

## STUDIES ON SYSTEM INFLUENCE IRRIGATED AND NON IRRIGATED LAND MANAGING DIFFERENT DOSES OF NP, ON THE EXTENT OF ACCOMPLISHMENTS PHYSIOLOGICAL HYBRID MAIZE OITUZ

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### Abstract

*The present work tries to establish the role of irrigation and applying variable doses of Nitrogen and Phosphorous, it also tries to ground, from the physiological point of view, the contribution of each factor in achieving high quantitative and qualitative productions. Within the experimental filed an important moment was followed, respective the 8 full-grown leaves phase, and lab tests were kept in order to perform physiological determinations. After lab determinations of physiological processes which took place in the case of this hybrid in two different systems and after applying different doses of fertilizers, the results were also graphically represented.*

**Key words:** assimilation, carotene, photosynthesis, respiration, transpiration

### INTRODUCTION

For field crops, corn (*Zea Mays*), is one of the most common crops, with a rich dowry genetic and a wide use both for humans as well as food, medicine and pharmacy.

Corn, is an important source of energy used as human food, with a high content in kilocalories, include: proteins, fats, carbohydrates, vitamins.

Therefore, it is recommended to use the seeds of maize both for healthy individuals and especially for those with cardiovascular disease, those who are likely to get fat, diabetes, etc.

Because of its high capacity of adaptation to soil and climate conditions as well as because of the ample improvement process, maize culture has a spreading area that guarantees the satisfaction of all requirements of every county in our country, and, in many counties –mainly the southern and the western ones – may accomplish important availability in the case of our national economy. [2]

The importance of fertilizers within maize culture logically come from the great production capacity of this culture for which important quantities of nutritive elements extracted from soil are necessary. [1]

The research that took place in the last two years emphasized the powerful impact of chemical fertilizers combined with applying an adequate technology upon the carried out physiological processes, that is assimilating and dissimilating and the repartition of dry substance in the plant.

### MATERIALS AND METHODS

The study was performed using an Oituz maize hybrid, when the 8 full-grown leaves became visible and this hybrid was cultivated in the north-western part of Dolj District, at Dobrești chernozem, and both irrigated and non-irrigated systems were a used, after a precursory wheat culture in 2012, and physiological analysis were performed in order to point out the changes of the chemical

composition of plants when applying different dosage of NP.

Analysis were performed by using variants disposed in four repetitions having as an example one row graduated multi-staged plots of land method.

The sowed area of the variant is of 22.4 m<sup>2</sup>, and its density is of 50,000 plants/hectare. Analyses of soil were effectuated at 0-25 cm and 23-34 cm. depth.

The experiment pursues three factors:

- I. Factors **A** - Oituz hybrid;
- II. Factors **B** - irrigation system; non-irrigated;
- III. Factors **C** - the application of fertilizing dosage.

## RESULTS AND DISCUSSIONS

By combining the graduations of the three factors resulted 20 variants disposed in 4 repetitions using the divided one row multi-stage parcel method.

The disseminated area of the variant is 22,4 m<sup>2</sup>, having a 50 000 plants/hectare density. Within the experimental field two calendaristic important moments were pursued, 8 leave stage, withholding assays for laboratory analysis for an estimation regarding physiological processes.

Utilized work methods for physiological determinations regarding maize plants:

- determination of photosynthesis;
- determination of net effective power of assimilation;
- determination of chlorophyll pigmies;
- determination of foliated surface parameter;
- determination of absorption capacity was performed by using the gravimetric method;
- determination of suction force.

Mathematic calculation used for the interpretation of experimental results.

In the interpretation and presentation of experimental results, the analysis of variation represents one of the first important systematization of information, of distinguishing the contribution of different sources of variability. [4]

A study of the relation between variables can be performed by means of a statistical modern

method as correlation, simple linear regression, quadric regression, etc.

The correlation coefficient is a relative quantity which does not depend on pints used for the respective variants.

The expenditure of fertilizers reared during the last decades as fertilizers are acquired by using high fossil energy consumption, and this is one of the reasons why the way of administrating the production process in order to acquiring maximum efficiency is of great interest.

For a correct application of chemical fertilizer before sowing have been carried out determinations to the ground to avoid any excess of doses and ground pollution.

### Acquired results regarding vegetable biomass in 2013 Oituz hybrid

The evolution of the photosynthesis process (Table 2), expressed in CO<sub>2</sub>/dm<sup>2</sup> mg determined at the beginning, on June, the 20th, presents a clear development between the non-irrigated variant and the irrigated one, and a development within the same variant also. An increase of photosynthesis process by 20% toward the control in the case of irrigated variant against the non-irrigated control is perceivable. The optimum dosage, as we notice in Fig.1. is recorded in the case of irrigated variant, as maize doesn't react when using a significant dosage of Nitrogen and Phosphorus (N<sub>120</sub>P<sub>100</sub>).

