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CHANGES IN THE PEDOLANDSCAPE OF THE ROMANATI PLAIN (THE FIELD OF DĂBULENI)

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Abstract

Recovery of sandy soils has always been a matter of strict necessity in the word. In Romania, soils also occur among several relief units, their areas totaling 439,000 ha, 381,000 ha of agricultural use, such as wind 272,000 ha. For the purpose of agricultural solis must have at least 50 cm thick (but usually more than 2 m) coarse texture (sandy or sandy loam), with less than 12% clay < 0.002 mm and a low humus content (often under 2%). As a prerequisite, in the exploitation of high wind undulating sandy land necessary to start implementation of development projects for their agricultural mechanization and the introduction of irrigation. The first intervantion of this kind in our country have been performed in Oltenia Plain, specifically Blahnita Plain and Plain Romanaţiului, respectively Dăbuleniului field. Fitting in irrigated sandy land in our country to increase agricultural production led to the total change in soil cover. He had less regard to the conservation of soil horizon or no education and land leveling pursued primarily to complete mechanization of agricultural operations in terms of uniform distribution of water on the surface leveled.

Key words**:** *Romanati Plain*, *pedolandscape, soils, irrigation.*

INTRODUCTION

The exploitation of the sandy soils has always been a problem of stringent actuality, both nationally and internationally. In the agronomic sense, these soils must be characterized on a growth of at least 50 cm (but most frequently on more than 2 m) by a coarse (sandy or sandy loam) texture, having thus less than 12% clay < 0.002 mm and a low humus content (frequently under 2%) [3]. In Romania, the sandy soils are spread within more relief units, grouped in 18 perimeters, where it totalizes 467,000 ha, out of which 381,000 have an agrarian function and only 321,000 are cultivated (Fig. 1, Table 1) [4, 5].

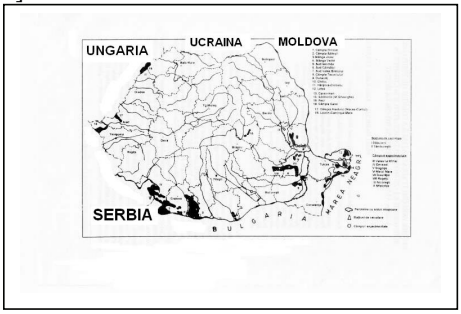

Fig. 1. Map spread of sandy soils in Romania

Table 1. The distribution of sandy soils in Romania

The geomorphologic unit and the perimeter it appears in	Total (thousand ha)	Forest (thousand ha)	Agrarian function (thousand ha)			Total agrarian land (thousand ha)
			Agrarian	Vineyards	Orchards	
I. **The Banato-Crişană Plain**						
a. Valea lui Mihai-Carei Plain	22.2	3.4	4.3	-	14.5	18.8
b. Mureş Plain	3.5	-	-	-	3.5	3.5
- Grindu Macea-Curtici	0.4	-	-	-	0.4	0.4
- Grindu Aranca	3.1	-	-	-	3.1	3.1
II. **The Romanian Western Plain**						
c. Blahniţei Plain	44.6	9.0	-	35.8	-	35.8
d. Băileştiului Plain	42.0	11.4	4.9	22.5	3.2	30.6
e. Romanaţiului Plain (on the left side of Jiu River)	79.6	3.7	1.0	51.0	23.9	75.9
III. **The Romanian Central and Eastern Plain**						
f. The Plain of Muntenia	32.5	3.6	0.3	16.3	12.3	28.9
- Burnasului Plain (on the left side of Vedea River)	1.7	0.1	-	-	1.6	1.6
- Mostiştei Heath (south of Ialomiţa)	3.3	0.5	0.1	1.3	1.4	2.8
- Ialomiţei Heath (south of Călmăţui)	27.2	3.0	0.1	14.8	9.3	24.2
- Brăilei and Râmnicului Plain (south of Siret Meadow)	0.3	-	0.1	0.2	-	0.3
- Tecuciului Plain	11.5	3.0	0.1	-	8.4	8.5

IV. **Braşov's Depression**						
g. Râu Negru-Reci Depression	2.2	0.3	0.3	-	1.6	1.9
V. **The Dobrogea Plateau**						
h. Murighiol Hills (Dunavăţ)	3.2	0.1	-	3.1	-	3.1
i. Casimcei Plateau (Hârşova-Ciobanu)	0.3	-	-	0.3	-	0.3
VI. **Danube's Meadow and Delta**						
j. Danube's Meadow between Calafat and Corabia	3.7	-	2.5	-	1.2	3.7
k. Danube Delta and the littoral plain	28.6	1.5	23.6	-	1.4	25.0
- Grindul Letea	8.8	1.3	7.1	-	0.4	7.5
- Grindul Caraorman	6.3	0.1	5.2	-	1.0	6.2
- Grindul Sărăturile	5.8	0.1	5.7	-	-	5.7
- Grindul Chituc	5.6	-	5.6	-	-	5.6
Total of sands and sandy soils developed on eolian deposits	272	36	37	129	70	236
VII. **Other Meadows**						
Sands and alluvial sandy soils	167	22	23	10	112	145

