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PEDOLOGICAL AND AGROCHEMICAL STUDY AT SC AGRILEMI SRL, TO DEVELOP FERTILIZATION PLAN ON CULTURE

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Abstract

Mavrodin town, is located in the center of Teleorman County on DJ 703, between the towns Buzescu and Calinesti. Research has been conducted on an area of approximately 400 hectares on land plane, belonging to SC Agrilemi SRL, the soil cover is represented by reddish preluvosoil molic subtype. In order to characterize morphologic and physicochemical soil type representative, it opened soil profile from which samples were taken and modified natural soil settlement and several polls.

For the preparation of fertilizer on crops, it was made an agrochemical mapping, which consisted of a collection of 40 soil samples environments, which are conditional and analyzed in laboratories ICPA. Also it determined the productive potential of the soil cover based on the study of evaluation and mitigation measures recommended enunciation.

Key words*: soil fertility, potential, agrochemical, fertilizer.*

INTRODUCTION

This study, scientific research under contract no. 1187/09.11.2016 between SC Agrilemi SRL, as beneficiary, and the University of the Agronomic Sciences and Veterinary Medicine of 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.

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 calcimetrul 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 = humus x 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 Schoffield 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^3) to the temporary humidity of the soil (g/cm^3)

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

The coefficient of hygroscopic (CH) drying at 105 ° C of a sample of soil moistened in advance in equilibrium with an atmosphere saturated with water vapor (in the presence of a solution of H2SO4, 10%) -% by weight (% w/w).

Wiping coefficient (CO): calculated by multiplying by 1.5 the hygroscopicity factor determined by the modified Mitscherlich method (no vacuum, witness evidence) – weight %.

RESULTS AND DISCUSSIONS

The soil specific area mapped is represented by red preluvosol molic subtype, with the following formula: Am-Bt_1–Bt_2-Ck, whose morphologic and physico-chemical characterization will be presented below (Figure 1).

Figure 1. Reddish preluvosoil, molic subtype (EL - rs.mo)

Morphological characteristics

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

Bt_1 (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.

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

Bt_2 (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 hard wet and very tough when uacată very plastic and sticky, very compact, there is waste in the form of films neoformaţii clay faces structural aggregates;

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, moderately dry cohesive, presents rare grains of sand, rare spots of $CaCO_3$, strong effervescence.

Physico-chemical characterization

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

Analytical data for preluvosoil 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).

Table 1. Physico-chemical analysis at soil EL rs-mo, of studied territory

Horizon	Am	Bt_1	Bt_2	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^3)	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

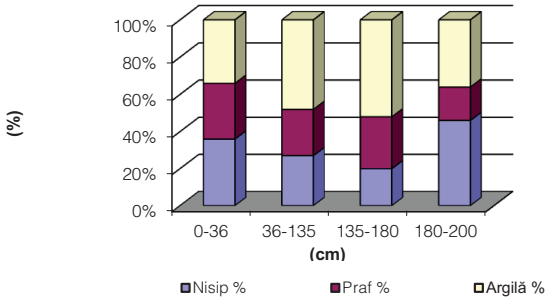

Figure 2. Granulometric composition

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).

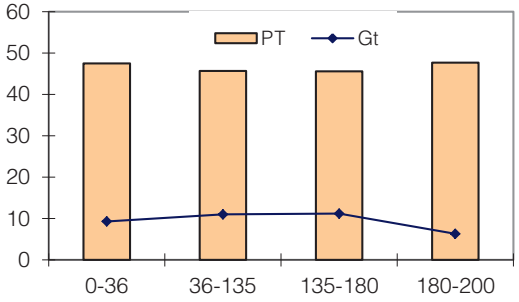

Figure 3. Variation porosity and degree of compaction the soil profile

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).

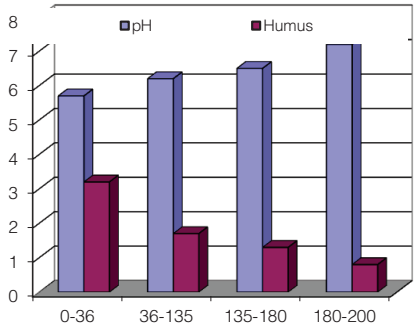

Figure 4. Variation reaction soil and humus content the soil profile

The results of analysis based on agrochemical four samples taken from the sole, as well as agrochemical recommendations on fertilizer application rates in crops, they are shown in Table 2 (a and b).

Table 2 (a) Dosing recommendations of chemical fertilizers and amendments based on agrochemicals analyzes

PAO	Plot	Area (ha)	Crop	Previous crop	Production obtained (t/ha)	pH	Humus, %	P ppm	K ppm	IN %	Ah	SB	Vah %
1	S 90	90	Wheat	Sunflower	2500	5.43	3.08	29.6	250	2.26	6.13	23.2	79
2	S60	60	Wheat	Peas	3000	5.72	4.30	85.3	300	3.35	5.46	25.8	82
3	S25	25	Rapeseed	Wheat	5500	5.48	4.44	92.0	345	3.39	5.84	25.0	77
4	S60	60	Wheat	Rapeseed	3000	5.55	4.15	58.0	270	3.13	5.84	23.9	80
5	S160	160	Rapeseed	Sunflower	2500	5.66	4.57	42.0	280	3.55	5.98	26.9	81

Table 2 (b)

PAO	Plot	Area (ha)	Crop	Previous	Production obtained (t/ha)	N (kg a.s./ha)	P_2O_5 (kg a.s./ha)	K_2O (kg a.s./ha)
1	Mag.	90	Wheat	Sunflower	2500	85	60	-
2	Grp. F	60	Wheat	Peas	3000	40	100	80
3	S25	25	Rapeseed	Wheat	5500	125	40	-
4	Grp. S	60	Wheat	Rapeseed	3000	100	50	25
5	Agrom.	160	Rapeseed	Sunflower	2500	70	45	-

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 reddish preluvosoil – molic subtype.

The reaction is moderately acidic soil with pH values between 5.23 and 5.86 reason for Correction of reaction by applying calcium-based amendments or fertilizers with physiologically alkaline reaction.

Nitrogen supply, represented by nitrogen index (IN) is average, with values between 2.01 and 3.95%.

The supply of phosphorus is medium-high for the whole area studied, by between 21-80.

Supply mobile potassium is like for phosphorus, medium-high, with values between 144 and 363.

Total surface presents moderately acidic pH, so it must be fertilized with ammonium nitrate. It is banned applying fertilizer ammonium nitrate, ammonium sulfate or urea on the sole.

Make fertilization with NP/NPK (20:20)/(15:15:15) and ammonium nitrate (CAN azomures = 27% N + 7%CaO + 5%MgO sau NAC Linzer = 27% N + 12.5% CaO).

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