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STUDIES AND RESEARCH ON THE SOILS COATING FROM ZAVOI COMMUNE, CARAS - SEVERIN COUNTY

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Abstract

The soil is considered as a great wealth of mankind and its protection and rational use of stringency is for each of us. The soil is involved in society, established in the area of human settlement and infrastructure for all human activities contributing to the achievement of all requirements of society and the continuity of life on Earth. Investigation was carried out jointly Zăvoi, Caraș-Severin and soils studied were: Aluviosoil, Distrycambosoils, Eutricambosoils, Luvosoils and on limestone, intrazonal, meet Rendzina and Gleyosoil in lower areas. The most common pedogenesis processes that influence soil development in the territory are: bioaccumulation is argilization, argiloiluviation, migration and accumulation of carbonates, processes and stagnogleyzation gleyzation, the contractilo-inflating etc.

Key words**:** *porosity of aeration, soil, studies, total porosity*

INTRODUCTION

The Zăvoi commune is located in the Bistrica corridor and belongs to the Caraș-Severin County which is located in the south-west extremity of the country. County is bordered to the Northwest and North with Timiș County, North-East with Hunedoara County, to the east with Gorj County, South-East with Mehedinti County, in the South with the Danube River and in the South-west with Serbia.
The Zăvoi Commune consists of six localities: Zăvoi, commune residence, Măgura, Măru, Poiana Mărului, Bistra and Voislova.
In terms of geomorphological the Zăvoi Commune is located in the depression corridor of the Bistra, bounded to the East and Southeast by the Țarcu Mountains, in the north by the Poiana Rusca Mountains, in the west by the Sacos-Zăgujeni hills and communicate with Timis depression.

MATERIALS AND METHODS

Following the movements made in the field, soil samples were taken which were brought to the laboratory's research in the discipline of Soil Science USAMVB, "King Michael The First of Romania" from Timisoara and prepared for analysis, determining the next indicators: the composition size, bulk density, specific gravity, determination of soil reaction, hydrolytic acidity, total exchange acidity, the determination of humus, total nitrogen, alkaline earth carbonates, phosphorus and moving potassium.
The following determinations were done: total porosity, the porosity of aeration, field capacity, the capacity of useful water; fading coefficient, supply of mold (t/ha) of Nitrogen index (IN) and the degree of compaction.

RESULTS AND DISCUSSIONS

The Zăvoi Commune is bordered to the north by Rusca Montana Commune, to the East by the Marga and Bautar Communes, then with Gorj and Hunedoara counties to the South-East, in the South-West with Teregova commune, in the West by the Bolvaşniţa, Turnu Ruieni, Obreja commune and Oţelu-Roșu city (Fig. 1.).
Maru Village is situated along the Bistra River, DJ 683 to Poiana Mărului at a distance of about 7 km from the commune residence.
The main watercourse crossing from East to West Zăvoi commune is the Bistra River, the

main tributary of the river Timiș. The Bistra Valley appearance today is due to river erosion and successive catches, which occurred early in the Quaternary. The Bistra River consists of two major water courses, which have their origin in the Tarcu Mountain massif: the Bistra Ardealului and the Bistra Marului. The area has a rocky foundation, generally built of crystalline limestone, mica and volcanic sedimentary formations.

Fig. 1. Map of Caras -Severin (http://www.pescarul.com/judete/timis

Climatology is characterized by average annual temperatures ranging from 11-12^{o}C, annual average rainfall is around 600-750 mm.

On the strength of natural setting of the relief, climate and vegetation, the soils from Bistra Valley has a zonal distribution with characteristic types of steppe, steppe, forest and grassland regions.

In the Bistra valleys there are Aluviosoils and high in the mountains meet Țarcu Dystricambosoils and Eutricambosoils, slightly below meet Luvisols and on limestone, Intrazonal, meet Rendzina and Gleyosols in lower areas.

1.Aluviosoil strongly gleyed. Aluvuisoils properties are shown in Table 1.

Strongly gleyed aluviosol properties are: soil texture is medium throughout the profile, soil reaction is slightly acid between 0-124 cm, moderately acidic between 124-170 cm humus content in Ap is weak; reserves of humus in the top 50 cm is small, the index shows a low nitrogen supply nitrogen Ap, Ap mobile P content is very low, the contents of the cell K Ap is weak, the degree of soil base saturation shows an eutric soil between 0-124 cm, a mesobasic soil between 124-170 cm. Variation of the essential characteristics of morphological and chemical characteristics of the soil in the unit main unit soils associated with soil and keeping the soil condition (erosion, landslides, etc.): small variations.

Drainage (internal, external, global) and permeability: very high.

The water regime of the soil flooded every 2-5 years by spills.

