THE BEARING OF SOME GEOLOGICAL DEPOSITIONS RELATIVE TO THE ACCESSIBILITY OF ROOTS AT DEEP ROOTING SPECIES IN OLTENIA MINING BAY

COMPORTAREA UNOR DEPOZITE GEOLOGICE FAŢĂ DE ACCESIBILITATEA RĂDĂCINILOR LA SPECIILE CU ÎNRĂDĂCINARE PROFUNDĂ ÎN BAZINUL MINIER OLTENIA

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Abstract: *The researches were performed on arranged fields in Oltenia Mining Bay, and they are incomplete and concern the accessibility of root system at deep rooted species in edaphically environments with gross medium texture. The paper sets apart the causes which do some edaphically media could not be pierced by the root system of plants.*

Rezumat**:** *Cercetările s-au executat pe terenurile amenajate din cadrul Bazinului Minier Oltenia, sunt parţiale şi privesc accesibilitatea sistemului radicular la specii cu înrădăcinare profundă în medii edafice cu textură medie grosieră. Lucrarea evidenţiază cauzele care fac ca anumite medii edafice să nu poată fi penetrate de sistemul radicular al plantelor.*

Key-words: *ecological reconstruction, biometrical measurements, knots, disintegrated mineral part.*
Cuvinte cheie**:** *reconstrucţie ecologică, măsurători biometrice, noduli, parte minerală dezagregată*

INTRODUCTION

The researches which were the object of present paper had the purpose of solving next problem:

The accessibility of root system in some physical-chemical media:

The solving of this problem was asked by the practical needs of the ecological reconstruction process of fields without economic charges, as well as the need to count other materials except shingle and tough stone in useful edaphically volume account.

METHODS AND MATERIALS

It used the methodology of I.C.P.A. Bucharest to research the soil on the land.

It used the work methodology issued by I.C.P.A. Bucharest for laboratory analyses.

Biometrical measurements at root system of deep root species were made with Oskamp-Dragavţeev system.

The data obtained by O.S.P.A. Gorj through its studies and soil researches made in Oltenia Mining Bay.

RESULTS AND DISCUSSIONS

A. The physical-chemical characterization of geological depositions in dumps

Before analytical determinations and biometrical measurements it made observations concerning the distribution geological depositions vertically (in excavating fronts) and horizontally (from East to West and from North to South) – in the entire Oltenia Mining Bay. It observes the next:

- Vertically – in excavating fronts the geological stock-piles belongs to Quaternary (Holocene, Pleistocene) – in water meadows and flats and to Neocene (Levantine, Dacian, Pontian and Meotian) – in hill area. In the frame of this geological spectrum were picked up samples and was made the granulometric analysis, observing the geological depositions with medium texture (LN-L-LA) have the major quota (approx.60%), the geological stock-piles with gross texture (NL-N) represent approx. 20%, the geological stock-piles with fine texture (AL-A) represent approx. 10%, the shingles and fluvial boulders represent approx. 10%;

- Horizontally it observes the percentage increasing of gross stock-piles from East to West, without exceed the medium texture stock-piles (list no.1)

On this grading base of geological stock-piles updated it passed to chemical determinations. The global chemism of geological depositions is acceptable. (list no.2).

B. The distribution of root system at deep rooting species (prune tree, apple tree and vine) - on arranged dumps.

To set apart the bearing of some geological depositions (brought to daylight by excavating and dumping) were made biometrical measurements at root system of some deep rooting species (apple-tree, prune-tree and vine).

When were done the biometrical measurements, the plantations were 20 years old and were set up on arranged dumps.

On a medium-gross grading base (LN-NL) and a chemism which show a satisfactory supply of main nutrients, at all chosen species it realize a satisfactory and good development of root system. The root distribution index (I.D.R) is 3.27 at apple-tree species, 35 at prune-tree species and 4.31 at vine (fig.3, 4, 5).

At analyzed profiles it observed distances in control sections which are not accessible to root system for analyzed species (nodules).

C. Physical – chemical features of nodules:

In 6, 7, 8 lists are shown the main-physical – chemical features of “nodules”, by comparison with the rest of edaphically environment in which it realized the distribution of root system. It observes next:

- the main chemical features of “nodules” show a weak supply in organic substances and main nutrients on base of a weak-medium basic reaction. It doesn’t observe important differences (chemical) between nodules and the rest of edaphical environment.
- The physical aspect – the “nodules” show like dense agglomerations, with no structure, resistant to break, with small sizes (3-4 cm to 40-50 cm).

