STUDIES ON THE CULTIVATION TECHNOLOGY OF FIVE MAIZE HYBRIDS IN THE PEDOCLIMATIC CONDITIONS FROM GIERA

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Abstract. *Corn is one of the most important crops due to its many uses. Grains are widely used in human nutrition, industry and animal feed. They are rich in non-nitrogenous extracts (68-69%), protein (over 10) and fat (4.5%). In addition, 1.8-2.7 l of oil and 3.6 kg of cakes result from embryos. The theme of the study has as main objective to contribute to the development of an intensive technology for this plant, in conditions of good soil and climate in Banat. The research carried out in the period 2019-2020 led to obtaining important results both theoretically and practically related to this culture. The research was carried out on a clay loam vertical preluvosol soil with a favorable climate for a wide range of agricultural crops. The general objective of the researches aims at the behavior of an assortment of corn hybrids created by the companies CORTEVA, KWS and LIMAGRAIN, in terms of the level of yields obtained and its quality. In order to highlight the behavior of the maize hybrids studied, determinations were made regarding:*

- grain production, depending on the hybrid (kg / ha);

- mass of 1000 grains (g);

- calculation of economic efficiency. The studied agricultural experience is monofactorial. The area under study is part of the Timiș Plain and is characterized by very good vegetation conditions for corn cultivation, being included in the very favorable cultivation area in our country.

Keywords: *Technology, MMB, economic efficiency calculation*

INTRODUCTION

In our country, corn holds the most important place, being cultivated on 50% of the area occupied by cereals. [4,6,14]. Through the large areas it occupies, but especially through the productions made, mankind is dependent on corn, in providing food. [13]. Of the area sown with corn, 70% is concentrated in the south of the country (Oltenia, Muntenia, Dobrogea, southern Moldova) and the Western Plain, in these areas registering the best vegetation conditions [17,19]. The best results are obtained on soils with large edaphic volume, fertile, with medium textures (loam-sandy, loamy or loam-clay) that ensure the formation of a deep root system and therefore provide the plant with water and nutrients [18].

Corn is a cereal that is grown all over the world, and can be found up to altitudes of 3,900 meters. [5]. Corn grains are used to make alcohol, starch, glucose and dextrin. Also, a very good quality oil is extracted from corn germ. From the data known so far, 72% of maize production is used in animal feed, 7% in industry and 21% in human feed. [1].

Most of the corn production is used in animal feed (75-80%) as concentrated fodder, silage or green mass. [13].

With good results in feeding, the residues from the grain processing are used (bran, borage from the alcohol factories, the residues from the oil extraction, etc.). The stems and spines of the female inflorescence are used in the pulp industry or as a material for fire, and the cloths for packaging, braids, and stigmas in folk medicine.

Corn grains are used in the industry of alcohol, starch, dextrin and glucose and other products (syrup, pectin, plastics, lactic acid, acetic acid, acetone, dyes, synthetic rubber, beer, coffee substitutes, glaze pastes, etc.).). [7,8,9,2,3].

One of the following products can be obtained from 100 kg of corn: 77 kg of flour, 63 kg of starch, 71 kg of glucose, 50-60 kg of isomerosis (invert sugar) or 44 l of alcohol, and from the embryos results 1.8-2, 7 l of oil and 3.6 kg of grits. [12,15,16].

Corn grains are widely used to obtain biofuel (ethanol), just as the whole green plant can be used to obtain biofuel (methanol, ethanol), methane gas, electricity. [10,11].

MATERIALS AND METHODS

The general objective of the researches aims at the behavior of an assortment of corn hybrids created by the companies CORTEVA, KWS and LIMAGRAIN, in terms of the level of yields obtained and its quality.

The area under study is part of the Timiș Plain and is characterized by very good vegetation conditions for corn cultivation, being included in the very favorable cultivation area in our country.

The research was carried out in the period 2019-2020.

In order to highlight the behavior of the maize hybrids studied, determinations were made regarding:

- grain production, depending on the hybrid (kg / ha);
- mass of 1000 grains (g);
- calculation of economic efficiency.

The studied agricultural experience is monofactorial.

The hybrids studied are: LG30.369; P0268; P9757; KAPITOLIS and KASHMIR

The precursor plant for corn was rapeseed.

Fertilization was done in two stages and potassium chloride with an active substance 0-0-60 with an application of 200 kg / ha and an NPK 8-24-24 complex with an amount of 300 kg / ha was used. Sowing began in mid-April with an 8-row Gaspardo hoe-type seed drill with a row spacing of 75cm.

