THE INFLUENCE OF THE NITROGEN AND PHOSPHORUS DOSES ON THE PRODUCTION AND THE QUALITY AT THE ZEA MAYS EVERTA PERLAT 625

INFLUENȚA APLICĂRII DIFERITELOR DOZE DE AZOT ŞI FOSFOR ASUPRA PRODUCȚIEI ŞI CALITĂȚII BOABELOR LA ZEA MAYS EVERTA PERLAT 625

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Abstract: *The use of the popcorn at large scale determined us to study the Zea Mays hybrid Everta Perlat 625. There were administered various nitrogen and phosphorus doses in order to obtain significant results on the quantity and quality of the corn varieties used for popcorn and of course its grains expanding properties. In this paper there will be presented a series of significant results obtained through the use of various nitrogen and phosphorus in two important development stages, in two systems – irrigated and in natural conditions, cultivated on a silt-sandy soil determining as well its cultivation possibilities.*

Rezumat:*Consumarea floricelor de porumb (pop corn) pe scară largă, ne-a determinat să luăm în studiu hibridul Zea mays everta Perlat 625, administrându-i diferite doze de azot şi fosfor pentru obținerea de rezultate cât mai semnificative în ceea ce priveşte cantitatea şi mai ales calitatea boabelor porumbului pentru floricele şi de asemenea urmărirea gradului de expandare ale acestor boabe. În această lucrare va fi prezentată o serie de rezultate semnificative obținute prin administrarea de diferite de doze de azot şi fosfor în două momente importante din viața plantei, în două sisteme irigat şi neirigat, cultivat pe un sol luto-nisipos, precum şi posibilitățile de cultivare a acestuia.*

Key words: ***hibrid, doze de azot si fosfor, parameters,*** *irrigation system, non-irrigated system*
Cuvinte cheie: *hybrid, doze de azot si fosfor, parametrii, system irigat, system neirigat*

INTRODUCTION:

The Everta co-variety was cultivated since prehistoric times, being after some researchers the first cultivated corn. The species *Zea mays* everta Sturt, (popcorn variety) which has small grains with 40-140 grams MMB, shiny, with colours from silver-white, sometimes yellow-orange or red, blue and even black. Grains have different shapes, the endosperm has a corn texture, except a small portion around the embryo. The species has a raised rising capacity. Today, the corn used for popcorn, is profitable for a lot of producers and traders.

MATERIAL AND METHOD

The trials were placed at the Botanical Garden of the University of Craiova on silt-sandy soil using the Perlat 625 hybrid. There were administered various nitrogen and phosphorus doses in order to obtain significant results on the quantity and quality of the corn varieties used for popcorn and of course its grains expanding properties.

STUDIED PARAMETERS:

I:factor A- irrigation system
-A1-irrigation system
-A2- non-irrigated system

II: factor B- the application of fertilizing dosage
-B1- N_0P_0
-B2- $N_{60}P_{40}$
-B3- $N_{80}P_{60}$
-B4- $N_{100}P_{80}$
-B5- $N_{120}P_{100}$

III: factor C- gradul de expandare

The trial is polifactorial, arranged in the field on the under divided plots method studying three factors. By combining the three factor's degrees, resulted 10 variants in 4 repetitions, after the under divided plots method on a row. The studied soil had a 6,10 pH, Ah=0,9, Sb=7,6, N2=2,1, P2O5=7,9, H2O=11, H=1,08.

- Number of plants/plot of land;
- Time of blooming;
- Time of raw silken;
- Uniformity of raw silken;
- Height of plants;
- Height of corn cob insertion;
- Number of resistant plants in case of drought;
- Physiological raw silken period;
- Number of untimely dried plants;
- Note of maturity plants;
- Number of lacerated plants.

Year 2007 was a very dry year, which determined low yields especially in natural conditions. The influence of the technology used – natural conditions (without irrigations), the use of fertilizers over the standard trial N0P0 where the estimated production was 780 kg grains/hectare, the yield increased by using N60P40 with 7,8% and by using N80P60 with 19,8%. The maximum quantity applied - N120P100 determined a significant increase of the yield by 36, 2%.

Tabel 1.

Influence of the employed non irrigated system and of the applied fertilisers on the production of crop grains at the Perlat 625 hybrid, in 2007

Variants	Yield Nonirrigated (kg/ha)	Relative yield (%)	Difference (kg/ha)	Signiff.
N_0P_0	780	Control	-	control
$N_{60}P_{40}$	810	103,8	30	-
$N_{80}P_{60}$	856	109,7	76	*
$N_{100}P_{80}$	892	114,3	112	**
$N_{120}P_{100}$	921	118	141	***

In irrigated conditions, the standard yield is 1720 kg/ha, and the gradual use of fertilizers determined significant increases of the yield by percentages between 20, 5% to 49, 6%.

