CHARACTEREZATION OF SOILS FROM MOȘNIȚA NOUĂ COMMUNE, TIMIȘ COUNTY, ROMÂNIA

Rebeca VARGA, O. EREMI, A. OKROS, A. BORCEAN
***University of Agricultural Sciences and Veterinary Medicine"King Michel I of Romania" of Banat from Timisoara* 119, Aradului Avenue, Timișoara 30064, Romania**
Corresponding author: adalbertokros@usab-tm.ro

Abstract. *The object of the activity of mapping, credit rating and evaluation is the soil (earth), the thinnest and most fragile covering of the Earth. It is studied in relation to the environmental factors and conditions that condition its existence, together with them forming land units (habitats, biotopes, homogeneous ecological territory units, resorts, ecosystems) with specific favors for the development of different agrarian or natural phytocenoses, with specific skills for different agricultural, forestry and special uses.(Marin 2017) The territory of Moşniţa Nouă commune, from a geomorphological point of view, falls within the land of the Tisa Plain, the support of the digression plain, the distinct Timiş Plain. The geological terrain of the area of which the researched territory is part is integrated in the geological past of the great natural region: the Pannonian Plain. From a hydrographic point of view, the area to which the territory of Moşniţa Nouă commune belongs belongs to the Timişuiui basin, which borders on the south and east, the territories of Urseni and Albina villages.(Duma 2017, Dicu 2016) The Timiş River functions as a feeder (at maximum levels) of the groundwater level in the area and as a drainage role of the groundwater level in the area and as a drainage role of the groundwater level. The records from the meteorological station in Tirnişoara between 1896-1955, updated with more recent data from 1986-1995, were used to characterize the climatic conditions. From the point of view of vegetation, the territory of Moşniţa Nouă commune is characterized by a humid forest-steppe vegetation.Oancea 2012, Dragoescu 2019).*

Keywords: *Activity, temperature, biological, tratament, agriculture, vegetation*

INTRODUCTION

In Romania, the preoccupations of subdivision of lands, according to their productivity, expanded with the increase of the amount of taxes or of the different donations that are perceived in the Romanian feudal states (XVIII - XIX centuries).

Thus, in the "Condica for the correction of the laws of 1818" are established differentiated gifts of the plain on the hill and in relation to the settlement of the villages towards the city. A kind of "zoning of payments according to the level of donations to the state" was then carried out. (OKROS 2015)

The territory of Moşniţa Nouă commune, from a geomorphological point of view, falls within the land of the Tisa Plain, the support of the Rambling Plain, the distinct Timiş Plain.

Within the studied territory there is a single geomorphological unit, the alluvial plain where they can be differentiated, a meadow area (in the southern and eastern part of the territory, in the villages of Albina and Urseni and a slightly higher area located in the Timiş Bega (northern part of Moşnita Veche territory). (FLORESCU 2014, MIHUT 2018)

The geological terrain of the area of which the researched territory is part is integrated in the geological past of the great natural region: the Pannonian Plain.

It arose in the Quaternary by sinking the crystalline mountain range following tectonic movements. As a result of these tectonic disturbances, this area was separated from the rest of the sea, leaving places behind it, occupying large areas fed by the waters of rivers, streams, until the Danube cut its current riverbed. (MARIN 2018, ASTRID 2017)

From a hydrographic point of view, the area to which the territory of Moşniţa Nouă commune belongs belongs to the Timişuiui basin, which borders on the south and east, the territories of Urseni and Albina villages. The Timiş River functions as a feeder (at maximum levels) of the groundwater level in the area and as a drainage role of the groundwater level in the area and as a drainage role of the groundwater level (at minimum levels).

The winds with the highest frequency blow from the N and E direction, the calm representing 20.9% of the time.

The highest speed (2.4-3.5 m / sec has the winds from the N and S direction). There are no winds with actions harmful to crops.

From the point of view of vegetation, the territory of Moşniţa Nouă commune is characterized by a humid forest-steppe vegetation. (DRAGOSLAV 2016, MIHUT 2014).

MATERIAL AND METHODS

Determination of physical properties

Soil texture- through the Cernikova method (the principle underlying the pipetting method is the sedimentation of particles into a liquid at different rates, depending on their size, according to Stokes' law).

