

## PEDOLOGICAL STUDY OF LAND SUITABILITY IN THE AREA OF MAVRODIN TELEORMAN COUNTY, REGARDING THE ARRANGEMENT OF IRRIGATION WITH WATER FROM ZOOTECHNICAL COMPLEXES

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**Key words:** soil fertility, pretability, irrigation, zootechnical complexes

### ABSTRACT

*The studied area is located in the center of Teleorman County, belonging to the Mavrodin cadastral territory, currently used as an arable land. The pedological mapping was performed with the purpose of identifying the soil area, assessing its fertility as well as the suitability for irrigation with wastewater.*

*In this regard, a soil profile was opened and several surveys were collected from soil samples in natural and modified settlements, for morphological, physical and chemical analyzes. The soil type identified is red preluvosol.*

*Geomorphologically, the land is part of the Roman Plain, the subunit of Burnaz, between the Danube Lunca, the Vedea, Teleorman and Calniștei valleys, extended west to the Teleorman river and the eastern limit of the county. The ground level is maintained between 8-10 m, with small fluctuations depending on the terrain.*

*The type of soil identified, is classified in the luvisoluri class, having the following sequence of horizons: Ao-AB-Bt-C.*

*The criteria for classification into classes, subclasses and other subunits of land according to the suitability to irrigate with waste water are those mentioned in chap. 10 from MESP, vol II (ICPA, 1987) with some additions.*

*According to Annex 11.1 of the MESP, vol II (ICPA, 1987), the following additional criteria intervene in the selection of lands that can be irrigated with wastewater (soil type, soil texture, soil volume, soil thickness, erosion, soil unevenness, groundwater depth, excess surface moisture, other restrictions.*

### INTRODUCTION

This study, scientific research under contract no. 1187/09.11.2016 between SC Agrilemi SA, as beneficiary and the University of Science Agronomy and Veterinary Medicine in Bucharest - as a performer.

The object is to control the execution of a research entitled "Development of soil and agrochemical study to elaborate the plan of

fertilization on crop area of 400 ha. For this study were carried out works on morphological characterization, physical and chemical, determining the production potential of the soil cover, stating the measures to improve soil and crop fertilization plan development, with recommendations on the types of fertilizers.

In addition to the conditions for the exclusion from irrigation with clean convention water, in the case of irrigation with waste water, there are added a number of restrictions, which extend the scope of the lands

completely excluded from irrigation (VI-class land), such as : soil type, soil texture, soil volume, soil thickness, risk of erosion, unevenness, ground level, excess humidity, etc..

## MATERIALS AND METHODS

Soil sampling agrochemical middle of plowed horizon (0-20 cm) were composed of 15-20 individual samples from the surface sampling plots of ground. The parceling of land, was considered pedological complexity, uniformity of land utilization, crop structure so that each sample representing a plot as uniform. The results were analyzed and interpreted based on the standards contained in the catalog A.S.R.O. that are consistent with international standards.

*Methods of analysis used to determine the chemical characteristics:*

Organic matter (humus): determined by volumetric wet oxidation method after Walkley-Black, the change Doughnut - STAS 7184 / 21-82

Carbonates - gasometric method using calcimetru/Scheibler after SR ISO 10693: 1998 (%)

Nitrogen content was determined indirectly (by calculation) based on the humus content and degree of saturation with bases.

$$IN = \text{humus} \times V / 100$$

Accessible phosphorus (P mobile): after Egner-Riehm-Domingo and dosed with molybdenum blue colorimetric after Murphy-Riley method (reduction with ascorbic acid).