MATERIAL AND METHOD

Data regarding the sandy soils of Romania have been obtained when the soils map on the scale of 1:200,000 has been realized. Then, after 1976, the National Institute of Research and Development for Pedology and Agro-chemistry in collaboration with S.C.C.P.N. Dăbuleni carries out thorough researches (1:10.000-1:25.000) in all of the 18 perimeters with sandy soils. A great number of soil profiles have been described, on depths of 1 to 2 m, many soil samples being taken from the genetic horizons of the soils, on depths no bigger than 20 cm. Next, the samples tally-sheets with the suggested analyses (granulometry, humus content, pH reaction, base saturation value, etc.) that have to be performed were drawn up. At the same time, for each perimeter, besides the soil maps, interpretative maps (of grouping lands after the limitative factors of the agrarian production) have also been drawn up [2, 3].

At S.C.C.P.N., after the relief has been organised through levelling and modelling (eolian rolling), when most of the sandy soils have become anthropic protosoils, we have carried out new pedological researches. The identification and separation of such soils has been possible only having in mind a series of characteristics such as soil uncovering value, de depth immersion of some diagnostic horizons fragments, including thickness of these fragments, presence of fine material strips, carbonates and phreatic water depth apparition, thickness of the humus horizon, etc. [6].

Soil samples, for which we asked for special laboratory analyses, even mineralogical ones, have been taken. Of course, the interpretation of data has been done according to the ICPA methodology [11].

RESULTS AND DISCUSSIONS

From the very beginning, regarding the superior exploitation of the rolled sandy lands, the implementation of some works for organizing the land with the purpose of mechanization and introduction of irrigation are imposed as an obligatory condition.

These kind of interventions occurred for the first time in Oltenia's Plain (Blahniţei Plain, Romanaţiului Plain), hence also in Dăbuleni's Plain [1, 10].

Before the organization, Dăbuleni's Plain presented a eolian curly relief, made of a series of longitudinal dunes 3-9 m tall, and interdunes, oriented on the direction of the most powerful wind (the north-west one), not on the direction of the most predominant (the north-eastern one) (Fig. 2).

The soil cover contains a wide range of types, subtypes and varieties of soils such as protisoils, cernisoils, cambisoils, reddish preluvosoils, luvosoils, etc. (Fig. 3) [8].

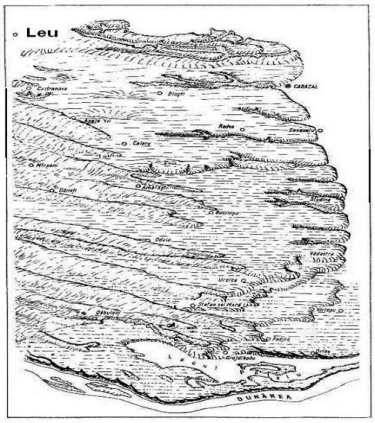

Fig. 2. Schematized block relief in Jiu-Olt (Romanaţiului) Plain

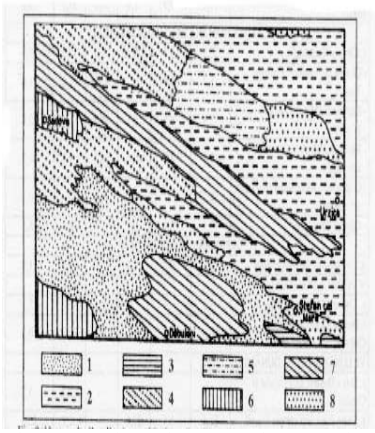

Fig. 3. The map of the soils from Sadova-Corabia system before organizing the soils through levelling and modelling works in order to introduce irrigation

1. Cambic chernozems on sands; 2. Cambic chernozems on loams and sandy loams; 3. Typical cambic chernozems on loess and loessial deposits; 4. Reddish preluviosoils and regosoils; 5. Reddish preluvosoils, including typical luvosoils on sands; 6. Typical luvosoils on reddish loams; 7. Regosoils on sands; sand, sandy regosoils and typical cambic chernozems on sands.

