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STUDIES REGARDING THE TECHNICAL AND OPERATIONAL CHARACTERISTICS OF THE SCARIFIED AGGREGATE

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Abstract: The purpose of this work is to study the technical characteristics of an aggregate to be scarified under the conditions of the classic soil processing system.

When preparing the land for plowing, the following operations will be performed:

- checking and removing the causes that can cause the creation of unfavorable conditions for the work of the machines;
- the delimitation of return zones and the choice of the most efficient methods of travel;
- dividing the land into plots and marking the line for the first crossing.

For the performance of mechanized works, the plots are chosen in such a way as to ensure the work for a longer time, without switching to other plots. The minimum plot size must ensure work on at least one shift.

After choosing the direction of travel, the turning areas are demarcated at the ends of the plot. At the beginning, the turning area is delimited by stakes, after which a furrow is drawn to a depth of 6 - 8 cm. These traces show the place where the scarifier was moved into the transport and working position. Return areas are worked after the work on the plot is finished.

The concept of soil conservation includes a set of activities, measures and technologies that compete to maintain the state of soil fertility without significantly reducing harvests or without high costs. This concept arose from the considerations that the land is the most important means of human existence that ensures the obtaining of food products, raw materials for the energy industry, etc. and consequently maintaining the biological capacity is a necessity imposed by the existence of social life.

• Introduction

- The contemporary world and especially agricultural specialists are increasingly aware of the fact that agriculture is an important source of regenerative energy for the economy, but at the same time it is also a large consumer of energy. [Anișoara DUMA COPCEA și colab., 2023].
- In this context, the mechanical processing of the soil by traditional methods is questioned today by more and more people due to the high energy consumption and the continuous degradation of the arable soil through erosion and excessive settlement. [Casiana MIHUȚ și colab., 2022]. The classic tillage system, in addition to the special contributions to social progress, also brought serious damage to the environment and even its vital resources, continuously decreasing soil fertility. [Casiana MIHUȚ și colab., 2022, Casiana MIHUȚ și colab., 2023].
- Soil conservation technologies were imposed by certain practical needs, especially of an economic nature, and their rapid expansion, especially in the United States and Canada, was due to the indisputable advantages compared to classic technologies, among which: reduction of water and wind erosion, increasing organic matter and natural soil fertility, reducing compaction, reducing production costs, reducing fuel and labor consumption. [Vlad Dragoslav MIRCOV și colab. 2023]. This system covers a wide range of methods whose primary purpose is to keep plant residues on the surface of the arable soil to reduce erosion. [Lucian Dumitru NIȚA și colab., 2023, NIȚA L., și colab., 2018, Casiana MIHUȚ și colab., 2023].

• Material and method

- The technological sheet for operating the aggregate includes the following indicators: working conditions (land characteristics), agrotechnical requirements, indications regarding the characteristics of the aggregate and its preparation for work, land preparation for work, indicators regarding work organization and work quality control. The working regime is established taking into account the load of the engine and the tractor.
- The technological sheet also includes the most important indicators of the organization of the technological process (duration of the travel cycle, worked surface and fuel consumption per hectare).
- The 100 ha plowed area has the following dimensions:
 - - length 1000 m;
 - - width 1000 m.
- The plowing work with the PP-3.30 plow will be carried out by moving the aggregates along linear paths, using the methods of plowing with the tiller and in parts by alternating the plots. The returns at the ends of the plot will be made with a loop and at 900.
- The technical characteristics of the Gaspardo Artiglio Magnum 500/5 scarifier
- The scarifier Artiglio Magnum 500/5 by Maschio Gaspardo is intended for deep loosening of the soil up to a depth of 50 cm. Works

• Results and discussions

- Calculation of economic indices
- The economic indices assume both the knowledge of the consumption per surface unit and of the expenses per hectare, by elements of expenses.
- The production costs for carrying out a mechanized agricultural work are composed of indirect costs and direct costs.
- Indirect expenses are those incurred for the performance of several mechanized works or in the general interest of the enterprise. Indirect expenses are recorded separately and then, according to certain criteria, the share is distributed for each mechanized work.
- Direct expenses are those that are determined directly and are included in the cost of each mechanized work. In assessing the economic efficiency of an agricultural aggregate, only the indicator of direct expenses is used, because it expresses the reduction of labor and material expenses by using the respective agricultural aggregate. Direct expenses are expressed in lei/ha.

Nr. crt	Economic indices		lei /ha
1	Direct expenses	C_d	119
	of which: - remunerations	C_S	3,7
	- fuels	C_C	97,0
	-depreciation	C_A	10,0
	-technical service	C_{dt}	8,3
2	Ancillary expenses	C_{ac}	23
3	TOTAL	C_T	142

• Conclusions

- The advantages of scarification compared to traditional plowing work are the substantial reduction of fuel consumption per hectare due to the greater working width, high productivity thanks to the superior working speed, high permeability of the soil. All this leads to the quantitative and qualitative increase of production against the background of reduced expenses.
- It loosens the soil vertically, without inverting the layers, unlike plowing which, by turning the furrow, separates the soil layer from its natural support, the soil becoming an artificial body.
- It achieves the breaking of hardpan and deeper impervious layers, ensuring easy infiltration and storage of water in the soil. The water from the precipitation does not drain to the surface of the soil, causing erosion, but accumulates in the soil.
- It stimulates aeration and heating of the soil, intensifies the biological activity in the soil. In this way, the humification/mineralization processes are kept in balance, gradually providing the necessary nutrients for the plants.
- Erosion and soil loss are reduced. The degree of loosening achieved by scarification ensures that water from precipitation does not drain to the soil surface, causing soil loss through erosion.
- The loosening achieved by scarification ensures unimpeded root growth. Air penetrates more easily at the level of the roots and through the oxidation processes the energy necessary for the growth of the roots is provided.
- It ensures the conservation of organic matter in the soil and the reduction of CO₂ emissions. The process of decomposition of organic matter occurs gradually with the formation of humus and nutrients, without forcing this process by intensifying the decomposition and mineralization of organic matter with CO₂ emissions.