



INFLUENCE OF FILM MULCH (DARK FILM) ON THE GENERAL PHYSICAL PROPERTIES OF SLIGHTLY SALINE SOILS AND COTTON YIELD

Kholmatov Bobir Toshpulatovich¹, Khursanboy Makhsadov²

¹Senior teacher of Jizzakh Polytechnic Institute, ² Jizzakh Experimental Station of the Research Institute of Cotton, Seed Production and Agricultural Technologies Candidate of Agricultural Sciences
kholmatov.b@inbox.ru

ANNOTATION

The article describes the results of experiments with polymer film mulching (transparent and black) on irrigated grasslands of Jizzakh region. As a result of mulching the soil, a decrease in soil density and an increase in porosity are observed. The density of the driving layers in the mulched variants ranged from 1.33 g cm³ to 1.46 g cm³ in the less treated variants mulched with organic matter, and 1.46-1.59 g cm³ in the control.

Keywords: *volume and specific gravity, macro-micro aggregate, manure, organic matter, licorice, straw, cotton stalks, wheat, cotton stalks, moss, cotton.*

INTRODUCTION

Development of scientifically grounded agricultural technologies for care, including irrigation, mineral fertilizers, which will improve the reclamation of irrigated lands in Jizzakh region, prevent salinization, increase soil fertility, and provide high yields of agricultural crops, including soybeans, moss, red beans, sugar beets and nuts. One of the most pressing issues is the scientific substantiation and implementation of measures for feeding and combining crops. Many scientists of Uzbekistan are conducting research to optimize the properties of irrigated soils [5; 6; 7; nine]. As a result of the study, it was determined that the optimal density of irrigated basic soils in Uzbekistan is in the range of 1.2-1.4 g / cm³. Analysis of the available literature shows that mulching of soils is aimed at improving their soil properties, ie, water-physical, chemical, saline, nutritional, microbiological, ecological and thermal regimes [1; 2; 3; 4; five; 8; 9], despite the fact that in the Jizzakh region the lack of scientific research on mulching indicates the relevance of the work. The experiment was carried out at the Jizzakh Experimental Station of the Research Institute of Cotton Growing, Seed Production and Agricultural Technology.

MAIN PART

The experiment was carried out in 2 directions:

Experiment 1 consisted of 18 variants and was carried out in a slightly saline field with 3 repetitions.

Experienced options were placed in 3 tiers.

The area of each variant in the experiment (4 rows) was 3.6 x 40 m = 144 m², with a total area of 0.80 ha.

The experiment was carried out according to the following system.

Experimental system.

Bap. τ/p	Type of crop	Salt washing norm, m3/ ha	Norm of mineral fertilizers, kg/ ha			Local fertilizer norm, t / ha	With planting, the range is mulched with a film between them.
			N	P	K		
1	Sugar beet	Salt won't wash off	240	170	120	-	-
2			200	140	100	5	+
3			160	110	80	10	+
4	soybean		60	90	60	-	-
5			45	60	45	5	+
6			30	45	30	10	+
7	Red beans		60	90	60	-	-
8			45	60	45	5	+
9			30	45	30	10	+
10	Sugar beet	2000-2500	240	170	120	-	-
11			200	140	100	5	+
12			160	110	80	10	+
13	soybean		60	90	60	-	-
14			45	60	45	5	+
15			30	45	30	10	+
16	Red beans		60	90	60	-	-
17			45	60	45	5	+
18			30	45	30	10	+

The main interest in the experiment was the density of the soil layer, especially the change in the general physical properties and structural state of the soil compared to traditional tillage with poor mulching treatment

with plastic wrap. The density of the solid part, that is, the specific gravity, depends on its mineralogical composition and the amount of organic matter 2,56-2,66 г/см³.

When using the technology of mulching with various organic substances, the soil density turned out to be equal to the optimal density units after planting in the drive layer. In the mulched variants, washed with saline, the soil density layer was high at the beginning of the experiment, while the aggregates were porous as a result of the improved composition of macro- and microaggregates in the upper layer during the growing season.

In the experiment, the highest yield (28.6 c / ha) was obtained from the 12th option, where the annual rate of phosphorus-potassium fertilizers was washed at the rate of 3500-4000 m³ / ha, with an annual manure rate of 5 t / ha, and between rows of cotton mulched when shooting.

At the same time, the additional yield was 12.0 c / ha due to salt washing, 1.6 c / ha due to local fertilizers and 5.1 c / ha due to mulching between rows of cotton.

In the experiment, on average, 196.4-268.8 m³, 2500-3000 m³ / ha and 1500-2000 m³ / ha with the cultivation of 1 ton of cotton in salt washed (3,6,9,12 var) options at the rate of 3500-4000 m³ / ha. In variants with salt washing, 180.3-230.0, 152.4-203.2 m³ of water was used. For 1 centner of cotton in mulched variants between the rows of cotton, the savings amounted to 39.0-56.2 m³ of water (Table 3).

Thus, the following study revealed the following.

