

PRE-PLANTING LAND CULTIVATION IN UZBEKISTAN

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Abstract

This article discusses the fact that the most important and primary task in preparing the land for sowing seeds of cereals and other crops in Uzbekistan is the early spring harrowing of the fields and that if this agrotechnical measure is carried out promptly, the field surface will be soft and well-levelled, as a result of which the moisture accumulated in the soil will not rise and the emergence of weeds will be ensured.

Keywords: Cultivator, cereals, chisel, leveller, field, arrowhead, saline, passive, rotary, combined, operation, paw, seed, sow.

Introduction

The delay in early spring fertilization causes the loss of moisture in the soil, the surface of the field becomes loose and the ploughing layer hardens. As a result, the opportunity to sow quality seed and harvest is lost. Therefore, early spring fertilization of the fields should be started as soon as the surface layer of 8-10 cm of soil is reached and should be completed within 2-3 days. In fields that have been washed with brine and given wet storage water, the mature parts of the field are first weeded, and then the entire field is fertilized. This ensures that the soil is soft and matures evenly throughout the field.

Immediately before planting, the lands where the seed is collected due to the natural moisture in the soil (the first region) are fertilized along with levelling (threshing), and the lands that are given moisture collection water (the second region) and saline washed (the third region) are ploughed with chisel-cultivators 1- It is softened 2 times, and the soil is ground and sprayed 2-3 times.

Toothed harrows are used to soften the surface of the soil at a depth of 4-6 cm, to partially level it, to break up lumps on the surface of the plough, and to break up the soil to preserve the moisture accumulated in the soil and to eliminate the sprouting weeds. They are used in conjunction with extensive trailers.

Chisel-cultivators loosen the soil to a depth of 12-18 cm in one go, fertilize and harrow or grind. Chisel-cultivators are equipped with softening claws when working on non-weeded fields, and bullet-shaped claws when working on weedy fields. If fertilizing is planned along with tillage, softening plows are installed in the first two rows, and bullet-shaped plows equipped with fertilizer scoops are installed in the last third row.

Pre-planting levelers and trowels are used to level the field surface before planting and compact it as required.

As it can be seen from the above, the preparation of the fields (especially those that have been watered and washed with salt) for planting consists of agrotechnical activities such as harrowing,



harrowing, leveling and grinding, which are carried out by separate machines. About ten types of tillage machines and implements are used. This leads to excessive labour, fuel and other material costs, soil structure damage and excessive compaction. It should also be noted that the existing machines do not meet the requirements of minimum and conservation tillage and energy-resource efficiency, which have been widely used all over the world in recent years.

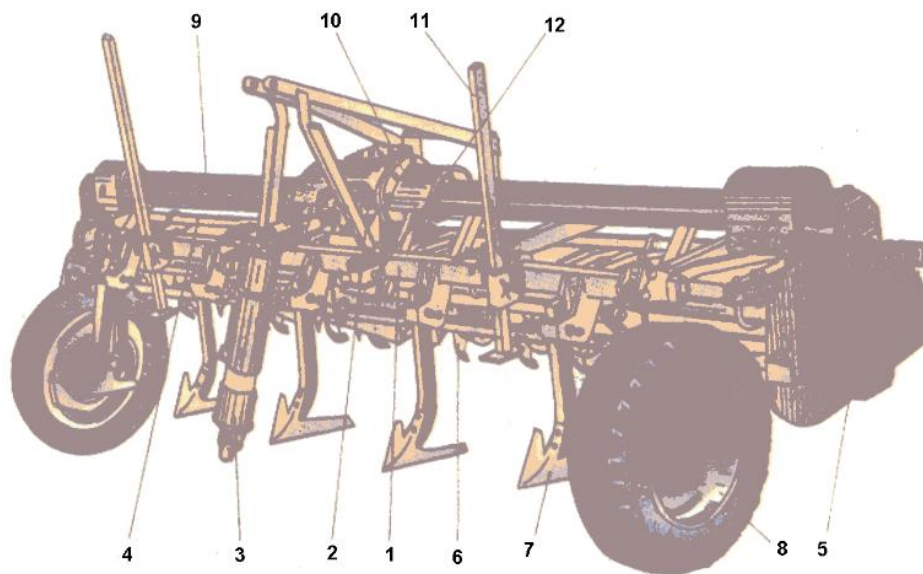
The most important way to eliminate the shortcomings in the pre-sowing treatment of the land is to use combined machines and add agrotechnical measures. Based on this, the combined machines and aggregates developed for tilling the land before planting were analyzed.

Combined machines used in pre-sowing tillage combine several or all technological operations to prepare the soil for planting. As a result, the negative impact of tractors on the soil is reduced, the quality and productivity of work increases, the period of tilling the soil is shortened its moisture is preserved, and fuel and other costs are reduced.

