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THEORETICAL JUSTIFICATION OF THE PARAMETERS OF THE COMBINED MACHINE

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ABSTRACT: the satya presents the features of the new technology of tillage and preparation of the field for sowing crops on the ridges. A design scheme was developed and a prototype of the combined unit and its device was prepared, as well as the details of the technological operations performed: simultaneous formation of the ridge, deep loosening of the soil along the line of the pre-formed ridge, local fertilization and the final formation of the ridge and irrigation furrows.

KEYWORDS: aggregate, ridge formation, soil, preparation, technology, seeding, screw body, ploughshare, deep reamer.

INTRODUCTION

In the world, the leading place is occupied by the development and application of energy-saving and high-performance machines for tillage and preparing it for sowing. "If we take into account that on a global scale, the area of land for sowing crops on the ridges is 120 million hectares" [1], then the development of energy-resource-saving technologies and machines with high quality of work and productivity for preparing the soil for sowing on the ridges is considered an important task. At the same time, much attention is paid to the development and use of combined machines that perform all

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the technological processes of tillage and preparing it for sowing on ridges in one pass through the field.

In the world, research works are being conducted aimed at developing new scientific and technical bases of resource-saving technologies for preparing fields for sowing on ridges. In particular, in this direction, it is relevant to conduct targeted scientific research on the development of a combined machine for preparing fields with harvested cotton stems for sowing seeds on ridges and substantiating the technological process of its working bodies, ensuring resource conservation in the processes of interaction with the soil.

Analysis of studies has shown that when preparing fields for sowing on ridges, improving the quality of processing, as well as reducing fuel, labor and other costs, can be achieved by using a combined unit that forms new furrows instead of existing ridges, new ridges instead of existing furrows in fields without cotton stalks [2].

THE MAIN FINDINGS AND RESULTS

The proposed technology is carried out in the following sequence: at the same time, the soil is loosened from the side parts of the right ridge of the existing row spacing, and the lower layer of the right side of the formed ridge is loosened linearly to a depth of 25-30 cm, rotation of the upper layer of soil with a thickness of 10-12 cm of the existing right ridge to the left - to the right side of the middle of the existing row spacing and loosening of the lower part of the upper layer of the right ridge. Then, in this sequence, the soil is loosened in the lateral parts of the left ridge of the existing row spacing, and the lower layer of the left side of the formed ridge is loosened linearly to a depth of 25-30 cm., rotation of the upper layer of soil with a thickness of 10-12 cm of the existing left ridge to the right-to the left side of the middle of the existing row spacing and loosening of the lower part of the upper layer of the left ridge. After that, the loosened lower soil layer of the right and left ridge is moved to the middle of the existing row spacing on the previously displaced upper layers. As a result, a new ridge with a deeply loosened lower layer is formed instead of the existing furrow, and a new furrow is formed instead of the existing ridge [3].

To substantiate the design scheme of the combined unit and the type of working bodies implementing the proposed technology, an analysis of the design of the units that prepare the fields for sowing seeds was carried out. As a result, a block diagram of the combined unit was developed for the implementation of the technology of preparing cotton fields for sowing seeds without cotton fields (Fig. 1). The combined unit consists of a frame 1; a mounted device 2; a support wheel 3; a deep

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loader with an inclined rack 4 and 5, left and right wrapping dumps 6 and 7; a ripper 8; ridging tool 9.

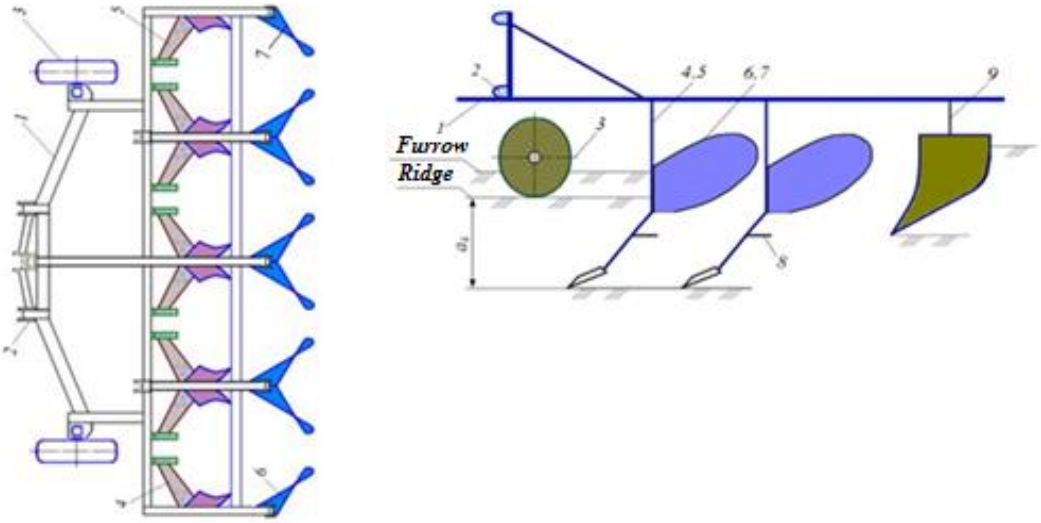

Fig. 1. Design diagram of the combined machine

A deep dredger with an inclined stand loosens the soil of the side parts of the right ridge, the existing row spacing and linear deep loosening of the lower layer of the right side of the formed ridge, its blade cutting off the top layer of the ridge soil wraps it to the left - to the right side of the middle of the existing row spacing, and the ripper loosens the lower part of the upper layer of the right ridge [4,5,6].

