

## RESEARCH REGARDING THE INFLUENCE OF THE FERTILIZATION SYSTEM ON MAIZE PRODUCTION IN BRĂILA PLAIN

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### Abstract

*Due to the fact that the fertilization system of the maize plant is directly involved in the growth and development processes, they influence both the fertility of the soil and the yields obtained.*

*The main objective for the research conducted in the crop year 2008-2009 was to determine what is the effect of chemical fertilization in the climatic conditions of this specific year, particular to the Râmnicelu area from Brăila Plain, on PR36R10 and Florencia maize hybrids.*

*The polyfactorial experiment was made here in order to investigate and estimate the influence of the fertilization factor on the crops that were obtained, analyzing the differences between the productions obtained in the crop year 2009 and 2010.*

*The average yield obtained was directly influenced by climatic conditions, rain and by the amount of fertilizer used.*

*In 2009, the average yield produced for the Florencia hybrid varied from 5800 kg/ha for the unfertilized version, to 9280 kg/ha for the fertilized ones while the production for the PR36R10 hybrid registered a growth of 2130 kg/ha for the version placed on an agrofond of  $N_{100}P_{50}$ .*

### INTRODUCTION

In the agricultural production, natural and anthropogenic factors act simultaneously, not separately (Dimancea St., 1966).

In agriculture, chemical fertilizers can be used to supply plants with nutritive elements but only as a complement to other agrophytotechnical measures like biological nitrogen fixation and crop rotation.

Maize is one of the most important plants for a country's economy due to the fact that it can be used as food for both humans and animals. That is why, in 1994, at a National Maize Growers Association Conference they said: "Life without maize would be a lot tougher".

The yield of maize however, varies from variety to variety, location to location and also depends on the availability of essential factors such as soil nutrient status and application of fertilizers. Nitrogen is a vital plant nutrient and a major yield-

determining factor required for maize production (Adediran and Banjoko, 1995; Shanti et al., 1997).

Making this experiment in field conditions was the primary mean of establishing the optimal dose of fertilizer to be used in the specific soil conditions of Râmnicelu area.

## **MATERIAL AND METHODS**

All the weather data, regarding the temperature, air humidity and rain was provided by SCDA Brăila.

The research on the influence of the dose of fertilizer was made on a soil that is specific to this area: aluviosol.

The experiment has been materialized on field following the method of parcels subdivided in 3 repetitions with two factors.

The first factor was represented by the hybrid with two graduations:

Factor A - the hybrid:  $a_1$  - Florencia;  $a_2$  - PR36R10. The second factor was represented by the agrofond with 2 graduations:  $b_1$  - unfertilized and  $b_2$  - fertilized with  $N_{100}P_{50}$ .

The cultivation technology was the same for both hybrids, placed in an unirrigated regime, and being fertilized with NPK complex fertilizer.

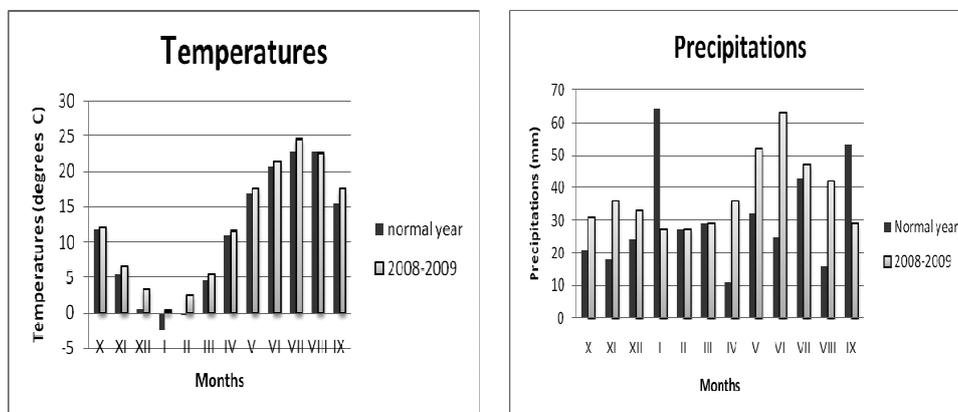
## **RESULTS AND DISCUSSION**

The hydro-climatic characterization of the crop year 2009 highlighted a year with high temperatures that exceeded the normal limit with  $1.2^{\circ}\text{C}$  (Figure 1).

From all the recorded temperatures it has been found that there were no negative monthly average temperatures in the cold period. The minimum was  $0.3^{\circ}\text{C}$  in January.

Across the whole agricultural year the total rainfall was 363 mm, below the normal limit (447 mm) with 84 mm, attesting a year below average but highly contrasting. In April, May and June, the rainfall values registered, situated between 25 and 38 mm, were the lowest compared to the normal limit. This is why this crop year was described as poor when it comes to precipitations, and because of the low pluviometric input in the phenophase, the grain production was affected.

The soil on which the experiment was located was gley typically immersed. On the ploughed stratum, the soil was alkaline, eith 8.02 pH value, the humus content was good (4.12%), very well supplied with nitrogen (0.29%), phosphorus (42 ppm) and potassium (190 ppm).



**Fig. 1. Climate elements - temperatures and precipitations**

Following the results obtained and materialized in the Table 1 it has been found that both PR36R10 and Florencia hybrids have registered significant production increases up to 3.5 t/ha. Thus, the Florencia hybrid has registered a production increase of maximum 3.4 t/ha in the first repetition compared with the unfertilized version while the PR36R10 hybrid has registered an increase of 2.13 t/ha.

*Table 1*

**Influence of fertilizer rate on the maize crop yield**

Hybrid Rate	Florencia (kg/ha)	Dif. (kg/ha)	Signif.	PR36R10 (kg/ha)	Dif. (kg/ha)	Signif.
N <sub>0</sub> P <sub>0</sub>	5810	Control	-	6123	Control	-
N <sub>100</sub> P <sub>50</sub>	9279	3469	***	8253	2130	***

*DL5% = 258 kg/ha; DL1% = 599 kg/ha; DL0.1% = 1881 kg/ha*

Fertilization has positively influenced the productions obtained, observing a significant relationship between the level of production and the specific climatic conditions registered in the vegetation period of both hybrids. The correlation ratio between the 2 analyzed factors (the hybrid and the fertilization system) was 0.64, the yields obtained in all repetitions following the regression curve, which conducted to the conclusion that the “a” factor is dependent on the “b” factor.

**CONCLUSIONS**

1. The research conducted certifies that the production gain increases in the case of chemical fertilization, ranging between 1.4 and 1.6 t/ha.
2. A good result on grain production was recorded in hybrid PR36R10, this one satisfying better adaptability conditions than the Florencia hybrid.

3. The agricultural year of 2009 was characterized, in the vegetation period, as being extremely dry. This characteristic has negatively influenced the grain production obtained. In comparison with the agricultural year of 2010, when both hybrids have been observed in the same technological conditions, the yields obtained registered significantly higher values of approximately 12 t/ha for PR36R10 and 11.8 t/ha for the Florencia hybrid.
4. The results obtained from these studies showed more emphasis on the importance of N and P for maize, high fertilizer input is one of the conditions required to obtain maximum yield of Florencia and PR36R10 hybrid maize.
5. Production variations were influenced by both climate and the application of chemical fertilization, apply fertilizer based on nitrogen and phosphorus led to significant increases in production.

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