Combined machines are mainly divided into three types: machines that combine ploughing and plough surface treatment; machines that add technological processes of processing before planting in the soil; and machines that combine tillage and planting.

Currently, toothed, plate, tube, ring-toothed, rubber-shaped and segmented rollers are widely used in combined machines made up of combinations of passive, rotary and active working bodies according to the principle of action.

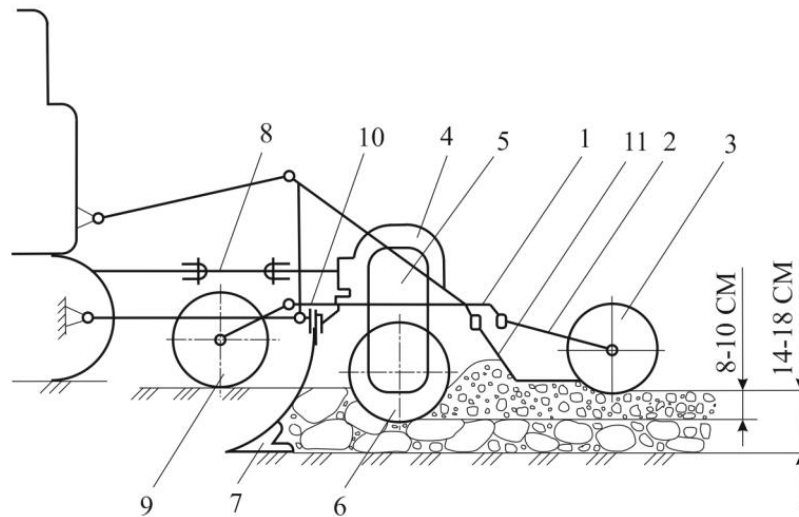
KFG-3.6 milling cultivator, OPU-2.2 universal soil tiller, gearless rotary tiller and other machines have been developed in our Republic for use in preparing land for planting seeds [1-3].



Frame 1; 2nd reducer; 3-cardan shaft; 4th intermediate shaft; 5th side reducer; 6th blade; 7th arrow-shaped claw; 8th base wheel; 9 and 10 coax; 11th base; 12th finger

Figure 1. KFG-3,6 milling cultivator





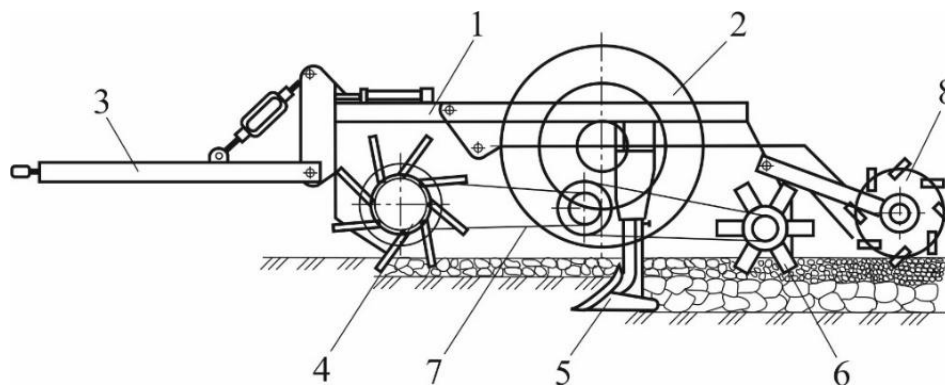
Frame of the 1st device; 2- pull; 3- reel; 4th central reducer; 5th side reducer; 6- rotor; 7th arrow-shaped paw; 8-cardan shaft; 9th base wheel; 10-base wheel fixing bracket; 11- leveling apron.

Figure 2. Technological operation of the OPU-2.2 soil tillage device

KFG-3.6 milling cultivator (Fig. 1) mechanical structure is designed to prepare heavy and loose land for planting seeds of agricultural crops. It consists of a frame, bullet-shaped claws installed on it, a milling drum, and aprons. During the work, the bullet-shaped claws loosen the soil to a depth of 18 cm, the milling drum grinds it to a depth of 8-10 cm, the apron flattens the field surface and the coil compacts it. Cultivator coverage width is 3.6 m and it is used in addition to tractors of 4 classes [1].

The OPU-2,2 universal tillage device (Fig. 2) is designed to prepare saline-washed and irrigated land for planting seeds of seeds and other agricultural crops [2].

The continuous rotary tiller (Fig. 3) is also designed to prepare fields that have been washed with saline and wet stock water for seeding in the spring. , the softening work bodies located between the leading and the driven rotors soften the soil to a specified depth, the blades of the leading rotor grind the cuttings on the field surface, and the roller further crushes and compacts them [3].



