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A TECHNIQUE FOR DIGGING POTATOES PLANTED IN SMALL AREAS

A.A. Karimov, PhD.
Sh.R.Jalilov, Researcher.

Abstract. *The scientific article discusses the justification of the parameters of the techniques for digging potatoes planted in small areas. The results of field research and theoretical justification of the parameters of the improved potato digger are shown*

Keywords: *Improved potato digger, rod, potato, digger, lattice plowshare, torque, vibration.*

1. Introduction

In the world, scientific and research work is being carried out aimed at improving energy and resource-efficient methods of digging potatoes and the weapons that implement them. In particular, special attention is being paid to the creation of energy and resource-saving tools, which can perform high-quality and complete digging of potatoes in small areas. In this regard, it is considered urgent to improve potato digging methods, develop forced vibrating potato diggers that implement them, justify their technological work process and parameters of working parts.

In the agricultural production of our republic, comprehensive measures are being taken to reduce labor and energy consumption, save resources, harvest products based on advanced technologies, and develop high-performance agricultural machines, and certain results are being achieved. In the strategy of agricultural development of the Republic of Uzbekistan for 2020-2030, among other things, "...private investment to support the modernization, diversification and sustainable growth of the agricultural and food industry The tasks of reducing state participation and introducing mechanisms for increasing investment attractiveness, rational use of land and water resources, increasing productivity in farms, improving product quality. In the performance of these tasks, it is important to carry out research in areas such as the development of a potato digger equipped with grating plowshares and oscillating plows that ensure high productivity due to low energy consumption in the process of digging potatoes, and the justification of the parameters of the working parts that ensure high work quality. is doing.

Creation of potato digger machines abroad, improvement of constructions of digging bodies and justification of their parameters. Halderson, A. Sptcht, P. Howard,

J. Breska, G. Knochel, A.A. Sorokin, G.D. Petrov, V.A. Sakun, Y.P. Lobachevsky, A.M. Marchenko, M.Ye. Matsepuro, S.N. Borichev, E.S. Reingart, W.T. Amilechev, N.Y. Lipsky, I.R. Razmislovich, M.B. Uglanov, N.F. Studies by Didenko et al.

2. Materials and methods

The purpose of the study is to justify the parameters of the potato digger, which will increase the productivity and provide high quality indicators.

The physico-mechanical properties of potato-planted field soil, a grid harrow and a vibrating potato digger were taken as the object of the study.

The subject of the research is potato digging technological process, the processes of interaction of the improved potato digger's grating blade and oscillating blade with lumpy soil and their parameters, the laws of change of the digger's energy and quality indicators. Research methods. In the process of research, the rules of mathematical calculation, laws of theoretical mechanics, methods of statistical analysis, determination of the degree of loss and damage of potatoes with the potato digger's working bodies, mathematical planning of experiments and tensometry methods, as well as the methods specified in the existing regulatory documents, were used.

The practical results of the research are as follows:

an improved potato digger with a grid plow and a oscillating hoe was developed;

when the developed improved potato digger is used, minimal loss and damage of potatoes and reduction of energy-resource consumption have been achieved. Scientific and practical significance of research results. The scientific significance of the research results is explained by the fact that the design of the improved potato digger with a grating and oscillating grater has been developed, and the results obtained in theoretical and practical studies can be used to justify the parameters of other similar machines and working bodies.

The practical significance of the research results is explained by the fact that with the developed improved potato digger, an increase in fuel and lubricants, labor consumption and productivity was achieved due to digging potatoes at the level of agrotechnical requirements, using less energy.

During the operation of the potato digger, the soil and lumps from the plow interact with the rods, and the quality and reliability of the technological process mainly depends on its character and time. In the process of work, the nodular soil crushed under the influence of the harrow moves along its surface and falls into vibrating piles, and under their influence, the nodular mass is further crushed and the potato is separated from the soil. The crushed soil passes through the sieves, that is, the soil is sieved. Potatoes left in the rods move to their ends and fall to the surface of the field.

