# RESEARCH CONCERNING FUNDAMENTAL PROCESSES INVOLVED INTO NITROGEN DYNAMICS ON SOIL PROFILES IN DOLJ DISTRICT

## STUDIU PRIVIND PROCESELE FUNDAMENTALE IMPLICATE ÎN DINAMICA AZOTULUI PE PROFILELE UNOR SOLURI DIN JUDEŢUL DOLJ

***GĂVOZDEA Mihaela***
University of Craiova, Romania

***Abstract.****Putting into practice of new agrricultural techniques based on the most advanced scientific knowledges in one the field of technology, especially of the ecological one, a major requirement of promoting a long lasting agriculture. Therefore it appeard the need of new studys making concerning the content in main chemical elements of the soils nitrogen phosphorus, potassium. In the present paper I have studied the content in nitrogen on the profiles of one of the soilschernozem type, alluviosoil type and psamosoil type which are to be found in south of the Dolj county. These profiles go down to the depth of, 45-50 cm. Simultaneously there were determined other agrochimical indicators like pH, humus and the clay content. From the results optained we can notice grate amount of nitrogen and humus on the chernozem type of soil, compared to the other type of soils.*

**Key words :** index of nitrogen, alluviosoil, chernozem, humus, pH.

***Rezumat.*** *Aplicarea unor noi practici agricole bazate pe cele mai avansate cunoştinţe ştiinţifice în domeniul tehnologiilor, mai ales a celor ecologic valabile, este o cerinţă majoră a promovării agriculturii durabile. De aceea a apărut necesitatea elaborării unor studii privind conţinutul solurilor în principalele elemente chimice, respectiv azot, fosfor, potasiu. În lucrarea de faţă am studiat conţinutul în azot pe profilele unor soluri de tipul cernoziom, aluviosol şi psamosol care se găsesc în sudul judeţului Dolj. Acest profile merg până la adâncimea de 45-50 cm. Concomitent au fost determinaţi şi alţi indicatori agrochimici, cum ar fi pH-ul, humusul şi conţinutul în argilă. Din rezultatele obţinute se constată o cantitate semnificativă de azot şi humus pe tipul de sol cernoziom, comparativ cu celelalte tipuri de soluri.*

**Cuvinte cheie:** indice azot, aluviosol, cernoziom, humus, pH.

## INTRODUCTION

The long lasting development represents the capacity to the humankind to insure countinuosly the requirement of the present generation, but without compromising those to the next generation. In agriculture, like in any onther economic branch no sistem can't be considerate long lasting for the farmer and the society he belongs to not benefical that is, it is not viable from the economic point of wiew.

The present paper presents one of the main elements existing in the soils, and especially the total nitrogen, from the plounghed layer and on the soil profile,

too. The total nitrogen vary between 0.07-0.38% (Vintilă, 1984), depending on the soil type and growing from the whitin luvisoils to chernozems. These total nitrogen presents many forms, that is 90-95% from the total nitrogen represents organic nitrogen, mineral nitrogen representing 5-10% from the total nitrogen, this one is to be found in fixed forms of $NH_4$ and in changeable forms, too.

The role of this element is very important, reflecting the best the degree of participation of „nutrition humus" to supply plants with nitrogen. After the index of nitrogen, the supply with nitrogen is weak in the south of Oltenia.

## MATERIAL AND METHOD

To accomplish the study there were tachen three types from Gighera village, Dolj county, that is: chernozem, alluviosoil and psamosoil.

For each and every type of soil there were made three profiles an two depths, going down to 45-50 cm, i.e. the maximum stage of corn root development.

There were determined the following analyses: $N_t$, pH in distilated water, humus% and content in coloidal clay, after the methodology of ICPA Bucharest.

## RESULTS AND DISCUSSIONS

The study was made in 2007-2008 in Gighera commune area.(table 1,2,3).

*Table 1*

**Caracteristics of Gighera chernozem**

| **Soil area measurement** | **Nr. 1 CZ ka - Xvm - $K_1$ - $d_5$ - LL/SF - Tem/NB - Ae12** | | **Nr. 2 CZ ka - Xvm - $K_1$ - $d_5$ - SF/SF - Teg/NI-A** | | **Nr. 3 CZ cb - $d_5$ - LL/LN - Tem/NI-A - $c_{41}$** | |
|---|---|---|---|---|---|---|
| Sampling depth (cm) | 0-10 cm | 30-40 cm | 0-10 cm | 35-45 cm | 0-10 cm | 40-50 cm |
| Nitrogen index | 2 | 2,2 | 2 | 0,7 | 2,5 | 2,6 |
| pH in distilled water | 8,4 | 8,14 | 6,55 | 6,61 | 6,81 | 6,90 |
| Humus (%) | 2,2 | 2,24 | 2 | 0,75 | 2,52 | 2,48 |
| Total nitrogen (N%) | 0,125 | 0,123 | 0,106 | 0,048 | 1,90 | 0,115 |

The first profile made on the depth of 0-10 cm reveals a weack alkaline soil reaction, the content of nitrogen is small, the index of nitrogen is medium and the content in humus is small. The next layer i.e.Am has an alkaline reaction, the content in total nitrogen is small, the index of nitrogen is medium and the content in humus is small.

The second profile, on the Ap layer has an acid reaction, the content in total nitrogen is small, the index of nitrogen and the content of humus has the same value. On the Am layer, the reaction of the soil is weak acid, the content in total nitrogen is very small, the index of nitrogen is very small the content in humus is very small.