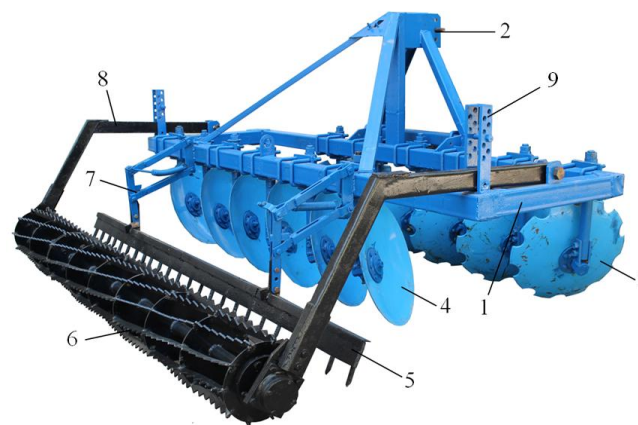
1-frame, 2-support wheel, 3-traction device, 4-leading rotor with teeth, 5-softening working bodies, 6-leading rotor with blades, 7-chain transmission, 8-plate roller

Fig. 3 Rotary softener without trailer transmission

However, it should be noted that the above-mentioned combined machines are not widely used in agricultural production due to their high energy consumption and unreliable operation.

The following combined machines have been developed at QXMITI for use in the preparation of lands freed from winter wheat for planting repeated crops, and lands freed from repeated crops for planting grain crops with autumn spikes [4-6].

The combined disc harrow (Fig. 4) is used in the preparation of fall wheat-fallow land for repeat crops, fallow land for wheat planting, and pre-planting treatment of loose land. It consists of a common frame equipped with a suspension device and working bodies in the form of a spherical disk (disc softeners), a leveller and a plate roller. Spherical disks are fixed to the frame with the help of special brackets, the leveller is attached to the frame utilizing a parallelogram mechanism equipped with a pressure spring, and the plate roller is movable, i.e. hinged, to the frame utilizing special pullers. In the process of work, the spherical disks installed in the first and second rows soften the soil to a specified depth, and the leveller and rolling disks additionally grind, level and compact the layer surface [4].



Frame 1; 2nd suspension device; 3,4-1 and 2-line spherical disk working bodies; 5-straightener; 6- reel; Parallelogram mechanism equipped with 7th pressure spring; 8-roller puller; 9-checking plates

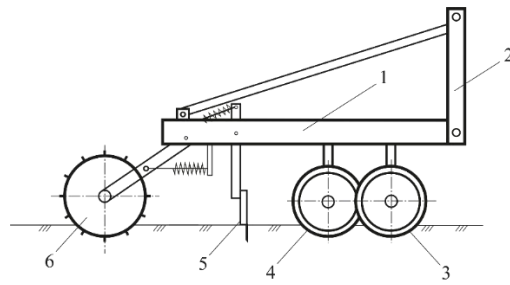
Figure 4. Overview of the combined disc harrow

The combined machine for processing newly ploughed land (Fig. 5) consists of rollers equipped with discs with a cone-shaped working surface, a leveller and a plate roller.

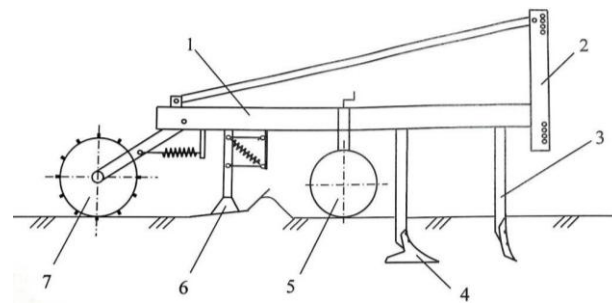
The working process of the machine takes place in the following order: the flakes turned by the plug bodies are first affected by the disc rollers. They grind the ploughshares and compact them along the entire driving layer, then the leveller flattens the surface of the plough. After that, the planed roller acts on the soil compresses the surface of the plough to the required level and creates a soft layer to collect moisture in it [5].

In the conditions of our republic, the combined machine (Fig. 6) used in the preparation of land for sowing seeds softens the soil to a depth of 14-24 cm with the help of softeners. It creates a soft soil layer, that is, it makes the soil ready for sowing seeds in one pass through the field. This ensures a significant reduction in the consumption of labour, energy and fuel lubricants, and does not over-compact the soil [6].





1-frame, 2-suspension device 3,4-disc rollers; 5-straightener; 6-plate coil
Figure 5. Scheme of a combined machine used in the cultivation of a newly plowed field



1 – frame; 2 – suspension device; 3,4 – softener and arrow-shaped paws; 5 – support wheels; 6 – leveler; 7 – reel
Figure 6. Scheme of the combined machine developed at QXMITI

Therefore, the use of combined machines in pre-sowing tillage reduces fuel consumption and other costs due to the addition of technological processes and the reduction of the number of aggregates passing through the field, improving the quality of tillage and preserving moisture in it, crops and seeds. It allows to plant the seeds on time and collect them. In addition, the harmful effect of tractors on the soil is reduced when the land is cultivated with combined machines.

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