AGRONOMIC RESPONSE OF MAIZE IN "TIMIS PLAIN"

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Abstract. *The aim of the paper is to present research on the testing of maize hybrids in the pedoclimatic area of Ohaba Forgaci, with a view to introducing them into culture and optimizing some technological chains in order to obtain economic and high-quality harvests; 11 maize hybrids from almost all maturity groups were tested. The maize seed used in the research tests had a high cultural value, in accordance with regulations currently in force. The conducted research was single-factor experiment carried out during 2018-2019 regarding the specification of technological chain particularities relevant for corn, specific for Ohaba Forgaci. From a geomorphological point of view, the researched perimeter is part of the physical-geographical unit "Banat-Crişana" which is situated in intermediate relief steps between the Western Carpathians and the edge of the Pannonian depression. The following main forms of relief are found in the respective sector in which the researched perimeter is located: hill, terrace, alluvial plain, meadow. From a thermal and rainfall point of view, the studied perimeter displays a temperate continental climate. The annual value of the aridity index "de Martonne" is 33.3 (exoreic regime), and for the annual hydro-climatic index the value 100 was obtained, a typical value for a balanced hydrological figure. The experiment was organized on a vertic-stagnic preluvosol type of soil, medium loam-clay / medium clay-loam, on medium-fine swelling clays from Ohaba Forgaci.*

Keywords : *maize, maize technology, climate*

INTRODUCTION

Corn is a cereal that is grown all over the world, and can be found up to altitudes of 3,900 meters. 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].

In our country, corn holds the most important place, being cultivated on 50% of the area occupied by cereals. [2,3,8].

According to FAO statistics, the distribution of consumption is: 21% in human food, 72% in animal feed and 7% in industry. Through the large areas it occupies, but especially through the productions made, mankind is dependent on corn, in providing food. [4].

Most of the corn production is used in animal feed (75-80%) as concentrated fodder, silage or green mass. [7].

Maize 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, pastes for glazing dragees, etc.) [5].

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. [6].

The whole plant harvested and chopped in the milk-wax maturation phase is used to obtain the silo, which is widely used in the feeding of dairy cows. The whole plant can also be used as a green meal [9].

MATERIAL AND METHODS

The research that is the object of the paper has as objective the testing of some hybrids in the pedoclimatic zone Ohaba Forgaci in order to introduce them in the culture and to optimize some technological links in order to obtain economic and high quality harvests. 11 corn hybrids were tested from close all maturity group, all part of the same lot.

The research carried out on a soil of the type Vertical-stagnant preluvosol, medium loam / clay loam, on medium-fine swelling clays [11].

Single-factor experiment were conducted using 11 maize hybrids from three maturity group as following

Semi-early: P 9415; P 9241; P 9537; P 9757; P 9874;
Semi-late: P 0023; P 0268; P 9911;
Late: P 0216; P 0412

The control hybrid was the DKC 4351 hybrid, being a semi-early hybrid.

The results were calculated and interpreted by analyzing the statistical sequence of variations.

The precursor plant was wheat cultivation.

Fertilization was done with 250 kg / ha DAP and 200 kg / ha ammonium nitrate applied to the brood. The herbicide was made with ADENGO.

Plowing and scarification preceded by weeding were performed immediately after harvesting the preceding plant. The preparation of the germination bed was done with the combine before 2 days before sowing.

Harvesting was carried out in the optimal period directly from the field, with the combine on variants.

RESULTS AND DISCUSSIONS

The summary results on the evolution of the maize crop from the comparative crop are given in Table 1 and Figure 1.

The level of harvests obtained for the 11 hybrids, belonging to the DEKALB-witness company and the 10 experienced Pioneer hybrids were over 11,000 kg / ha, proves that they are valuable hybrids, with great capacity to adapt to the pedoclimatic conditions in the area where they were carried out. research. The highest harvest of 12,145 kg / ha was obtained for the late hybrid P 0216, exceeding the harvest of the control hybrid DKC 4351 by 7% returning a difference of 778 kg / ha, statistically assured as very significant.

This indicates that the two hybrids mentioned, through the vegetation period they have the capacity to capitalize on the thermal potential from the vegetation period in the area and a good capacity to cover the climatic stress factors that appear during the vegetation period.

