

STUDY REGARDING THE OPTIMIZATION OF FERTILIZATION FOR THE POPCORN CULTIVATED ON TIMIȘ PLAIN

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Abstract: Maize occupies the third place among the cultivated plants, which means according to the date obtained from FAO, over 159 millions of hectares cultivated land generating a production of over 1300000 thousand tons. 5% of the world's total maize production is industrially processed, this percentage also including the popcorn. The surface cultivated with maize in Romania was of 2345.5 thousands ha in 2009 and the average yield obtained was of 3406 kg/ha, respectively a total production of 7987.7 thousand tons. Popcorn belongs to the *Zea mays* L. species, *everta* Sturt Bailey convariety (sin. *microsperma* Köern. The varieties of this convariety differ in grain and rachis colour and in having a jaw-like prolongation or not. The most spread variety is *oryzoides*, with reddish grains, white colour and white rachis. The biologic material studied consisted in the varieties Turda, Jebel, Bărăgan, Kesckemeti and Little jewels. The specialized literature does not present data regarding popcorn fertilization, which is what determined us to

conduct the present study on a cambic chernozem, wet-phreatic, with poor salinization under 100 cm, situated in the Timiș Plain region. The paper presents the crop results for the five varieties, cultivated with four fertilization levels. In the researched region the yields varied between 1057 kg/ha for Kesckemeti variety, the variant fertilized with $N_0P_{60}K_{60}$ and 4092 kg/ha for Turda variety fertilized with $N_{225}P_{60}K_{60}$. The nitrogen fertilizers applied on a base of $P_{60}K_{60}$ increased the average yield of the 5 varieties with 22% (N_{75}) – 33% (N_{150}) și 47% (N_{225}). The increase in grains for 1 kg was of .81 kg for the variant fertilized with N_{75} , of 4.9 kg for the variant fertilized with N_{150} and of 4.7 kg for the variant fertilized with N_{225} . The paper presents the results of the experiments conducted on the influence of fertilization on the number of plants with 1 and 2 corn cobs, on the percentage of sterile plants and on the evolution of the mass of 1000 grains and of the hectolitre mass.

Key words: *Zea mays everta* Sturt, fertilization.

INTRODUCTION

Although popcorn is one of the oldest cultivated corn varieties, the surface cultivated with popcorn (*Zea mays* L., convarietatea *everta*) is restricted because of the little production capacity. The increase in the quantity demanded noticed in the last decades made it necessary to create more productive popcorn varieties (hybrids) and to perfect a specific cultivation technology, this research being part of this field:

MATERIAL AND METHODS

The biologic material studied belongs to the species *Zea mays* L., *everta* Sturt convariety, of the following sources:

- Turda – *gracillima* Körn variety;
- Jebel – *xanthornis* Körn variety;
- Bărăgan – *gracillima* Körn variety;
- Kesckemeti – *xanthornis* Körn variety;
- Little jewels – *melanornis* Körn variety;

The experiments were bifactorial, with three repetitions, in which the A factor is

represented by the fertilization even, with four graduations ($N_0P_{60}K_{60}$, $N_{75}P_{60}K_{60}$, $N_{150}P_{225}K_{60}$ and $N_{225}P_{60}K_{60}$), and the B factor is represented by the five mentioned biotypes. The previous culture was the autumn wheat. The applied technology was the current one, with the remark that the sowing was done with a density of 60.000 grains/ha in the second decade of April.

RESULTS AND DISCUSSION

The yield results are mentioned in Table 1.

