

STUDIES ON THE INFLUENCE OF NITROGEN FERTILIZATION AND SOIL TYPE ON CORN PRODUCTION IN CONDITIONS OF NE BĂRĂGAN

STUDII PRIVIND INFLUENȚA FERTILIZĂRII CU AZOT ȘI A TIPULUI DE SOL ASUPRA PRODUCȚIEI DE PORUMB BOABE ÎN CONDIȚIILE BĂRĂGANULUI DE NORD- EST

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Abstract. *To achieve the objectives and field experiences are conducted in the period 2010 -2011, the Braila county soil types vary in climatic conditions of the agricultural year, which was characterized as favorable in terms of rainfall, for corn, aimed to influence the dose of nitrogen fertilization and soil type on maize production. Following the results achieved it was found that an important role in the increased production of corn to nitrogen fertilization was level. The highest production was recorded on cambic chernozem soil at doses of N_{80} kg/ha, which resulted in a significant production increase of 46.6% compared to version control, unfertilized*

Key words: corn, nitrogen fertilisation, soil types

Rezumat. *Pentru realizarea obiectivelor propuse s-au efectuat experiențe de câmp în perioada 2010 -2011, pe teritoriul județului Braila, tipurile de sol fiind diferite. În condițiile climatice ale anului agricol 2010 -2011, care s-a caracterizat ca fiind favorabil din punct de vedere al precipitațiilor, pentru cultura porumbului, s-a urmărit influența dozei de fertilizare cu azot și a tipului de sol asupra producției de porumb. În urma rezultatelor înregistrate s-a constatat că, un rol important în creșterea producției de porumb l-a avut nivelul de fertilizare cu azot. Cea mai mare producție a fost înregistrată pe solul cernoziom cambic la doze de N_{80} kg/ha s.a , ceea ce a determinat la un spor de producție semnificativ de 46.6 % față de varianta martor, nefertilizată.*

Cuvinte cheie : porumb, fertilizare cu azot, tipuri de sol

INTRODUCTION

Crop fertilization is an important link in which acts directly on production efficiency. (Borlan et al., 1994) Thus, the intake of nutrients as fertilizers applied to most plants, the soil types in our country, nitrogen was and who strongly influenced the production of corn that is mainly induced by nitrogen fertilizers and yet closely interrelated with the specific conditions of culture and state of vegetation (Calancea, 1990; Goian et al., 2004).

Thus, agricultural production, both natural factors and those by which man comes not act in isolation, but together. (Dimancea, 1966), leading to consistent conclusion that inorganic fertilizers exerts a strong influence on growth processes, development of plants. (Stefano et al. 2004).

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Research executed into agriculture in this area have had to establish an optimal nitrogen fertilization based on soil type, the natural fertility of their.

MATERIAL AND METHOD

Research has been conducted in the period 2010-2011, the agricultural area Baraganul de nord-est on different soil types. The first experimental field was located on cambic chernozem soil the second field on aluviosol. The biological material used was the hybrid PR37Y12.

The experimentally variants

Factor A - soil type (chernozem cambic and aluviosol)

Factor B - level of fertilization (unfertilized, N₄₀ kg / ha, N₈₀ kg / ha).

As a method of settlement of experiments has been used subdivided parcels,

Interpretation of results was done using analysis of variance and multiple comparison (MSTAT-C), regressions and correlations (statistical package SAS / SAT, PASW).

RESULTS AND DISCUSSIONS

The two types of soil chemical analyzes were performed on the ground watching the percentage of total nitrogen, pH, amount of mobile phosphorus and humus on the tread depth of 0-40 cm. Media obtained from analysis of the main agrochemical soil is shown in table 1.

Table 1

Principal agrochemical properties of soils

Type of soil	pH	Humus %	N total (%)	P _{mobil} ppm	K _{mobil} ppm
cambic chernozem	8,20	3,2	0,202	49,3	237,1
aluviosol	8,1	4,61	0,264	76,4	262,2

According to agrochemical analysis of soils under study shows that soil reaction is slightly alkaline, with values ranging between 8.1 and 8.2.