Table 1. Chemical properties of the argicchernosiomusn from the Dobrești Dolj

Genetic horizon	Depth (cm)	The value Ph (H <sub>2</sub> O)	S.B. m.e./100g	S.H. m.e	Humus %	N total %	P p.p.m.
Ap1	0-25	7.08	24.26	3.48	2.76	0.135	22.6
Ap2	25-34	7.21	26.84	2.31	29.18	0.137	28.2

For the same irrigated variant the intensity of photosynthesis rises over 270 mg CO<sub>2</sub>/dm<sup>2</sup> when using the same fertilizer dosage presented earlier. Regarding the respiration process, expressed in CO<sub>2</sub>/100 g.m.v. mg unimportant values are recorded on June, 20 th, in non-irrigated and irrigated system also, the eliminated dioxide quantity being of no interest in the case of studied variables (Fig.3). The absorption capacity determined by using g/H<sub>2</sub>O presents minimum values in

the case of non-irrigated system, excepting N<sub>80</sub>P<sub>60</sub> variant, where the highest value. As we speak of irrigated variants, the difference is meaningful and the content of fertilizers is raising (Fig. 3).

The suction force (Fig.4) expressed in atmospheres presents a rising tendency in the case of the first non-irrigated variants after that it begins to decline.

In the case of variants to which irrigation was applied, the most evident suction force was recorded to the irrigated control and the influence of fertilizers did not affect the suction force.

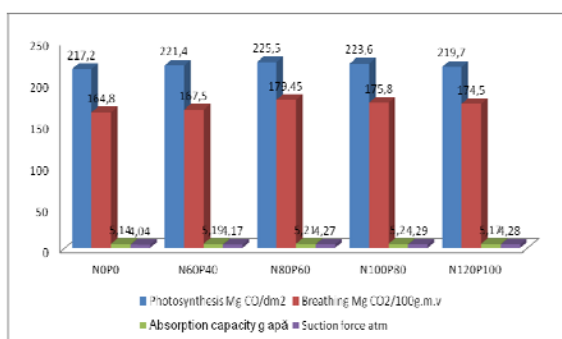


Fig.1. Influence of the nitrogen and phosphorus doses on some physiological processes to the crop Hybrid Oituz, moment I, 2o june 2013

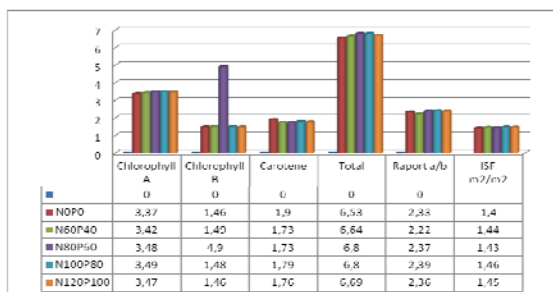


Fig.2. Influence of the nitrogen and phosphorus doses on some physiological processes to the crop Hybrid Oituz, moment I, 2o june 2013 -Clorophyl and carotene

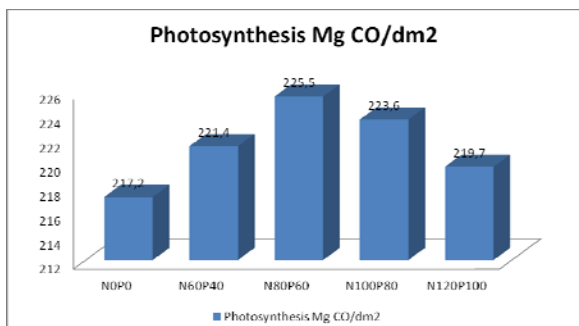


Fig.3. Influence of the nitrogen and phosphorus doses on some physiological processes to the crop Hybrid Oituz, moment I, 2o june 2013 –Photosynthesis

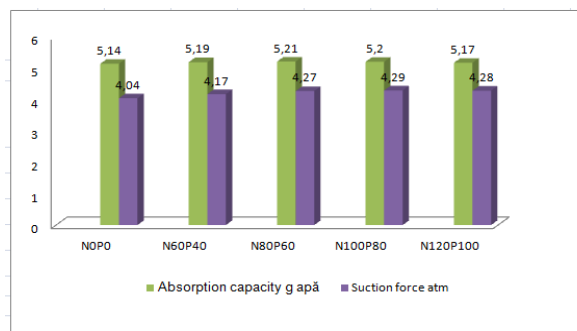


Fig.4. Influence of the nitrogen and phosphorus doses on some physiological processes to the crop Hybrid Oituz, moment I, 2o June 20013 -Absorption capacity and suction force

