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THE INFLUENCE OF MODELING WORKS ON PROTISOILS WITH SPECIFIC GENETIC BEDROCK, IN THE CHARACTERISTIC RELIEF AREA OF DOLJ COUNTY

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Abstract

Through the research we have been carried out, it was aimed to identify the types of not levelled and modeled sandy soils, to determine the physical-mechanical, hydrophysical and chemical properties and, based on them, to ascertain the changes that appeared as a result of the modeling works, from a morphological point of view, in regarding the particle size composition and implicitly texture, density, bulk density, aeration porosity, total porosity, hydrophysical indices (hygroscopic coefficient (HC, %), wilting point (WP, %), water field capacity (WFC, %) available water capacity (AWC, %) yet, also, chemical properties (humus, soil reaction, bases saturation degree, supply of nutrients). Through a comparative study of the data obtained with the 4 identified sandy soil types (unleveled typical sandy soil, leveled typical sandy soil (uncovered), unleveled mollic sandy soil, leveled mollic sandy soil (covered), there have been observed an obvious influence of the leveling work on the mentioned properties that were found.

***Key words**: sandy soil, leveled, not leveled, properties, fertility.*

INTRODUCTION

The main characteristic of the soil, which makes it the life support for plants and the main source of supply of agricultural food products for mankind, is its fertility (Borlan & Hera, 1994).

The intensive agriculture practiced in the last period, led to the decrease of soil fertility. This is a problem encountered in all areas of the country and is manifested in particular by the reduction of organic matter, which implicitly leads to the loss of soil biodiversity (Mihuț et al., 2018; Vintilă et al., 1984).

Maintaining soil fertility and improving its fertility is a priority concern of specialists, of all those who are concerned with this means of production, with the aim of ensuring, through the productions obtained, the food needs of the population (Duma-Copcea et al., 2018; 2021).

Sandy soils are characterized by a low content of organic matter, which means that for the growth and development of plants, large amounts of chemical fertilizers are applied on these soils, which in most cases lead to groundwater pollution (Gheorghe et al., 2003; Răducu, 2009).

In order to prevent the contamination of groundwater with nitrates and to preserve and even increase the fertility of these soils, it is necessary for fertilization to be carried out in a balanced way, in appropriate doses, for the practice of sustainable agriculture in the area of sandy soils (Hera, 2002; López et al., 2019; Pedro et al., 2019).

The production of agricultural products, both quantitatively and qualitatively, is influenced by the quality of the soil. Physical soil degradation is mainly caused by agricultural activity (Virto et al., 2015).

Sandy soils are considered sensitive ecosystems. Any change in soil and landscape conditions can lead to important changes in its environment (Eftene et al., 2022).

Farmer, through his intervention, modified the natural framework in which the soil was formed and thus the soil formation processes were disturbed (Popescu, 2018).

Undeveloped soils, sands and sandy soils have been studied relatively recently. The papers regarding the improvement of sands have gained scope in the last 40-50 years (Popescu et al., 2015).

In the Dabuleni area, Dolj County, an area characterized by a specific relief of dunes and inters dunes, the sandy soils were leveled, they were shaped many years ago, for their use for agricultural purposes and in this way, the natural landscape of these soils was disturbed and the soil formation processes proceeded differently.

The present work proposes a review of the properties of soils always at the beginning of formation, as a result of the quartz bedrock that was the decisive factor in their genesis (Popescu, 2019), in this southern area of Dolj County. The aim was to identify the types of leveled and not leveled psamosoils, to determine the physical, hydro physical and chemical properties, and based on them to ascertain the changes that occurred as a result of the modeling and leveling works.

Psamosoils are characterized by a low natural fertility, as a result of the participation in high percentages of coarse size fractions (over 65%), in the composition of the mineral part, which causes conditions in which the growth and development of plants are strongly disturbed.

The sandy soil has a low percentage of fine or clayey particles and this conducts sandy to lacking of cohesion which favors wind erosion in the area (Popescu, 2017).