Table 1. Strongly gleyed alluvial soil properties

Horizon	**Ap**	**Ao**	**A/Cg_2**	**CGo_3**	**$IICG0_3$**	**$IIICG0_4$**	**$IVCGr_5$**
Depth (cm)	*0-16*	*16-28*	*28-40*	*40-65*	*65-89*	*89-124*	*124-170*
Coarse sand 2-0. 2 mm	3.4	2.6	7.7	5.4	6.3	20.5	19,0
Fine sand 0.2-0.02 mm	55.7	56.3	63.2	60.6	55.1	49.5	41.6
Dust from 0.02-0.00 mm	13.4	12.5	9.8	11.8	10.9	9.3	8.1
Dust 0.001 - 0.002 mm	9.1	11.0	6.8	8.5	10.0	6.8	11.3
Clay < 0.002 mm	18.4	17.6	12.5	13.7	17.7	13.9	18.3
Fine clay < 0.01 mm	27.5	28.6	19.30	22.2	27.7	20.7	31.3
Texture	LN	LN	LN	LN	LN	LN	LN
Density (g/cm^3)		2.65	2.60	2.62			
Aparent Density (g/cm^)		1.17		1.32			
Total porosity (%)		55.9		49.7			
Aeration porosity (%)		35.0		26.3			
Coef. of the higr. (%)		3.24	2.86	3.38			
Field capacity (%)		17.88		17.77			
Cover. useful water (%)		11.72		12.92			
Conduct.hydraulics (mm/hour)		60.0		85.0			
Coef. of wilting (%)		6.16		4.85			
Floor of moisture (%)		12.02		11.31			
pH in H_2O	6.35	6.20	6.45	6.60	6.40	6.40	5.40
Humus (%)	1.73	1.11	0.62	0.43			
Total N (%)	1.63	1.04	0.59	0.41			
P(ppm) inAl	6.3	5.7	7.5	8.6	12.3	24.2	29.4
K(ppm) in Al	50	52	38	36	34	36	36
SB me/100g soil	15.60	15.40	16.00	16.50	15.20	12.60	11.40
SH me/100g soil	2.90	3.12	2.83	2.45	2.64	2.59	5.09
Tme/100g soil	18.50	18.52	18.83	18.45	17.84	15.19	16.49
V (%)	84.32	83.15	84.97	86.72	85.20	82.95	69.13
Book of humus (0-50 cm)	62 t/ha						

2. Stagnic Luvosoil. Luvosoil properties are shown in Table 2.

Stagnic luvosol properties are: soil reaction is

moderately between 0-34 cm, slightly acidic between 34-147 cm, neutral between 147-180 cm humus content in AP is weak; reserve humus (0-50 cm) is small, the index shows a low nitrogen supply nitrogen Press; mobile P content in Ap is medium, cell K content is medium, the degree of soil base saturation shows a mesobasic soil between 0-50 cm, an eubasic soil between 50-180 cm, soil texture is medium between 0-34 cm, medium-fine between 34-71 cm, fine between 71-180 cm high bulk density is between 21 -71 cm, midway between 71-90 cm, the degree of compaction is high between 21-71 cm, 71-90 cm emphasized between, total porosity is small between 21-50 cm, between 50-90 cm very small.

Table 2. Physical and chemical properties of stagnic luvosoils

Horizon	**Ap**	**El**	**E/B**	**Bt_1w**	**Bt_2W_3**	**B/CW_3**	**CW_4**	**$IICW_3$**
Depth (cm)	0-21	21-34	34-50	50-71	71-96	96-117	117-147	147-180
Coarse sand 2-0. 2 mm	2.2	2.0	2.8	2.0	1.8	1.5	1.4	1.1
Fine sand 0.2-0.02 mm	32.2	32.0	28.0	29.4	22.1	24.1	23.1	26.6
Dust from 0.02-0.00 mm	16.0	17.6	15.7	12.0	12.9	10.8	10.2	13.5
Dust 0.001 - 0.002 mm	17.5	15.4	16.8	16.2	14.2	11.1	12.1	11.1
Clay < 0.002 mm	32.1	33.0	36.7	40.4	49.0	52.5	53.2	47.7
Fine clay < 0.01 mm	49.6	48.4	53.5	56.6	63.2	63.6	65.3	58.8
Texture	PL	PL	LA	LA	AL	AL	AL	AL
Density (g/cm^3)		2.41	2.44	2.43	2.36			
Aparent Density (g/cm^)		1.40	1.41		1..35			
Total porosity (%)		42.0	42.3		42.8			
Aeration porosity (%)		9.42	10.16		10.04			
Degree of compaction		15	16		19			
Coef. of the higr. (%)				8.33	10.22			
Field capacity (%)		23.27	23.5		24.27			
Cover. of useful water (%)		11.67	10.6		7.07			
Conduct.hydraulics (mm/hour)		2.4	1.8		1.2			
Coef. of wilting (%)		17.44	18.2		20.74			
Floor of moisture (%)		11.60	12.9		17.20			
pH in H_2O	5.20	5.40	5.85	5.85	6.00	6.15	6.30	6.90
Humus	1.49	0.87	0.74					
Total N (%)	1.22	0.72	0.66					
P(ppm) inAL	22.2	16.6	8.4	5.1	3.9	4.5	4.4	5.7
K(ppm) in AL	132	86	86	88	121	126	139	110
SBme/100g soil	11.2	12.0	14.8	16.8	19.6	18.0	21.0	22.0
SH me/100g soil	6.29	6.38	5.06	5.16	5.04	4.70	4.37	2.97
Ah me/100g soil	4.71	4.13						
Al mobile me/100 g soil	0.528	0.496						
Tme/100g soil	17.49	18.38	19.8	21.96	24.64	22.70	25.70	24.97
V (%)	64.04	65.29	74.5	76.50	79.54	79.29	82.77	88.10
Book of humus (0-50)	77 t/ha							