Soil with humus supply proved to be well stocked at aluviosol 4.61% while the cambic cermoziomul supply was low to medium, with values 3.2%.

Two soil types have been a good supply of nutrients (middle nitrogen and good phosphorus and potassium).

A major role in growth and development of the corn had recorded precipitation during the growing season (fig. 1).

In all the years of experimentation, the total average intake of 515 mm rainfall was above the multiannual (446.9 mm) to 67.9 mm, testifying in favor of this crop year, but unevenly distributed precipitation.

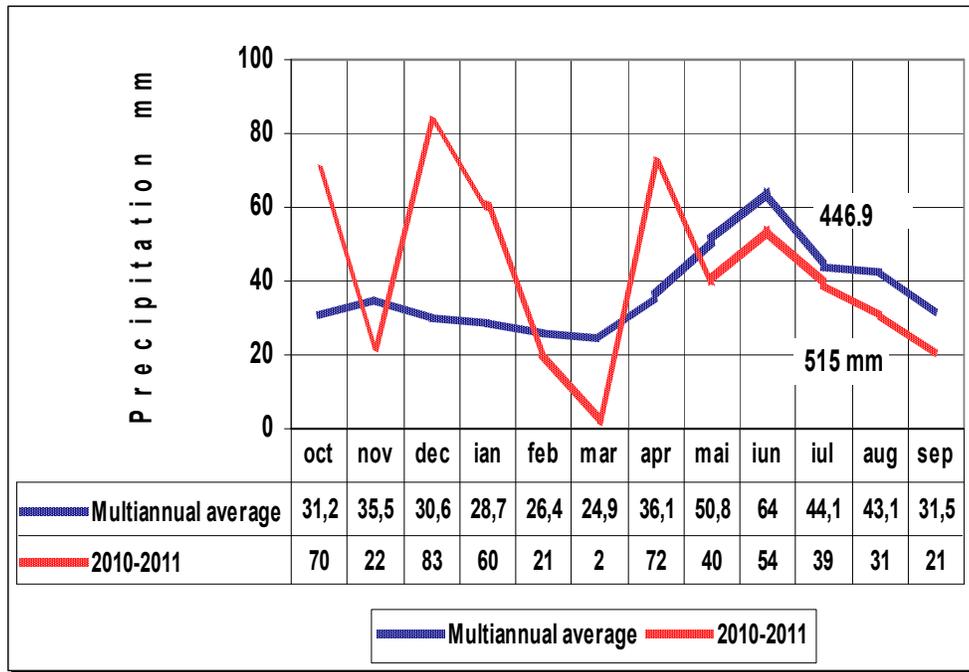


Fig 1 - Precipitation recorded in the experimental field

Analysis of variance (table 2) for the production of maize revealed significant action of the soil type. It also highlights the very significant action of nitrogen fertilization and soil type interaction with fertilization with this type of fertilizer applied to corn.

Table 2

Analysis of variance

variability	SP	GL	S ²	test F
repetition	0.211	2	0.006	-
Soil	0.580	1	0.580	36.175 *
error	0.032	2	0.016	
level fertilization	18.204	2	9.101	1108..623 **
Soil x nitrogen fertilization level	0.668	2	0.334	40.478 **
error	0.427	8	0.053	

Table 3 shows the area under agriculture Bărăganul de sud-est toward superiority aluvisol cambic chernozem soil with a production increase of 5.4%, in the context of applying the same levels of fertilization.

Table 3

Influence of soil type on production

Variants	Production (t/ha)	Production %	Difference		Significance
			t/ha	%	
Cambic Chernozem	7.57	105.4	0.39	5.4	*
Aluviosol	7,18	100	mt	100	Control

LSD 5% = 0.444t/ha LSD 1% = 0.635t/ha LSD 0.1% = 0.890t/ha

Fertilization level (table 4) significantly affect maize production. It is noted that regardless of the type of soil applied fertilizare increase corn production was significant ($R = 0.9866$ ***) of 30.4 kg per kg N applied.

