STUDIES ON THE INFLUENCE OF SOIL WORKS IN CLASSICAL SYSTEMS IN MAIZE UNDER THE CONDITIONS OF CHIŞINEU CRIŞ, ARAD COUNTY, ROMANIA

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Abstract. *In all agricultural activities, soil works are, according to classical technology, complex actions involving high energy expenditure making productions profitable conditional on the correct execution and during the optimal period. The influence of minimal work on the modification of the physical attributes of the soil is mainly explained by reducing field traffic, mobilising the soil to a much lesser extent than the classical system, modifying biological activity in the soil as a consequence of the ratio between porous and solid parts, as well as by working during the optimal period of performance. In order to implement, in production, the most efficient soil work and weed control technologies, in order to obtain high productions at the lowest cost, we recommend the following: when growing maize on the territory of Chişineu Criş, Arad County, Romania, account must be taken of the physical and chemical properties of the soil, as well as of climate conditions, with direct reference to temperature and precipitation. In view of the sensitivity of maize to weeding, we recommend choosing herbicides according to the composition of weed species Results require the use of the classic variant of soil work, where the highest productions have been obtained, but do not exclude some variants of minimal works. An important argument in support of the research carried out is the value of the main indicators of economic efficiency, which attest to the profitability of maize crops. When cultivating maize on the territory of Chişineu Criş, account should be taken of the physical and chemical properties of the soil, as well as of climate conditions, with direct reference to temperature and precipitation. In view of the sensitivity of maize when weeding, we recommend choosing herbicides according to the floral composition of weed species. Results require the use of classical tillage, in which the highest productions were obtained, without excluding some variants of minimum tillage.*

Key words: *agricultural, cultivation, aggregate, climate conditions, economic efficiency*

INTRODUCTION

The large number of works and repeated crossings on the ground with tractors and agricultural machinery negatively influence physical, chemical, and biological attributes causing long-term soil fertility to decrease and increasing erosion: for their execution, we need large quantities of fuels, lubricants and hours of work, which increases the cost per unit of agricultural product.[OKROS A., și colab. 2014, CASIANA MIHUȚ, și colab. 2012, MIHUȚ CASIANA 2014, CASIANA MIHUȚ, și colab., 2018]

The **purpose of the study** is to know the influence of the minimum tillage system on the physical properties of the soil and of maize production. [ALINA LAȚO,și colab.2012]

This can be summarised as follows:

1.Establishing variants of soil work in a conservative system in order to reduce production costs and obtain productions close to those obtained by the conventional work system;

2.Outlining methods for determining the influence of works according to the minimum tillage system on the physical properties of the soil and the degree of weeding under the conditions of Chișineu Criș; [A. OKROS, și colab., 2014, OKROS ADALBERT, 2015]

3.Determining the influence of different sown of sowing on maize production;

4.Meeting the necessary agrotechnical requirements the minimum tillage system in as short a time as possible, which would allow the reaching of optimal time for the establishment of crops with favourable consequences for crop development;

5.Capitalising on the positive effects resulting from the lowering the number and the intensity of the works, in particular in the field of preserving and rebuilding soil fertility, as well as reducing fuel consumption. [ȚĂRĂU D., 2003, GHEORGHE DAVID, și colab. 2018]

The **objectives** pursued to achieve the intended purpose are as follows: [ILEA R., 2013]

- Analysing the evolution of the concept of minimum tillage within the concept of soil work;
- Establishing soil conservation possibilities as a result of the practice of unconventional work technologies;
- Determining the influence of sowing density on maize yield;
- Establishing the influence of the variants of soil work by studying the weeding degree;
- Establishing fuel consumption, the level of total technological expenditure and the profit [LUCIAN NITA, și colab., 2019]

MATERIAL AND METOHD

The study was carried out under the specific conditions of Chișineu Criș, Arad County, Romania, on 100 ha arable land. The study refers to grain maize culture, the plant with the largest extension in the area. In addition to maize, wheat is cultivated on large areas and fodder plants are grown on smaller areas. The farm has the following machines: 2 tractors (Fendt 615 LS and U 650M), 1 reversible plough with 4 bodies (Lemken Opal 140), 1 born plough (PP-4(3)30), a disc harrow (GH-3.2), a disc harrow (Maschio SC GD-6.4), a combined rotary harrow (GRC-2.5), a total processing cultivator (CP4-4), a chisel, 1 seed-drill for maize (Gaspardo), 1 grain seeder (SUP 29M), 1 fertilizer machine (MIC 500), 1 herbicide machine (MEP-500), two tractor trailers, a baler and a combine harvester (John Deere Cereal 1450 CWS).Sustainable development characterized by productivity, profitability, ecological character and the ability to conserve its resources supposes the development of soil work systems through appropriate energy management, in harmony with the diversity of agroecosystems, and with ecological management in plant protection. In Romania, the transition from conventional agriculture through alternative systems to sustainable agriculture should take into account a number of issues:

