STUDY REGARDING THE NITROGEN DOSES NECCESARIES FOR AUTUMN AND SPRING CROPS IN BANAT PLAIN

Alina LAȚO, Isidora RADULOV, F. CRISTA, L. NIȚĂ, Adina BERBECEA, M. BOLDEA K. LAȚO

Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania "from Timisoara

119, Calea Aradului, Timisoara, Romania, iaroslavlato@yahoo.com

Abstract. *The paper presents the doses of nitrogen necessaries for main autumn and spring crops in Banat Plain area. The data presented in this study were received from many farmers in the studied area. The most important crops in Banat Plain are: wheat, maize, sun-flower and barley, they were finding cultivated in the largest surfaces by local farmers. To establish the nitrogen doses it was taken into account the following parameters: expected yield in function of the specific consumption of the plant, the crop cultivated before, quality classes of arable lands and nitrogen uptake in the soil by manure. It might be find some errors in nitrogen doses mathematical account because not all the farmers form the studied area rapport their data. The nitrogen doses are expressed in kilogram active substance per year, for each crop. The largest doses of nitrogen were calculated for maize crop and the smallest for sun-flower crop. The obtained data after this research might be used in agronomical practice.*

Key words: *autumn crops, spring crops, nitrogen doses.*

INTRODUCTION

Nitrogen is considered essentially a growth factor. Increasing the size and weight of the cells and the plant as a whole, it cannot be conceived without biosynthesis protein substances, which cannot take place without nitrogen. Nitrogen participate in the growth processes of plants, is the main determinant of the amount of crops, but also their quality, especially in terms of the presence of protein and essential amino acids. (BUDOI GH., 2004)

The need for nitrogen varies from one species to another, thus, wheat and corn need larger amounts of nitrogen than the trees or vines. Corn is a plant consuming nitrogen, which absorbs most of the nitrogen in the first part of the growing season, reaching maximum at panicle formation and silky. During the formation of seed, up to 70% of the nitrogen is transferred to the seed leaf. Corn must have a good supply of nitrogen at the end of the growing season to increase the protein content of the seed. (SALA F. ET ALL., 2010, 2011)

MATERIAL AND METHODS

To prepare a nutrient management plan for a farm nitrogen plant in semi-intensive system, it was considered and the contribution of organic fertilizer. Evaluation of production forecast was made based on the grade of evaluation of grades of farmland. Were considered autumn grain crops (wheat and barley), corn, sunflower, since they are the most important in the Banat Plain. The amount of nitrogen required balancing export mineral nitrogen from the soil and plant life is judged on expected yields and the input of organic fertilizers. If the soil

organic fertilizers supplied enough nitrogen to crops unobtainable no longer recommends the application of mineral fertilizers (BORZA ET ALL., 2007). Values of fertilizer minerals needed to be applied are calculated according to crop rotation, grade the land and organic fertilization.

If necessary dose prediction of nitrogen for arable class grade, depending on the crop and the previous plant, it is recognized as a model of theoretical model type:

$$y = y_0 + ae^{-bx}, \quad (1)$$

where :
y is the dependent variable
x is the independent variable
a is the constant of proportionality
b is the decrease speed
y_0 is the lower asymptote.

Lairing the equation (1) we get:

$$-\ln(y - y_0) = bx - \ln a. \quad (2)$$

From regression (2) b is the coefficient of x, to determine the free term and y_0 determine the trend of decline.

RESULTS AND DISCUSSIONS

Representing chart in the same coordinate system, both experimental data and theoretical curves function data (1) we get Figures 1-9. In Figures 1-9 are shown good agreement between experimental data and theoretical curve.

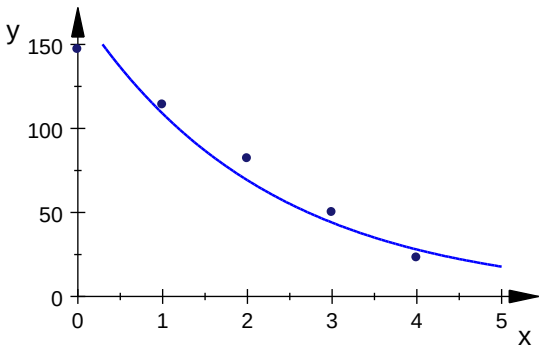

Fig. 1 Predictive curve for N necessary for cereal crop when the pre-emergent crop is cereals