The time of sliding of potatoes on khivych depends on the physical and mechanical properties of potatoes and the parameters and mode of operation of vibrating khivych. The time of sliding of potatoes on the sieves should be minimal, on the contrary, accumulation of unsifted soil and lumps occurs, which leads to clogging of the potato digger and increases its traction resistance. According to Rod, we determine the time of sliding of soil and potatoes according to the following expression.

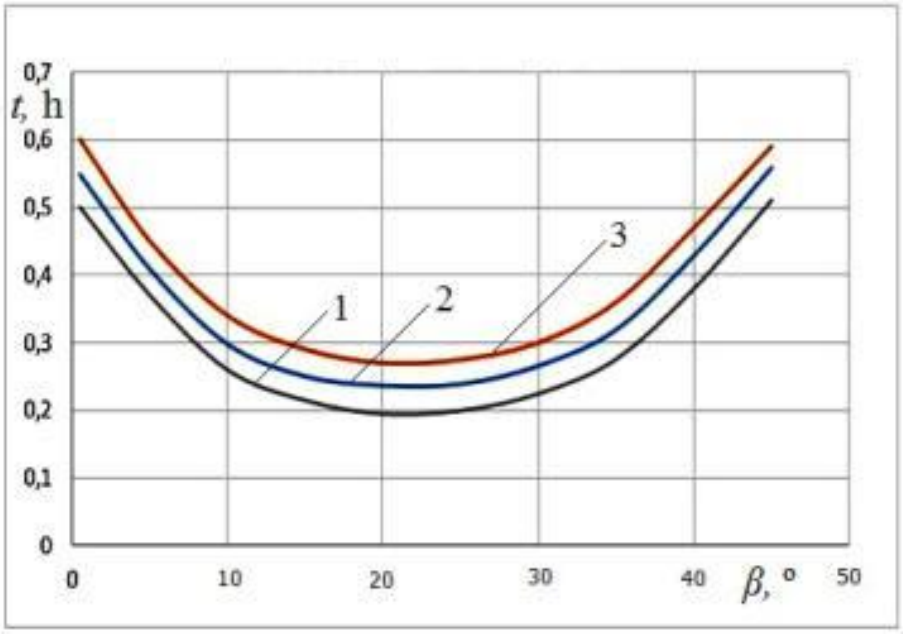

Figure 1. The dependence of the time t for the soil to fall from the rod on the angle of its installation bx

As can be seen from Figure 1, for a 25-cm-long rod, when the angle of its installation relative to the horizon (bx) is in the range of 16º to 30º, the time of sliding potatoes along the rod has a minimum value 0.27-0.3 sec. will be between

3. Results and discussion

Based on the above, it is desirable if the average value of the installation angle of the khivich with respect to the horizon and its extreme values are between 16º and 30º. In this case, there is no accumulation of tubers in the pile, and the resistance of the potato digger to the pull is minimal.

4. Conclusions

To base the design of the potato digger, diggers of four types were made: with a working body of the "paraplau" type, equipped with khivych; in the form of a claw equipped with khivichs; non-oscillating grid plows and oscillating grid plows.

According to the results of experimental studies, it is advisable to equip the potato digger with a grid plow and vibrating hivets to ensure the loss and damage of potatoes at the required level. The conducted analyzes made it possible to develop the

design of an improved potato digger, which increases productivity, ensures minimal damage and loss of potatoes, based on the structural features of the existing weapons used in potato digging and their working parts.

The most optimal design of the improved potato digger is a design consisting of a transmission mechanism, a grid plow and forced oscillating coulters.

As a result of the conducted theoretical research, analytical links and mathematical models were obtained that allow determining the parameters and operating mode of the improved potato digger griddle and oscillating plows.

Rapid splitting of the knotted sedge at the required level with low energy consumption. The width of the plow with a grid should be 55 cm, the angle of installation of the plow with respect to the horizon should be 22º, the length of the plow should be 38 cm, and the distance between the slots of the grid should be 3 cm.

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