Table 1

Synthesis of harvest results 2018-2019

Maize Hybrid	Harvest kg / ha	%	The difference kg / ha	The meaning
DKC 4351	11367	100	MT	
P 9415	11008	97	-359	000
P 9241	10718	94	-649	000
P 9537	10851	104	-516	000
P 9757	11715	103	349	XXX
P 9874	11364	100	-3	
P 0023	11954	105	587	XXX
P 0268	10322	90	-1045	000
P 9911	11504	101	137	XX
P 0216	12145	107	778	XXX
P 0412	11127	98	-240	000

DL 5% = 91 kg / ha DL 1% = 124 kg / ha DL 0.1% = 168 kg / ha

Fig. 1. Synthesis of harvest results obtained for maize hybrids.

The smallest crop of hybrids studied, it was obtained for the hybrid P 0268, of 10,322 kg / ha, with 10% below the harvest of the control hybrid, the difference of 1045 kg / ha being significantly negative. Analyzing the fact that the yield for the semi-late hybrid of over 10,000 kg / ha is very good economically, the hybrid can be used successfully in the cultivation area.

Among hybrids The P 9757 hybrid in which the harvest was 11,715 kg / ha exceeding by 3% the yield obtained for the control hybrid, with a difference of 349 kg / ha ensured statistically as very significant

CALCULATION OF THE MAIN INDICATORS OF ECONOMIC EFFICIENCY

In order to highlight the profitability of corn grain cultivation, we considered it necessary to perform the calculation of the main indicators of economic efficiency.

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 "production costs" indicator, the cost estimate for the experimental cycle has been prepared. The average price from the two experimental years was 0.40 lei / kg table 2.

The highest production was for the hybrid**P 0216**, this being 12,145 kg / ha, and the lowest production was obtained for the hybrid **P 0268**, where only 10322 kg / ha were obtained.

The value of the main production is directly proportional to the capitalization price, falling between 4287 lei / ha and 4858 lei / ha, respectively. The production costs were depending on the hybrid, being between 2587 lei / ha for the DKC 4351 hybrid and 2744 lei / ha for the P hybrid. 9757. The total profit ranged between 1482 lei / ha in the case of the hybrid P 0268 and 2129 lei / ha in the case of the hybrid P 0216. The highest profit rate was recorded for the hybrid P 0216 of 78.01%

Table 2

Calculation of the main indicators of economic efficiency in corn grains

Maize Hybrid	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 (%)
DKC 4351	11367	4547	2587	0.22	1960	75.76
P 9415	11008	4403	2721	0.24	1682	61.81
P 9241	10718	4287	2685	0.25	1602	59.66
P 9537	10851	4340	2597	0.23	1743	67.11
P 9757	11715	4686	2744	0.23	1942	70.77
P 9874	11364	4545	2608	0.22	1937	74.27
P 0023	11954	4782	2708	0.22	2074	76.58
P 0268	10322	4129	2647	0.25	1482	55.98
P 9911	11504	4602	2713	0.23	1889	69.62
P 0216	12145	4858	2729	0.22	2129	78.01
P 0412	11127	4451	2680	0.24	1771	66.08

