THE CORELATION BETWEEN THE DOSES OF NITROGEN AND PHOSPHORUS APPLIEND ON THE NON IRIGATED SYSTEM AND PHYSILOGICAL PROCESSES OT THE CROP HYBRID OLIMP

CORELAȚIA DINTRE DOZELE DE AZOT ȘI FOSFOR APLICATE ÎN SISTEM NEIRIGAT ȘI UNELE PROCESE FIZIOLOGICE LA HIBRIDUL DE PORUMB OLIMP

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Abstract. *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. The research that too 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.*

Key words: *correlation, research, interaction, graphic representation, respiration, transpiration, photosynthesis, assimilation, carotene.*

Rezumat. *Importanta deosebita a ingrasamintelor la cultura porumbului deriva, in mod logic, din capacitatea mare de productie a acestei culturi pentru care sunt necesare cantitati importante de elemente nutritive extrase din sol. Cercetarile intreprinse in ultimii ani au scos in evidenta puternicul impact al ingrasamintelor chimice combinate cu aplicarea unei tehnologii adecvate asupra desfasurarii proceselor fiziologice respectiv asimilatiei si desimilatiei si repartitiei substantei uscate in general in planta.*

Cuvinte cheie: *corelație, cercetare, interacțiune, reprezentare grafică, respirație, transpirație, fotosinteză asimilație, caroten.*

Among the main cultures, very important is the maize culture which is compared to 'cultures that have golden beans'. Maize is considered nowadays one of the most important cultivated plants for the agriculture of our country, as well as on a global scale because of the significant area that maize holds as well as high productions/hectare that are obtained. 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.

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 where also graphically represented.

MATERIAL AND METHOD

The study was performed using an Olimpia maize hybrid, when the 8 full-grown leaves became visible and this hybrid was cultivated in the north-western part of Dolj District, at Sarbatoarea, on chernozem, and both irrigated and non-irrigated systems were a used,, after a precursory wheat culture in 2004, 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 m², and its density is of 50,000 plants/hectare. Analyses of soil were effectuated at 0-25 cm and 23-34 cm. depth.

MATHEMATICAL CALCULATION OF EXPERIMENTAL RESULTS

When presenting the experimental results, the analysis of variation represent the first important systemizing information, distinguishing different contribution of sources of variability.