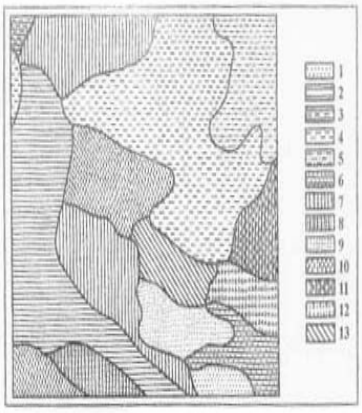

Fig. 4. The map of soils from the Sadova-Corabia system after the levelling and modelling works

1. Typical psamosoils, humidly phreatic; 2. Typical erodosoils with loess sublayer; 3. Cambic erodosoils, strong anthropic coverd; 4. Lamellar argic erodosoils, humidly phreatic; 5. Typical anthropic protosoils covering typical chernozems, humidly phreatic; 6. Typical anthropic protosoils, covering gleic molic psamosoils; 7. Typical anthropic protosoils, covering typical erodosoils, humidly phreatic; 8. Typical anthropic protosoils, covering cambic erodosoils, humidly phreatic; 9. Typical anthropic protosoils, covering gleic erodosoils; 10. Typical anthropic protosoils, covering gleic lamellar argiloluvial erodosoils; 11. Molic anthropic protosoils, covering gleic psamosoils; 12. Molic anthropic protosoils, covering typical erodosoils, humidly phreatic; 13. Molic anthropic protosoils, covering typical gleic erodosoils. In most of the case, the primary sequence of genetic horizons can still be noticed; the soil cover of the organized territory distinguishes by a wide range of blunted soils, their remains of horizons making impossible their categorization into a certain type of soil.

As they are tillage grounds, they present at the surface an Ap horizon that comes from B or C, AC or AB horizon, having less than 20 cm in thickness [5, 8]. The modification of the pedolandscape is also reflected in the chemical properties and the nutients' supply level of the soils. Thus, the reaction of the soils becomes moderately acid to low alkaline (5.4-8.2); 75% of soils end up presenting a low-very low to extremely low humus content (0.5-2.5%) (Fig. 5). The provision with nutrient substances becomes very low in total azote (0.036-0,070%), low in phosphor (11-17 ppm) and very low in potassium (Fig. 6, 7).

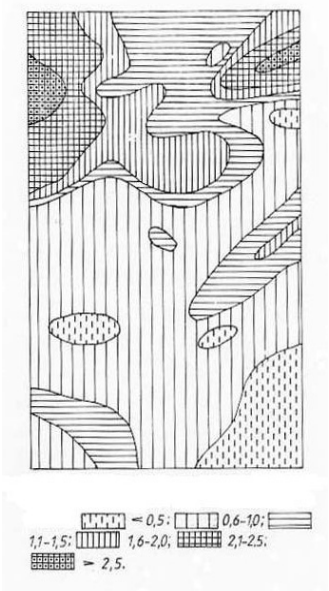

Fig. 5. Humus value (%) of anthropic sandy soils after modelling and levelling

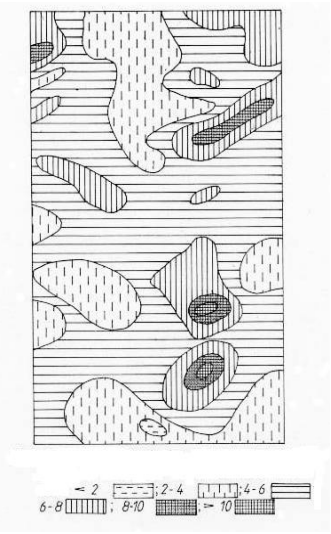

Fig. 6. Mobil phosphor value (ppm) of anthropic sandy soils after modelling and levelling

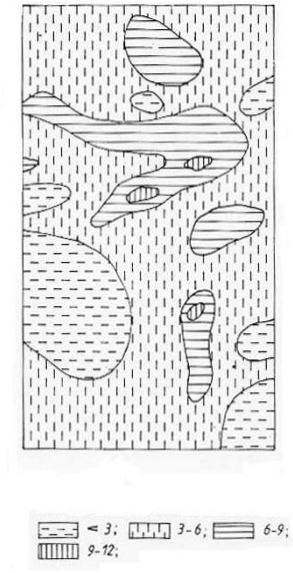

Fig. 7. Potassium value (ppm) of anthropic sandy soils after modelling and levelling

CONCLUSIONS

The preparations of sandy soils for introducing the irrigation system in our country in order to increase the agrarian production led to total change of the soil cover. The process had in view less or not at all the conservation of the superior A horizon of the soil, but the levelling of the lands with the purpose of complete mechanization of the agrarian works and the uniform distribution of water on the levelled surfaces.

The levelling of the sandy lands should start with the uncovering of the humifer material, respectively the superior horizon of soils, its depositing and restoration after the levelling operations, thus the values of soils fertility not only that are maintained at the initial value, but they are even enriched.

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