The third profile, on Ap layer has an weak acid reaction, the content in total nitrogen is big, the bindex of nitrogen is middle, the content of humus is middle. On the A/B layer, the reaction of soil is neutral, the content in total nitrogen is small, the index of nitrogen is middle, the content in humus is middle.

*Table 2*

**Caracteristics of Ghighera alluviosoil**

| Soil area measurement | Nr. 1 ASgcsc-$G_4$-$S_{23}$-$k_1$-$d_4$-t/t-Tfm/NB-Ps | | Nr. 2 ASgc-sc-$G_4$-$S_{31}$-$k_1$-$d_2$-a/a-Tfm/NB-Ps | | Nr. 3 ASgcsc-$G_4$-$S_{22}$-$k_1$-$d_3$-a/a-Tfa/NB-Ps | |
|---|---|---|---|---|---|---|
| Sampling depth (cm) | 0-10 cm | 20-30 cm | 0-10 cm | 27-37 cm | 0-10 cm | 35-45 cm |
| Nitrogen index | 0.1 | 2.2 | 1.1 | 0.4 | 1.9 | 0.8 |
| pH in distilated water | 8.60 | 8.68 | 7.99 | 8.15 | 7.71 | 8.08 |
| Humus (%) | 0.15 | 2.24 | 1.3 | 0.5 | 1.92 | 0.82 |
| Total nitrogen (N%) | 0.016 | 0.144 | 0.064 | 0.018 | 0.100 | 0.027 |

The first profil on the depth of 0-10 cm reveals a weak alkaline soil reaction, the content in total nitrogen is verry small, the index of nitrogen is very small and the humus content is very small. The next layer i.e. 20-30 cm has a weak alkaline soil reaction , the content in total nitrogen is small, the index of nitrogen is small, the content in humus is small.

The second profile, on the depth of 0-10 cm has a weak alkaline reaction, the content in total nitrogen is very small, the index of nitrogen is small, the content of humus is small. On the 27-37 cm layer, the reaction of the soil is weak alkaline, the content in total nitrogen is verry small, the content in humus is very small.

The third profile, on the depth 0-10 cm has a weak alkaline soil reaction , the content in total nitrogen is small, the index of nitrogen is small, the content of humus is small. On the depth 35-45 cm the reaction of soil is weak alkaline, the content in total nitrogen is very small, the index of nitrogen is small, the content in humus is small.

*Table 3*

**Caracteristics of Ghighera psamosoil**

| Soil area measurement | Nr. 1 PSmoka-$k_1$-$d_5$-u/u-Teg/NB-Ps | | Nr. 2 PSmoka-$k_1$-$d_6$-u/u-Teg/NB-Ps | | Nr. 3 PSka-$k_1$-$d_6$-u/u-Teg/NB-Ps | |
|---|---|---|---|---|---|---|
| Sampling depth (cm) | 0-10 cm | 40-50 cm | 0-10 cm | 34-45 cm | 0-10 cm | 40-50 cm |
| Nitrogen index | 2.7 | 2.0 | 2.5 | 2.0 | 2.5 | 2.6 |
| pH in distilated water | 7.24 | 7.90 | 7.39 | 7.95 | 6.81 | 6.90 |
| Humus (%) | 2.76 | 2.00 | 2.56 | 2.08 | 2.52 | 2.48 |
| Total nitrogen (N%) | 0.129 | 0.115 | 0.129 | 0.125 | 0.119 | 0.115 |

The first profil on the depth of 0-10 cm reveals a weak alkaline soil reaction, the content in total nitrogen is small, the index of nitrogen is medium and the humus content is medium, too. The next layer i.e. 40-50 cm has a weak alkaline soil reaction , the content in total nitrogen is small, the index of nitrogen is small, the content in humus is small.

The second profile, on the depth of 0-10 cm has a weak alkaline reaction, the content in total nitrogen is small, the index of nitrogen is medium, the content of humus is medium. On the 34-45 cm layer, the reaction of the soil is weak alkaline, the content in total nitrogen is small, the content in humus is small.

The third profile, on the depth 0-10 cm has a weak alkaline soil reaction, the content in total nitrogen is small, the index of nitrogen is medium, the content of humus is medium. On the depth 40-50 cm the reaction of soil is weak alkaline, the content in total nitrogen is medium, the index of nitrogen is medium, the content in humus is small.

## CONCLUSIONS

Following the analyses made there can be noticed the direct dependence between the decrease of the total nitrogen and the humus in depth, the index of nitrogen presents the same evolution and the pH realises a increase together with the depth decrease.

As it can be noticed from the tabels 1, 2, 3 there are fluctuations in tha case of all the three types of soil, the chernozem type beeing the best supplied with nitrogen.

There can be noticed that the first layer regardless the type of soil presents the most increased values of the studied parameters except with pH.

### REFERENCES


1. **Budoi Gh.**, **2004** – *Tratat de agrochimie*. vol. 1, Editura Sylvi, Bucureşti.
2. **Rusu M., 2005** – *Tratat de agrochimie*. Editura Ceres, Bucureşti.
3. **ICPA**, **1981** – *Instrucţiuni privind executarea studiilor agrochimice*. Red. coord. Borlan Z.
4. **ICPA**,**1987** – *Metodologia elaborării studiilor pedologice,* vol. 1-3. Bucureşti.