MATERIALS AND METHODS

In order to identify the types of soil in the field and for their morphological description, soil profiles were dug in the field.

The laboratory analyzes were performed according to the methodology established by the Institute of Research for Pedology, Agrochemistry and Environment Protection Bucharest (IRPAEP Bucharest, 1987) and they are as follows:

1. Particle size analysis: the size fractions with a diameter larger than 0.2 mm (2-0.2) were determined by sieving; silt and clay were determined by pipetting and fine sand by sieving.
2. Bulk density (Db), was determined on soil samples in natural structure with the help of 100 cm^3 cylinders;
3. Density (D) was determined using the pycnometer method;
4. The total porosity (Pt, %) was determined by calculation according to the bulk density and density using the relationship: Pt (%) = (1 – Db/D) x100;
5. Aeration porosity (Pa, %), was established by calculation using the value of total porosity, water field capacity (WFC) and bulk density according to the relationship: Pa (%) = Pt – (WFC x Db);
6. The maximum hygroscopicity coefficient (HC) was determined by the Mithscherlich method using a 10% sulfuric acid solution;
7. The wilting point (WP, %) was established by calculation according to the maximum hygroscopicity coefficient using the relationship: WP (%) = HC x 1.47;
8. The water field capacity (WFC, %), was determined by centrifuging the soil sample at a centrifugation force 1,000 times greater than the force of gravity;
9. The available water capacity (AWC, %), was determined by calculation with the following relationship: AWC (%) = WFC – CO;
10. The humus (organic matter) content was determined by the Walkley-Blak method;

13. The nitrogen content was determined by Kyeldahl method;

15. Soluble phosphorus, by flame Egner-Riehn-Domingo method;

14. Soluble potassium, by flame Egner-Riehn-Domingo method;

14. The pH value by the potentiometric method, in 1:2.5 ratio aqueous solution;

16. Hydrolytic acidity (HA), by Kappen method;

17. The cation exchange capacity (CEC) by Kappen method;

14. The bases saturation (BS), by calculation with the relationship BS = CEC + HA;

18. The bases saturation degree (BSD), by calculation with the relationship BSD (%) = CEC/BS x 100.

RESULTS AND DISCUSSIONS

Knowing the soils and their agro-productive properties is of first order importance for obtaining high and good quality productions.

In the category of soils with low natural fertility, there are also non-evolved soils, protisoils, where the sandy bedrock material was the decisive formation factor.

Through the present research, it was sought to highlight the influence of the anthropic factor in modifying the properties of protisoils with genetic specificity of bedrock material, by leveling psamosoils, on the specific relief of the southern area of Dolj County, Dabuleni area.

The territory is found in the contact area of the Romanati Field with the terraces on the left of the Danube river, it is located on the high terrace of the Danube and presents a specific morphology of dune and inter dune field with a general orientation from West to East and with a length for several km. Smooth lands are much more extensive than those with dunes and inter dunes (Avram et al., 2004).
Following the research carried out on the ground, the following soils with genetic specificity of sandy bedrock material were identified, respectively, types of psamosoils: typical not leveled psamosoil on the dune; not leveled mollic psamosoil on the inter dune; typical leveled psamosoil (leveled); leveled mollic psamosoil (covered).

The typical not leveled psamosoil on the dune

Interpreting the results of the laboratory analyses, for the physical properties (Table 1), it
is found that the soil has a very high content of coarse sand (over 70%). The fine sand content is much lower and varies on the soil profile between 17.27-18.58%. Also, the soil has a low content in fine particles, the clay varying on the profile between the limits of 4.96-6.40. The amount of silt decreases with the depth of the profile, from 6.22% in the Ao horizon, to 5.17% in the C horizon. Depending on the determined particle size fractions, the soil texture is sandy-loamy throughout the depth of the profile.