3.Eutricambosoils moderately gleyed. Eutricambosoils properties are shown in Table 3.

Table 3. Physical and chemical properties of eutricambosoil

Horizon	**Ap**	**Ao**	**Bv**	**B/C**	**CGo3**	**IICGo4**	**IIICGr5**
Depth (cm)	0-14	14-33	33-58	58-82	82-105	105-127	127-150
Coarse sand (2-0.2 mm)	1.4	1.2	0.5	0.6	1.2	0.5	0.6
Fine sand (0.2 - 0.02 mm)	30.6	32.8	28.5	40.0	41.7	45.6	46.3
Dust from 0.02-0.002 mm	14.1	12.8	15.1	14.7	16.5	16.2	16.0
Dust 0.001 - 0.002 mm	19.1	20.5	21.8	17.3	16.8	14.5	14.7
Clay < 0.002 mm	34.8	32.7	34.1	27.4	23.8	23.2	22.4
Fine clay < 0.01 mm	53.9	53.2	55.9	44.7	40.6	37.7	37.1
Texture	LA	LA	LA	LL	LL	LL	LL
Density (g/cm^3)		14.7	1.25	1.35			
Total porosity (%)		42.2	49.8	46.5			
Aeration porosity (%)		4.6	17.7	11.8			
Degree of compaction		15	1	4			
Coef. of the higr. (%)		6.08	6.61	4.64			
Field capacity (%)		14.07	13.70	16.08			
Cover. of useful water (%)		2	1.1	2.1			
Conduct. hydraulics (mm/hour)		11.50	11.99	9.64			
Coef. of wilting (%)		18.54	18.84	17.68			
Humus (%)	1.86	1.24	1.05				
pH in H_2O	5.70	6.20	6.00	5.85	5.80	6.10	6.10
Total N (%)	1.71	1.15	0.98				
P(ppm) inAL	6.4	7.6	4.5	7.1	9.1	10.5	12.0
K(ppm) in AL	91	93	82	52	48	58	54
SBme/100g soil	20.0	20.80	20.60	14.40	15.80	17.2	17.4
SH me/100g soil	5.42	4.68	4.92	4.13	4.03	3.67	3.84
Tme/100g soil	25.42	25.48	25.52	18.53	19.83	20.87	20.64
V (%)	78.64	81.63	80.72	77.71	79.68	82.41	84.30

Eutricambosoils have the following properties: soil reaction is moderately acid 0-14 cm, 14-15 cm slightly acidic, humus content in the top 20 cm is low, supply of humus (0-50 cm) is small; nitrogen index shows a low nitrogen supply in the first 20 cm cell P content in the top 20 cm is very low; cell K content in the first 20 cm is medium, the degree of soil base saturation shows an eubazic soil, soil texture is medium-fine between 0-58 cm, midway between 58-150 cm high bulk density is between 14-33 cm, between 33-82 cm is a middle density.

CONCLUSIONS

Soils are one of the great richess that nature has endowed our planet. They were created over millions of years by the interaction between the atmosphere, hydrosphere and lithosphere in the wonderful natural laboratory. They became, during the evolution of the planet, a complex envelope, its qualities, provides the possibility of developing vegetation - the basis of the food chain in any ecosystem.
In the Zăvoi commune, soils are arranged in increments of altitude, depending on topography and climate, which determines the character of their area.
In the high area of land, in the mountain area, one can meet Districambosoils ensuring the development of beech forest floor and beech forests mixed with other species, lower we will meet eutricambosoils and Luvisols, and in the Bistra valley Gleiosoils, alluvisoils and on the limestone Intrazonal, Rendzinas soils.
On the strength of natural setting of the relief, climate and vegetation, Bistra soils have a zonal distribution with characteristic types: steppe, steppe, forest and grassland regions.
Fluvisoils are used for agriculture, and are the most fertile soils of the Zăvoi commune and the most cultivated with crop plants: maize, wheat, sugar beet, vegetables etc.
Eutricambosoils have a medium natural fertility and are cultivated with cereals, corn, fruit trees, vines.
Dystricambosoils are the least fertile soils of the commune, in general, are filled with forests, pastures and meadows of low productivity and cultivated with potato.
Luvisoils have a low to medium fertility are filled with fruit, especially plum and apple trees, meadow and pasture and some forest.

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