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PHYSICAL AND CHEMICAL PROPERTIES OF PSAMOSOIL, PRELUVOSOIL AND CHERNOZEM IN THE MEHEDINTI COUNTY

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Abstract

The area is 4,993 km2 Mehedinti, representing 2.1% of the country. Mehedinti County due to its potential, diversity of terrain and geographical location, has a well-defined economic landscape, being one of the few counties with the smooth articulation of agricultural use, featuring a whole range agrochemical and pedological, which requires a scientific approach permanently and agricultural phenomenon. Structural changes in agriculture, the existence of conflicting properties with optimal criteria, economic and biological, agricultural farms, impose a number of restrictions that require us to promote research priorities and objectives able to rehabilitate agricultural infrastructure around. Knowing in detail yielding and technological features, favouring and restricting factors of agricultural production on each land portion both from the point of view of present response and of real possibilities of turning them into better ones can be, for the decision-maker a precious tool in achieving the most suited practical measures of producing plant biomass in a dynamics well correlated with environmental ecological requirements.

Key words: *characteristics, profile, physical – chemica, soil*

INTRODUCTION

Soil has many roles, as natural resource, as support and place for many activities, but what is the most important it is its role as main way of vegetal production.[4]
Soil conditions, understanding this soil as factors holding vegetation, [2] water and food items, is a complex of traits that act directly and indirectly on plant growth and fruitfulness.[1]
Soil fertility in accordance with climatic allows farmers to obtain crop-specific parameters individually. [5]
The influence of natural conditions through land reclamation works or agro - pedo - improvement leads in all cases, the change characteristics of environmental factors, which generally are favorable for plant growth.[3]

MATERIALS AND METHODS

The samples were processed and the following analyses were made using the following methods:

Physical proprieties determination:
The texture of the soil was determined through the Cernikova method (dropping method has the following principle: different speed sedimentation of the liquid particles, in conformity with their size and the Stokes law).
The stability of the granule-like fractions in weight percents was made following the formulas:
-Brutish sand (2 – 0.2 mm in diameter)% = m_1 x 100/m_0 x F;
-Fine sand (0.2 – 0.02 mm in diameter)% = 100 x m_2/m';
-Dust (0.02 – 0.002 mm in diameter)% = (m_2 – m_3) x V x 100 / (v x m_0) x F;
-Clay (with the diameter < 0.002 mm)% = m_3 x (V x 100 / V x m_0 - d) x F in which:
-m_0 – the soil quantity in g;
-m1 – the brutish sand quantity in g;
-m2 – the quantity of particles extracted at the first dropping (P+A) in g;
-m3 – the quantity of particles extracted at the second dropping (A);