The density used for sowing was 68 thousand germinating grains / hectare, the distance between plants in a row was 19.6 cm.

The herbicide was made with a pre-emergent Adengo herbicide

Climatic data were taken from Banloc Meteorological Station. On the territory of Banloc commune, the influence of the climate with Mediterranean nuance is felt, to a rather significant extent, which consists, especially, in the taming of the cold climate in the winter months.

The average annual temperature is 11.10 C. The highest average annual temperature was 12.10 C in 1934, and the lowest 8.70 C in 1940.

The annual rainfall totals 500-600 mm., And the monthly rainfall - a maximum in January and a minimum in February-March.

The maximum rainfall in 24 hours generally does not exceed 130 mm. The frequency of these precipitations is relatively low.

The type of soil on which the experiment was placed is the vertical-stagnant preluvosol, medium clayey / clayey loam, on medium-fine swelling clays [18].

Following the calculation of the participation percentages of the granulometric fractions and based on these values, consulting the triangular texture diagram, the texture of this type of soil was determined, which is clayey to a depth of 53 cm, then becomes clayey up to 89 cm and then becomes clayey.

The soil reaction is moderately acidic and weakly alkaline with pH values increasing from 5.45 in the A horizon to 8.19 in the C horizon.

RESULTS AND DISCUSSIONS

The harvest results from the experimental cycle 2019 - 2020 are presented in table 1. and figure 1.

If we analyze the recorded harvest data we can see that the highest harvest of 8550 kg / ha was made for the hybrid P0268, registering a difference of 1700 kg / ha compared to the control hybrid LG30.369, statistically assured as very significant, followed by the hybrid P9757 (6600 kg / ha), with a difference of 250 kg / ha compared to the control hybrid.

KAPITOLIS and KASHMIR hybrids produced over 6200 kg / ha, being insignificant.

Table 1

Yield results for maize crop 2019-2020

Alternative	Yield kg/ha	%	Difference kg/ha	Significance
LG30.369	6850	100		
P0268	8550	80	1700	xxx
P9757	6600	96	-250	0
KAPITOLIS	6350	93	-500	000
KASHMIR	6275	92	-575	000

DL 5%= 176 kg/ha DL 1%= 256 kg/ha DL 0,1%= 385 kg/ha

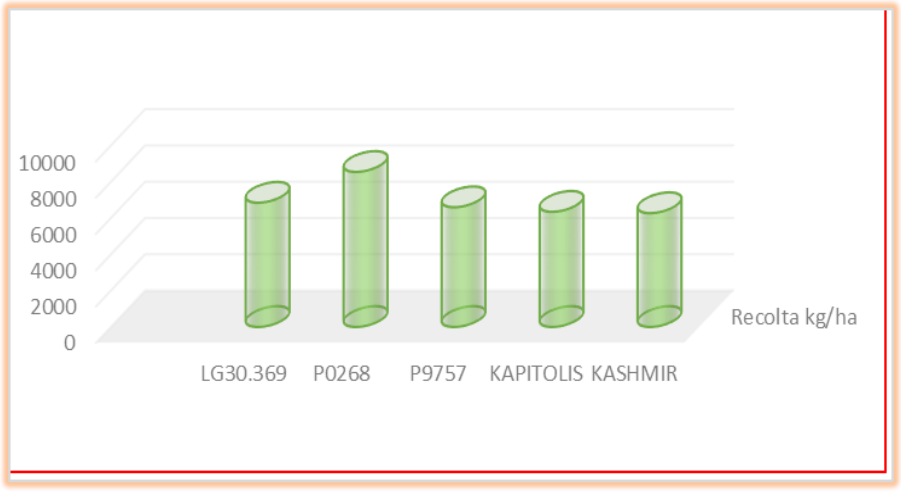

Fig. 1. Synthesis of corn harvest results 2019-2020

RESULTS REGARDING THE MASS OF 1000 GRAINS

The mass of 1000 grains is an element of productivity with implications on the quality of indisputable importance, because on it depends the size of the embryo and the amount of reserve substances for germination and emergence.

The value of MMB is one of the most important and stable components of maize production, a synthetic indicator of the general adaptability of local conditions.

This indicator allows the appreciation of the seed size, being much more relevant compared to the hectolitre mass.

During the two years of experimentation 2019-2020, the average value of the mass of one thousand grains achieves higher values in the hybrids P0268 of 208 g and P9757 of 199 g. In the hybrid KAPITOLIS MMB it was 190 g. And in the hybrid KASHMIR of 187 g., fig. 2.

