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THE RESULTS OF EXPERIMENTS THE WIDTH OF THE SOIL DEEPER LIKE GOUGEAND ITS IMPACT ON STUDYING PERFORMANCE

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ABSTRACT

This article describes the results of experiments on improving the design of energy-saving, deepening plow and studying the effect of the width of the trench depth on its performance, which allows to soften the subsoil without compaction, along with plowing.

KEYWORDS: *Plow, Overturner, Soil Deepener, Softener Like Gouge, Longitudinal Beam, Lock, Drive Underlayment, Berch Compensation, Energy Consumption, Crushing Quality, Compacted Walls Furrows.*

INTRODUCTION

Modern science for mechanization of agriculture of the republic, increase of productivity of agricultural crops to ensure the implementation of the Resolution of the President of the Republic of Uzbekistan Sh. and the application of modern techniques and technologies, aimed at the effective use of technical achievements, extensive scientific and innovative work aimed at improving the existing ones [1].

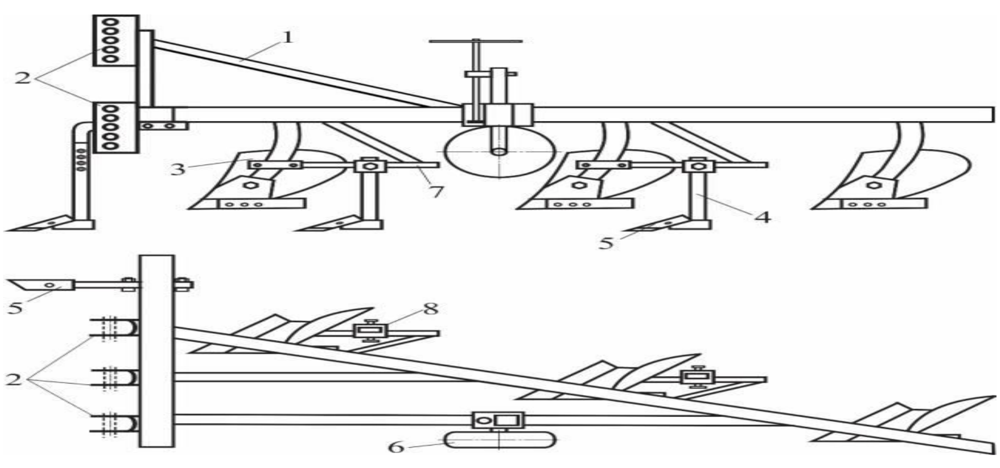
In order to produce a higher yield than any other crop, the soil must be treated and leveled before planting. When cultivating the land, the main focus should be on protecting the soil and restoring its fertility. For this purpose, traditional and resource-efficient methods of tillage are used. Which method to use is chosen according to local conditions.

Traditionally, the main tillage is carried out by plowing the soil deep (more than 30 cm) with a plow. When working with a plow, the top layer of soil is cut off and moved to the side and turned at a certain angle. As a result of the overturning, the cut stalk layer is deformed and crushed, the soil structure is restored, weed seeds and remnants and insects are buried, and the lower, humus-rich layer of soil is removed to the surface.

In irrigated lands, intensive tillage technology is used to harvest 2-3 times. This leads to repeated introduction of machine-tractor units, including drive units, into the field. As a result, the top layer of soil crumbles to dust, and the density of the bottom layer increases. In addition, when the soil is plowed to the same depth for several years with a plow, an over-compacted “berch compensation” appears at the bottom of the plow, preventing plant root development and water absorption. It is impossible to get high yields from such lands. This is why resource-saving methods of tillage and soil protection technologies are becoming more widespread around the world.

Based on the above, one of the most pressing issues in the agricultural sector is to reduce the energy consumption of this process by improving the basic process of tillage, ie the technological process of deepening the subsoil with plowing [2].

Advanced earthing plug frame 1, suspension device 2, overturner 3 and longitudinal beam 7 locks 8 are used to loosen the plow to a depth of 10-15 cm from the cutting line of the plow, depending on the location of the driving berch layer. (picture1).



