ANALYSIS OF MACHINES AND DEVICES USED IN LAND PREPARATION BEFORE PLANTING

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Annotation. The article analyzes the use and quality of work of machines and equipment for pre-sowing tillage. In terms of tillage, the assumptions for crushing hard materials are considered and the advantages and disadvantages are identified. Based on the analysis, a method for assessing the performance of machines based on the determination of specific kinetic energy in tillage is proposed and the method of determination is described.

The main part of spring sown areas in the country is plowed in autumn. Timely and high-quality plowing will lay a solid foundation for next year's harvest. Timely and effective agro-technical measures such as saline washing, watering, preparation of soil for sowing in early spring and sowing are achieved in quality arable lands.

When the soil is tilled before planting, the soil is compacted, a fine-grained soil layer prevents the bottom moisture layers from building up, and creates favorable conditions for the seeds to germinate.
When leveling the soil before planting, fine-grained soil should be formed in the layer where the seeds fall. The top soft layer allows the germinating seeds to heat up well, provide air, and keep the moisture of the bottom layer normal. It also helps eliminate weeds [1].
Before planting, the fields should be well leveled, the soil should be fine-grained, and the soil should be well loosened. The use of chisel, harrow, rake and milling cultivators (KFG, OP-2,2) gives good results [2].

Currently, the preparation of spring lands for sowing includes gear (BZTX-1,0; BZTS-1,0; BZSS-1,0) and disc (TDB-3,0; BDT-3,0) rakes and various molasses (MV). -6, MV-6,5, VP-8). However, this leads to a deterioration of the physical and mechanical properties of the soil, a large loss of moisture from the soil, as well as an increase in fuel consumption and other costs [4].
In saline-free zones with sufficient rainfall in autumn, the topsoil is stormed. If there is a lot of rain in the spring, the fields will be flooded again. All soils are loosened with a chisel cultivator or disc heavy storms [5].
Saline soils with insufficient rainfall are additionally irrigated in winter to collect moisture. In the spring, depending on the maturity of the fields will be selectively rained. Once the lands are filled, they are cultivated en masse. Before planting, a chisel cultivator or a disc harrow is inserted into the field and then leveled [6].
Cultivation of saline washed lands begins in early spring - with storms: with the maturation of the soil is used chisel cultivators, then the fields are qualitatively mulched.
The following machines are used to work the soil before planting. ZBES-1, O and ZBTU-2, medium and heavy gears. UKPG, KZU-0,3 and ChKU-4 chisel cultivators, VDT-22, BDT-2,5A, BDNT-2,2 disk heavy storms, MVN-2,8 circular motors and others are used. S-11, SB-12 trailers are used to connect to the tractor [7, 8].
Gear harrows are used for fertilizing the top layer of soil, leveling the low-altitude, watering the roots with weeds, removing weeds. Gear harrows work 5-7 cm on the ground and in some cases up to 10 cm [9].

They are divided into heavy, medium and light types depending on the mass of the storm that corresponds to a single tooth. Heavy storms are used for deep storming of heavy soils, and light storms are used for surface storming of light soils. In cotton growing areas, medium and heavy storms are used before sowing seeds, and light storms are used before sowing vegetable and other crops [10, 11].

ZBZS-1,0 trailer is widely used in cotton growing zones. With the help of such a storm, it is possible to storm a small area at high speed, creating a narrow aggregate.

BSO-4 mesh suspension is used to break up the topsoil, remove weeds and topsoil, and harrow potato crops planted on the ridge. In particular, it creates favorable conditions for the germination of seeds.

In cotton, trailers BDT-2,2 or BDT-2 A and installation BDNT-2,2 are used [12, 13].

BDT-2,5A disc harrow is widely used in cotton growing. They are attached to 30-40 kN class tractors. The discs in the battery (six in each) are mounted on a rotating square shaft on bearings attached to the frame. In the front section of the storm, the directional angle of the battery is set backwards, while the discs in the battery are set inwards (longitudinal axis of the storm), in the rear section, the directional angle of the battery is set forward and the discs are set outwards.

