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MOISTURE, HARDNESS AND DENSITY OF THE SOIL IN THE TECHNOLOGICAL PROCESS OF FORMING TRANSVERSE PAWLS BETWEEN ROWS OF COTTON

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Olimov Khamid Khaydarovich
doctoral student of the Research Institute of Agricultural Mechanization, Ph.D., associate professor.
E-mail: holimov@mail.ru

Annotation

In this article the result of investigation to determine physic and mechanic property of soil in transverse pawl period between cotton rows are given. Determined results are used to find technique and technological unraveling of device to create transverse pawl between cotton rows.

Key words

moisture, hardness, density, mechanic content of soil, dry soil mass, work organ, resistance of device to pull.

Introduction: The Government of the Republic of Uzbekistan adopts a number of Decrees and Resolutions on the rational use of water resources, improvement of land reclamation, preparation of irrigated lands for planting and planting of agricultural crops, the implementation of which is unconditional. As a result of the consistent policy pursued, the country is achieving high productivity through the efficient use of irrigated lands.

In ensuring the implementation of the Resolution of the President of the Republic of Uzbekistan dated April 17, 2018 No PP-3671 “On measures to organize the activities of the Ministry of Agriculture of the Republic of Uzbekistan” and the Ministry of Agriculture of the Republic of Uzbekistan According to Part 5 (b) of Annex 5 to the organizational structure of the Ministry of Agriculture, “Ensuring the timely and quality of agro-technical measures for the cultivation of cotton and industrial crops, as well as the development of legumes and oilseeds, water use” Significant work is being done in the country to increase the degree of mechanization of winter agriculture, as well as the implementation of agrochemical

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measures, the introduction of advanced agrotechnologies for the cultivation of agricultural resources and water-saving technologies [1].

Research object and method: It is known that in the technology of cotton growing, from sowing it to the formation of the transverse pawl is passed several times between the rows with sowing and mowing units. As a result, the moving part of the tractor moves between several rows several times, and the soil in the previous part of the moving part is relatively compacted. The physical and mechanical properties of the soil in the part and the ridge differ [2.4-5-6].

The physical and mechanical properties of the soil have a significant impact on the energy and quality of the transverse pawl forming device, and it is important to know these properties when substantiating its dimensions.

Physical-mechanical and technological properties of soil (soil moisture, density and hardness) in the period of formation of longitudinal floors between rows of cotton (soil moisture, density and hardness) in layers of 0-30 cm every 5 cm in accordance with GOST 20915-2011 [3].

Experiments to determine the physical and mechanical properties of the soil during the formation of the transverse pawl were carried out on a 16-hectare field located on the 1851th contour of the farm "Safoev Furkatjon" Bukhara district of Vobkent region. Irrigation with heavy sand content belongs to the type of grassland soil. There are up to 3 meters of agro irrigation ditches. The amount of humus 1-1,5 %.

The amount of water in the soil is estimated in absolute moisture W (%). Soil moisture has a significant impact on its technological properties, and therefore the quality of work and power consumption, in the dry state, large-sized lumps increase the resistance of the working body, accelerate wear in friction, and lead to the formation of dusty elements. When the soil moisture is in optimal condition, it is easily and well compacted and minimal energy is consumed during cultivation.

The marginal field moisture content of irrigated fields is 27% and the moisture content for the growth of cotton is 14.0-21.0% [40. p-32-36].

The plant absorbs only 0.15-0.2% of the water it receives from the soil and uses the rest for evaporation, transpiration, through the leaves and other surface organs. Transpiration is important in plant life, due to which the plant root ensures the absorption of water and dissolved minerals in it, the evaporation of water regulates the body temperature of the plant [4, p.96].

If the moisture from the soil is not sufficient for the transpiration of the plant, then the plant leaves are covered to reduce the moisture evaporating surface, and the chlorophyll grains of the cotton leaves turn dark green to reduce the absorption

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of sunlight. This process is observed throughout the field and means that the plant is thirsty. If the irrigation of the fields is delayed, there will be no water around the leaves and the process of leaf formation will begin leads to low productivity.

Another advantage of mechanizing the technological process of longitudinal flooring using manual force between the rows of cotton is that fields are prepared for the first irrigation process faster due to the fact that this process is performed in a short time with the help of machinery.

During this period, the results of the study of soil moisture, hardness and density between the rows of cotton in layers are the main indicators in the use of the device of transverse flooring. Soil moisture is determined by storage in a drying cabinet below 105°C based on field samples [3, p.19].