Table 1. Physical properties of typical not leveled psamosoil on the dune

Horizon	Depth (cm)	Size fractions				Texture class	Bulk density (g/cm^3)	Density (g/cm^3)	Total porosity (%)
		Coarse sand, %	Fine sand, %	Silt, %	Clay, %				
Ao	0-35	70.11	17.27	6.22	6.40	S-L	1.42	2.64	47
AC	36-91	69.54	17.53	6.77	6.21	S-L	1.45	2.68	46
C	Under 91	71.29	18.58	5.17	4.96	S-L	1.52	2.70	44

Regarding the physical properties, they present the following values: the bulk density increases with depth to 1.42 g/cm^3 in the Ao horizon, up to 1.52 g/cm^3 in the C horizon. In the same way, the density also varies, namely in the Ao horizon it has a value of 2.64 g/cm^3 then it gradually increases with the depth of the profile up to 2.70 g/cm^3 in the C horizon. These values determine a low porosity (47-44%), which shows that the soil it is strongly pressed. The hydro - physical indices (Table 2) have very low values, being determined by the very low content of humus and clay. The hygroscopicity coefficient has a value of 0.86 in the Ao horizon, reaching a value of 0.54 in the C horizon.

Table 2. Hydro-physical properties of typical not leveled psamosoil on the dune

Horizon	Depth (cm)	HC, %	WP, %	FC, %
Ao	0-35	0.86	1.29	4.88
AC	36-91	0.90	1.35	4.79
C	Under 91	0.54	0.81	3.51

The wilting point, being calculated indirectly according to the maximum hygroscopicity coefficient, shows the same variation on the profile as this one. The water field capacity has low values, being between 4.88 and 3.51, values that decrease with the depth of the profile. The typical not levelled psamosoil on the dune has a low water storage capacity.
From a chemical point of view (Table 3), the soil is very poorly supplied with organic matter, the humus content being between 0.52% on the surface and 0.18% in depth. The total nitrogen content is also very low, being between 0.028% on the surface and 0.010% in depth. The typical unleveled psamosoil on the dune is poorly supplied with soluble phosphorus and potassium. The phosphorus content varies from 4.8 mg/100 g soil in the Ao horizon to 2.3 mg per 100 g soil in the C horizon, and the potassium content varies from 6.5 mg per 100 g soil in the Ao horizon, to 5.7 mg per 100 g soil in the C horizon. The soil reaction is slightly acidic, the pH value being 5.9 on the surface and 6.4 in depth. The amount of cations retained by the colloidal complex is

very small because the soil is poorly supplied with colloids, thus, the total cationic exchange capacity has low values, being between 2.14 and 3.41 me/100 g of soil. The degree of saturation in bases varies along the depth of the profile, having values of 70% in the Ao horizon and 80% in the C horizon, values that increase with the depth of the profile.

Table 3. Chemical properties of typical not leveled psamosoil on the dune

Horizon	Depth (cm)	Humus (%)	Total nitrogen (%)	Soluble P (mg at 100 g soil)	Soluble K (mg at 100 g soil)	pH in H_2O	CEC	HA	BS	BSD (%)
							(me at 100 g soil)			
Ao	0-35	0.52	0.028	4.8	6.5	5.9	3.41	1.46	4.87	70
AC	36-91	0.41	0.024	3.1	5.8	6.0	2.88	1.04	3.92	73
C	Under 91	0.18	0.010	2.3	5.7	6.4	2.14	0.52	2.66	80

The not leveled mollic psamosoil on the inter dune

From Table 4, it follows that the not leveled mollic psamosoil on the inter dune has a sandy-loamy texture on the entire profile. The largest proportion is held by coarse sand, registering values that increase with the depth of the soil profile from 69.16 in the Am horizon to 71.16 in the C horizon. The fine sand has much lower values, values that vary along the depth of the soil profile from 17.51 in the Am horizon to 17.64 in the C horizon. Clay has values between 5.89-7.21. Depending on the determined size fractions, the soil texture is sandy-loamy throughout the depth of the profile. The degree of compaction is high throughout the depth of the profile, the bulk density being between 1.38-1.49 g/cm^3. The smallest compaction is found on the surface (1.38 g/cm^3).

