



THE IMPACT OF MINIMIZING INTER-ROW PROCESSING ON THE GROWTH AND DEVELOPMENT OF THE COTTON ROOT SYSTEM

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ABSTRACT

On the saline soils of the Republic of Karakalpakstan, field studies were carried out to identify the effectiveness of minimizing inter-row cultivation of cotton. According to the results of the study, it was established that when several operations are combined in one pass of the tractor, fuel costs are significantly reduced, soil compaction is reduced, and good conditions are created for the normal growth and development of the cotton root system. With inter-row processing, it is possible to combine inter-row cultivation with cutting furrows before vegetative irrigation.

KEYWORDS: *Soils, cultivation, minimization, combining, cultivation, cotton, growth and development of the cotton root system, fuel and energy savings, root length.*

INTRODUCTION

In cotton growing, the bulk of work is mechanized. Cultivation of cotton is carried out with the use of heavy tractors and agricultural machines, which cause, especially with their repeated use, excessive soil compaction. The bulk density of the soil increases, the water, air, nutritional regime of the soil deteriorates, which affects the activity of beneficial microorganisms, and, in general, adversely affects fertility, as a result, the yield of plants decreases. In the conditions of the Republic of Karakalpakstan, where most of the irrigated lands are saline and low-humus, soil compaction is especially undesirable.

The transition to the minimization of soil cultivation, by combining several operations for preparing the soil and caring for plants, with the implementation of two, three methods in one pass of the tractor unit is one of the important conditions for preserving the potential soil fertility, reducing labor and material costs.

As you know, the main purpose of inter-row cultivation is loosening the topsoil and combating weeds. The depth and frequency of processing are important. With a delay in the timing of inter-row cultivation, moisture is lost, soil compaction and debris increase, which creates unfavorable conditions for the formation of the root system, growth and development, and the yield of cotton.

Research method - field method. The soils of the experimental plot are meadow-alluvial, the degree of salinity is average, and the level of occurrence of groundwater is 1.5-2.0 m. The cotton varieties C-4727 and Chimbay-5018 were sown with row spacing of 60 cm, the plant density was within 100 thousand plants per hectare. The experiment was carried out according to the following scheme.

Table 1
Experiment scheme

Variant number	Cotton varieties	Frequency of inter-row processing
1	C-4727	8
2	C-4727	5
3	Chimbay-5018	8
4	Chimbay-5018	5



The experiment was carried out in the Northern soil-climatic zone (Chimbay region).

The object of research is saline soils, the frequency of processing, cotton, root system.

RESEARCH RESULTS AND THEIR DISCUSSION

The experiment studied two varieties of cotton, C-4727 and Chimbay 5018, the frequency of inter-row cultivation (8 and 5), incl. eightfold - studied as a control.

To identify the influence of the multiplicity of inter-row cultivation on the length of the active roots of cotton, the length of the active roots was determined in July, 1 August and 1 September.

As evidenced by the data in Table 2, as of July 1, the length of active roots of variety C-4727 was 53.2-53.9 cm in 2013, and that of variety Chimbay-5018 was 44.5-46.1 cm, i.e. the main root of the Chimbay-5018 variety is comparatively shorter than that of the C-4727 variety. The frequency of inter-row treatments before irrigation affects the growth of roots and their degree of damage insignificantly, and after irrigation it significantly affects the damage to the roots. For example, during the period of mass flowering of cotton with a fivefold processing in both varieties, the root length is noticeably longer compared to eightfold processing by 6.2-8.3 cm in variety C-4727, and in variety Chimbay-5018 1.3-3.6 cm, i.e. there are certain tendencies towards an increase in the length of the roots against the control variant. With an increase in the number of passes of the aggregate, the cotton root system is located in a deeper soil layer than in cotton on the variant with a smaller number of passes of the aggregate. The thickness of the root collar and root shank to a depth of 28-30 cm decreases with an increase in the number of passes of the aggregate compared to the minimum processing. Even greater differences in root length were obtained between varieties. Whereas in the C-4727 variety in the phase of mass flowering, the root length is within 131.2-139.5 cm, then in the Chimbay-5018 variety it is 122.5-131.5 cm, i.e. 8.7-8.0 cm shorter. The data obtained show that as the plants mature, the roots are lengthened moderately.

From the data in Table 2 it is also clear that in 2014 the sowing dates were much later compared to other years. But varieties of early maturity differed in the following way. If on July 1 the length of active roots in C-4727 variety was within 28.4-31.7 cm, then in Chimbay-5018 variety it was 21.3-28.0 cm, i.e. by 3.7-7.0 cm in length for the C-4727 variety than the Chimbay-5018 variety. The same differentiation in the growth of the length of active roots, depending on varietal differences, was obtained on August 1 and September 1.



Table 2
Growth dynamics (cm and dry weight c / ha) of roots

Variant number	Length of active roots, cm			Dry mass of roots, c.ha	Length of active roots, cm			Dry mass of roots, c.ha	Length of active roots, cm			Dry mass of roots, c.ha
	1.VII	1.VIII	1.IX		1.VII	1.VIII	1.IX		1.VII	1.VIII	1.IX	
2013 y. C-4727 Variety 2014 y. 2015 y.												
1	53,9	139,5	152,3	10,6	28,4	120,5	140,5	8,49	54,1	136,7	137,3	10,8
2	53,2	131,2	137,6	10,0	28,6	115,4	135,0	8,64	55,4	136,0	137,3	9,8
Chimbay-5018 variety												
3	44,5	126,7	131,8	9,7	21,3	93,3	121,2	7,0	51,1	125,4	125,4	9,9
4	46,1	125,4	127,3	10,0	27,4	109,1	128,2	7,24	53,1	127,4	127,4	10,3



It should be noted that in the Chimbay-5018 variety, depending on the frequency of inter-row processing, the length of active plant roots clearly changes. If with fivefold processing (option 4) the length of active roots at the beginning of inter-row cultivation was 27.4 cm, then with eightfold processing (option 3) 21.3 cm. Gradually, as the frequency of inter-row cultivation increased, a sharp decrease in the length of active roots was observed. So for example, on August 1, in plants where eightfold inter-row cultivation was carried out, the length of active roots was 121.2 cm in redistribution, then in plants with fivefold inter-row cultivation it was 128.2 cm.

CONCLUSION

Thus, it can be concluded that the active part of the root system reacts sharply to changes in certain environmental factors. The general rule is that the frequency of inter-row cultivation affects the growth and development of the root system, thereby changing the growth energy of plants and their parts.

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