-V – the volume of the suspension in the sedimentation cylinder in cm^3;
-v – the dropper volume in cm^3;
-d – correction factor that depends of the nature of the dispersant used to treat the samples and that has the value:
-1.6 – when using sodium hydroxide;
-10.2 – when using sodium hexa-meta-phosphate;
-m' – the mass of dry and carbonate free soil (g);
-100 – perceptual report factor.
-Determining the chemical proprieties:
-Determining the humus content of the soil was made through titration methods – the Tiurin method.
The method consists of oxidation of the humus carbonate with a chromium anhydride or potassium bi-chromate in the presence of sulfuric acid.
Equipment and materials: 100 ml conic pot; 300 ml conic pot; 20 – 25 ml and 50 ml burette; glass pear, analytical balance and heating installation.
Reagents: silver sulfate (mercury or aluminum); oxidative substance; orto-phosphoric acid 85%; di-phenyl-amine solution 0.5%; Mohr salt 0.1 n.
The humus content of a soil sample was calculated with the following formula:
Where:
-V_1 – is the volume of Mohr salt solution 0.1 n consumed at titration of the witness sample (m1);
-V_2 – is the volume of Mohr salt solution 0.1 n consumed at titration of the chromic acid excess from the analyzed soil (m1);
-F – is the factor of the Mohr salt;
-0.0005181 – is the humus content in g oxidizing 1ml chromic acid 0.1 n;
-M – is the weight of the analyzed soil sample (g);
-K – is the coefficient calculated for the referred result regarding the completely dried soil.
Soil reaction (pH) was determined through the potentiometric method with pH sensitive glass electrode, at a soil : water report of 1 : 2.5;
Phosphor and mobile potassium determination, extraction of ammonium acetate lactate, at a pH of 3.75 and the calorimetric dosage of phosphor with molybdenum – tin chloride – ascorbic acid after the Muphy method, respectively flam-photometry of potassium.
Determination of the total capacity of cationic exchange (T) was made after the Bower method through the saturation of the soil with sodium from sodium acetate 1 N at a pH of 8.2.
In the case of saturated soils with base ions T = S_B.
In the case of the soils that absorbed both base positive ions and hydrogen ions, T = $S_B + S_H$.
The degree of base saturation (V) – defines the proportion in which the colloidal complex is saturated by base positive ions and was calculated with the formula:
The high values of V% express a weak elutriation, neutral to alkaline reaction and a series of favorable proprieties the exception being the saturated solutions that have V = 100% but present positive sodium ions that give unfavorable proprieties.
The low value of v% expresses a strong elutriation, debasing and an acid reaction and less favorable soil proprieties for the growth and development of crops.
The exchange base capacity (exchange base sum) (S_B) – is measured in m.e. / 100g completely dried soil at 105^0C and results from the total of basic positive ions Ca^{2+} + Mg^2 + K^+ + Na^+ absorbed in the colloidal complex of the soil.
The exchange capacity for hydrogen (absorbed hydrogen) (S_H) – is measured in m.e. / 100 g soil and represents the total amount of positive hydrogen ions absorbed in the colloidal complex of the soil.
S_H determination was made through the leaching of the soil until exhaustion with a tampon solution of potassium 1 N at a pH of 8.3.
And the hierarchy methodology.
To make the assessment calculus we have chosen from the multitude of environmental conditions that characterise each land unit within the District of Mehedinţi only those considered most important, easier and more

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accurate to measure, that can usually be found in soil study works, called assessment indices.
In assessing lands for natural conditions each of the indices mentioned except for index number 69 that intervenes directly participate in the establishing of assessment grade for an assessment coefficient that oscillates between 0 and 1, depending on the total unfavourableness or favourableness of the grade for the requirements of the use to take into account.

RESULTS AND DISCUSSIONS

This coarse sand has values oscillating between 42.0-46.3, the minimal value being in the Ao horizon, and maximal value being in the C horizon.
Fine sand has values that decrease from the soil surface to lower horizons, maximal value being in the Ao horizon.
Dust has values oscillating between 3.5 and 2.1.

Table 1. Physical – chemical properties of the soil: Psamosoil

Horizon Horizon depth	MU cm	Ao 0-35	C 35-120
Coarse sand 2.0-0.2 mm	%	42.0	46.3
Fine sand 0.2-0.02 mm	%	47.9	43.4
Dust 0.02-0.002 mm	%	3.5	2.1
Argile 0.002 mm	%	6.6	8.2
Humus	%	0.58	0.31
I.N.	%	0.45	0.29
pH in H_2O	%	5.6	6.35
S.B.	me/100g	6.56	6.56
H. sch.	me/100g	1.80	0.42
T	me/100g	8.36	6.98
V	%	7.5	93.9
P mobil	ppm	23.6	17.1

The most important component part of the granulo-metrical fraction (clay) has the maximum value in the last horizon (C – 8,2), its value being lower in the first horizon (Ao – 6.6).

After having analysed and after having consulted the triangular diagramme of the texture we measured the texture of the psamosoil which is a sandy-clayish texture, undifferentiated on the profile.
Soil reaction is with no significant differences whatsoever per profile, with values between 5.6-6.35.
The sum of changeable bases is low for the whole profile.
The humus percentage being 0.58-0.31, it shows a low content in humus in the soil.
Potassium (K) supply is low towards the lower horizon, having a value of 66.