-Rural demographic evolution and the desire for continuous increase in living standards;

-The need for a period of transition from conventional agriculture to different variants of the unconventional soil work system;

The existence of the funds necessary to carry out the conversion. In our country, the earth board plough agriculture practiced for thousands of years remains the basic work applied on most agricultural land. Under excessive weeding of arable land, with lack of suitable machines and equipment, the tillage is perceived by farmers as the life-saving solution for incorporating plant debris, weeds and fertilizers. When seed, pesticides, and fertilizers suppose mandatory costs, reducing soil work in number and intensity becomes a reliable solution for increasing the efficiency of the agricultural production process. The development of unconventional tillage should rely on the concept that the implementation of sustainable technologies must mainly ensure the achievement of the following requirements: creating an exploitation framework in agriculture and eliminating the degradation of the agricultural

environment; relaunching and increasing agricultural production through new agricultural technologies;training high-performance agricultural producers with incomes comparable to those in other economic sectors.

Developing agriculture in harmony with nature by protecting and improving the natural basic resources base (primarily soil, water and biodiversity resources). The new systems also bring about many questions involving the accumulation of new knowledge. It is necessary to raise the level of training of farmers by transferring information using practical demonstrations in the field, brochures, technical assistance and expert advice. Farmers' interest in reducing work and preserving soil resources will increase as the belief that economic and social benefits depend, in the long term, on soil conservation methods. Although, in our country, research on reducing soil works and testing some various minimum tillage systems started as early as the 1960s, their expansion into agricultural practice is quite softened. [MARIA POPA, și colab., 2016].The success of these practices depends not only on natural and socio-economic conditions, but also on the farmer's ability to choose the best variant related to the conditions of the area and the requirements of the cultivated plant. [NICOLETA MATEOC-SIRB, 2013,]. The causes of limiting the extension include solving the following problems: lack of adequate machinery and equipment, inefficiency of soil protection legislation, lack of programs for implementing new technologies, technological disputes on the economic efficiency of the new system, and psychological causes. [NIȚĂ LUCIAN-DUMITRU, 2007, L NIȚĂ, 2018]

RESULTS AND DISCUSSIONS

In all agricultural activities, soil works according to classical technology are complex actions involving high energy expenditure making productions profitable conditional on the correct execution during the optimal period. The influence of minimum tillage on the modification of the physical attributes of the soil is mainly explained by reducing field traffic, mobilising the soil to a much lesser extent than the classical system, modifying biological activity in the soil which changes the ratio between the porous and the solid parts, as well as by operating during the optimal period. In order to implement the most efficient soil work and weed control technologies, in order to reach high productions with the lowest cost, we recommend: When cultivating maize on the territory of Chișineu Criș, account should be taken of the physical and chemical properties of the soil, as well as of climate conditions, with direct reference to temperature and precipitation. In view of the sensitivity of maize when weeding, we recommend choosing herbicides according to the floral composition of weed species. Results require the use of classical tillage, in which the highest productions were obtained, without excluding some variants of minimum tillage.An important argument in support of the research carried out is the value of the main indicators of economic efficiency, which attest to the profitability of maize crops.

CONCLUSIONS

Sustainable development characterized by productivity, profitability, ecological character and the ability to conserve its resources supposes the development of soil work systems through appropriate energy management, in harmony with the diversity of agroecosystems, and with ecological management in plant protection. The development of unconventional tillage should rely on the concept that the implementation of sustainable technologies must mainly ensure the achievement of the following requirements: creating an exploitation framework in agriculture and eliminating the degradation of the agricultural environment; eelaunching and increasing agricultural production through new agricultural technologies; training high-performance agricultural producers with incomes comparable to

those in other economic sectors; developing agriculture in harmony with nature by protecting and improving the natural basic resources base (primarily soil, water and biodiversity resources).

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