillage on changes in the volume mass of soil during cotton cultivation, g/cm3

Variant Number	The year is 2023.					The year is 2024.				
	Soil layer, cm									
	0-10	10-20	20-30	30-40	0-40	0-10	10-20	20-30	30-40	0-40
After sowing cotton										
1	1,20	1,28	1,36	1,44	1,32	1,20	1,32	1,36	1,37	1,31
2	1,16	1,23	1,28	1,37	1,26	1,12	1,24	1,41	1,41	1,29
3	1,14	1,22	1,27	1,35	1,24	1,15	1,26	1,30	1,32	1,27
4	1,14	1,22	1,27	1,36	1,25	1,15	1,26	1,39	1,40	1,30
5	1,16	1,23	1,28	1,37	1,26	1,14	1,25	1,40	1,40	1,30
At the end of the growing season, before harvesting cotton										
1	1,24	1,37	1,42	1,47	1,37	1,22	1,42	1,44	1,46	1,43
2	1,23	1,35	1,41	1,45	1,36	1,21	1,42	1,47	1,49	1,40
3	1,22	1,36	1,40	1,43	1,35	1,20	1,40	1,42	1,44	1,37
4	1,22	1,36	1,40	1,43	1,35	1,21	1,40	1,41	1,43	1,36
5	1,24	1,37	1,42	1,45	1,37	1,20	1,41	1,42	1,45	1,37

The data given in Table. 3 data show that the value of the volume mass of soil largely depends on the depth of the main tillage, after which the technologists of pre-sowing preparation cultivated cotton.

Modern American Journal of Biological and Environmental Sciences
ISSN (E): 3067-7920
Volume 2, Issue 3, March, 2026
Website: usajournals.org

Thus, in 2023, in var. 1 with 10 before sowing tillage for cotton, the volume mass of soil in the layer of 0-40 cm after sowing was 1.32 g/cm3 in the control, while in var. 2-5 with minimum tillage of 5-7 operations -1.24-1.27 g/cm3, at the end of the growing season - 1.37 and 1.35-1.37 g/cm3, respectively (Table 3). In 2024. cultivation of cotton, a slight increase in the volume mass of soil in this layer was noted and it amounted to 1.31 after sowing cotton in the control with a minimum before sowing in the VAR. 2-5-1.26-1.30 g/cm3, at the end of the growing season - 1.38 and 1.36-1.40 g/cm3, respectively.

Table 3 shows that in the first year of cotton cultivation in the variants of the minimum before sowing tillage, the volume mass of soil after sowing cotton in the layer of 0-40 cm was 1.24-1.27 g/cm3, and with repeated cultivation in the control variant 1.32 g/cm3, by the end of the growing season in all variants of the experiment the soil was noticeably compacted, but there are no significant different variants with a different number of treatments. When cultivating cotton in the second year, a looser soil composition was preserved in the variants of the minimum before sowing tillage, and in the var. 1, where repeated pre-sowing tillage was carried out, some soil compaction is noted.

Consequently, looser soil composition is created and maintained in the minimum tillage options. After sowing, the volume mass of soil in the layer of 0-40 cm in var, 1 with multiple cultivation was 1.32 in 2023, 1.31 g/cm3 in 2024, according to the minimum tillage options, it varied in the first year 1.24-1.27, in the second year - 1.26-1.30 g/cm3, respectively.

Thus, the generalization and analysis of the results of studies of the volume mass of soil in our field experiments of 2023-2024 allow us to conclude that an increase in the number of passes of tillage units during pre-sowing tillage of the soil for cotton causes its compaction and thereby worsens the water-physical properties.

Conclusion and proposals.

1. Reducing the number of pre-sowing treatments and the use of effective technology, starting from the first year of sowing cotton, significantly improves the water-physical properties of the soil. The largest amount of agronomic valuable fractions for two

Modern American Journal of Biological and Environmental Sciences
ISSN (E): 3067-7920
Volume 2, Issue 3, March, 2026
Website: usajournals.org

years was maintained with minimum tillage according to years 58.3; 57.7 against 50.5; 50.0 on control with multiple pre-sowing treatment.

2. Looser soil composition is created and maintained in the minimum tillage options. After sowing, the volume mass of soil in the layer of 0 – 40 cm with repeated cultivation was 1.32 in the first year; in the second year of sowing 1.31 according to the options of minimum cultivation - 1.24 - 1.27, respectively; 1.26 – 1.30 g/cm3.

REFERENCES

1. Sh.I. Mamatozhiyev. Dissertation for the degree of Candidate of Agricultural Sciences. Tashkent -1990.
2. Mamatozhiev Sh.I. Do sowing tillage after plowing alfalfa with intensive technology of cotton cultivation. Trudy SoyuzNIHI.Vyp.63, "Issues of intensive technology of cotton cultivation".Tashkent-1988., 82-89 p.
3. Mamatozhiev Sh.I. Technology of minimal pre-sowing soil cultivation for sowing cotton after plowing alfalfa. Proceedings of SoyuzNIHI. Issue 60, "Agrotechnics and Cotton Yield", Tashkent-1986, 19-24 p.
4. Mamatozhiev Sh.I. Minimum pre-sowing tillage after plowing alfalfa with intensive technology of cotton cultivation. Actual science. International Scientific Journal. No 11 (28) 2019 Volgograd., 68 p.
5. Mamatozhiev Sh.I. Intensive technology of minal'noy pre-sowing tillage for cotton after plowing alfalfa. Actual science. International Scientific Journal. No 11 (28) 2019г. Volgograd., 63 p.