The determination of the granulometric fractions in weight percentages was done using the following formulas:

Coarse sand (2 - 0.2 mm in diameter) % = $\frac{m_1\ x100}{m_0 xF}$

Fine sand (0.2-0.02 mm in diameter) % = $\frac{100xm_2}{m'}$

Dust (0.02 - 0.002 mm in diameter) % = $\frac{(m_2 - m_3)xVx100}{(Vxm_0)xF}$

Clay (diameter less than 0.002 mm) % = $\frac{m_3 xVx100}{Vxm_0 - dxF}$

Soil density (cm3) - using a pycnometer, using distilled water;

Soil density is calculated using the following formula:

$D = \frac{M_2 - M}{M_1 + M_2 - M - M_3}$ x d

Apparent density (cm3) -the formula by which we calculated the bulk density is as follows:

$$DA = \frac{M_1 - M_2}{V}$$

Total Porosity Pt (%) -was calculated using the following formula: $PT = \left(1 - \frac{DA}{D}\right)x100$

Aerosis Porosity Pa (%). In order to determine it by calculation we used the values of some hydrophysical and physical indices: PA = PT - CC x DA

Setting And Soil Compaction (Gt)

$$GT = \frac{PMN - PT}{PMN} x100$$

PMN = 45 + 0,163 x A

Determination of chemical properties

Soil Humus Content (%) - by titrimetric methods, respectively Tiurin method;

The principle of the method is to oxidize the carbon in the humus with a solution of chromium anhydride or potassium dichromate in the presence of sulfuric acid.

The humus content of a soil sample was calculated using the following formula:

$$\text{Humus\%} = \frac{(V1\ \ V2)\ \text{x f x}\ 0{,}0005181\text{x}\,100}{\text{m}}\ \text{x K}$$

pH of the soil solution - according to the potentiometric method, in aqueous extract 1: 2.5;

Total nitrogen dosage - was done by Kjeldahl method (soil mineralization is done by boiling with concentrated sulfuric acid in the presence of catalyst);

Mobile phosphorus - determined by Egner-Rhiem-Domingo on a UV-VIS spectrophotometer;

Assimilable potassium - extracted into ammonium lactate acetate and determined with atomic absorption spectrophotometer;

Total Cationic Exchange Capacity (T) - determined by the Bower method;

Degree Of Saturation In Bases (V%) - was calculated by the formula:

$$V = \frac{S_B}{S_B + S_H} X100(\%)$$

RESULTS AND DISCUSSIONS

In this chapter we will analyze the soil within the Moșnița Nouă commune, Timiș county.

Table 1.

The caracterization of the soil units

Territorial soil unit (U.S) NO. 1.01 **Name**: Typical eumezobasic brown soil. **Surface:** 25.88 ha **Prevalence:** Timiș-Bega interfluve **Soil characteristics:** **Morphological**: it has the folloming sequence of horizons: Ap-Ao-Bv-C. **Plowing horizon, Ap**-25 cm, medium sandy-lay, brown with the structure destroyed by plowing; **Horizon A ochric, Ao**-20cm, medium sandy-clay, yellowish brown with grainy structure; **Horizon B cambic, Bv**-50cm, medium sandy-clay/sandy loamy-clay, yellowish to reddish-yellowish with prismatic texture; **Horizon C**-30cm, sandy-caly, reddish with undefined structure. **Limiting factors:** • Acidity pH 5.5-5.8; • Moderate humus reserves; • Very weak unevenness of the terrain;	**Territorial soil unit (U.S) NO. 22.01** **Name**: Typical gleic soil, very strong glazed. **Surface:** 401.04 ha **Prevalence**: Timiș-Bega interfluve **Soil characteristics:** **Morphological:** it has the following sequence of horizons: Ap-Ao-A/C-Cg-CGo3-4 **Plowing horizon, Ap**-20cm, medium clayed, brown with the structure destroyed by plowing; **Horizon A ochric, Ao**-20cm, medium clay/sandy-clay, yellowish brown with grany structure; **Transition horizon A/C**-20cm, medium sandy-clay, yellowish brown with undefined structure; **Glazed C horizon**-15cm, medium sandy-clay, yellowish mith rust spots with undefined structure; **Gleic horizon grafted on a C horizon, Cgo3-4**-70cm, medium sandy-clay/coarse loamy sand, yellowish to purple unstructured. **Limiting factors:** • Moderate humus reserve;

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- Moisture deficit

Improvements measures:

- Limestone amendaments;
- Semi-fermented organic fertilizers;
- N, P, K fertilization;
- Irrigation;
- Surface drainage;
- Maintenance levelling.

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- Very weak unevenness of the terrain.

Improvements measures:

- Semi-fermented organic fertilizers;
- N, P, K fertilization;
- Surface drainage;
- Deep drainage;
- Maintenance levelling.