The density has values between 2.63-2.70 g/cm^3, the values increasing with the depth of the profile and this due to the fact that the humus content is higher at the soil surface.

It is also found that the total porosity decreases on the profile as the depth increases, namely from 48% in the Am horizon to 45% in the C horizon. As for the aeration porosity, it is observed that within the not leveled mollic psamosoil on the inter dune, its values show fluctuations on the profile, namely in the Am horizon it is 39%, then it increases in the AC horizon to 40% after which it decreases again to 39% in the C horizon.

Table 4. Physical properties of the not leveled mollic psamosoil on the inter dune

Horizon	Depth (cm)	Size fractions				Texture class	Bulk density (g/cm^3)	Density (g/cm^3)	Total porosity (%)	Pa (%)
		Coarse sand, %	Fine sand, %	Silt, %	Clay, %					
Am	0-46	69.16	17.51	6.14	7.21	S-L	1.38	2.63	48	39
AC	47-98	70.88	17.15	5.86	6.11	S-L	1.45	2.68	46	40
C	Under 98	71.16	17.64	5.31	5.89	S-L	1.49	2.70	45	39

The hydro-physical indices of the not leveled mollic psamosoil on the inter dune vary as follows (Table 5):

- The hygroscopicity coefficient has low values, the values decreasing with the depth of the profile from 1.22% in the Am horizon to 0.75% in the horizon C;
- The wilting point shows the same variation in values as the hygroscopicity coefficient, decreasing from 1.83 in the Am horizon to 1.12 in the C horizon;
- The water field capacity decreases with the depth of the soil profile, with decreasing values, from 6.04% in the Am horizon to 3.88% in the C horizon;
- The available water capacity has very low values between 2.76-4.21%, which shows that there is a small amount of available water capacity to the plants.

Table 5. Hydro - physical properties of the not leveled mollic psamosoil on the inter dune

Horizon	Depth (cm)	HC, %	WP, %	FC, %	AWC, %
Am	0-46	1.22	1.83	6.04	4.21
AC	47-98	0.88	1.32	4.20	2.88
C	Under 98	0.75	1.12	3.88	2.76

From the values listed in Table 6, it can be seen that the not leveled mollic psamosoil on the inter
dune is very poorly supplied with humus, which is 1.16% on the surface and 0.37% in depth.

According to the total nitrogen content, it can be appreciated that the typical unleveled inter dune sandy soil is very poorly supplied, varying with depth between 0.020-0.071%. The soil is also poorly supplied with phosphorus and potassium, as follows: phosphorus decreases with depth from 6.14 mg per 100 g of soil in the Am horizon to 3.16 mg per 100 g of soil in the C horizon; potassium decreases from 7.81 mg per 100 g soil in the Am horizon to 5.88 mg per 100 g soil in the C horizon. The soil reaction is slightly acidic, the pH value being 6.1 on the surface and 6.6 in depth. The amount of exchangeable bases decreases on the profile, presenting values between 2.99 and 5.21 me per 100 g of soil. The hydrolytic acidity has very low values. These values decrease with the depth of the profile from 1.23 me per 100 g of soil in the Am horizon to 0.62 me per 100 g of soil in the C horizon. The degree of saturation in the bases has values that show fluctuations on the profile, namely it has a value of 80% in the Am horizon, increases to 84% in the AC horizon, then decreases to 82% in the C horizon.

The typical leveled psamosoil (leveled)

It is spread on the site of the former dunes, which, following the sand modeling works, were uncovered, the upper part of the sandy material being transported into the inter dune.

Physical properties (Table 7).