Available potassium (K mobile): extraction after Egner-Riehm-Domingo and determination by flame photometry.

pH: determined potentiometrically with a combined glass and calomel electrode in an aqueous suspension to the Soil / Water 1/2.5 - SR 7184 / 13-2001

The acidity of the hydrolytic - extraction with sodium acetate to pH 8, 2

Amount bases - Kappen method Schofield Chirita by extraction with 0.05 normal hydrochloric acid

*Methods of analysis used to determine the physical properties:*

The apparent density (AD): the method of the metal cylinder of known volume (100 cm<sup>3</sup>) to the temporary humidity of the soil (g/cm<sup>3</sup>)

The total porosity (PT) by calculating (% by volume -% v / v)

## RESULTS AND DISCUSSIONS

The soil specific area mapped is represented by chromic luvosoil mollic subtype, with the following formula: Am-Bt<sub>1</sub>-

Bt<sub>2</sub>-Ck, whose morphologic and physico-chemical characterization will be presented below (Fig. 1).



Figure 1. Chromic luvisoil, molic subtype (EL – rs.mo)

**Am (0-36 )cm**, 7,5YR color wet and dry material with well developed grainy structure in the upper horizon and medium developed at its base polyhedral aggregates very compact and strongly cemented;

**Bt<sub>1</sub> (36-135) cm**, uniform color in shades of 7,5YR 3/2 material 3/3 7,5YR wet and dry material, columnoid-prismatic structure is medium and high. The texture is clay.

**Bt<sub>2</sub> (135-180) cm**, uniform color in shades of 7,5YR 3/3 material 3/4 7,5YR wet and dry material. The texture is clay. The structure is prismatic medium and high frequencies fine cracks. The material is very

**Ck (> 180) cm**, uniform color in shades of 7,5YR 4/4 material 5/4 7,5YR wet and dry material. The texture is clay loam. The material is unstructured, friable wet,

shatters hard. The texture is clayey loam horizon is poorly compacted, hard wet, rough dry, moderately plastic and sticky,

The material is very strong in wet and dry very hard, very plastic and sticky, very compact and strongly cemented;

hard wet and very tough when uacată very plastic and sticky, very compact, there is waste in the form of films neoformații clay faces structural aggregates;

moderately dry cohesive, presents rare grains of sand, rare spots of CaCO<sub>3</sub>, strong effervescence.

The physico-chemical characteristics of this type of soil, are consistent with the formation of physical and geographical conditions

thereof. Analytical data for preluvisoil reddish-molic are shown in table 1. Analyzing data from the table, it appears that

the texture is fine, differentiated profile, the amount of clay is greater in B horizons (36-

180 cm) compared to the value recorded the horizon surface (Figure 2).

**Table1**

*Physico-chemical analysis at soil EL rs-mo, of territory studied*

Orizont	Am	Bt <sub>1</sub>	Bt <sub>2</sub>	Ck
Dept (cm)	0-36	36-135	135-180	> 180
Sand gr. (2-0,2 mm)	19.4	16.1	11	26.5
Sand fin (0,2-0,02 mm)	16.6	10.9	9.5	19.5
Dust (0,02-0,002 mm)	30	25	27.5	18
Clay (< 0,002 mm)	34	48	52	36
Texture	TM	AL	AL	TT
pH	5.7	6.2	6.5	7.2
Humus (%)	3.2	1.7	1.3	0.8
Bulk density (g/cm <sup>3</sup> )	1.38	1.46	1.47	1.39
Total porosity (%)	47.5	45.7	45.7	47.7
Degree of compaction GT (%)	weak	moderate	moderate	weak
Carbonates (%)	0	0	0	9.7
Phosphorus (ppm)	52	18	10	-
Potassium (ppm)	254	112	67	-
Coefficient of hygroscopic (%)	7.9	12.3	12.2	4.7
Wilting coefficient %	1.9	16.9	18.3	12.7
Field capacity %	21.2	24.2	24.5	23.5
Usable water capacity%	9.3	7.3	6.2	10.8
Total capacity (%)	34.4	33.1	33.9	33.6
Humus reserve (t/ha)	156	109	81.2	21.6