1 frame, 2 suspension, 3 overturners, 4 columns, 5 softeners like gouge, 6 support wheels, 7 longitudinal beams, 8 locks.

Picture 1.Structural scheme of the improved soil-deepening plug

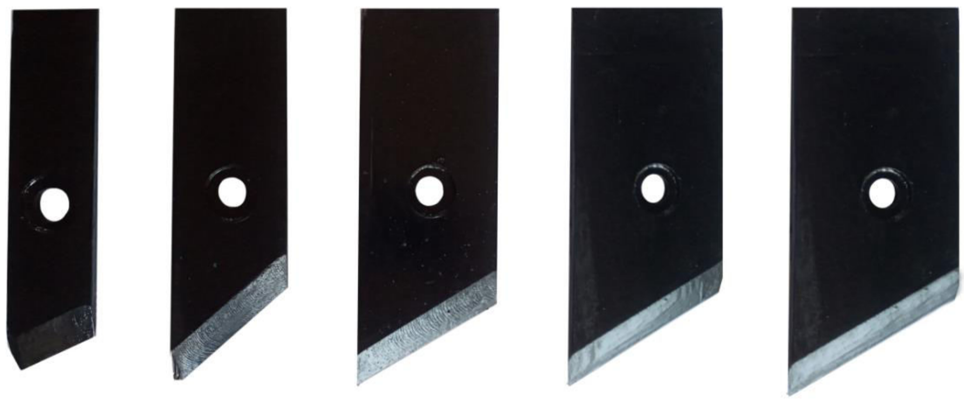
Based on the results of theoretical research, the width of the excavation scanner in the conduct of these experiments. 10 mm with interval 40 mm and 80 mm changed to.

Picture 2 shows the appearance of the scans, which vary in width.

The depth of tillage specified in the experiments is 15 cm, the angle of penetration of the screed into the soil is 30 cm° and speeds of 6 and 8 km / h were set.

The main indicators in the study of the width of the working body were the height of the compacted wall formed at the bottom of the softened layer and its resistance to gravity. In addition, the degree of soil compaction, the depth of tillage, and its standard deviation were obtained.

The results of the experiments are shown in Figures 3,4,5.



a) *b*) *s*) *d*) *e*)

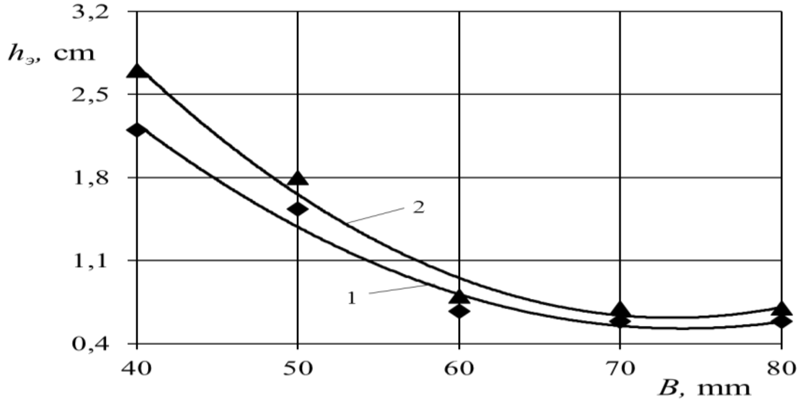
Figure 2. The widths were 40 (a), 50 (b), 60 (c), 70 (d) and 80 (e) mmscans

An increase in the width of the working body leads to a deterioration in the quality of soil compaction, ie the size of the treated layer 100 mm greater than and 10050 mm increase in the amount of lumps (fractions) in the interval, size 50 mmand the number of fractions smaller than This can be explained by the fact that as the width of the working body increases, the deformation zone of the soil increases and the probability of moving large lumps increases. An improvement in the quality of soil compaction was observed with increasing movement speed.