Soil moisture was found by measuring 8 samples at every 5 cm interval of the excavated pit from 5 points of the experimental field to 80 cm and was determined on the basis of average values.

Soil hardness is determined using a conical triangle with a sharpening angle of 22°30′ and a cross-sectional area of 1 cm2 on a hardness measuring instrument manufactured in VISXOM.

The density of the soil is determined on the basis of the ratio of the mass of dry soil to the volume of the instrument (cylinder) taken for sampling [3, p.7-8].

Results and samples: The results of the experimental studies on the moisture, hardness and density of the field soil are given in Table 1.

Table 1

Moisture, hardness, and density of the cotton field soils in which the experiments were performed on the stalks and ridges

Soil ayer, cm	Humidity, %		Hard, MPa		Density, g/cm3	
	Bulge	Furrow	Bulge	Furrow	Bulge	Furrow
0-5	8,5	8,8	0,33	0,38	1,11	1,16
5-10	10,1	12,0	0,36	0,42	1,13	1,17
10-15	15,3	16,7	0,65	0,83	1,18	1,21
15-20	17,2	17,9	1,23	1,35	1,19	1,23
20-25	18,6	19,2	1,66	1,79	1,21	1,25
25-30	20,1	20,2	2,05	2,12	1,24	1,29

From the data in Table 2.1, it can be seen that the soil moisture in the 0-10 cm layers varied between 8.5-10.1% in the ridge and 8.8-12.0% in the ridges. Humidity is relatively low due to the presence of Therefore, by this time the root

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system of cotton seedlings reaches 15-20 cm, the development of the root system is observed due to the decrease in moisture on the surface of the field and the aspiration of the roots of cotton seedlings to deeper moisture. However, by this time, as the roots of the cotton seedlings penetrate into the pit, the growth rate of the root decreases due to the increase in soil hardness, which slows down the rate of evaporation of moisture in the field. The seedlings are thirsty. At this time, depending on the degree of thirst of cotton seedlings and the soil climatic conditions of the field, the first irrigation is recommended [5, 6, 7, 8, 9].

It can be explained that the soil hardness in the 0-10 cm layers of the studied rows is in the range of0.45-0.51 MPA in the ridge, and in in the range of 0.38- 0.42 MPA in the ridge. It was found that the soil hardness in the ridge is higher than the soil hardness in the ridge due to the displacement of the softened soil when tilled by the working bodies on the ridge, which settles and is softened by the aggregates on the ridge [10, 12].

Correspondingly, the soil density can be seen in the range of 1.18-1.19 g/cm3 in the ridge on the 0-10 cm layer, and 1.16-1.17 g/cm3 in the ridge. The moisture, hardness, and density of the pink and eagle soils vary considerably as the eats are treated, and this difference decreases as the layer deepens. In the 10-20 cm layer of soil, soil moisture is in the range of 15.3-17.2 % in the furrow, 16.7-17.9 % in the furrow, the hardness is in the range of 0.65-1.23 MPA in the furrow, 0.83-1.35 MPA in the furrow. The density was found to be in the range of 1.18-1.21 g/cm3 in the stalk and 1.23-1.25 g/cm3 in the stalɜk. In the analysis of the properties of this layer, the depth of tillage of cultivator working bodies is within this layer and can be directly assessed as a difference in the physical and mechanical properties of the soil up to this layer of soil means that the soil has been loosened by the cultivator working bodies [13, 14].

As can be seen from Table 1, the moisture and hardness of the 20-30 cm layer of soil is almost the same in the ridge and the ridge, only due to the effect of the soil wheel it is greater than the ridge in the ridge. Assuming that the auger working body of the transverse pawl forming device between cotton rows at a depth of 20-25 cm, the average soil moisture in this range is 18.6%, hardness 1.82 MPA and density 1, we can see that it is 24 g/cm [16, 17].

Conclusion: The experiment allows finding the resistance of the device to gravity and the degree of friction of the auger working body with the soil through the physical and mechanical properties of the soil, determined during the formation of the transverse pawl between cotton rows. The soil moisture in the 0-30 cm layers of sedges and ridges is 8.5-20.9 and 12.8-20.2 percent, respectively.

This is due to the fact that the top layer of the slope is exposed to solar temperature, the humidity is relatively low, increases with depth and the gap decreases. The soil hardness is 0.15-2.55 and 0.68-3.1 MPA, and the density is 0.92-1.34 and 1.05-1.38 g/cm3.

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