The highest growth of 38.3% recorded productive dose of N_{80} kg / ha, while having the highest insurance statistics from unfertilized variant. An intermediate position is occupied by kg N_{40} / ha crop with a significant increase of 13.9%

Table 4

Influence of fertilization on production

Variants	Production (t/ha)	Difference		Significance
		t/ha	%	
N0	6.26	Martor	100	Control
N40	7.13	0.87	13.9	**
N80	8.69	2.40	38.3	***
$Y = 0.0304x + 6.145$ $R = 0.9738$ $R^2 = 0.9866$ ***				

LSD 5% = 0.168 t/ha LSD 1% = 0.246 LSD 0.1% = 0.351 t/ha

Analyzing factors interaction with the type of soil nitrogen fertilization was found regardless of soil type fertilization increased dose resulted in statistically harvest increases (fig. 2).

It also shows that soil type makes different realization corn yields under application difertelor nitrogen fertilization levels.

Thus cambic chernozem soil determines the largest production increase statistically ($R = 0.9883$ ***) per kg of nitrogen applied to 36.4 kg while the soil is also achieved growth aluviosol asigutat but 25 kg per kg of nitrogen applied.

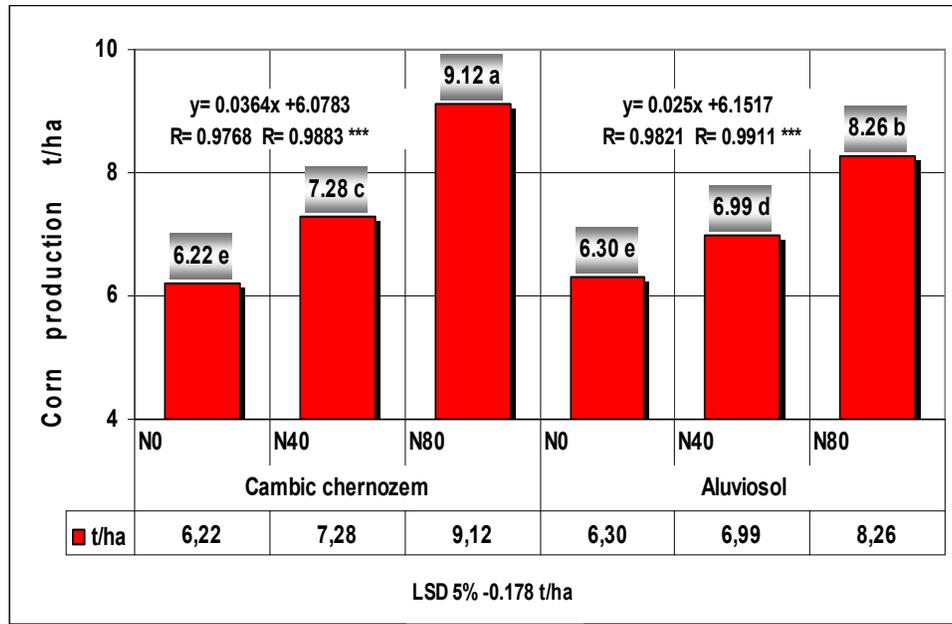


Fig. 2 - Influence of soil type and fertilization level on the production of corn

This difference in increase of yield is mainly due to different natural fertility of these soils. Thus cambic chernozem soil nutrients less insured reaction more strongly to the chemical fertilizer nitrogen application.

Thus the first level of significance lies N_{80} on cambic chernozem soil with a production of 9.12 t / ha followed by the same dose of nitrogen in the soil aluviosol with 8.26 t / ha

The third stage of meaning lays N_{40} cambic chernozem soil applied, because N_{40} is applied aluviosol ranks the fourth of significance.

CONCLUSIONS

1. Corn found optimal growth and development in the conditions of land agricultural area NE Bărăgan.

2. Type of soil is cultivated corn, its natural fertility status is essential in the determination of the nitrogen fertilization

3 The assured production increases due to nitrogen fertilization is done on cambic chernozem soil which results in increased production of corn by 5.4% compared other type of soil considered.

4. The optimum level of fertilization with nitrogen is N_{80} in both studied soils, which determine the highest and insured corn production.

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