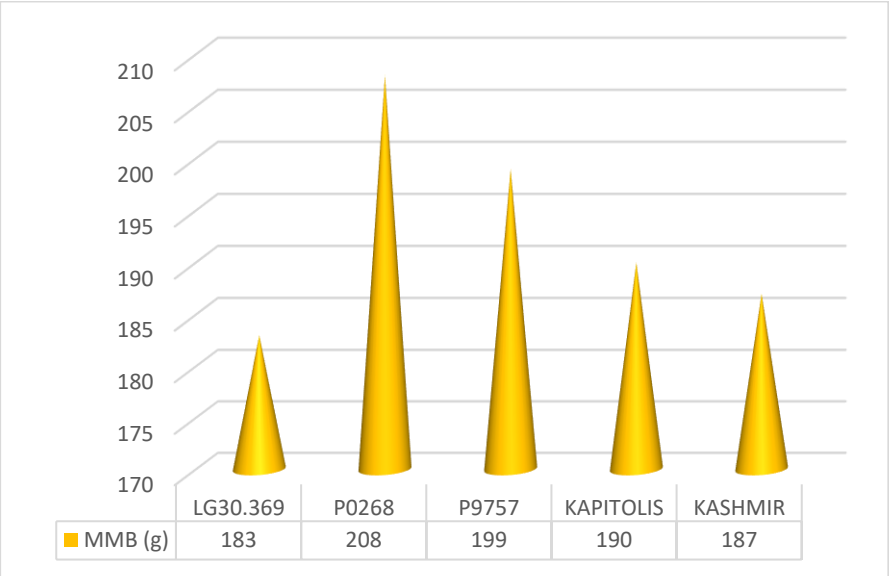

Fig. 2. The synthesis of the mass of 1000 grains registered in the experimental cycle 2019-2020.

CALCULATION OF THE MAIN INDICATORS OF ECONOMIC EFFICIENCY

In order to highlight the profitability of the corn crop for grains, we considered it necessary to perform the calculation of the main indicators of economic efficiency table 3.4.

The analyzed indicators are the following:

- main production (kg / ha);
- the value of the main production (lei / ha);
- production costs (lei / ha);
- production cost (lei / kg);
- total profit (lei / ha);
- profit rate (%).

For the indicator "production costs" the cost estimate for each experimental variant was prepared. The average price from 2019-2020 corresponding to the agricultural year was used.

The average recovery price of one kg of corn for grain was 0.7 lei / kg.

The highest yield was obtained for the hybrid P 0268, which was 8550 kg / ha, and the lowest yield was obtained for the KASHMIR hybrid, where only 6275 kg / ha were obtained.

The value of the main production is directly proportional to the capitalization price, falling between 4393 lei / ha and 5985 lei / ha, respectively.

The production costs were depending on the hybrid, being between 3300 lei / ha for the hybrid LG30.369 and 3700 lei / ha for the hybrid P0268.

The total profit ranged between 895 lei / ha in the case of the KAPITOLIS hybrid and 2285 lei / ha for the P0268 hybrid. The highest profit rate was recorded for the hybrid P0268 of 162%.

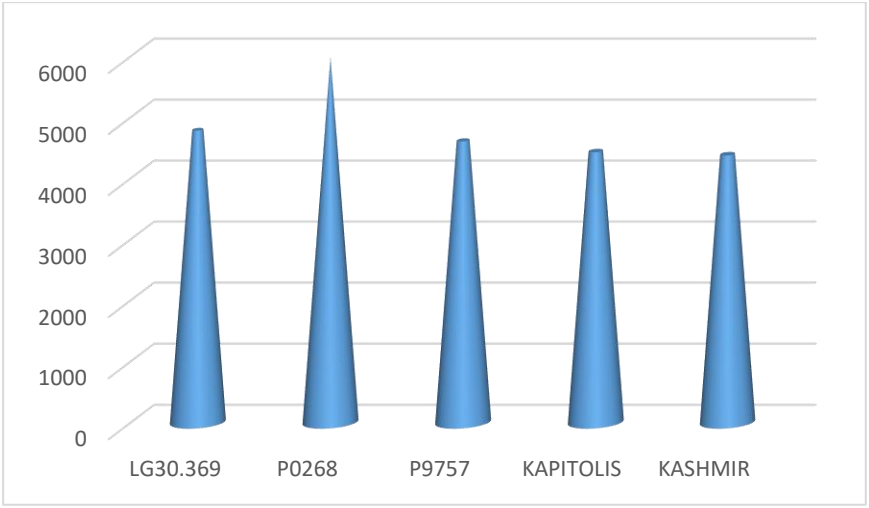

Fig. 3. The value of the main production (lei / ha)

