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STUDIES ON THE TECHNOLOGY OF MECHANISM FOR CORN CULTIVATION

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Abstract:

This paper presents an analysis of the consumption and costs of mechanized works and the materials used in the corn culture in order to optimize the culture technology. The studies in this paper were carried out in the specific conditions of the Arad Plain, belonging to the great geographical unit Western Plain. The territory under study belongs to the locality, being representative of the Arad Plain. The paper focuses on a detailed analysis of the consumptions and costs associated with the mechanized work and materials used in corn cultivation, with the aim of optimizing the agricultural technology used. The studies were carried out in the specific conditions of the Arad Plain, part of the large geographical unit Câmpia de Vest. The analyzed territory is representative for this region and belongs to a locality in Câmpia Aradului, which makes the conclusions faithfully reflect the agricultural realities in this area. Carrying out mechanized work at the optimal time and under suitable soil moisture conditions has a significant impact on agricultural production. Well-drained and lump-free soil facilitates uniform emergence and proper plant development. In this context, carrying out soil preparation work in a correct way contributes to creating a favorable environment for the growth of maize, ensuring optimal conditions for the absorption of water and essential nutrients. The intensive use of agricultural machinery contributes significantly to the increase of labor productivity in agriculture. This allows not only the optimization of agricultural work, but also the expansion of mechanization, which makes it possible for each agricultural producer to achieve a higher output per unit of time. Thus, with the increase in the efficiency in the use of resources and the reduction of the execution time of the works, farmers can feed an increasing number of people with the products obtained, thus contributing to ensuring food security and increasing the sustainability of the agricultural sector.

• Introduction

- Corn mechanization technology is evolving rapidly, adapting to modern farming needs with an increased focus on sustainability and efficiency.
- Maize can be grown on different soils with different fertility, texture and reaction, but extreme soils should be avoided. Good predecessors for corn are perennial legumes, straw cereals, flax, hemp, sugar beet, potato, etc. Although it supports monoculture, it is not indicated to cultivate corn for more than 2-3 years on the same land only if organic and chemical fertilizers are applied and weeds, diseases and pests are properly controlled. (DURAU CARMEN CLAUDIA, ET AL, 2022)
- Having a high productive potential, corn consumes large amounts of nutrients. For every 1000 kg of grains + secondary production, corn consumes: 18-28kg of nitrogen, 9-14kg of P2O5 and 24-36kg of K2O. On all types of soil, corn makes good use of both organic and chemical fertilizers. Manure is well utilized by corn, especially on heavy and cold soils, but it is also recommended on lighter soils, in doses of 30-40 t/ha that are immediately incorporated through basic plowing. (CASIANA MIHUȚ, ET AL, 2024) The doses of chemical fertilizers are established taking into account, mainly the expected production level, the specific consumption and the reserves of the soil in nutritional elements, but other factors are also taken into account such as: the preceding plant, the fertilization applied in previous years, the degree of soil water supply, cultivar used. And so on Nitrogen can be applied in the spring when preparing the germination bed or simultaneously with the sowing in the row when the dose is reduced to about one third of the total amount of nitrogen and even during the vegetation with the mechanical harrows using reduced doses.(CASIANA MIHUȚ, ET AL, 2024, CASIANA MIHUȚ, ET AL, 2022)

• Material and method

For the weeding work, the aggregate composed of the John Deere 7230 R tractor + the Lemken Rubin 9/500 disk harrow was used
The **plowing** work was carried out with an agricultural aggregate composed of: John Deere 7280R tractor + Lemken Europal 9/5+1 plow
To avoid land subsidence through several works, the Lemken Korund 8/600K vibratory cultivator was used
Sowing unit: John Deere 5100M tractor + Gaspardo-MT seeder.
Two works were carried out: pre-emergence herbicide and foliar treatment. The Bargam 4000 herbicide machine was used in aggregate with the Deutz Fahr 150 tractor.
Maize was harvested as grain with a John Deere W550 self-propelled combine equipped with a Capello R6 6-row cob picker.

• Results and discussions

- The mechanization technology for corn cultivation was realized in a farm in the Parța area, Timiș county.

• MECHANIZATION OF DE-SEEDING WORK

- The weeding work was carried out in the summer, immediately after the harvesting of straw grains, with the aim of keeping water in the soil by forming a superficial layer of 10 cm, to close the pores, made up of plant residues and the soil dislodged following the work carried out.

The plot intended for plowing was worked as follows: first the control furrows were drawn for turning at the ends of the plot, then it was plowed in length by moving the aggregate according to the method in the swale, the furrows being overturned on the same side, after which the ends were plowed of the plot with the turning of the furrows towards the plowed land.

• Conclusions

- The present work presents the culture technology of the corn crop in the Parta area, Timis county
- Maize cultivation technology has evolved significantly, transforming traditional agriculture into an activity of high precision and efficiency. By mechanizing the stages of soil preparation, sowing, maintenance and harvesting, farmers can achieve higher and higher quality crops while reducing labor costs and losses.
- The central problem of rational mechanization is to optimize the coordination of work and machinery throughout the entire technological process to produce results with a minimum consumption of labor and energy. By using modern technologies of mechanization, chemicalization, fertilization and by choosing varieties suitable for different types of technologies, superior results can be achieved from an economic point of view, ensuring a higher production with low costs in terms of fuel consumption. Another significant advantage is that work is carried out at the optimal time for mechanization, thus maximizing efficiency.

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