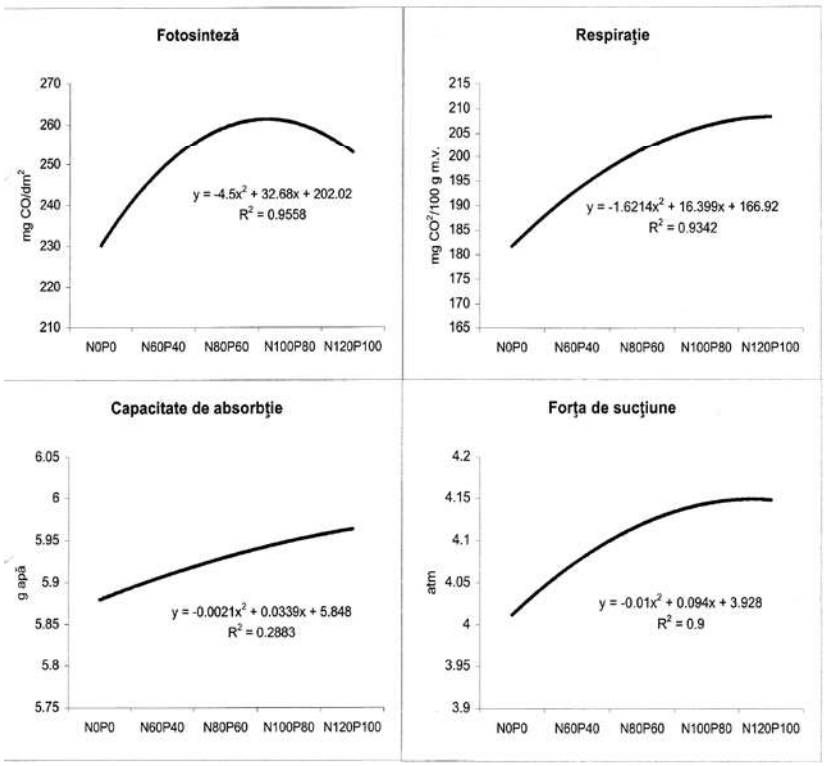

Fig. 1 - Correlation between doses of Nitrogen and Phosphorous that were applied within non-irrigated system and some physiological processes of the Olimp hybrid (year 2005)

The study of the relation between variables may be performed when using modern statistic methods such as correlation, simple linear regression, square regression etc. The correlation coefficient is relative; it doesn't depend on measure units that are used for the respective variant. Except an analysis of variation and the calculation of square regression, graphic representation was used – column diagrams.

In the case of the irrigated variant, the intensity of photosynthesis increases and it reaches a higher value than 270 mg CO/dm² when applying the same doses of fertilizers above. The correlation coefficient, instead, is of 0.9558 (fig. 1. a).

The respiration process is assured by the regression coefficient, but it is 0.9342 static assured, and the curve reaches the maximum value when using N120P100 within non-irrigated system (fig.1.b). In the case of non-irrigated system, that is picture 1.c, a slow increase of absorption capacity is noticeable once the mineral fertilizers content increases, R=0.2883, compared to irrigated variants where the absorption capacity is maximum in the case of N100P80 variant, the correlation coefficient is of 0.8414.

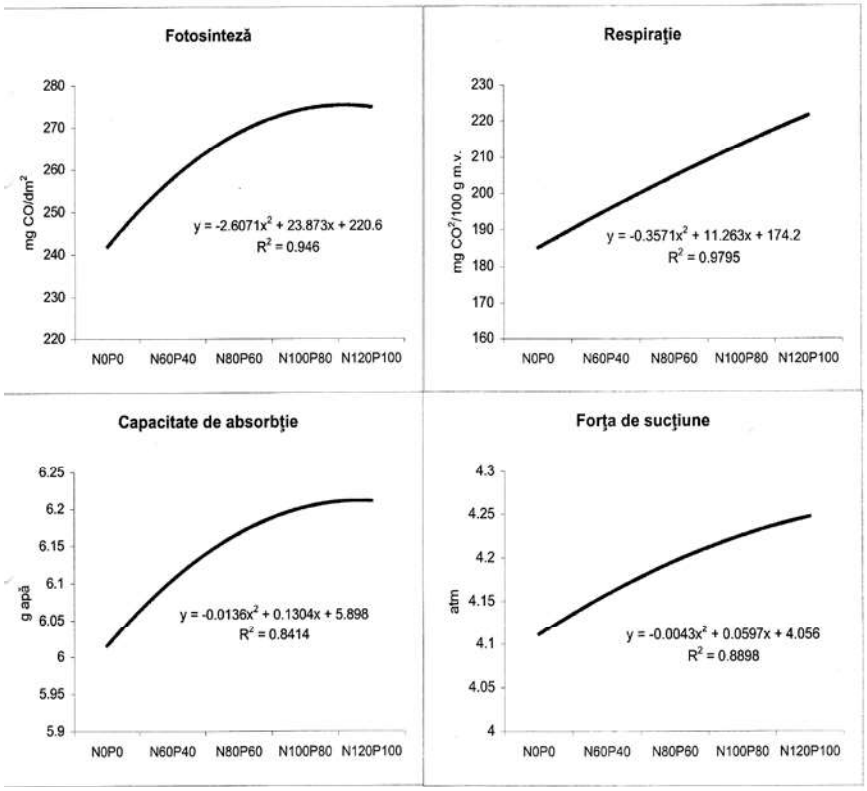

Fig. 2 - Correlation between doses of Nitrogen and Phosphorous that were applied within irrigated system and some physiological processes of the Olimp hybrid in the year 2005.