The main parameters that affect the quality indicators and the traction resistance of the blade are the following (Fig. 2): H_a - blade height; b_a - blade grip width; a_a - blade processing depth; ε_a - the angle of entry of the blade of the lower edge of the blade into the soil.

The parameters of the blade are determined based on the condition of cutting off half of the existing ridge and wrapping it in the existing furrow. On the basis of previous studies by scientists, the shape of the cross-section of the existing and formed ridge is assumed to be sinusoidal.

To form a new ridge of this shape instead of the existing furrow, it is necessary to cut a layer with a width from each half of the left and right ridge of the row spacing b_a and thick a_a and wrap them in the middle towards each other. Then the maximum blade width will be equal to:

$$b_{a\min} = \frac{B_M}{4} - \frac{t_y}{2}. \quad (1)$$

By expression (1) with the width of the row spacing B_M=90 cm and the thickness of the rack of

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the working body with an inclined rack t_y = the maximum blade width is b max=21 cm.

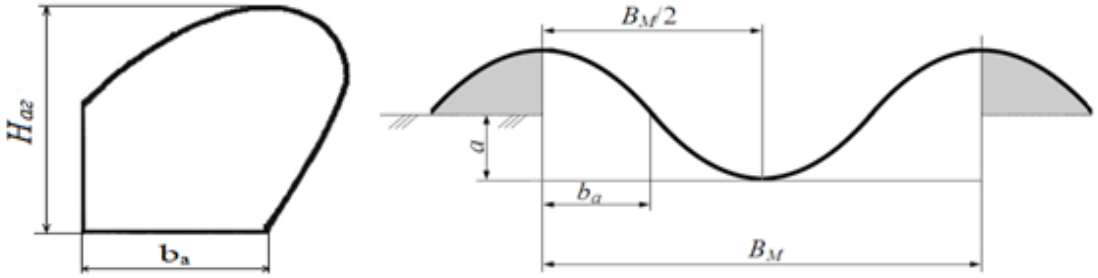

Fig. 2.The scheme for determining the width of the blade grip.

The maximum depth of processing of the dump is determined from the condition of stability of the laid layer, i.e., not overturning it obrotno.

$$a_{a\max} = \frac{b_a}{1{,}27} = \frac{21}{1{,}27} = 16{,}53см. \qquad (2)$$

The height of the body was determined by the following expression

$$H_{om} = \sqrt{a_a^2 + b_a^2}. \qquad (3)$$

By a=12 cm b_a=21 cm according to expression (4), the body height must be greater than 23.32 cm. We accept $H_{от}$=24 cm.

CONCLUSION

According to the results of the theoretical studies carried out to prepare the fields for cotton sowing with minimal energy consumption and high quality of work is provided with a semi-screw blade design, a working width of 0.21 cm, a processing depth of 0.12 cm and a minimum height of 0.24 cm .

REFERENCES

1. http://www.nrcs.usda.gov

2. Тоштемиров С.Ж., Раззаков Т.Х.,Эргашев Г.Х. Энергоресурсосберегающая технология и комбинированный агрегат для подготовки полей к посеву хлопчатника // Academy, 2020. №3(54). С.7-10.

3. Тоштемиров С.Ж. Энергоресурсосберегающие технологии и комбинированный агрегат для подготовки почвы к посеву сельскохозяйственных культур на гребнях // Научный журнал. “Молодой учёный”. - Чита, 2017. - №29. - С. 27-29.

Published: May 30, 2021 | Pages: 120-124

4. Маматов Ф.М., Тоштемиров С.Ж. Новая технология и агрегат для подготовки почвы к посеву хлопчатника на гребнях // Научный журнал. “Молодой учёный”. - Чита, 2013. - № 10. - С. 259-260.

5. Toshtemirov S.J, Mamatov F.M., Botirov Z.L., Chuyanov D.Sh., Ergashov G’.Kh., Badalov S.M. Energy-resource-saving technologies and machine for preparing soil for sowing // European science revive. – Austria, 2018. – № 3-4. – p. 273-240. (05.00.00; № 2).

6. Тоштемиров С.Ж., Раззаков Т.Х.,Эргашев Г.Х. Новая технология и агрегат для подготовки почвы к посеву // Научно-методический журнал. “Вестник науки и образования”. – Москва, 2021. - №6 (109).- С. 25-29.