On base of a medium texture of nodules (LAP) – by comparison with coterminous edaphically environment (LN-NL), where is realized a normal root distribution, it observes:

In “nodules” there are between 2 and 10 times more dusts and clay then edaphically environment, in which it realized a normal development of root system.

The increasing of dust and clay content it realized with the decrease of sands and especially of gross sands.

Table 1

Physical characterisation of geological depositions brought to daylight by dumping

Crt nr	Texture classes of dumping materials	%	Material types	Physical features					
				Grading					Texture
				Gross sand	Fine sand	Dust	Physical clay	Colloidal clay	
1	Gross	20	Sands	1.9-51.0* (3.6-43)	34.7-88.4 (36.1-65)	3.7-17.7 (4.1-15.8)	5.1-18.5 (15.5-16.5)	2.2-11.8 (2.8-10.5)	N-NL
2	Medium	60	Sandy lutes	2.2-47.0 (3.1-41.0)	24.3-63.6 (26-52)	8.7-25.6 (9.5-22.5)	18.2-37.2 (19.5-35)	11.4-22.9 (12-20)	LN
3			Lutes	1.6-24.9 (2.5-21.2)	28.3-56.6 (30-53.0)	15.6-26.4 (16.5-25.0)	32.2-44.3 (33.0-43.0)	19.1-32.0 (20-31)	L
4			Clay lutes	0.2-25.1 (0.5-19.5)	20.8-39-3 (21.5-36)	3.2-33.4 (10-32.0)	17.7-58.3 (18-56)	24.5-43.5 (25-42)	LA
5	Fine	10	Clays with lute Clay	0.4-10.7 (0.6-9.5)	6.3-25.3 (6.5-23.6)	14.6-51.6 (15.2-47.5)	62.3-88.6 (63.6-69.5)	40-7-72.8 (41.5-61.6)	AL-A
6	-	10	shingles and boulders	-	-	-	-	-	-

Table 2

Chemical characterisation of geological depositions brought to daylight by dumping

Texture classes of dumping materials	%	Material types	Chemical features									
			pH	$CaCO_3$	Organic matter	C %	I.N	P_2O_5 ppm	K_2O ppm	S.B. Me/100 gr	T Me/100 gr	V %
Gross	20	NN	6.2-8.7** (6.8-7.2)	0.3-13.2 (0.5-6.0)	0.03-1.50 (0.05-1.28)	0.02-0.87 (0.04-0.53)	0.03-1.50 (0.05-1.28)	3.2-14.0 (3.5-6.4)	14-16 (14-15)	7.2-9.2 (7.5-8.4)	8.7-11.1 (8.9-10.5)	80.0-100 (83-95)
Medium	60	LN	6.2-8.5 (6.6-7.5)	0.1-14.7 (0.3-9.5)	0.16-3.00 (0.25-2.50)	0.09-1.74 (0.1-1.36)	0.16-2.76 (0.25-2.20)	3.4-94.0 (3.6-32.1)	32-166 (40-87)	8.9-24.5 (9.3-21.4)	10.1-25.2 (10.5-22.3)	88.1-100 (90-96)
		LL	5.4-8.8 (5.7-7.7)	0.1-15.6 (0.9-13.0	0.12-5.92 (0.25-4.70)	0.06-3.43 (0.1-3.2)	0.12-5.27 (0.2-4.6)	3.0-45.6 (4.0-36.1)	22-132 (25-115)	21.3-39.5 (24.0-32.5)	24.1-44.3 (26.0-39.0)	89.1-100 (91-96)
		LA	6.8-8.9 (7.0-7.7)	0.1-9.8 (1.0-9.5)	0.40-6.04 (0.45-5.90)	0.23-3.50 (0.25-3.2)	0.40-5.64 (0.5-5.2)	2.30-53.2 (2.5-38.0)	24-116 (26-110)	11.9-28.0 (12.5-26)	12.3-29.4 (13.1-28.2)	93.0-100 (94-96)
Fine	10	AL	4.9-8.5 (5.5-7.2)	0.71-26.0 (1.50-18.5)	0.32-4.52 (0.40-4.40)	0.41-2.62 (0.50-2.50)	0.32-4.16 (0.4-3.95)	6.6-49 (7.5-35)	96-172 (97-165)	24.6-39.1 (25.1-36.5)	33.1-42.3 (34.5-40.3)	74.3-100 (75-96)