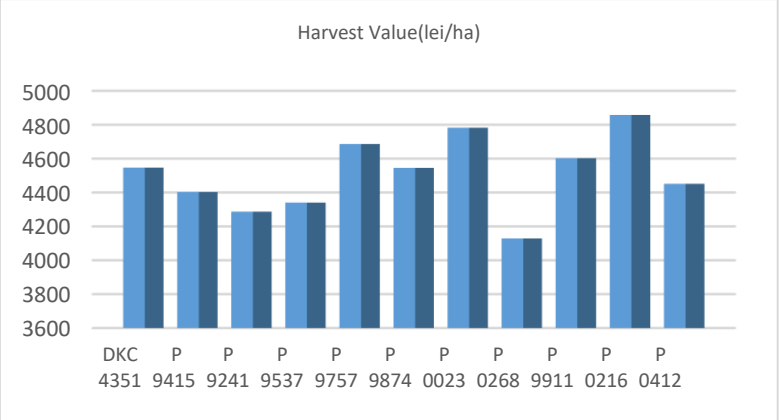

Fig. 2. The value of the main production lei / ha

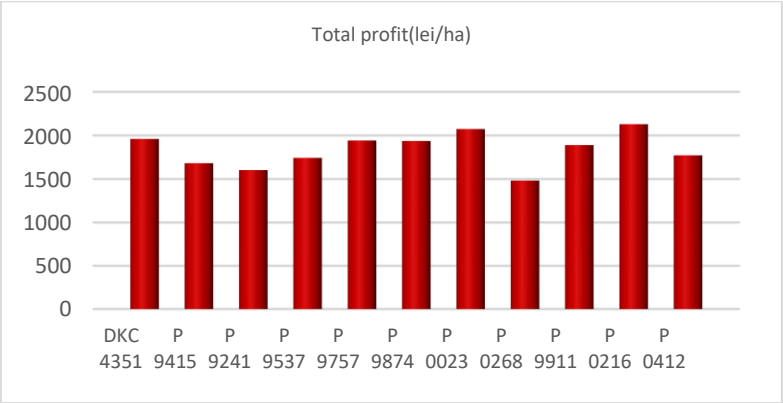

Fig. 3. Total profit lei / ha.

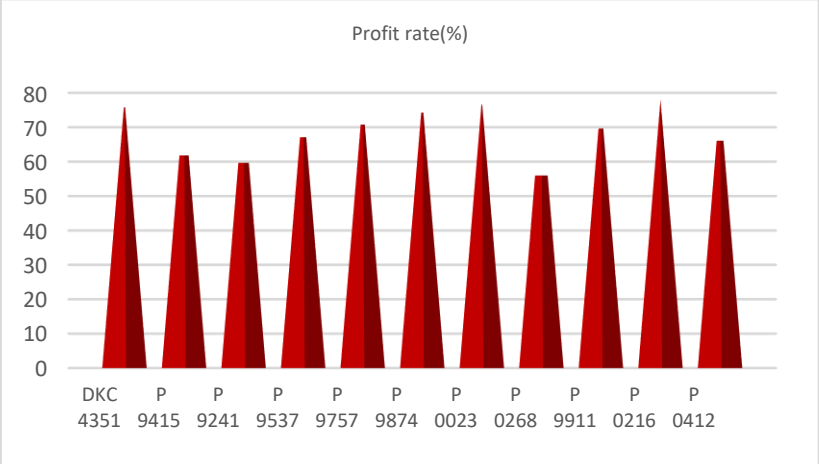

Fig. 4 Profit rate(%)

CONCLUSIONS

The research was carried out in the Lugoj area (Ohaba Forgaci), located in the eastern part of Timiș County, a territory located in the Timiș County Plain. The climate is temperate continental. The annual value of the "de Martonne" aridity index is 33.3 (exoreic regime), and for the annual hydroclimatic index the value 100 was obtained, a characteristic value for a balanced hydrological balance. The soil type is a vertical-stagnant preluvosol, medium loamy clay with a humus content of 3.26% pH-5.45-7.75 and a degree of base saturation of 100%.

The research was carried out on maize cultivation, the plant with a large share in the area aiming to contribute to the establishment of the structure of hybrids, in order to have a stability of the crops, compared to the annual climatic deviations. The comparative culture contained 11 maize hybrids, from almost all precocity groups, from early to late.

The results obtained lead to the following conclusions:

- the average productions in the two years divided the hybrids between 10322 kg / ha for the extra-early hybrid P 0268 and 12,145 kg / ha for the late hybrid P 0216. The level of productions demonstrated their high production capacity;
- the average production for the two years for semi-early hybrids (P 9757,) was 11715 kg / ha, for semi-late hybrids (P 0023) it was 11957 kg / ha, it is found that the yields were close, and for the late hybrid P 0216 harvest was 12,145 kg / ha;
- The value of the main production is directly proportional to the capitalization price, ranging between 4287 lei / ha and 4858 lei / ha, respectively.
- The production costs were depending on the hybrid, being between 2587 lei / ha for the DKC 4351 hybrid and 2744 lei / ha for the P 9757 hybrid.
- The total profit ranged between 1482 lei / ha in the case of the hybrid P 0268 and 2129 lei / ha in the case of the hybrid P 0216. The highest profit rate was registered for the hybrid P 0216 of 78.01%.
- In conclusion, it can be appreciated that the studied hybrids are valuable and can be recommended for agricultural practice.

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