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Territorial soil unit (U.S) NO. 24.01
Name: Strongly glazed, salline verticsoil.
Surface: 13.20 ha
Prevalence: Timiș-Bega interfluve
Soil characteristics:
Morpholocal: it has the following sequence of horizons: Apac-Ayna-sc-Btyna-B/Cynag-Cnag-CnaGo3-4-CacGr.
Plowing alkalinized horizon, Apac-25cm, loamy clay, light, slightly gray, efflorescence of salts with destroyed structure by plowing;
Saline, alkaline vertic horizon grafted on a A horizon,Ayna Ac-15cm, mediun loamy clay, light brown with gray, with sphenoid structure with sliding oblique faces;
Alkaline vertic horizon grafted on a clay-alluvial B horizon, Btyna-23cm, medium loamy clay, yellowish brown, slightly gray, with sphenoid structure, with sliding oblique faces;
Glazed alkaline vertic horizon grafed on a B/C transition horizon, B/Cynag-15cm, medium loamy clay, rusty yellow, with sphenoid structure, with sliding faces and salt efflorescences;
Alkaline gleic horizon grafed on a C horizon, CnaGo3-4-40cm, medium loamy clay/medium clay, yellowish purple rust, with salt efflorescences;
Alkalized gleic horizon grafted on a C horizon, CacGr-70cm, medium loam, purple rust, with undefined structure and with small frequent pores.
Limiting factors:

- Moderate humus reserve;
- Poor salinization;
- Very strong alkalization;
- Very weak unevenness of the terrain;
- pH7.9-8.4;
- Low porosity;
- Fine loamy clay texture.

Improvements measures:

- Semi-fermented organic fertilizers;
- N, P, K fertilization;
- Gyps amendaments;
- Washing excess salt;
- Fertilization with Zn, Mn, to susceptible plants;
- Obligatory working direction of the machines in the direction of the water flow;
- Deep drainage;

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Territorial soil unit (U.S) NO. 25.01
Name: Weak glazed vertisoil, moderately levigate.
Surface: 102.45 ha
Prevalence: Timiș-Bega interfluve
Soil characteristics:
Morphological: it has the folloming sequence of horizons: Ay-A/By-By-B/Cy-Ckg-CkGo3.
Vertic horizon grafted on a A horizon, Ay-35cm, medium loamy clay, dark brown with sphenoid structure and with oblique sliding faces;
Gleic horizon grafted on an A/B transition horizon, A/By-20cm, medium loamy clay, blackish brown with sphenoid structure and with oblique sliding faces;
Vertic horizon grafted on a B horizon, By-25cm, brownish clay with yellowish tinge to yellowish brown, with sphenoid structure and liding faces;
Vertic horizon grafted on a B/C transition horizon, B/Cy-25cm, medium loamy clay, yellowish with undefined structure and with oblique sliding faces;
Glazed horizon C, Ckg-30cm, medium loamy clay with yellowish rust spots, undefined structure;
Gleic horizon grafted on a C horizon, CkGo3-45 cm, medium loamy clay, yellowish rust with undefined structure.
Limiting factors:

- Acidity pH 5.5-5.8;
- Very weak unevenness of the terrain;
- Fine loamy clay texture;
- Very low porosity.

Improvements measures:

- Limestone amendaments;
- Semi-fermented organic fertilizers;
- N, P, K fertilization;
- Deep drainage;
- Surface drainage;
- Maintenance levelling.
- Non-systematic and non-permanent drainage channels;
- Obligatory working direction of the machines in the direction of the water flow.

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Territorial soil unit (U.S) NO. 39.01
Name: Typical alluvial soil.
Surface: 51.64 ha
Prevalence: Timiș-Bega interfluve

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Soil characteristics:
Morpholocal: it has the following sequence of horizons: Ap-Ao-C.
Plowing horizon, Ap-20cm, medium clayed, brown with disturbed structure because of agricultural works;
Horizon A ochric, Ao-25cm, medium loamy clay, yellowish brown with a grany structure;
Horizon C-55cm, coarse loamy clay, yellowish, unstructured.
Limiting factors:

- Acidity pH5.5-5.9;
- Moderate humus reserve;
- Moisture deficit;
- Very weak unevenness of the terrain.

Improvements measures:

- Semi-fermented organic fertilizers;
- N, P, K fertilization;
- Limestone amendaments;
- Surface drainage;
- Irrigation;
- Maintenance levelling.

CONCLUSIONS

- The great diversity of the soil subtypes has a special ecological significance for each culture in the sense of a differentiated favorability and of the possibility of obtaining the agricultural production.
- In order to bring the soil to a favorable growth, improvement measures are presented.
- In this paper, the limiting factors were highlighted.
- Analyzing the limiting and restrictive factors of agricultural production we can bring the soil in the best condition for plant growth and fruiting.

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