Table 6. Chemical properties of the not leveled mollic psamosoil on the inter dune

Horizon	Depth (cm)	Humus (%)	Total nitrogen (%)	Soluble phosphorus	Soluble potasium	pH in H_2O	CEC	HA	BS	BSD (%)
				(mg at 100 g soil)			(me at 100 g soil)			
Am	0-46	1.16	0.071	6.14	7.81	6.1	5.21	1.23	6.44	80
AC	47-98	0.52	0.028	3.91	6.11	6.4	3.82	0.71	4.53	84
C	Under 98	0.37	0.020	3.16	5.88	6.6	2.99	0.62	3.61	82

Table 7. Physical properties of typical leveled psamosoil (leveled)

Horizon	Depth (cm)	Size fractions				Texture class	Bulk density (g/cm^3)	Density (g/cm^3)	Total porosity (%)
		Coarse sand, %	Fine sand, %	Silt, %	Clay, %				
AC	0-52	69.31	18.13	6.31	6.25	S-L	1.44	2.68	47
C1	53-94	71.14	18.54	5.23	5.09	S-L	1.52	2.70	44
C2	Under 94	71.46	19.06	4.59	4.89	S-L	1.53	2.70	44

Depending on the determined size fractions, the soil texture is sandy-loamy in the AC and C1 horizons and sandy to sandy-loamy in the C2 horizon. Interpreting the results, it is found that even in the typical leveled psamosoil (leveled), the high content of coarse sand is maintained (over 69%). The smallest weight within the size fractions is held by dust, its values decreasing with the depth of the profile from 6.31% in the AC horizon to 4.59% in the C2 horizon. Clay has values close to those of dust, namely it gradually decreases from 6.25% (horizon AC) to 4.89% (horizon C2).

The soil is compacted over the entire depth of the profile. The bulk density is between 1.44 and 1.53 g/cm^3.

The highest compaction is found in the C2 horizon (1.53 g/cm^3). The density varies from 2.68 g/cm^3, (horizon AC) to 2.70 g/cm^3 (horizon C1 and C2). These values result in a low porosity of 44-47%, which shows that the typical exposed psamosoil is strongly compacted. As can be seen from Table 8, the hydro - physical indices have low values due to the low content of humus and clay. Thus, the hygroscopicity coefficient has very low values, ranging from 0.83% in the AC horizon to 0.51% in the C2 horizon. The wilting coefficient, being calculated according to the maximum hygroscopicity coefficient, varies as well, the values decreasing from 1.24 in the AC horizon to 0.76 in the C2 horizon.

Table 8. Hydro - physical properties of typical leveled psamosoil (leveled)

Horizon	Depth (cm)	HC, %	WP, %	FC, %	AWC, %
AC	0-52	0.83	1.24	4.18	2.94
C1	53-94	0.52	0.78	3.56	2.78
C2	Under 94	0.51	0.76	3.50	2.74

The water field capacity also has low values with variation on the profile, as well as the withering coefficient and the maximum hygroscopicity coefficient, that is, it decreases from the value of 4.18% on the surface to 3.50% in depth. The soil has a low water storage capacity, the useful water capacity being between 2.74-2.84%.

From Table 9, it follows that the typical leveled psamosoil (leveled) has a very low humus content, which is between 0.41% on the surface and 0.16% in depth. The soil is poorly supplied with nutrients. It has a very small nitrogen reserve, varying between 0.010 - 0.023%, a low phosphorus content (2.33-3.16 mg per 100 g of soil), these phosphorus values having fluctuations of increase or decrease throughout the depth of the profile. Compared to the values of nitrogen and phosphorus, which show variations along the depth of the profile, the potassium content decreases on the profile from the value of 5.77 mg per 100 g of soil (horizon AC) to 4.99 mg per 100 g of soil in the horizon C1, it increases again reaching the C2 horizon at the value of 5.14 mg per 100 g soil. The reaction of the soil is weakly acidic, throughout the depth of the profile. The degree of saturation in the bases presents values that increase with the depth of the profile from 71% (horizon AC) to 79% (horizon C2).