Table 3

Entiantrosoil spolic – LN - Prune-tree

Soil	Level	CHARACTERISTICS														
		Chemical							Physical							
		pH	H %	CaCO3 %	IN	P ppm	K Ppm	V %	Gross Sand %	Fine sand %	Dust %	Fine clay %	Clay %	Text.	Sand + dust	Clay
Ao	11	8.2	1.12	13.1	1.1	41.4	150	100	3.4	56.8	19.4	31.8	20.4	LN	79.6	20.4
S_1	47	47	8.4	0.32	14.5	0.3	6.9	42	100	1.3	63.1	19.6	24.4	16.0	LN	84.0
S_2	42	8.2	0.41	13.4	0.4	8.4	42	100	4.3	60.8	14.6	25.2	20.3	LN	79.7	20.3
Noduls		8.5	0.28	0.30	0.28	38.0	102	100	5.7	11.1	40.3	71.0	42.9	LAP	57.1	42.9

Table 4

Entiantrosoil spolic LN-NL - Apple-tree

Soil	Level	CHARACTERISTICS														
		Chemical							Physical							
		pH	H %	CaCO3 %	IN	P ppm	K Ppm	V %	Gross Sand %	Fine sand %	Dust %	Fine clay %	Clay %	Text.	Sand + dust	Clay
Ao	22	8.2	0.77	9.1	0.77	19.3	150	100	6.9	68.5	9.7	20.2	14.9	LN	85.1	14.9
S_1	40	8.3	0.16	8.9	0.16	3.5	32	100	40	88.8	2.8	7.9	4.4	N	95.6	4.4
S_2	38	8.4	0.22	14.8	0.22	3.3	30	100	20.3	70.9	2.1	7.2	6.7	NL	93.3	6.7
Noduls		8.6	0.28	0.4	0.28	122	84	100	3.3	13.8	39.0	70.8	43.9	LAP	56.1	43.9

Table 5

Entiantrosoil spolic – LN - Vine

Soil	Level	CHARACTERISTICS														
		Chemical							Physical							
		pH	H %	CaCO3 %	IN	P ppm	K Ppm	V %	Gross Sand %	Fine sand %	Dust %	Fine clay %	Clay %	Text.	Sand + dust	Clay
Ao	23	8.2	1.32	2.8	1.32	21.9	62	100	8.7	51.9	23.4	28.9	16.0	LN	84.0	16.0
S_1	49	8.3	0.84	13.6	0.84	10.5	72	100	0.4	58.7	24.7	31.0	16.2	LN	83.8	16.2
S_2	28	8.0	0.80	10.6	0.80	24.5	58	100	0.7	64.2	20.6	27.2	14.5	LN	85.5	14.5
Noduls		8.6	0.28	0.5	0.28	18.0	94	100	3.3	18.0	44.0	61.2	34.7	LAP	65.3	34.7

D.The bearing of nodules relative to the accessibility of root system

In consideration with the input of root system trough absolvent fuzz is exclusively mechanical and take into account that the clay can be penetrated by the root system when is normally wet, it can concluded that in the medium grading environments, not structured and pressed, this process depends on the relation between disintegration produces, means sands and dusts.

At analyzed species (apple-tree, prune-tree and vine) – the raise of root system is normal or almost normal, in the conditions the disintegration produces (sands and dusts) are 79% to 95% (whence dusts are 5 to 20%, and the alteration products – clay – are under 20%).

Therefore, in grading environments where sands (fine and gross) are important in comparison with dusts and clay, among sands particles exist enough distances to be penetrated by root system.

Inside the "nodules" disintegrated mineral part is 56.1 to 65.3 (smaller than the edaphically environment, where the roots are normally developed) but whence dusts are 67.3 to 70.5%. Sands are 5 to 25% whence total mineral part.

Therefore, in grading environments where the dusty part is important as against the sands, after setting, the dusts obdurate free distances among dust particles, and edaphically environments being impenetrable for plants' roots.

CONCLUSIONS

Physically speaking dumps of sterile contain:

- approximately 60% - geological depositions with medium texture (LN-LA)
- approx. 20% - gross geological depositions (N-NL);
- approx. 10% - fine geological depositions (AL-A).

Chemically speaking

- geological depositions encourage the satisfactory and normal development of plants' roots.
- The development of root system at apple-tree, prune-tree and vine in edaphically environments with medium-gross texture is good and satisfactory (I.D.R. = 3.27, 3.50, 4.31).

Dumps of sterile contain jams ("nodules") – with next features:

- Chemical: the features of nodules are like the other edaphically environments from dumps.
- Physically: the nodules have medium texture (LAP) – in which the disintegrated part is over 55% from total mineral part.

Edaphically media with medium texture, pressed, not structured, in which the dust part is dominated in comparison with sands, and together are over 55% from mineral part, are not penetrable for root system of plants.

LITERATURE

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