Tabel 2.

Influence of the employed non irrigated system and of the applied fertilisers on the production of crop grains at the Perlat 625 hybrid, in 2007

Variants	Yield irrigated (kg/ha)	Relative yield (%)	Difference (kg/ha)	Signiff.
N_0P_0	1720	martor	-	martor
$N_{60}P_{40}$	1780	103,4	60	*
$N_{80}P_{60}$	1890	109,8	170	**
$N_{100}P_{80}$	2010	116,8	290	***
$N_{120}P_{100}$	2065	120	345	***

The yield of the corn used for popcorn was significant in irrigated conditions as well as the grain's quality and expanding properties, highly recommending this hybrid for cultivation.

Figure 1. *Zea Mays Everta* Perlat 625

Figure 2. Analysis of laboratory

ANALYSIS OF EXPANSION WITHIN THE LABORATORY

After the maize beans were ingathered (100 beans), they were subjected to determinations of expandability at 60°C and 25% humidity. In this way it is performed the first determination, using gas flame, and, after a period of 2 minutes, it results: 32 very well expanded beans, 30 medium expanded beans and 38 unexpanded beans. If the exposure time increases the beans are burnt.

The determination is taken again but an electric stove is used this time. The expansion period is of 4 minutes and the results are the following: 62 expanded beans, 15 medium expanded beans and 23 unexpanded beans. For the ingathered beans in these humidity conditions which return to consumption, a slower and longer heating (4 minutes), but:

Table 3

The expansion results of pop corn beans depending on Humidity (H) and Temperature (T)

Quantity	H %	T°C	Time of exposure	Source of heating	Degree of expansion		
100 beans	25%	60°C	2 minutes	Gas flame	Very well	Medium	Unexpanded
					32	30	38
100 beans	25%	60°C	4 minutes	Electric stove	62	15	23

For acquiring better results, it is recommended that the corn cobs are ingathered when they reach their physiological maturity and the humidity of beans is of 12.9%.

Picture 5.The process of obtaining Perlat 625 beans at 12.9% humidity

The same determinations are effectuated, using an electric stove and the following results are obtained:

For a quantity of 100 beans at 12.9% humidity, using gas flame, after a period of 1 minute, the following results are obtained: 87 very well expanded beans, 11 medium expanded beans and 2 unexpanded beans. The determination is repeated, but this time an electric stove is used and the following type of beans are obtained: 78 very well expanded beans, 10 medium expanded beans and 12 unexpanded beans.

The same determinations are effectuated, using an electric stove and the following results are obtained:

For a quantity of 100 beans at 12.9% humidity, using gas flame, after a period of 1 minute, the following results are obtained: 87 very well expanded beans, 11 medium expanded beans and 2 unexpanded beans. The determination is repeated, but this time an electric stove is used and the following type of beans are obtained: 78 very well expanded beans, 10 medium expanded beans and 12 unexpanded beans.

Tabel 4

The expansion results of pop corn beans depending on Humidity (H) and Temperature (T)

Quantity	H %	T°C	Time of exposure	Source of heating	Degree of expansion		
100 beans	12,9%	60°C	1 minutes	Gas flame	Very well	Medium	Unexpanded
					87	11	2
100 beans	12,9%	60°C	2 minutes	Electric stove	78	10	12

CONCLUSIONS:

- The combined influence between hybrid and culture technology (irrigation and applying the right dose of fertilizers) determines modifications of the main physiological processes which lead to obtaining maximum production when rationally applying dose of fertilizers.
- The studied hybrid acted differently from the culture technology point of view, the registered values from the physiological point of view were different, each of them using the right quantity of fertilizer.
- The combined influence of culture system (irrigated non-irrigated) as well as the applied doses of fertilizers determined, from the quantitative point of view, remarkable differences in the case of all qualitative features of the Perlat 625 hybrid.
- We highly recommend Perlat 625 hybrid for production, when using an irrigated system and applying a maximum dose of N120P100 and N100P80 for an economic efficiency.
- Using the pop corn on a large scale in order to obtain financial advantages.
- For acquiring better and more economical results, the maize ingathering and preserving until it reaches the value of 13% humidity within beans production.
- The use of natural gas or other high caloric power sources as a source of expansion.
- In order to obtain a better result, it is recommendable to use a certain dose of fertilizers and an irrigated crop system.

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