The regression coefficient is static assured and it is descending in the case of the non-irrigated system (Fig.1.d), the suction force has high values when applying an N120P100 dose.

In the case of the irrigated variant, the intensity of photosynthesis increases and it reaches a higher value than 270 mg CO/dm² when applying the same doses of fertilizers above. The correlation coefficient, instead, is of 0.946 (Fig. 2. a).

In the case of the irrigated system, the regression curve has a linear tint, and the coefficient is static assured R=0.9795 (Fig. 2.b).

In the case of irrigated variants, the difference is significant and it is static assured once the content of fertilizers increases (Fig. 2. c), R=0.8414.

The suction force has a descending tint, in the case of irrigation and application of maximum doses of fertilizers, R=0.8898. (Fig. 2.d).

The physiological processes which determine the chlorophylls, the following results are obtained:

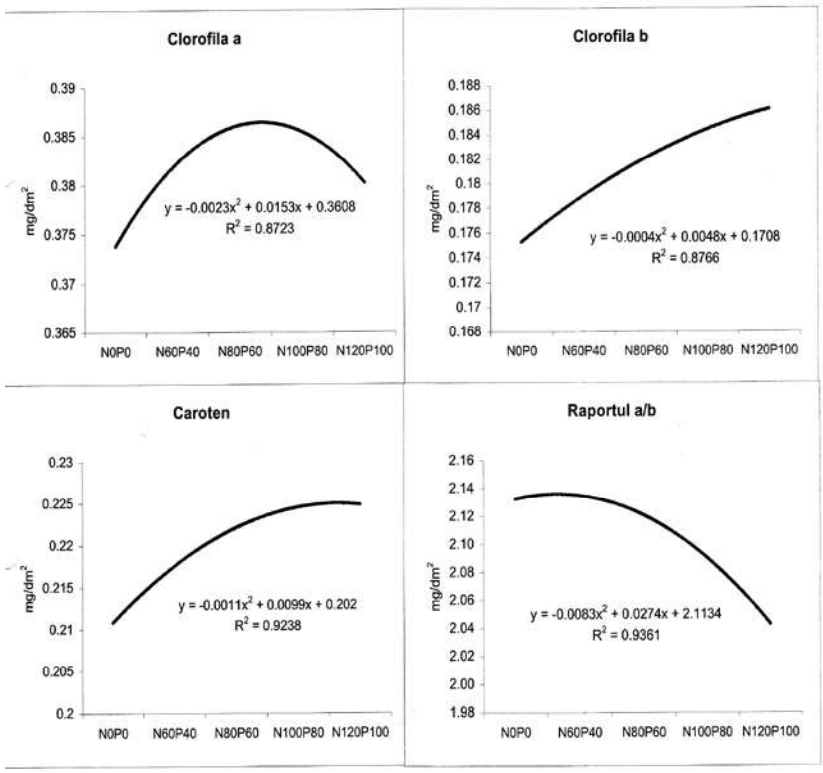

Fig. 3 - Correlation between doses of Nitrogen and Phosphorous that were applied within irrigated system and some physiological processes of the Olimp hybrid in the year 2005

The regression coefficient, in the case of the irrigated variant, is 0,8723 static assured (Fig. 3.a), and the curve of chlorophyll ‘a’ has a descending tint, which record maximum values when applying the dose of N100P80.

Chlorophyll ‘b’ reaches the maximum of its curve when applying a dose of N80P60, after that the values decrease and R^2=0.8766 (Fig. 3. b).

The carotene is represented by an ascendant curve; its maximum values are recorded when applying an N120P100 dose (Fig. 3.c).