The width of the working body so that the height of the compacted arch formed at the bottom of the softened layer is not minimal or at all 60 mm as long as it should not be less than 60 mmless than the height of the edge is significant, complete softening of the treated layer is not provided, its physical and mechanical properties deteriorate. It should also be noted that the increase in speed from 6.0 km / h to 8 km / h did not have a significant effect on the height of the walls compacted.

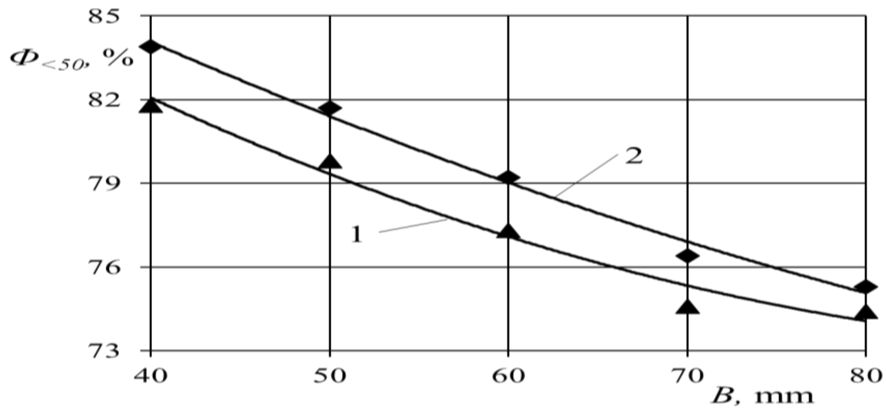
As the width of the working body increased, at both speeds its resistance to gravity increased according to the law of straight lines.

The height of the compacted walls, the degree of compaction of the soil and the resistance of the working body to gravity



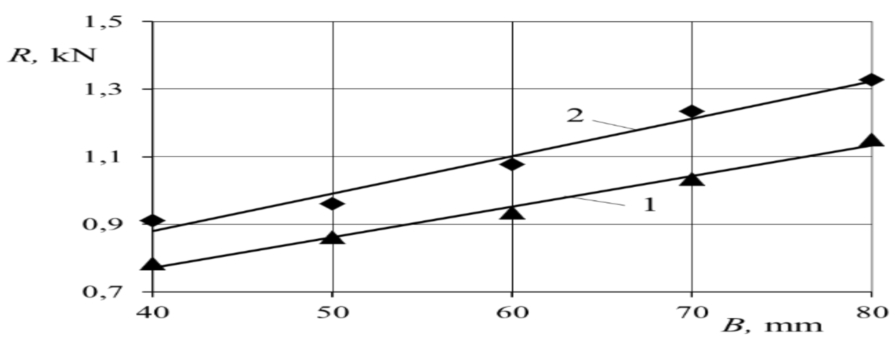
1-6 km / h; 2-8 km / h

Figure 3. Graph of the change in the height (he) of the walls compacted depending on the width of the working body (V)



1-6 km / h; 2-8 km / h

Picture 4. Graph of change of soil compaction rate (F <50) depending on the width of the working body (V)



1-6 km / h; 2-8 km / h

Picture 5. Graph of change of gravity resistance (R) of a working body depending on its width (V)

The change in width can be expressed by the following empirical formulas:

a) when the unit speed is 6.0 km / h

he= 10.957 - 0.2824V +0.0019 V2, m (R² = 0.9841); (1)

F <50= 97.837 - 0.4914V +0.0024 V2,% (*R*² = 0.9765); (2

R= 0.408 + 0.00907 V, kN (*R*² = 0.9895), (3)

b) when the unit speed is 8.0 km / h

he= 8.7334 - 0.2222V +0.0015 V2, m (R² = 0.9776); (4)

F <50= 97,414 - 0.3879V + 0.0014V2,% (*R*² = 0.9911); (5)

R= 0.4373 - 0.01107 V, kN (*R*² = 0.9767). (6)

where V is the width of the excavator shaft (V = 40-80 mm).

Studies have shown that the values determined by empirical formulas differ by more than 3.4 percent from the values obtained in the experiments.

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