Table 1

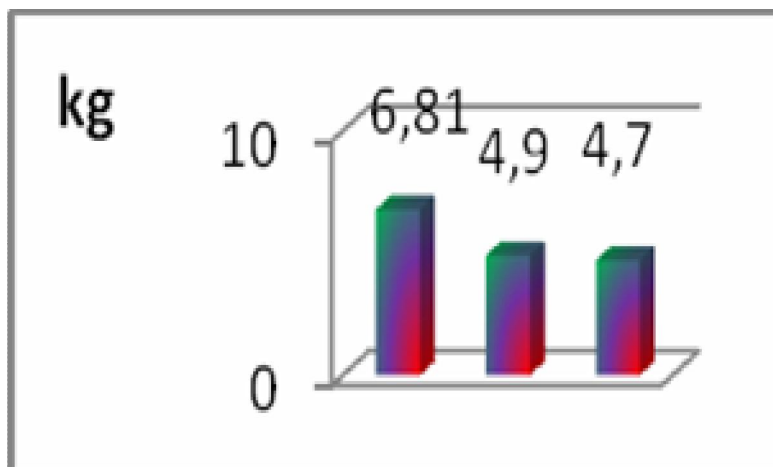
Popcorn grain yield obtained in Jebel

A Factor	B Factor					A Factor Averages			
	TURDA	JEBEL	BARAGAN	KECSEMETY	LITTLE JEWELS	Yield kg/ha	%	Dif. kg/ha	Signification
A1- $N_0P_{60}K_{60}$	2961	2373	2886	1057	2017	2258	100		
A2- $N_{75}P_{60}K_{60}$	3537	2856	3414	1357	2681	2769	122	511	XXX
A3- $N_{150}P_{60}K_{60}$	3517	3130	3538	1665	3135	2997	133	739	XXX
A4- $N_{225}P_{60}K_{60}$	4092	3343	3822	1893	3504	3330	147	1072	XXX

DL5% = 186 DL1% = 248 DL 0,1% =323

B Factor averages

Specification	TURDA	JEBEL	BARAGAN	KECSEMETY	LITTLE JEWELS
Yield kg/ha	3526	2925	3415	1491	2834
%	100	83	97	42	80
Difference kg/ha		-601	-111	-2035	-692
Signification		000	0	000	000



N ₀	N ₇₅	N ₁₅₀	N ₂₂₅
P ₆₀ K ₆₀ DL5% = 83 DL1% = 111 DL 0,1% =144			

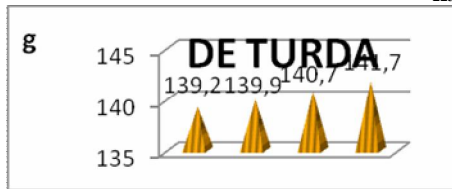
Increase in grains for 1 kg nitrogen active substance

The results show an increase in yield with very significant differences as the nitrogen doses applied on a bases of $P_{60}K_{60}$ increases, that is with 511 kg/ha in the variant fertilized with N_{75} , 739 kg/ha in the variant fertilized with N_{150} and with 1072 kg/ha in the variant fertilized with N_{225} .

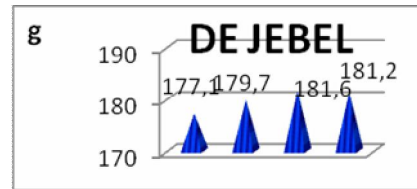
Figure 1 shows the mass variation of 1000 grains. According to this figure, the fertilization favourably influenced the mass of 1000 grains in the case of all five biotypes.

Figure 2 shows the hectolitre mass evolution depending on source and fertilization.

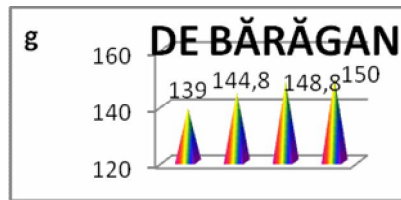
The values exceeded 80 kg/hl for all sources, reaching up to 84.8 kg/hl for the variety coming from Turda in the variant fertilized with N₂₂₅P₆₀K₆₀.



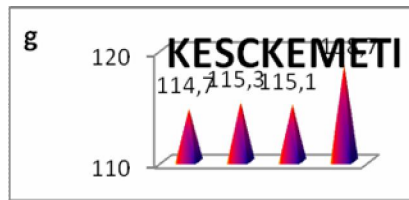
139,2	139,9	140,7	141,7
N ₀	N ₇₅	N ₁₅₀	N ₂₂₅
P ₆₀ K ₆₀			



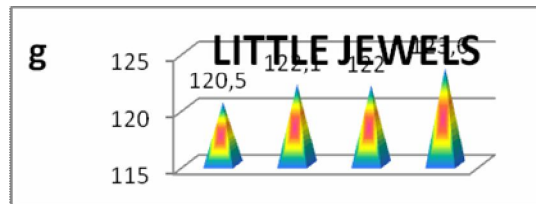
177,1	179,7	181,6	181,2
N ₀	N ₇₅	N ₁₅₀	N ₂₂₅
P ₆₀ K ₆₀			