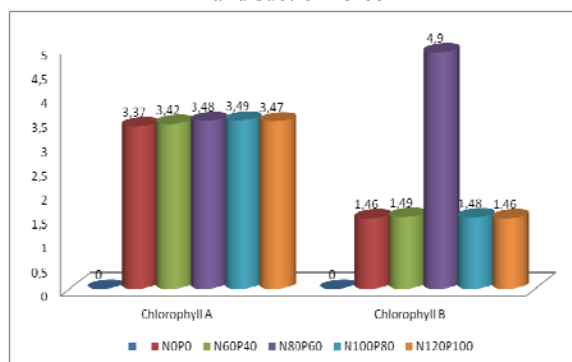


Fig.5. Influence of the nitrogen and phosphorus doses on some physiological processes to the crop Hybrid Oituz, moment I, 2o june 20013 -Clorophyl A and B

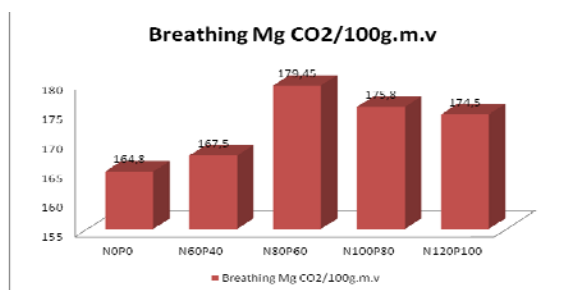


Fig.6. Influence of the nitrogen and phosphorus doses on some physiological processes to the crop Hybrid Oituz, moment I, 2o june 2013 - Breathing

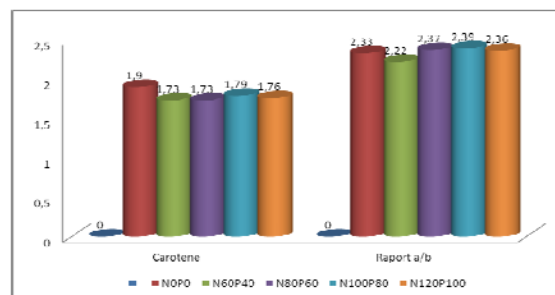


Fig.7. Influence of the nitrogen and phosphorus doses on some physiological processes to the crop Hybrid Oituz, moment I, 2o june 20013 - Carotene and a/b ratio

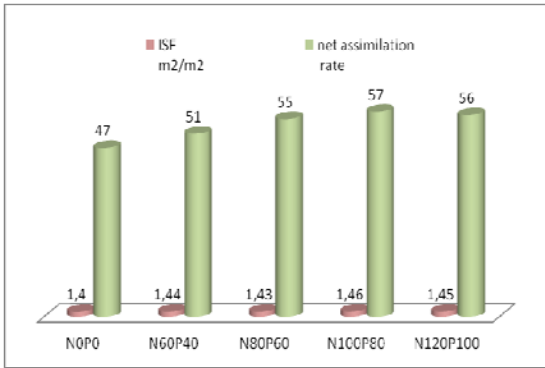


Fig.8. Influence of the nitrogen and phosphorus doses on some physiological processes to the crop Hybrid Oituz, moment I, 20 June 20013 - ISF and Net assimilation

[3]Pandia Olimpia, 2006, Research Regarding the Effect of Fertilizers upon Maize Production and Quality. Doctoral dissertation, Timisoara, 2006.

[4]Sima, E., 2002, Ecological Agriculture and Changing Perception in the Case of Quantity and Quality, The Information and Economic Reference Material Center, Bucharest

## CONCLUSIONS

The combined influence between the variety and technology of culture (applying irrigation and administering proper dosage of fertilizers) determines modifications of the main physiological features which may lead to an optimization of technologies, viz. obtaining maximum productions by rationally applying the dosage of fertilizers.

The simultaneous effects of applying irrigation by using variable dosage of fertilizers were also studied; in the case of the main physiological processes their effects are dependent on them. The combined influence of the system of culture (irrigated, non-irrigated) as well as the applied dosage of fertilizers determined noticeable quantitative differences in the case of all qualitative features of Oituz hybrid.

We recommend for production Oituz hybrid, in condition of irrigation and by applying the maximum dosage of N<sub>120</sub>P<sub>100</sub>, and N<sub>100</sub>P<sub>80</sub> for an economic efficiency.

## REFERENCES

[1]Goian, M., Sala, F., Berbecea Adina, Radulov Isidora, Gherban, C., 2000, The effect of mineral fertilizers upon the bean production of maize, on cambic chernozem within the Timisoara Didactic Research Station, between 1997 and 1999. Scientific research U.S.A.M.V.

[2]Hera, C., 1972, The influence of fertilizers upon certain maize hybrids sowed on different types of soils in Romania. An. ICCPT, Fundulea XXXVII.