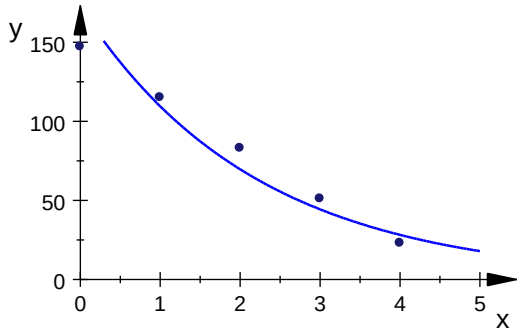

Fig. 2 Predictive curve for N necessary for cereal crop when the pre-emergent crop is maize

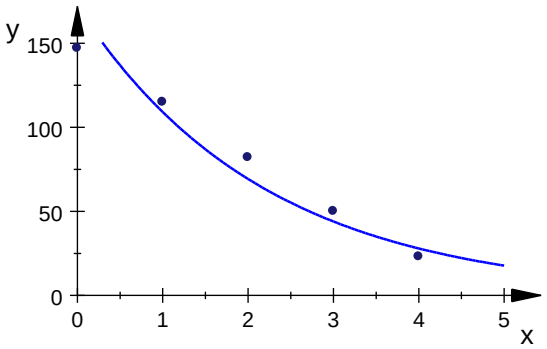

Fig. 3 Predictive curve for N necessary for cereal crop when the pre-emergent crop is sun-flower

From the charts 1,2, and 3 we observe that the maximum nitrogen dose for cereal crop is 150 kg a.s./ha and its decreasing with the soil fertility class, when, also the yield is lower and it doesn't matter which is the pre-emergent crop.

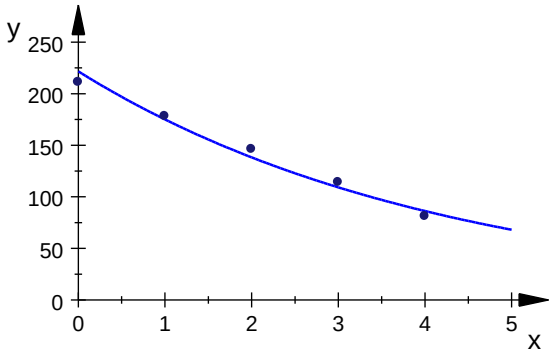

Fig. 4 Predictive curve for N necessary for maize crop when the pre-emergent crop is cereals

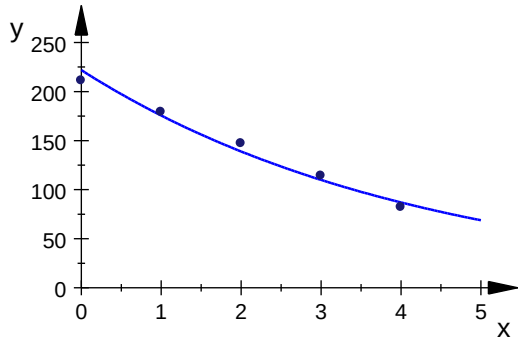

Fig. 5 Predictive curve for N necessary for maize crop when the pre-emergent crop is maize

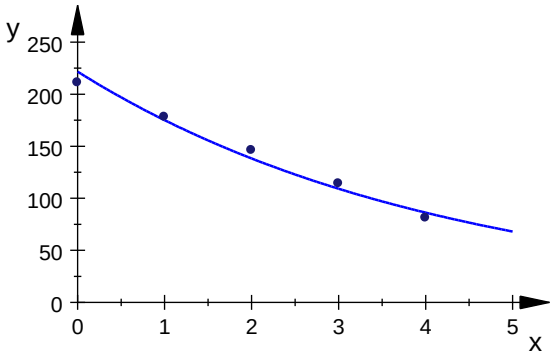

Fig. 6 Predictive curve for N necessary for maize crop when the pre-emergent crop is sun-flower

In case of maize crop the maximum admitted nitrogen dose is established at 225 kg a.s./ha, as it shows in 4,5 and 6 charts. The nitrogen dose is decreasing to 75 kg a.s./ha in the lower soil fertility class.

