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STUDY OF THE EFFECT OF THE LENGTH OF THE WORKING BODY OF THE RIPPER ON THE QUALITY OF SOIL CRUMBLING

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Annotation

In studies conducted to determine the effect of the interleaved working bodies of the Ripper on the density of the soil and the moisture content in it, the width of the loosened soil layer associated with the length of the Ripper is justified. Studied the design of different versions of the Ripper, in the working process of the selected working orgone analyzing its quality indicators.

Keywords: soil treatment, Ripper, quality of processing, soil density, width of the softened layer, traction resistance, Ripper length, acceptable length, aggregate speed, depth of processing.

The size of their working bodies has a direct impact on the quality of processing and energy consumption of chisel cultivators, deep softeners and other machines used for tillage in the cultivation of cotton and other agricultural crops.Studies to study the effect of row spacing of softener working bodies on soil density and moisture content in it have been based on the dependence of the width of the softened layer on the length of the softener.In this case, the design of the softener in different variants was studied and the quality indicators of the selected working body in the work process were analyzed.We find the length of the smoothing work surface using the diagram shown in Figure 1.

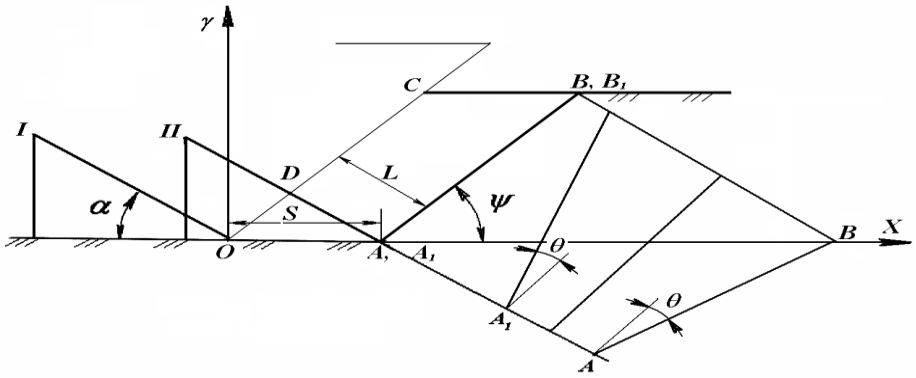


Figure 1. Deformation and disintegration processes under the influence of the working body of the soil.

It should be noted that the length l of the smoothing work surface must be equal to or greater than AD, ie

$$L \geq AD \qquad (1)$$

Otherwise, that is, under the influence of the working body, the soil is not sufficiently deformed and the stresses generated in it do not reach the critical limit, and as a result the soil is not sufficiently softened and crushed [1].

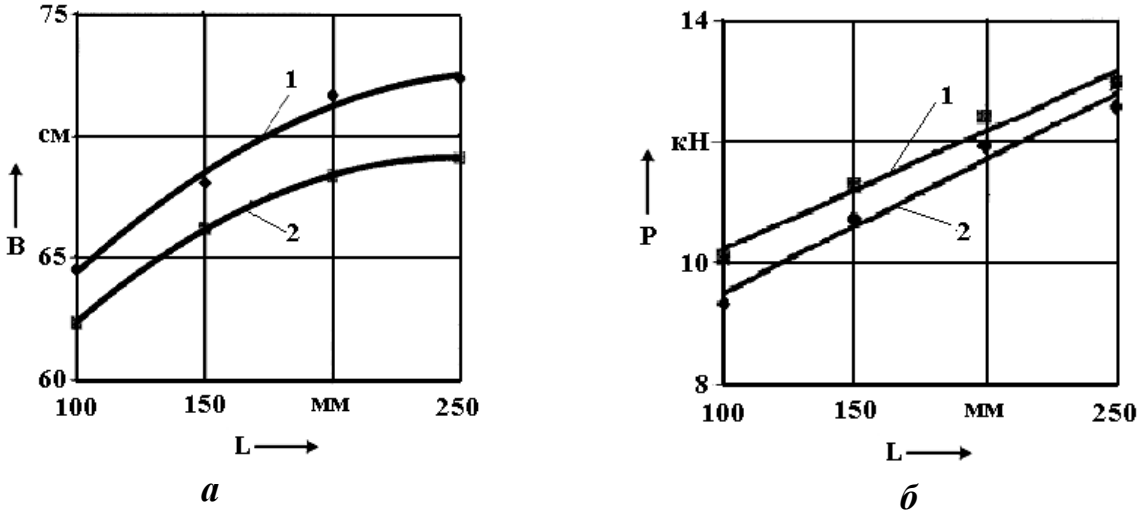
Studies have shown that the length of the softening work surface should be at least 150 mm to soften the soil to a depth of 35-40 cm at an aggregate speed of 1.5-2.0 m / s, depending on the physical and mechanical properties of the soil, working depth and working speed. detected. [9]

In experimental studies to determine the optimal length of the combined aggregate softener working surface, softeners with lengths of 100, 150, 200 and 250 mm were prepared and tested at speeds of 5.0 and 7.0 km / h. The experimental results are presented in Table 1.

Table 1 Performance characteristics of softeners with different work surface lengths

Length of smoothing work surface, mm	Operating speed, km / h	The amount of fractions of the following size (mm),%			Depth of softened layer, cm	
		>100	100-50	< 50	$M_{average}$	±σ
100	5,0	10,87	13,53	75,60	34,2	1,12
	7,0	8,86	13,56	77,58	35,3	1,08
150	5,0	8,42	14,64	76,84	33,4	1,22
	7,0	7,03	14,34	78,03	34,9	1,14
200	5,0	6,89	14,77	78,34	35,1	1,19
	7,0	6,33	13,76	79,91	36,3	1,42
250	5,0	6,50	14,70	78,80	34,2	1,28
	7,0	5,48	13,85	80,67	35,5	1,43

The data in the table show that the increase in the length of the working surface of the softener from 10 cm to 20 cm has led to an improvement in the quality of soil compaction, increased width of the softened layer and resistance to gravity of the working body. These values change little as the length of the smoothing work surface increases from 20 cm to 25 cm. [8]



а *б*

The speed of the 1.2 unit is 5.0 and 7.0 km / h

Figure 2. Graphs of changes in the width of the softened layer (a) and the tensile strength of the softener (b) depending on the length of its working surface

From the data in Figure 2, it can be seen that as the length of the softener increases, its gravitational resistance and the width of the softened layer increase, while as the velocity increases, the first index increases and the second index decreases. [7,8]

While the increase in the length of the softener and its resistance to gravity and the increase in the width of the softened layer are associated with an increase in the volume of soil deformed by the working body, the decrease in the width of the softened layer with increasing speed is explained by a decrease in soil interaction time. [7]

The analysis of the results obtained showed that the length of the softening work surface should not be less than 150 mm to ensure that the soil is softened at the bottom of the treated layer without the walls forming a compacted ditch.

Therefore, based on the research, it is safe to say that the working length of the softener should not be less than 150 mm to ensure quality grinding of the soil with low energy consumption.

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