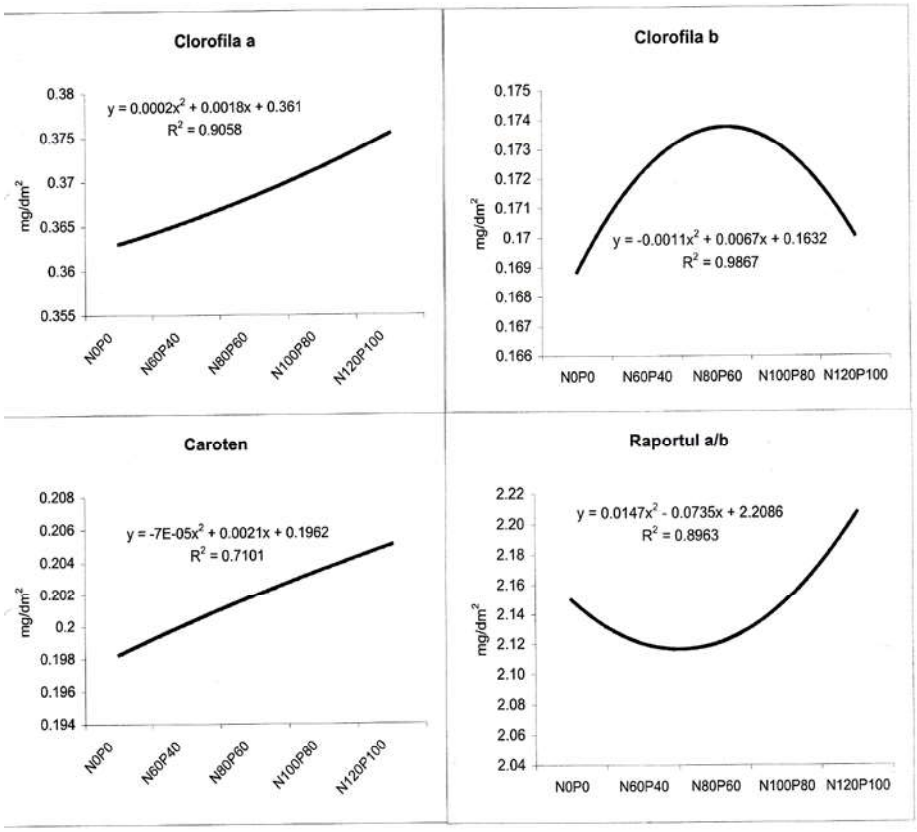

Fig. 4 - Correlation between doses of Nitrogen and Phosphorous that were applied within non-irrigated system and some physiological processes of the Olimp hybrid (year 2005)

The physiological processes which determine the chlorophylls, the following results are obtained:

The regression coefficient, in the case of the non-irrigated variant, is 0.9058 static assured (Fig. 4.a), and the curve of chlorophyll ‘a’ has a descending tint, which record maximum values when applying the dose of N120P100.

Chlorophyll ‘b’ reaches the maximum of its curve when applying a dose of N80P60, after that the values decrease and R^2=0.9867 (Fig. 4. b).

The carotene is represented by an ascendant curve; its maximum values are recorded when applying an N120P100 dose (Fig. 4.c).

Regarding the relation between a and b, it is noticeable a sudden decrease when applying the dose of N80P60 dose, after that it increases until applying a dose of N120P100 and then it reaches high values.

CONCLUSIONS

- The main purpose of using fertilizers is obtaining important productions when the expenses are minimally. The cost of fertilizers increased a lot in the last decades because the fertilizers are obtained by high consumption of fossil energy, and that is why it's of great interest the way of administrating the production process in order to obtain a maximum efficiency.
- The fertilization that uses Nitrogen and Phosphorous creates a stable balance of the soil elements.
- Phosphorous and Potassium as well applies the brake to the acidification of soil by Nitrogen. These two elements, especially Potassium, intensify the absorption of Nitrogen and balance the ionization report within the plant.
- It is necessary that, when applying fertilizers correctly depending on the provision soil degree in assimilable substances and plant needs, the soil reserve of macro-elements and sometimes microelements, to be complete.
- The best results are obtained when using an irrigated system of culture and variable doses of Phosphorous and Nitrogen fertilizers, the maximum supply being of N120P100.

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