139,0	144,8	148,8	150,0
N ₀	N ₇₅	N ₁₅₀	N ₂₂₅
P ₆₀ K ₆₀			

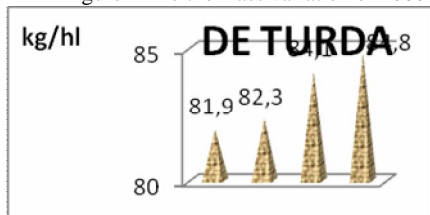


114,7	115,3	115,1	118,7
N ₀	N ₇₅	N ₁₅₀	N ₂₂₅
P ₆₀ K ₆₀			

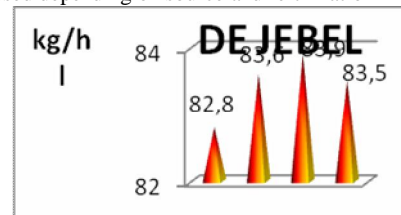


120,5	122,1	122,0	123,6
N ₀	N ₇₅	N ₁₅₀	N ₂₂₅
P ₆₀ K ₆₀			

Figure 1 The the mass variation of 1000 grains assessed depending on source and fertilization



81,9	82,3	84,1	84,8
N ₀	N ₇₅	N ₁₅₀	N ₂₂₅
P ₆₀ K ₆₀			



82,8	83,6	83,9	83,5
N ₀	N ₇₅	N ₁₅₀	N ₂₂₅
P ₆₀ K ₆₀			

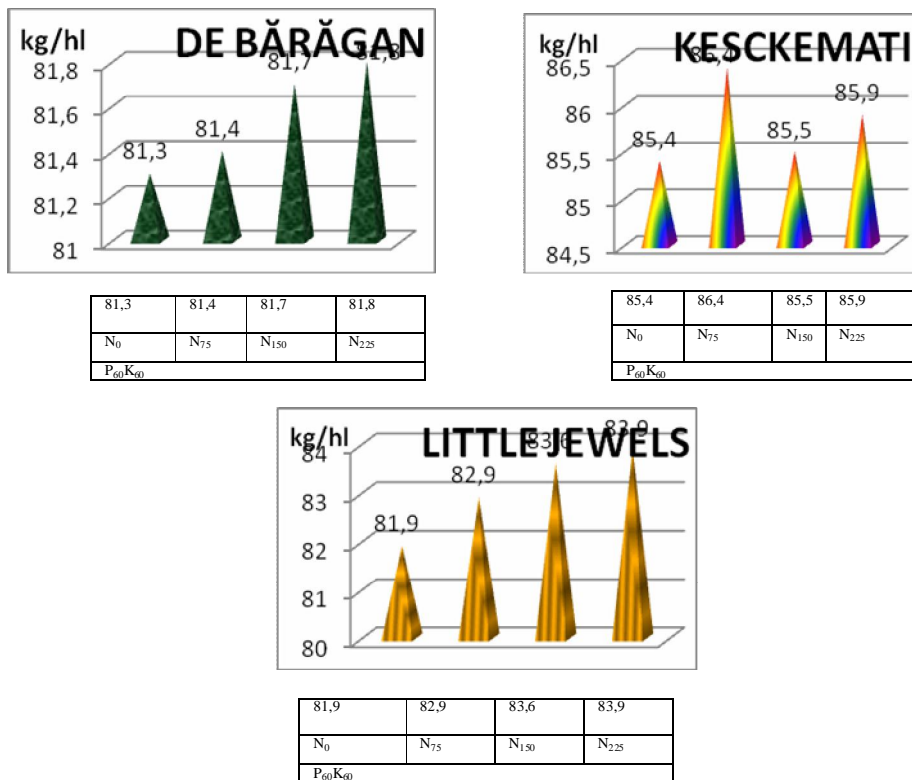


Figure 2 Hectolitre mass variation assessed depending on source and fertilization

CONCLUSIONS

The researches popcorn varieties registered economically efficient yields, which motivates the farmer to keep cultivating them.

Nitrogen fertilizers increased the average yield of the five sorts with 22% in the variant fertilized with N₇₅P₆₀K₆₀, with 33% in the variant fertilized with N₁₅₀P₆₀K₆₀ and with 47% in the variant fertilized with N₂₂₅P₆₀K₆₀.

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