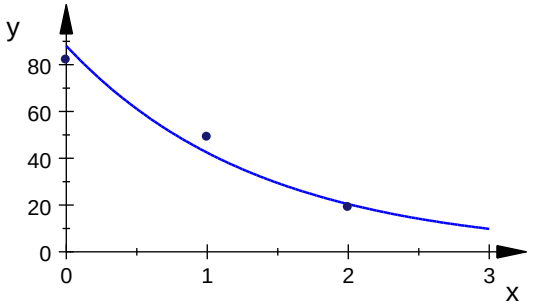

Fig. 7 Predictive curve for N necessary for sun-flower crop when the pre-emergent crop is cereals

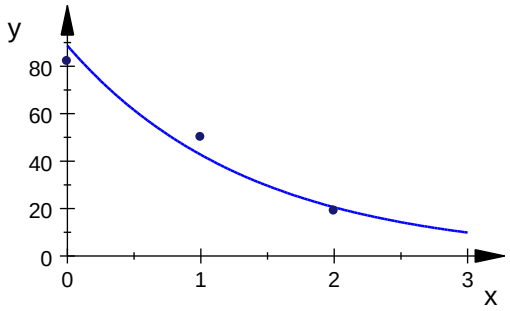

Fig. 8 Predictive curve for N necessary for sun-flower crop when the pre-emergent crop is maize

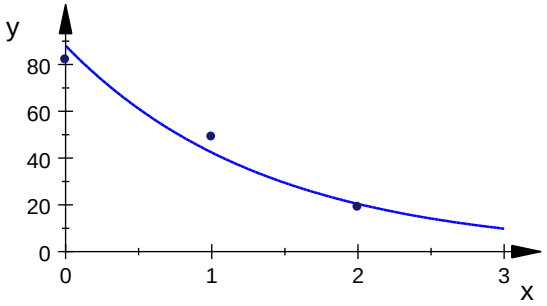

Fig. 9 Predictive curve for N necessary for sun-flower crop when the pre-emergent crop is sun-flower

For sun flower crop the highest nitrogen dose is 90 kg a.s./ha, as we can observe in 7, 8 and 9 charts and its decreasing once with the soil fertility class.

CONCLUSIONS

From all the crops cultivated on large areas in Banat, the most exigent one is maize, concerning the mineral nitrogen fertilisation.

Soil quality is one of the deciding factors when the mineral nitrogen dose is established for each crop.

In order to obtain favourable yield it is absolutely necessary to have a proper nitrogen nutrition of the crop and to respect the specific fertilisation period of each plant.

BIBLIOGRAPHY

1.BERNICOT MARIE-HELENE, – Avoine, Perspecitves Agricoles, nr. 202, Ed. ITCF, France, p.113-116, 1995
2.BOLDEA M., SALA F.- Optimizing the Area Fertilized with Nitrogen-based Chemical Fertilizers for Wheat Crops, Applied Mathematics, 2013, 3(3): 93-97
3.BORZA **I.,**ȚĂRĂU **D.**, F SALA, I ȚĂRĂU, M IORDACHE - Quality state of soils from West of Romania and measures for their fertility restoration, RJAS, 2007

4.BUDOI GH., Tratat de agrochimie (Agro-chemistry dissertation), vol. I şi II, Ed. Sylvi, Bucureşti, 2004
5.LIXANDRU GH., CARAMETE C., HERA CR., MARIN N., BORLAN Z., CALANCEA L., GOIAN M., RĂUŢĂ C., - Agrochimie (Agrochemistry), Ed. Didactică şi Pedagogică, Bucureşti, 1990
6.MĂRGHITAŞ MARILENA, RUSU MIHAI, MIHĂIESCU TANIA – Fertilizarea plantelor agricole şi horticole (Fertilisation of the agricultural and horticultural plants), Ed. AcademicPres, Cluj Napoca, 2005
7.RUSU M., MĂRGHITAŞ MARILENA, MIHĂIESCU TANIA, OROIAN IOAN, DUMITRAŞ ADELINA – Tratat de Agrochimie (Agro-chemistry dissertation), Ed. Ceres, Bucureşti, 2005
8.F. SALA, ISIDORA RADULOV, F. CRISTA, ADINA BERBECEA – The Correlation Between The Fertilization System And Yield For The Sunflower Crop, RJAS, 42(3), 2010, pp. 296-301
9.F. SALA, ISIDORA RADULOV, M. BOLDEA, F. CRISTA, ADINA BERBECEA - Elements Of Technical And Economic Efficiency With Nitrogen Fertilisation In Winter Wheat, Rjas, 43(3), 2011
10.ŞMULEAC A., GOIAN M., - Fertilizarea minerală şi organică la grâu şi porumb (Mineral and organic fertilisation for wheat and maize), Ed. Mirton, Timişoara, 2005