In the previous session, the outer ends of the batteries were rotated using a pull and screw mechanism relative to the inner ends to change the direction angle of the discs. In the next section, the inner ends of the batteries are rotated by a similar mechanism relative to the outer ends. The directional angle of the discs is adjusted from 0 to 180. The machine is moved to the transport or working position by a screw mechanism [15].

Before starting work, the disc harrows are adjusted to the desired depth using the lifting mechanism and the directional angle of the discs is changed. Depending on the soil condition, the directional angle of the discs changes: it is reduced for light and soft soils, and increased for hard, heavy soils. By changing the height of the attachment, the horizontal positioning of the frame is achieved and the discs are made to run at the same depth.

Disc harrow - installation BDNT-2,2 is used without base wheels and lifting mechanisms. Two batteries are attached to one frame. The directional angle of the discs is changed by repositioning the bolts securing the batteries to the frame holes. The frame is fitted with two boxes. They are loaded and the depth of the storm is adjusted. The working width of the storm is 2.2 m and it is used with T-4A and T-100MGS tractors. The BDN-3 installation disc harrow serves to loosen the top layer of the plow to a depth of 10 cm, bringing the plant roots upwards. Borona is equipped with MTZ-80 and MTZ-82 tractors. The disc batteries consist of nine recessed discs, two sliding bearings, and six slings [16].

The BDT-7 disc is used to loosen the topsoil of heavy storm plowed desert lands and to treat heavy soils after harvest.

The depth of operation with the storm is adjusted by changing the direction angle of the battery 12, 15, 180 [17].

Chisel-cultivators are used to loosen heavy soils to a depth of 10 cm in terms of mechanical composition. With a chisel-cultivator the soil is loosened to a depth of 10-15 cm, in some cases 25 cm. Chisel-cultivators are used to loosen the saline-washed and irrigated lands by opening the furrows and to level the slightly sloping lands.

A chisel cultivator is sometimes used to cultivate plowed lands in the spring. In doing so, the claws of the chisel lift the large lumps upwards, and the mule crushes and crushes these lumps. The working bodies of the chisel-cultivator consist of overturning softeners and arrow-shaped universal claws [19].

ChKU-4 hydrophilized chisel-cultivator is used in connection with T-4A tractors. Its base consists of a right-angled frame, to which the working bodies are attached in three rows, as in

the chisel-cultivator ChK-3.0. The required working bodies are set to the same size. At the back of the Ramaniig, a plate-scraper-type fertilizer is installed, and the soil is fertilized in one go. [20]

The difference in the walking depth of the claws placed in different rows on the lines should not exceed 30 mm. To do this, the height of the claw protrusion protruding from under the frame bracket is measured [21].

KFG-3.6 milling cultivator-softener is used to soften the soil layer of plowed, saline washed and large-grained soils in autumn and spring without overturning. It is also used to prepare the surface of the soil before planting. The aggregation is suspended and is used in conjunction with T-4A and T-150 tractors. This cultivator should not be used on rocky soils or in areas with wind erosion [22, 23].

The frame of the KFG-Z, 6 cultivator-softener consists of a welded structure, in front of which the bars are mounted on poles for deep softening of the soil. At the back of the frame is attached a prefabricated milling drum. The frame is also equipped with the main wheels of the cultivator, the extensions of the milling drum [24, 25].

KFG-Z, 6-milling cultivator-softener has the following advantages over ChKU-4,0 chisel-cultivator, ie the soil is better compacted and creates favorable conditions for planting [26, 27, 28].

An important parameter on which the energy intensity of the tillage process and its quality depend significantly is the value of the angle g between the blade of the working body and the direction of its movement. The problem of optimizing this parameter was sharply faced by local scientists in the 60s and 70s of the last century. This is due to the organization of production of high-power tractors in the former basket union, the use of which meant a significant increase in the operating speed of tillage units [29, 30, 31]. In this regard, a number of scientific studies have been conducted in different soil-climatic zones of the country, which allows to obtain a large amount of experimental materials and to adapt large-scale tillage equipment to high-speed modes [32, 33, 34,].

The conditions of use of tillage units place certain requirements on their design, which should ensure the minimization of energy, labor and capital costs during their operation. Newly developed tillage machines and working bodies should have better technical, economic and agrotechnical performance than the same purpose machines currently in use.

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