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Sustainable Development Trends and Challenges under COVID-19

Influence of Lozova Machinery units on crop residues incorporation

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Background: The issue of incorporating crop residues has recently become very relevant. Mankind strives for the greening of agriculture, ie the use of organic components in the cultivation of agricultural products. Plant residues are one of the sources of replenishment of the soil with the necessary macro- and microelements. For example, 1 t of straw contains 5 kg of nitrogen, 2.5 kg of phosphoric anhydride, 8 kg of potassium oxide, and in the straw of winter wheat also such trace elements as boron, copper, manganese, molybdenum, sulfur, etc. Moreover, for faster decomposition of straw, it is necessary to add nitrogen fertilizers. Another important characteristic that affects the rate of decomposition of plant residues is the degree of grinding and the amount of residues that remain on the soil surface. After all, it is known that the microorganisms that decompose them are inactive on the soil surface. Therefore, the aim of our study was the mass of plant residues left after tillage by Lozova Machinery units. **Methods:** The research was conducted near Mykolayiv, soil type: southern and heavy loamy Chernozem; culture - sunflower (hybrid R-120); the predecessor was winter wheat. The estimated biological yield was 17.79 c/ha. To determine the mass of plant remains, they were selected in tenfold repetition, arbitrarily from the surface of the field using a frame measuring 31.6 * 31.6 cm (100 cm²) and weighed using laboratory scales. The control option was CPC6.04, the studied units of Lozova Machinery were: Ducat 2.5, Ducat RST 6, Ducat UVT 6, and LIRA XL 21. **Results:** During the research, it was found that the control unit, which covered the entire area of the field, except the experimental area, showed a result of 0.052 kg/100 cm². After the Ducat 2.5 test machine, whose operating speed was 13.5 km/h, the weight of plant residues remaining on the surface was 0.041 kg/100 cm². The indicator of crop residues by the LIRA XL 21 machine (working speed 11-12 km/h) became - 0.064 kg/100 cm², for tillage Ducat UVT 6 (working speed 12-14 km/h) the indicator was 0.060 kg/100 cm², and Ducat RST 6 (operating speed 12 km/h) - 0.032 kg/100 cm². **Conclusions:** From the above results, we can conclude that the lowest rate of earnings of crop residues has a machine LIRA XL 21, but its productivity compared to other units is much higher due to the width of the capture. At the same time, the Ducat UVT 6 machine has the highest rate. However, it should be noted that the presented dynamics are typical for sunflower culture and the corresponding research conditions. A change in one of the factors can have a significant impact on the rate of incorporation of crop residues.

Keywords: soil tillage, Ducat UVT 6, Ducat RST 6, Ducat 2.5, LIRA XL 21