1. In the moderately saline soils of the Jizzakh region in December-January, when washing with salinity at the rate of 3500-4000 m³ / ha:

- In the soil layers 0-40 and 0-100 cm, the content of chloride ions decreased on average by 51.7-48.3%, the amount of dry residue decreased by 36.5-26.6%.

- The level of groundwater mineralization decreased by 59.8% for chlorine ions and 49.2% for dry matter.

Moisture reserves in the soil increased on average 1.5 times in the 0-100 cm layer and 1.4 times in the 0-200 cm layer.

- The growth and development of cotton has been accelerated, the yield is higher by 8.6-12.0 c / ha.

2. As a result of mulching the row spacing of cotton with plastic wrap during weeding:

- Irrigation of each hectare saved 300-450 m³ of water.

- Savings on maintenance, fuel and lubricants by 30-35%.

- Weed infestation has decreased by 2 times.

- The ripening of cotton is a fairy tale for 8-10 days, and the weight of the first crop was 15-20% higher.

- Due to mulching, the increase in yield was 2.5-5.1 c / ha. It is carried out 3-4 times less often, due to the low compaction of the soil, its water-physical properties are improved, the evaporation of soil moisture after irrigation decreases, and watering the nuts saves 410 m³ (23.3%) of water per hectare.

In soil layers 0-50, 0-70 and 0-100 cm before washing with saline solution, the bulk soil mass was 1.42-1.43-1.45 g / cm³, while after washing with saline, a slight soil compaction was observed.

3500-4000 m³ / ha in salt washed 3,6,9,12 variants in these layers on average 0.05-0.06-0.07 g / cm³, normally 2500-3000 m³ / ha in salt washed 5- 11 variants Concentrations of 0.04-0.05-0.05 g / cm³ and 1500.0000 m³ / ha were found to be 0.04-0.05-0.05 g / cm³ in 4-10 variants, washed in the norm. The results of the experiment showed that even from spring to autumn, the soil was slightly compacted. In variants 7–12, where cotton aisles were mulched with a film, it was noted that the soil was somewhat less dense (0.01–0.01–0.02 g / cm³) than in the control.

The amount of humus in the soil layer of the experimental field (0-30 cm) 0.795%, in the 30-50 cm layer under the drive 0.726%, total nitrogen in these layers 0.059-0.033%, phosphorus 0.083-0.072%, potassium 1.012-0.911%, nitrogen nitrate form - 10.3-12.7 mg / kg, active form of phosphorus - 29.6-24.2 mg / kg, potassium - 355-288 mg / kg.

If the soil of the experimental field is poor in these elements, then the supply of potassium in its general and mobile form will be from medium to high.

On the experimental field, it was found that after salt washing, the amount of nutrients in the soil, including the nitrate form of nitrogen, decreased by 3.7 mg / kg, mobile phosphorus by 5.1 mg / kg, and potassium by 4.2 mg / kg.

In the experiment, the moisture content in the 0-100 cm soil layer ranged from 16.9% to 26.0%, and in the salt washout at the rate of 2500-3000 m³ / ha, in variants 3,6,9,12, washed at the rate of 3500- 4000 m³ / ha. In the variants, it was found that salinity in these layers increased by 17.0-24.2%, and at the norm of 1500-2000 m³ / ha - by 17.5-22.0%, respectively.

Also in the experiment, the groundwater level was determined by flushing with saline through observation wells, then in spring, at the beginning of the season (at the beginning of the season), on the 3rd day and in the fall (at the end of the season).

In spring and autumn, the water permeability and moisture capacity of the soil were determined.

To keep the soil moisture at the level of 70-70-60% relative to the moisture content before watering, cotton is applied 2 times in the usual way (1-6 options) and 3 times in the option with film mulching (7-12 options) during the application period. irrigation was required.

To determine the timing and rates of irrigation, the soil layer is taken into account 0-70 cm before the flowering of cotton, 0-100 cm during the flowering period and 0-70 cm during the ripening period, mulched with a film. (Options 7-12) were watered depending on the moisture content of the layer 0-50 cm before flowering, 0-70 cm during flowering and 0-70 cm during ripening.

In 2016-2018, the irrigation rate was 965-1060 m³ / ha for cotton irrigation with ordinary furrows, 1900-2100 m³ / ha for seasonal irrigation and 410-610 and 1600-1760 m³ / ha for film mulching. Saved 300-450 m³ / ha of water per hectare of land.

In the experiment, the amount of chloride ions in layers 0-40 and 0-100 cm of soil in saline washed variants 4.10 at a rate of 1500-2000 m³ / ha was 41.3-36.9%, the amount of dry residue 18.0-21 , 3%, 2500 -3000 m³ / ha in the norm of the washed saline solution 5.11 variants, in these layers 47.1-39.0, 22.9-23.5% and in the norm of the saline solution washed in the norm 3.500-4000 m³ / ha in 3,6,9,12 variants of salts decreased by 52.5–50.0 and 30.7–27.0%, respectively. (Table 2)

In the experimental field, 25-30% of seeds did not germinate in variants 1, 2, 7, 8, sown without washing with saline solution, and by the end of the season, on average, 12.7-21.2 thousand. Bushes / ha of seedlings died, unable to withstand the impact harmful salts.