Table 9. Chemical properties of typical leveled psamosoil (leveled)

Horizon	Depth (cm)	Humus (%)	Total nitrogen (%)	Soluble phosphorus	Soluble potasium	pH in H_2O	CEC	HA	BS	BSD (%)
				(mg at 100 g soil)			(me at 100 g soil)			
AC	0-52	0.41	0.023	3.16	5.77	6.1	2.85	1.11	3.96	71
C1	53-94	0.19	0.014	2.55	4.99	6.4	2.11	0.53	2.64	79
C2	Under 94	0.16	0.010	2.33	5.14	6.4	1.99	0.51	2.50	79

The leveled mollic psamosoil (covered)

It is spread in the inter dunes, where, following sand modeling works, large amounts of sandy material were brought from the dunes.

The physical properties (Table 10) show that the leveled mollic psamosoil (covered) has a sandy-loamy texture in the A brought, Am and AC horizons and sandy-loamy to sandy in the C horizon. Coarse sand has a value of 70.21% in the A horizon brought, it decreases to 69.08% in the Am horizon, after which it increases again, reaching 71.26% in the C horizon. The fine sand presents values that increase with the depth of the profile from 17.27% in the A horizon to 18.90% in the AC horizon. The smallest proportion is held by dust. It has values that show variations on the profile, i.e. it increases with depth up to the Am horizon, after which it decreases in depth. Clay shows the same variation as dust, increasing with depth up to the Am horizon, after which it decreases in the other horizons. The degree of compaction is high throughout the depth of the profile, the bulk density being 1.44-1.52 g/cm^3. The greatest compaction is found at depth (1.52 g/cm^3) in horizon C. The density has values between 2.63-2.69 g/cm^3, values that increase with the depth of the profile.

The total porosity decreases as the depth increases, namely from 46% in the A horizon to 44% in the C horizon. The aeration porosity has approximately equal values along the depth of the profile.

Table 10. Physical properties of leveled mollic psamosoil (covered)

Horizon	Depth (cm)	Size fractions				Texture class	Bulk density (g/cm^3)	Density (g/cm^3)	Total porosity (%)	Pa (%)
		Coarse sand, %	Fine sand, %	Silt, %	Clay, %					
A brought	0-32	70.21	17.27	6.21	6.31	N-L	1.44	2.64	46	38
Am	33-79	69.08	17.32	6.33	7.27	N-L	1.51	2.63	43	33
AC	80-127	70.99	18.90	5.93	6.18	N-L	1.51	2.67	44	37
C	Under 127	71.26	17.42	5.40	5.92	NL-N	1.52	2.69	44	38

The hydro - physical indices vary as follows (Table 11): the hygroscopicity coefficient has low values and shows fluctuations along the profile, i.e. it increases from 0.87% in the A horizon to 1.20% in the Am horizon, after which it decreases reaching 0.73% in the C horizon; the wilting coefficient varies from 1.09% to 1.80% similar to the hygroscopicity coefficient; the moisture equivalent increases with depth up to the Am horizon, then decreases with depth. The water available capacity very low value between 2.82-4.22%, which shows that there it, is a small amount of useful water available to the plants.

Table 11. Hydro-physical properties of leveled mollic psamosoil (covered)

Horizon	Depth (cm)	HC, %	WP, %	FC, %	AWC, %
A brought	0-32	0.87	1.30	4.87	3.57
Am	33-79	1.20	1.80	6.02	4.22
AC	80-127	0.87	1.30	4.27	2.97
C	Under 127	0.73	1.09	3.91	2.82

Laboratory chemical analyzes (Table 12) show that the soft psamosoil covered by the inter dune
has a low content of organic matter, the humus content being 1.14% in the Am horizon and 0.36% in the C horizon. Regarding the total nitrogen content, it was found that the respective soil is poorly supplied, its values varying between 0.021 and 0.070%, with fluctuations on the soil profile. The reaction of the soil is slightly acidic, the pH values being between 6.0 and 6.4. The degree of phosphorus and potassium supply is medium, the phosphorus content increases from 4.9 mg per 100 g soil to 6.11 mg/100 g soil, after which it decreases towards the depth to 3.7 mg/100 g soil in the horizon C. The amount of potassium shows fluctuations on the profile. The amount of exchangeable bases shows fluctuations on the profile, increasing with depth up to the Am horizon (5.18 me/100 g soil), after which it decreases reaching the C horizon at 3.17 me/100 g soil. Hydrolytic acidity decreases with depth from 1.52 me/100 g soil to 0.62 me/100 g soil in the C horizon.

