

## **INFLUENCE OF REDUCING TILLAGE SYSTEMS ON THE STRUCTURE OF CHERNOZEM ORDINARY**

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*It was established that reducing of soil tillage improves soil structure of chernozem ordinary. Content of agronomically valuable structure aggregates in 0–30 cm soil layer under minimum soil tillage and no–tillage increases compared with soil plowing. The content of water stable aggregates changes in the same way.*

***Chernozem ordinary, plowing, minimum tillage, no-tillage, soil structure, water stable aggregates.***

Soil structure is one of the factors that effect on yield of crops. Soil that has optimal structural composition of arable layer, instrumental in the receipt a high yields crops and the productive use of water and nutrients.

**Purpose of research** - determine the effect of different tillage methods on structural and physical state chernozem and normal yield of winter wheat.

**Materials and methods.** Field researches were carried in a long experiment in "Agro-Soyuz" in Dnipropetrovsk region. Experiment includes the following variantes of soil tillage: 1) plowing depth of 23-25 cm; 2) minimum tillage depth of 4-5 cm; 3) zero tillage. The system of fertilization in winter wheat – N90P60K60, predecessor - corn silage. Soil research area - chernozem ordinary with humus content of 4.60%, medium supply of nitrogen, high - mobile phosphates and high - exchangeable potassium.

**Results and analysis.** It was established that in Chernozem ordinary dominated structural separately size of 1-5 mm. In our studies, 5-1 mm aggregates content in the layer 0-30 cm with minimum tillage increased by 2,1-15,7% for zero - on 7,1-7,4% compared to plowing (Table. 1).

**1. The influence of tillage on winter wheat on structural aggregate composition 0-30 cm layer chernozem ordinary usual, %**

Tillage	Layer of soil, sm	Structural units, mm					Kstr *
		>10	10–5	5–1	1–0,25	<0,25	
Spring							
Plowing depth of 23-25 cm	0–10	15,6	9,9	23,8	29,0	21,7	1,94
	10–20	21,8	16,9	24,7	24,1	12,5	1,92
	20–30	30,6	16,2	31,7	16,6	14,9	1,20
The minimum tillage depth of 4-5 cm	0–10	13,1	24,0	22,9	22,5	17,5	2,27
	10–20	22,8	17,7	32,2	21,4	5,9	2,48
	20–30	27,9	18,5	27,2	15,6	10,8	1,30
Zero tillage	0–10	17,1	18,1	27,5	21,9	15,4	1,56
	10–20	17,9	27,4	29,8	16,2	8,7	1,93
	20–30	31,6	18,7	30,3	11,6	7,8	1,31
Before harvest							
Plowing depth of 23-25 cm	0–10	12,6	12,7	27,1	32,0	15,6	1,21
	10–20	19,8	14,4	23,8	28,6	13,4	1,01
	20–30	23,4	21,3	26,3	23,1	14,9	1,15
The minimum tillage depth of 4-5 cm	0–10	16,3	23,9	27,6	23,7	8,5	1,50
	10–20	23,2	21,4	31,9	19,1	4,4	1,36
	20–30	26,9	17,6	33,4	13,4	8,7	1,48
Zero tillage	0–10	19,7	19,6	28,3	24,9	7,5	1,21
	10–20	20,7	25,7	32,5	17,2	3,9	1,64
	20–30	29,9	25,5	23,3	14,4	6,9	1,23

\* Kstr - structuring factor

Medvedev V. V. notes that the most positive influence on agrophysical properties provides winter wheat. During the growing season with a minimum

content of tillage aggregates 1-5 mm increased from 27.4 to 31%, and zero-tillage tillage - has dropped slightly.

In general, the best structural condition is observed in minimum and zero tillage, as evidenced by the higher coefficient structuring, namely for plowing 1,01-1,94, 1,36-2,48 to 1,21-1,93 minimum and on zero tillage.

Content waterproof aggregates in our study varied from 26.5 to 61.6%. Water resistance Coefficient was 0.4-0.5 and almost independent of cultivation. Down the profile chernozem aggregates increased ordinary water resistance.

Content agronomically valuable aggregates for all variants of the highest in the 10-20 cm layer, where in the spring by plowing it was 65.7; with minimum tillage - 71.3; at zero - 65.9%. Research of S. P. Tanchiki and V. Yamkoviy conducted in Chernozem typical also showed that the introduction of zero tillage in winter wheat for 4-5 years somewhat improved structural and physical state of the soil, lowered his brylystist. The content of agronomically valuable aggregates was within 78,7-81,6%. Structuring Coefficient was also higher in the variant with zero technology. The yield of winter wheat was 45,6-48,7 kg / ha and differed little on variations soil tillage.

Summary. Minimization of soil tillage is an effective means of improving the structure of ordinary chernozem by increasing the content of agronomically aggregates and improve their water resistance.