

## STUDY ON LAND PREPARATION TECHNIQUE FOR CULTIVATION OF FODDER CORN AFTER GREEN PEAS

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### Abstract:

*A current trend in agricultural technique is to perform minimal soil work both in preparing the soil for sowing and in caring for all plants, but especially for those that are sown.*

*This study looked at the production differences in fodder corn recorded between the incorporation of green peas with the disk and its incorporation into the soil with the multi-purpose cultivator. The two options show notable differences in depth and quality of work, effectiveness in weed control and impact on soil structure.*

*The research presents a comparative analysis of the two technologies, adapted to the specifics of chernozem soils, characterized by high fertility and a superior capacity to retain water and nutrients. The obtained results showed that the peas incorporated in the soil had a positive effect on the soil fertility and therefore also on the corn productivity.*

**Key word:** *minimum tillage, green mass peas, soil fertility.*

### INTRODUCTION

Due to its diversity of uses in human food, animal feed and in industries such as the production of bioethanol, starch, bioplastics and biogas, maize is one of the most important agricultural crops globally. About 8.5 million hectares is the area cultivated with grain maize in the European Union. In 2021, in terms of the area cultivated with grain corn, with 2,493,000 hectares, and a production of 14,445,000 tons, Romania was in first place in the EU. These data highlight the substantial contribution to the EU agricultural market and Romania's significant role in European corn production.

Maize harvested in the green mass stage is mainly used in animal feed and in the silage process. Harvesting at this stage represents a specific moment of development, as the plant has not reached full physiological maturity and the berries are in a milky or early waxy phase. What makes it essential in the feeding of ruminants is the increased energy value, given by the high content of soluble carbohydrates. The plant contains a high percentage of water, which makes it suitable for processes such as ensiling.

Cultivating fodder corn after green table peas is a sustainable agronomic practice

with multiple benefits on agricultural productivity and conservation of natural resources. This rotation harnesses the potential of the soil and contributes to increased efficiency in the use of nutrients and water.

Soil functions can be directly or indirectly affected by climate change. Thus, agricultural land management is exacerbating losses of soil multifunctionality across Europe due to dry weather and rising temperatures (Sünnemann et al., 2023). Changes in temperature, precipitation and humidity are examples of direct effects. Adaptations, including tillage techniques, crop rotation adjustments, crop mixtures, pest and disease management and irrigation could have indirect effects (Partal et al., 2023; Paraschivu et al., 2023; Sărățeanu et al., 2023; Sălceanu et al., 2022; Velea et al., 2021).

## **MATERIAL AND METHOD**

For the incorporation of peas, an adequate preparation of the soil is required, which ensures the preservation of moisture and a uniform germination of the seeds. Leveling and aeration operations are essential to reduce compaction and stimulate root development.

The experience was located on chernozem type land, being sown a very tall hybrid with high cob insertion and stay-green that has a very good fiber digestibility, an exceptional grain yield and a very good cob disease tolerance profile. The sowing was carried out on April 4, the temperature at ground level

being over 10°C. , seed embedment depth of 5 cm, distance between rows of 70 cm and distance between plants per row of 18 cm. The crop of silage corn was followed in a bifactorial experiment according to the method of subdivided plots with two factors after green mass peas.

The following options were used to prepare the land for corn silage:

a 1 - worked with the disc,

a 2 - worked with the multipurpose cultivator.

Maize silage was maintained in two ways:

b 1 - mechanical weeding between rows and herbicide in the row with a mixture of mesotrione and nicosulfuron based herbicides

b 2- herbicided in the row and between the rows with the same mixture of herbicides.

Harvesting was done when the corn kernels were in the waxy milk stage with a moisture content of 65–70%, ideal for direct feeding or ensiling, and production calculations are expressed in t/ha.

## **RESULTS AND DISCUSSION**

The obtained results aim to establish to what extent the classic field work technology for sowing and maintenance of double crops can be replaced by superficial land preparation works, and the control of weeds in the crop should be done with a mixture of herbicides based on mesotrione and nicosulfuron .

From the production data obtained, it can be seen that silage corn sown in field mechanically sieved between the rows

and herbicided in each row with a mixture of mesotrione -based herbicides and nicosulfuron gave the lowest yields compared to corn silage herbicided in-row and between-rows with the same herbicide mixture.

Table 1 The influence of land preparation works for sowing on silage corn production (t/ha)

OUT	Products t/ha
a <sub>1</sub> b <sub>1</sub>	23,142
a <sub>1</sub> b <sub>2</sub>	23,630
a <sub>2</sub> b <sub>1</sub>	24,453
a <sub>2</sub> b <sub>2</sub>	25,130

A forage corn hybrid with the "stay-green" characteristic is distinguished by the ability of the plants to maintain green leaves and stems for a longer period during the ripening process. Depending on the pedoclimatic conditions, the technology applied and the hybrid used, the crop of fodder corn in succession with peas for green table can reach 50 t/ha. Although hybrids with this characteristic usually show a superior tolerance to drought, heat and diseases, thus contributing to the stability of production in variable climatic conditions, considering the climatic conditions of this year 25,130 t/ha is the highest production. This fact is mainly due to the heat which caused the plants to be affected especially on the entire leaf surface from the upper part.

Fertilization needs are reduced due to the input of nitrogen from the previous crop. However, applying a moderate amount of supplemental nitrogen can enhance corn growth in the early stages.

During the growing season, the height of the corn plants was periodically measured, and at harvest, the thickness of the first internode of the stem was determined.

The most vigorous plants were those in which the soil was worked with the multifunctional machine.

Table 2 The influence of land preparation works for sowing on the vigor of corn plants

Applied works	Height as of 9.VII, 16.VII, 25.VII, 30.VII				Thickness in cm at harvest
a <sub>1</sub> - worked with the disc	149.1	170.4	186	191.4	2.16
a <sub>2</sub> - worked with the multipurpose cultivator	156.8	171.6	187.3	193	2.23



Fig 1 a<sub>1</sub> - worked with the disc



Fig. 2 a2- worked with the multipurpose cultivator.



Fig. 3 b1 - mechanical weeding between rows and in-row herbicide with mixture of mesotrione and nicosulfuron herbicides

Thanks to the multiple working organs, the multi-functional shreds the plant residues and distributes them evenly,

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Fig 4 b2- herbicided in the row and between the rows with the same mixture of herbicides.

## CONCLUSIONS

The multifunctional machine allows work at significantly greater depths, up to 30-35 cm, ensuring deep loosening and creating optimal conditions for the expansion of fodder corn roots. On chernozem, where fertility and water holding capacity are high, this working depth gives the roots optimal access to resources and maximizes production potential.

achieving a homogeneous mixture and contributing to a well-aerated soil structure helping to maintain the soil quality in the long term.

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