

THE INFLUENCE OF SOIL FORMED AFTER RAINFALL ON COTTON SEEDS AND THE TECHNOLOGY OF ITS DISPOSAL

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Abstract:

This article is devoted to the mechanization of agriculture, focused on achieving resource savings through the effective use of equipment and technologies to ease the burden of farmers in field farming. The article deals with the impact of the slush formed after rainfall on cotton seedlings and its elimination technology, and the results of the experiments conducted to apply a new device for softening the slush and its processing technology. given. It is based on the length of toothed fingers in the range of 200-250 mm in order to soften cotton at the required level with minimal damage to cotton plants.

Keywords:

Hardness, technical device, technology, aggregate, softening teeth, horse power.

In the soil-climatic conditions of our republic, heavy rains after seed sowing in most areas cause the appearance of thickets. It is known that the appearance of rust in seeded fields has a negative effect on the development of germinated seedlings, does not allow full germination of ungerminated seeds, and as a result, seedlings become sparse. In order to avoid this, after heavy rainfall, the crust formed on the surface of the soil should be quickly removed within 1-2 days [1].

One of the most important agrotechnical measures in the cultivation of cotton crops is the softening of the thicket that has appeared between the rows [2,3].

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In the soil-climatic conditions of our republic, after sowing seeds in most fields, heavy rains fall and as a result of temperature rise, slush appears in many fields.

Thick - soil is a hard layer that appears on the surface of the soil, and cracks appear on the surface of the field as a result of the decrease in moisture of this layer. [4].



Figure. 1. After a heavy rain, the mud formed on the surface of the field.

It is known from many years of experience that the thickness of the thicket that appears in the seeded fields is 2-3 cm in some places, and the mechanical composition of the soil reaches 4-5 cm in heavy areas, which negatively affects the development of sprouted seedlings, the thinness of young seedlings it compresses the body, stops it from growing and makes it sick and causes it to die. Hali does not allow ungerminated seeds to fully germinate, resulting in sparse seedlings. [5,6].



Figure. 2. Effect of mulch on cotton seedlings

Taking measures to soften the soil in the areas damaged by the heavy rains in early May, and the mechanical structure was light and moderate in the areas where the cotton sprouts germinated 70-80%. In areas with heavy soil, it is recommended to soften the soil using a device equipped with softening teeth [7].

As a result of the rains, it is expected to form strong clods in soils with a heavy mechanical composition, and if the clods are not prevented quickly in such areas, the clods will thicken due to the heat of the sun, and the root neck of cotton seedlings will swell, and nutrients will be lost. stops the tooth and causes the death of seedlings. Therefore, it is not necessary to delay the softening of the soil in such areas [8,9].



Figure 3. Changes observed in the field of dense formation.

Depending on the mechanical composition of the soil, in areas where healthy and flat seedlings have been collected, it is recommended to fully and correctly install the working bodies of the device, to prevent the seedlings from being buried and damaged, each part of the device. It is advisable to adjust the working bodies in the section according to the distance between the seedlings (60-90 cm) [10].



Figure 4. The process of matching the recommended fluff softening device to the cotton row spacing.

The described device is related to the field of agricultural mechanization, in particular, to the process of initial processing between rows. The structure of the new device will consist of the following. 4 handles are welded to a metal profile with a total length of 2.6 meters, one working body is installed on each handle. So, when each working body processes sprouted cotton seedlings in a 60 cm scheme from one row, it is possible to further increase the number of rows with the possibility of processing up to 5 rows in total [11,12].

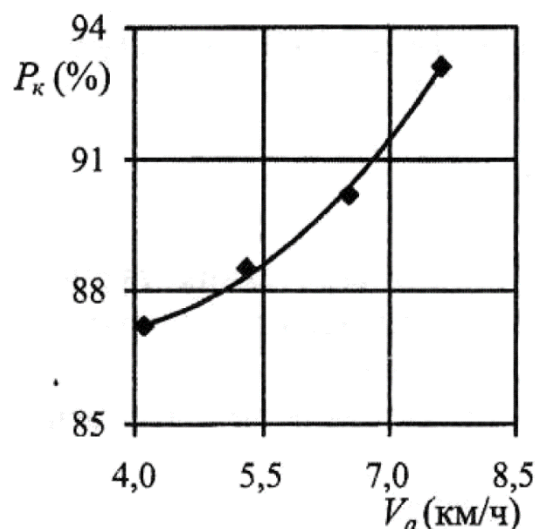
We determine the coverage width of the unit depending on the power of the pulling tractor. Tractors with 80-100 horsepower can handle up to 8 rows. The working body is the main part, and small frames made by welding are equipped with soil-cultivating (5) softening teeth. The softening teeth are attached to the small frame by means of a rotating hinge or bearings. From the forward movement of the pulling tractor, the softening teeth move in a circular motion and grind the dough (Fig. 5) [13,14].



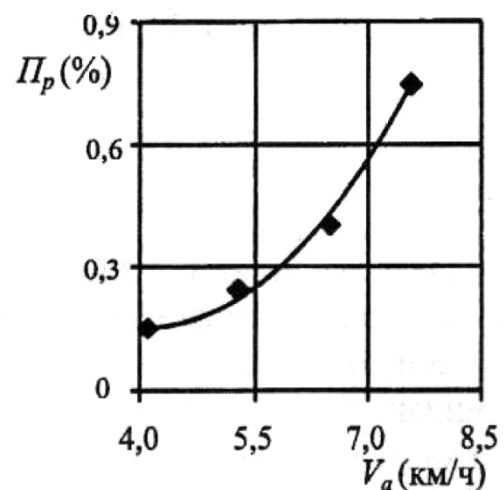
Figure 5. Procedure for pilot testing of the proposed cotton softening device.

The speed of movement of the aggregate has a great influence on the quality softening of the crust and damage to the fibers of the pulp. Based on this, experiments were conducted to study the changes in performance of the recommended softener equipped with teeth depending on the aggregate operating speed [15,16].

The data obtained in the experiments are presented in Fig. 6.



a - softening of cotton level.



b - damage to cotton seedlings level.

Fig. 6. Changes in softening of the pulp (R_k) and damage levels of cotton seedlings (Π_r) depending on the aggregate speed (V_a).

In this case, the length of the teeth of the softener gears is 200 mm, the distance between the teeth is 65 mm, and the speed of the unit is 6-8 km/h [17].

It can be seen from the data presented in the figure that the increase in the speed of aggregate movement has a great effect on the levels of damage to sprouts and softening of the pulp, which means that these indicators have increased [18].

Summary

It should be noted that in the process of softening the cotton, the damage of cotton sprouts in the range of 0.18-0.48% meets the initial requirements. Therefore, on the basis of the research data presented above, it can be said that the length of the toothed fingers should be between 200-250 mm in order to soften the cotton at the required level while causing minimal damage to the cotton plants. By using this device, it is possible to improve the quality of work with a decrease in metal, energy and fuel consumption during the softening process [19].

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