In the experiment, the most favorable conditions for the growth and development of cotton are salt leaching at the rate of 2500-3000 and 3500-4000 m³ / ha, the annual rate of mineral fertilizers (R-140 kg / ha, K-100 kg / ha) +5 t / ha ... In the 5th, 6th, 11th and 12th variants, cotton was 2.0-3.4 cm higher than the control at the early stages of growth (1.VI), and the number of leaves was 0.6. -1.5, the difference between the variants became more noticeable in the later phases of cotton growth.

According to observations carried out on August 1, the growth and development of cotton in the variants with film mulching occurred faster than in the variants with traditional cotton cultivation. The best results were obtained in options 9 and 12, which were washed with saline at the rate of 3500-4000 m³ / ha and mulched with a film during the cotton harvest, where the height of the cotton stem was 21.3-22.3 cm higher than the control, the yield branches - 0.6. 1.2 pieces and the number of pieces was 2-3 more.

On observations on September 1, the best results were observed in options 7-12, which were treated with a film between rows, the number of cocoons was 1.6-2.4, and the number of opened cocoons was 1.1-1.9 more than with simple technology ... was

In the experiment, the highest yield (28.6 c / ha) was washed with saline at the rate of 3500-4000 m³ / ha, the annual rate of phosphorus-potassium fertilizers when sowing manure was set at +5 t / ha. taken.

At the same time, the additional yield amounted to 12.0 t / ha due to salt washing, 1.6 t / ha due to local fertilizers and 5.1 t / ha due to mulching between rows of cotton.

In the experiment, on average, 196.4-268.8 m³, 2500-3000 m³ / ha and 1500-2000 m³ / ha with the cultivation of 1 ton of cotton in salt washed (3,6,9,12 var) variants at a rate of 3500-4000 m³ / ha. In variants with salt washing, 180.3-230.0, 152.4-203.2 m³ of water was used. For 1 centner of cotton in mulch variants between the rows of cotton, the savings amounted to 39.0-56.2 m³ of water (Table 3).

Thus, the following study revealed the following.

1. In the moderately saline soils of the Jizzakh region in December-January, when washing with salinity at the rate of 3500-4000 m³ / ha:

- In the soil layers 0-40 and 0-100 cm, the content of chloride ions decreased on average by 51.7-48.3%, the amount of dry residue decreased by 36.5-26.6%.

- The level of groundwater mineralization decreased by 59.8% for chlorine ions and 49.2% for dry matter.

- Moisture reserves in the soil increased on average 1.5 times in the 0-100 cm layer and 1.4 times in the 0-200 cm layer.

- Acceleration of the growth and development of cotton, the yield is higher by 8.6-12.0 c / ha.

2. As a result of mulching the row spacing of cotton with plastic wrap during weeding:

- Irrigation of each hectare saved 300-450 m³ of water.

- Savings on maintenance, fuel and lubricants by 30-35%.

- Weed infestation has decreased by 2 times.

- The ripening of cotton is a fairy tale for 8-10 days, and the weight of the first crop was 15-20% higher.

- Additional yield due to mulching was 2.5-5.1 c / ha.

CONCLUSION

This leads to an increase in soil fertility, activation of microbiological processes, an improvement in physical and chemical properties, an increase in productivity, and an improvement in the environment. Consequently, in the context of market reforms, it is necessary to evaluate agriculture not in terms of gross output or economic indicators, but primarily in terms of biological and environmental analysis of each sector.

REFERENCES:

1. Niyozaliev B.I. Recommendations for the use of mineral and local fertilizers in crop nutrition. Tashkent, 2009.
2. Sattorov J.S., Atoev B.K. To study the condition of saline soils, to create agrotechnologies to restore and increase their fertility. "Introduction of new energy-saving agro-technologies in agriculture." Collection of reports of the Republican scientific-practical conference on the topic. Tashkent, UzPITI, 2011, pp. 70-73.
3. Xidirov T. Investigate the depth and width of application when mineral fertilizers are placed under the cotton root. J. Cotton and grain growing. Tashkent, 1998, № 4, 24-25 p.
4. Maxsadorov X. and others. Influence of mulch irrigation methods on soil agrophysical, agrochemical properties and cotton yield. // J. Agroilm.-2-son. Toshkent-2016 y. 8-9 b.
5. Gaziev U.L., Murodova O.I., Axmurzaev Sh.I. Influence of ecological factors on cotton yield. Collection of scientific articles on "Climate change and the rational use of natural resources." Tashkent, 2012, pages 48-50.

6. Ermatov A., Axmurzaev Sh. Influence of sowing dates and mulching methods on soil agrochemical properties // J. Bulletin of agrarian science of Uzbekistan. Tashkent 2012, issue 1-2. Pages 161-117.
7. Bezborodov.G.A, Esanbekov M.Yu. Scientific bases of mulching irrigation of cotton fields with winter wheat straw Water and resource-saving agro-technologies in agriculture of Uzbekistan (conference reports), Tashkent, 2008, 63-67 p.
8. Diyorov G'.Q, Turapov I.T. Mulching the soil surface with a polyethylene film that decomposes under typical gray soil conditions