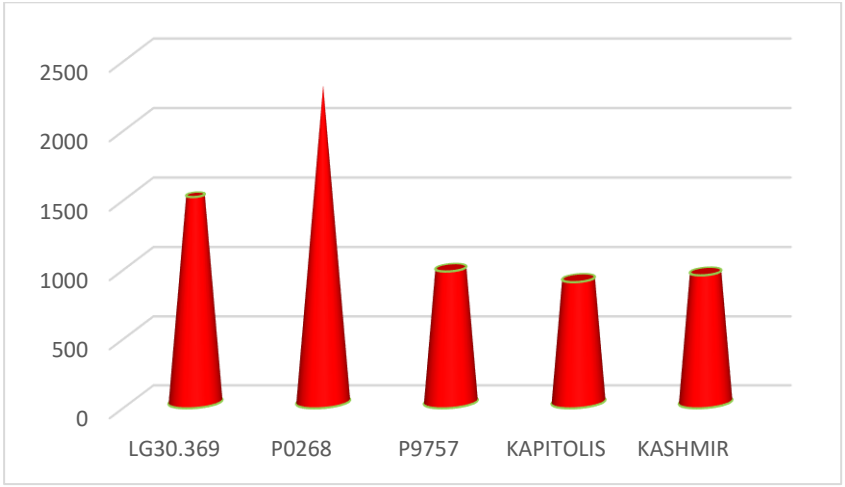

Fig. 4. Total profit (lei / ha)

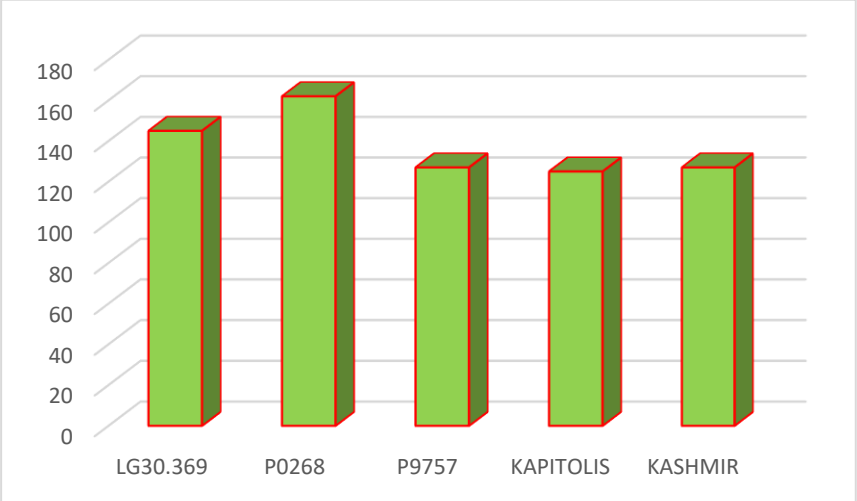

Fig. 5. Profit rate (%)

CONCLUSIONS

The research and results obtained for the five corn hybrids in the experimental years in 2019-2020 under the conditions of Giera, allow us to draw the following conclusions that can serve for corn farmers in the area.

1. The climatic conditions in the Giera-Banloc area differed from year to year.
2. The researched area has favorable conditions for maize cultivation.
3. Temperatures recorded during the vegetation period of maize are sometimes a stress factor and influence both the level of production and its quality.
4. If we analyze the recorded harvest data, we can see that the highest harvest of 8550 kg / ha was made for the hybrid P0268.
5. KAPITOLIS and KASHMIR hybrids produced over 6200 kg / ha.
6. The value of MMB is one of the most important and stable components of maize production, a synthetic indicator of the general adaptability of local conditions.
7. During the two years of experimentation 2019-2020, the average value of the mass of one thousand grains achieves higher values for the hybrids P0268 of 208 g and P9757 of 199 g.
8. The value of the main production is directly proportional to the capitalization price, falling between 4393 lei / ha and respectively 5985 lei / ha.
9. The production costs were depending on the hybrid being between 3300 lei / ha for the hybrid LG30.369 and 3700 lei / ha for the hybrid P0268.
10. The total profit ranged between 895 lei / ha in the case of the KAPITOLIS hybrid and 2285 lei / ha in the case of the P0268 hybrid. The highest profit rate was recorded for the hybrid P0268 of 162%.

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