Table 2. Physical – chemical properties of the soil: Chernozem

Horizon Horizon depth	MU cm	Am 0-51	AC 51-80	C 80-135
Coarse sand 2.0-0.2 mm	%	15.5	9.1	9.9
Fine sand 0.2-0.02 mm	%	49.5	55.8	54.8
Dust 0.02-0.002 mm	%	17.1	17.1	16.3
Argile 0.002 mm	%	17.9	18.0	19.0
Humus	%	2.11	1.33	1.20
I.N.	%	2.11	1.33	1.20
pH in H_2O	%	7.40	7.98	8.10
V	%	100	100	100
P mobile	ppm	62.6	81.3	23.8
K mobile	ppm	140	88	55

Coarse sand has values oscillating between 15.5-9.1, the maximal value being in the Ao horizon, and minimal value being in the AC horizon.
Fine sand has values that crease from the soil surface to lower horizons, maximal value being in the Ao horizon. Dust has values oscillating between 17.1 and 16.3.
The most important component part of the granulo-metrical fraction (clay) has the maximum value in the last horizon (C – 19,0), its value being lower in the first horizon (Ao – 17.9). After having analysed and after having consulted the triangular diagramme of the texture we measured the texture of the chernozem which is a sandy-clayish texture, undifferentiated on the profile. Soil reaction is

with no significant differences whatsoever per profile, with values between 7,40-8,10.The sum of changeable bases is low for the whole profile. The humus percentage being 2,11-1,20, it shows a low content in humus in the soil. Potassium (K) supply is low towards the lower horizon, having a value of 23,8. Coarse sand has values oscillating between 10.5-7.0, the maximal value being in the Ao horizon, and minimal value being in the C horizon. Fine sand has values that crease from the soil surface to lower horizons, maximal value being in the C horizon. Dust has values oscillating between 11.8and 14.2. The most important component part of the granulo-metrical fraction (clay) has the maximum value in the last horizon (C – 19,0), its value being lower in the first horizon (Ao – 19.6).

Table 3. Physical – chemical properties of the soil: Preluvosoil

Horizon Horizon depth	UM cm	Ap 0-19	Ao 19-36	Bt_1 50-94	Bt_2 94-128	C 128-160
Coarse sand 2.0-0.2 mm	%	10.5	6.5	8.5	8.0	7.0
Fine sand 0.2-0.02 mm	%	58.1	56.1	55.1	58.7	59.8
Dust 0.02-0.002 mm	%	11.8	13.2	13.6	12.7	14.2
Argile 0.002 mm	%	19.6	24.2	22.8	20.6	19.0
Humus	%	1.16	6.92	4.24	2.35	1.24
I.N.	%	0.91	6.29	4.01	2.20	1.24
pH în H_2O	%	6.42	6.64	6.88	6.85	8,18
S.B.	me/100g	9.95	16.76	18.86	17.81	-
H.sch.	me/100g	2.70	1.65	1.07	1.15	-
T	me/100g	12.65	18.41	19.93	18.96	-
V	%	78.7	91,0	94.6	93.9	100
P mobil	ppm	8,0	6,6	22.0	12.7	19.5
K mobil	ppm	108	100	74.0	116	62

After having analysed and after having consulted the triangular diagramme of the texture we measured the texture of the chernozem which is a sandy-clayish texture, undifferentiated on the profile. Soil reaction is with no significant differences whatsoever per profile, with values between 6,42-8,18. The sum of changeable bases is low for the whole profile. The humus percentage being 1,16-1,24, it shows a low content in humus in the soil. Potassium (K) supply is low towards the lower horizon, having a value of 62.

CONCLUSIONS

After calculating the note class for all cultures and plantations taken in consideration, there has been observed that the most fertile soils are: typical chernozeom and cambic chernozeom.
From these studies valuable information result regarding the lands soith restruction for variants uses, their characteristic localization and their surface stowing the sources-soil deposits for many resources, especially for the enlargement of the arable surface and the placement of the different agricultural regions.

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