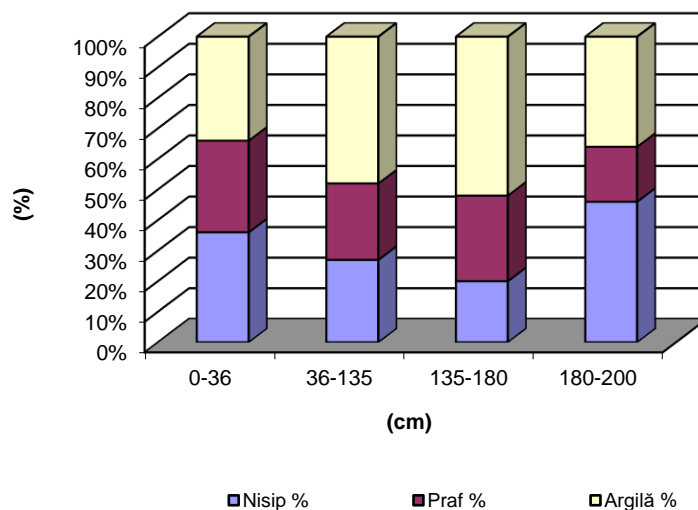


Figure 2. Granulometric composition

The total porosity of the soil is between 45% and 47%. The degree of compaction of the soil is poor in the ranges of 0-36 cm deep and 180-200 cm becomes moderate

between 36-180 cm depth profile in the Bt horizons and may be a factor limiting fertility to be corrected (figure 3) .

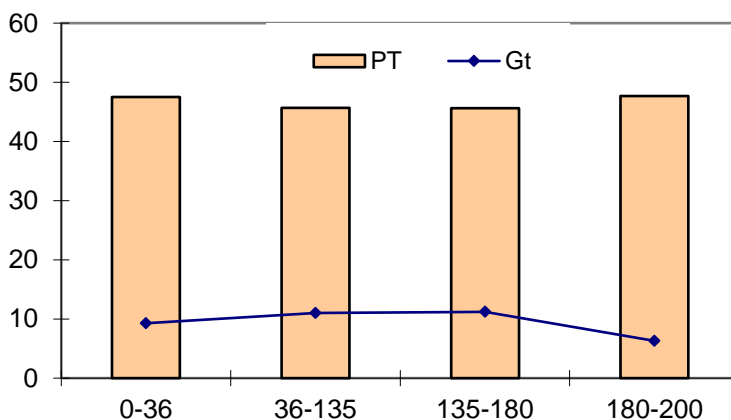


Figure 3. Variation porosity and degree of compaction the soil profile

The reaction is slightly acidic soil and soil fertility is a limitation. Also humus reserve in the upper horizon is medium and small drops to the underlying horizons. There is a

tendency of decrease in humus content and increase the profile of the reaction studied (Figure 4).

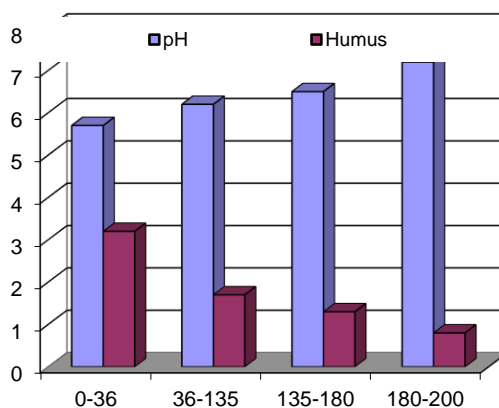


Figure 4. Variation reaction soil and humus content pe profilul de sol

## CONCLUSIONS

The soil is in concordance with the physical and geographical conditions of the area being identified only one soil type with regional character is chromicluvosoil – mollic subtype.

The studied territory is very well suited to each criterion, so it can be irrigated with wastewater from zootechnical complexes, because the texture is muddy, very high volume edaphic, deeply deep, without danger of erosion, uniform territory, water level over 10 m and excess zero humidity.

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