Linear plow with disk angle

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Abstract. The study aims to substantiate the design scheme of a linear plow with a disk angle. The authors have developed a linear plow with a disk plow for smooth, furrowless plowing. The proposed plow has disc lugs, screw housings, and guide plates. The technological scheme turnover of polygonal layers formed by disk pre-plugs, the scheme mutual arrangement housings and guide plates, and the general view laboratory-field installation for conducting experiments are given. During the experiments, the degree of sealing plant residues, height irregularities on the surface arable land, and the traction resistance device were used to evaluate the performance plow. To ensure the required quality work with minimal traction resistance, a linear plow must be equipped with disc pre-plugs installed in front housings along their field cut line. When installing a disk prep lug with a working surface facing towards the turn formation, the degree sealing plant residues and the height of irregularities is 92-95% and 4.3-5 cm, respectively, which fully complies with agro technical requirements.

1 Introduction

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2 Materials and methods

A laboratory-field device was prepared for experimental research (Fig. 1). Experiments to determine the quality indicators and resistance to drag disc-shaped disk angle wedge plugs were carried out in farms Kashkadarya region in 2022. Tenzometric fingers and a G-shaped strain gauge beam were fitted to the structure to determine drag resistance. In experiments, the speed device aggerbed with the TTZ-812 tractor was 6.4-8.5 km/h.

Fig. 1. Laboratory-field installation

The authors have developed an improved technology for the turnover layers within their own furrow and a design scheme for a linear plow with disk plow.

In the proposed improved flat plowing technology, the plast is cut correctly, and the left edges of their upper part before being rolled to 180º on the border of their own seedbed and brought to polygonal shape and then overturned on the border of their own seedbed (Fig. 2). Beyond it, the width of the seedbed is greater than the width plast. This results in a semi-free space on the left CD side edge plast and a thin free space on the AB side of the right edge. The rotation plast around the base edge is carried out with the CD edge less deformed, and the plast is poorly compressed at the first hem. This reduces energy consumption to overthrow the plast. To ensure the formation of an open seedbed by the guide plate, the seedbed width for the bodies after the first body must be greater than the width plast, i.e.

\[ B = b_n + b_e \]

where В is the garden bed width, cm; \( b_n \) is the plast width, cm; \( b_e \) is the open garden bed width, cm.

In this case, the guide plate bodies after the first body acts in an open ego.
The main working organs of ductless flat plowshare are in the form of a spherical disk with burrowers 1 and 4, screw bodies that roll to the correct side, which are placed by sliding in a longitudinal direction relative to each other 2 and 5, consisting guide plates 3 and 6, which are attached to their plowshare (Fig. 3).
The working process step-by-step plug is carried out as follows. In the form of a spherical disk mounted in front of the field edge, the angle finder 1 body cuts the left and correct edges in the upright plane field edge at the depth ad, respectively, and rolls it over the plastic to the right, resulting in the formation of a polyhedral plastic (Fig. 1, b). The steep section first guide plate 3 separates the limestone from the previous limestone. At the moment rotation of the first plastic π/4 radians to a certain angle, and the second body 5 is launched. It also forms a polygonal plastic with the help of a second crankcase 4, and rolls it to the side guide plate 6, acting on the open ego formed by the first body 2. The next rotation of the plastic on the border, its own ego is carried out under the joint influence of corps. This improves the quality of plowing the plastic and reduces drag resistance.
3 Results and discussion

In field experimental studies, the experience was conducted using the laboratory and field device (Fig. 4) to study the effect of disc-shaped on the performance indicators of a staggered plow.

Fig. 4. General type laboratory and field installation

In experiments, the coverage width of bodies was taken 50 cm, the total constructive coverage width device was 1.0 m, and the diameter of disc-shaped burners was 480 mm. In this case, the processing depth of their bodies was determined to be 26 cm, and that a disc-shaped angle 12 cm. As a criterion for assessing the performance of a staggered plug, the degree burial plant remains, the height of the irregularities (height of the grooves), and the resistance plug to pull were adopted. The results of the experimentation are shown in Fig.6.
The results of studies carried out show that with an increase in the speed device, the burial of plant remains in all three variants increased first under the law bubble parabola and then decreased. At the same time, the height irregularities decreased first under the law bottle-parabola and then increased, resistance to drag increased under the law bottle-parabola.

Fig. 6. Graphs dependence degree embedding plant residues ($K_u$), height of irregularities ($U_n$) and traction resistance device ($R$) depending on speed of movement frigate ($V$): 1 is option a; 2 is option b; 3 is option c.

In the process of operation of a hollow plug without a disc-shaped burrow, only the burial of plant remains in the range of 6.66-7.5 m/s of speed is greater than 90%. In contrast, in the variant where the working surface disc-shaped burrow is located in reverse on the working surface body, this indicator at all speeds, the penetration rate of plant residues is higher than 90% in the variant with a disc-shaped angle working surface and the bodies working surface focused on the side plast toppling. At all working speeds, the first and second options in terms of heights of sickles on the field surface, that is, in the process of their work, the height of sickles is greater than 5 cm, the disc-shaped angle working surface and the corps working surface the option aimed at the side with the increase in speed in all variants, the drag resistance plow was increased in the case bottle-parabola.
4 Conclusions

To ensure the required quality work with minimal traction resistance, the linear plow must be equipped with disc lugs installed in front housings along the line of their field cut. When installing a disk preplug with a working surface facing towards the turn formation, the degree of sealing of plant residues and the height of irregularities is 92–95% and 4.3–5 cm, respectively, which fully complies with agrotechnical requirements.

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