Table 12. Chemical properties of leveled mollic psamosoil (covered)

Horizon	Depth (cm)	Humus (%)	Total nitrogen (%)	Soluble phosphorus	Soluble potasium	pH in H_2O	CEC	HA	BS	BSD (%)
				(mg at 100 g soil)			(me at 100 g soil)			
A brough	0-32	0.54	0.031	4.90	6.63	6.0	3.52	1.52	5.04	69
Am	33-79	1.14	0.070	6.11	7.69	6.1	5.18	1.30	6.48	79
AC	80-127	0.89	0.057	3.88	6.44	6.3	3.76	0.85	4.61	81
C	Under 127	0.36	0.021	3.17	5.97	6.4	3.11	0.62	3.73	83

CONCLUSIONS

Carefully analyzing the data presented previously, regarding the properties of protisoils with genetic specificity of bedrock material, such as leveled and not leveled sands, as a result of the intervention of the anthropic factor, some obvious changes were found, which will be presented next.

From a morphological point of view, the Ao horizon appears on the surface in the not leveled dune psamosoil, with a small development due to the weak development of the vegetation and implicitly the lower content in humus.

By leveling the dunes, the Ao horizon disappears and the AC horizon is present on the surface. In the not leveled inter dune psamosoil, the surface horizon is Am, better developed than the surface horizon of the typical dune psamosoil, because the humidity is higher in these inter dune areas, the vegetation develops a bit better and the humification is more advanced, and after covering the ground with material uncovered from the sand dune, the Am horizon was covered and in this way an A brought to surface horizon can be highlighted on the ground surface.

Comparing the physical - mechanical, hydric - physical and chemical properties of the typical leveled and not leveled psamosoil, the following aspects are shown up:

Regarding the size composition and implicitly the texture of the soil, it can be stated:

- The texture is sandy-loamy both in the leveled and not leveled psamosoil from the dune and inter dune except for the C2 horizon from the leveled dune where the texture is sandy to sandy-loamy and C horizon from the leveled inter dune where the texture is sandy to loamy-sandy;
- Clay shows higher values in the case of the not leveled dunes compared to the leveled dunes;
- On the contrary, the clay is presented in the case of the inter dune (higher values in the case of the leveled inter dune compared to the not leveled inter dune).

After the execution of the leveling works, it is found that there is a decrease in the clay content both at the dune and at the inter-dune.

The compaction is much higher in the case of leveled soil compared to the not leveled one. The biggest difference between the horizons is found in the case of horizons Am and C2.

The increase in bulk density is due to the compaction produced by heavy earthmoving machineries, used for leveling and the effect of irrigation.

The aeration and total porosity show lower values in the leveled sand compared to the not leveled one. The total porosity shows values between 44-47% on dune and 45-48% on not leveled inter dune, compared to 43-46% on leveled inter dune. The total porosity within the leveled and not leveled dune has equal values.

Regarding the hydro - physical indices, from the comparison of the data it is found that they present lower values within the covering sand layer of the leveled dune sand, but in general they have low values in all types of sandy soils studied, due to the low content in organic - mineral colloids.

The comparative situation of the chemical properties of the leveled and uneven sands shows that humus, the organic component of the soil, has higher values in the case of not leveled sand, both dune and inter dune, compared to the leveled sand, the reaction is acidic and weakly acidic, the degree of saturation in bases is lower in the case of leveled sand than of not leveled sand, but there are not too big differences. There are some differences regarding the supply of nutrients, namely the leveled soil has a lower nitrogen, phosphorus and potassium content compared to the non-leveled soil.

All these properties indicate a low fertility of protisoils with genetic specificity of bedrock material, such as sands, and their inclusion in soil types undergoing soil formation processes.

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