Cercetări Agronomice în Moldova
Vol. XLII , No. 4 (140) / 2009

CHARACTERIZATION OF SOME LUVISOLS OF THE AMPOI BASIN, ALBA COUNTY

Alexandrina MANEA*, N. DUMITRU, I. RÎŞNOVEANU, Veronica TĂNASE

National Research and Development Institute for Soil Science, Agrochemistry and Environment Protection, Bucureşti

Received January 23, 2009

ABSTRACT - The Ampoi Basin is situated in the south-eastern side of the Apuseni Mountains. The bioclimatic conditions typical of this region are favourable to clay migration process. Because of the relief and parent material features, in this area there are Luvisols only on small areas, which are represented by Stagnic Luvisols and Alic-Stagnic-Albic Luvisols. In this scientific paper, we have shown the soil formation factors, which determined Luvisol development, soil morphology, physical and chemical characteristics. Stagnic Luvisols are spread on the Ampoi Terrace, on quasi-horizontal area. The parent materials on which these soils developed were Holocene loamy alluvial-proluvial deposits. Land was used as hayfields. The morphological profile was represented by *Ao, El, EBw* and *Btw* horizons. Alic-Stagnic-Albic Luvisols were spread in the north side of low slopes from the Metaliferi Mountains. The parent materials on which these soils developed were loamy deluvial deposits with substratum made of Tortonian sandstone and conglomerates. Land was used as weakly developed grassland. The morphological profile was represented by *Ao, Ea, EBw* and *Btw* horizons. The bioclimatic area was represented by broad-leaved trees-*Quercus petraea* forest. Soil response was highly acid (pH 4.7) and oligo-basic base saturation degree ($V_{8.3}$=11-23%), found in the Btw horizons contributed to frame these soils to alic soil subtype of this Luvisols. The analysed soils did not fulfil all the conditions for belonging to the Alisol class.

Key words: Luvisols, Ampoi, soil characterisation, alic subtype

REZUMAT - Caracterizarea unor luvosoluri din Bazinul Ampoiului, judeţul Alba. Bazinul Ampoiului este situat în partea de sud-est a Munţilor Apuseni, în jud. Alba. Condiţiile bioclimatice specifice acestei zone sunt favorabile procesului de argiloiluviere, dar datorită particularităţilor

* E-mail: alexandrinamanea@yahoo.com

reliefului şi varietăţii materialelor parentale, în această zonă, în anumite areale, se întâlnesc luvisolurile, care sunt reprezentate prin luvosoluri stagnice şi luvosoluri albice-stagnice-alice. În această lucrare sunt prezentaţi principalii factori pedogenetici, care au contribuit la formarea luvosolurilor în acest areal, precum şi caracterizarea morfologică şi fizico-chimică a acestora. Luvosolurile stagnice au fost delimitate pe terasa Ampoiului. S-au format pe suprafeţe cvasiorizontale, pe depozite aluvio-proluviale lutoase holocene, folosinţa fiind fâneaţă. Au profil morfologic, de tipul Ao, El, EBw, Btw. Luvosolurile albice-stagnice-alice au fost delimitate în partea inferioară a Munţilor Metaliferi, pe versanţii slab înclinaţi cu expoziţie nordică. S-au format pe depozite deluviale lutoase cu substrat din gresii şi conglomerate acide tortoniene, sub fâneaţă slab dezvoltată. Au profil morfologic, de tipul *Ao, Ea, EBw, Btw*. Zona bioclimatică este reprezentată prin păduri de foioase (nemorală)-etajul pădurilor de gorun. Reacţia solului puternic acidă (pH 4,7), la nivelul orizontului Bt_1w, şi gradul de saturaţie în baze oligobazic ($V_{8,3}$=11-23%), la nivelul orizonturilor de tranziţie EBw şi Bt_1w, au contribuit la încadrarea acestor soluri la subtipul Alic. Solurile analizate nu îndeplinesc în totalitate condiţiile pentru a putea fi încadrate la clasa Alosoluri.

Cuvinte cheie: Luvosoluri, Ampoi, caracterizarea solului, subtipul alic

INTRODUCTION

The Ampoi Basin is situated in the south-eastern side of the Apuseni Mountains, on both sides of the Ampoi Valley.

The bioclimatic conditions, which are typical of the area, are favourable to clay migration process and Luvisol formation, but they are found only on small areas, because of relief fragmentation (slope, narrow peaks, etc.) and of the variety of soil-making rock (including acid rocks).

The goal of this scientific paper was the knowledge of environmental factors that had contributed to the formation and evolution of Luvisols and to their morphological and physical and chemical characterization. They are represented by Stagnic Luvisols and Alic-Stagnic-Albic Luvisols.

MATERIALS AND METHODS

The field studies were carried out during 2001-2004. Establishing working itineraries was done according to the Methodology of the Research and Development Institute for Soil Science and Agrochemistry, 1987 (issue I), typical of the mountainous relief (Florea et al., 1987).

For delimiting soil types and sub-types, principal, secondary soil profiles and samplings were done. Within Luvisols there are Stagnic Luvisols and Alic-Stagnic-Albic Luvisols.

From the representative profiles, soil samples were taken from genetic soil horizons, which were analysed physically and chemically:

- Determination of granulometric fractions was done by the pipetting method for fractions < 0.002 mm, by wet sieving for fractions between 0.002 and 0.2 mm and by dry sieving for fractions > 0.2 mm;
- Response (of pH in watery suspension) was determined potentiometrically, using a combined electrode glass-horn mercury;
- Organic carbon and estimate of organic matter content, analysed by the

Walkley-Black Method, modified by Gogoașă;

- Content of total nitrogen, analysed by the Kjeldahl Method;
- Mobile phosphorus and potassium content in the solution of ammonium lactate, analysed by the Egner-Riehm-Domingo Method;
- Sum of bases, carried out by the Kappen Method and total acidity, by extraction with a solution of 1n sodium acetate;
- Total capacity of cation exchange was obtained by summing up the sum of total exchange bases and acidity.

RESULTS AND DISCUSSION

For the characterization of Luvisols, two representative profiles have been selected: P_1- Pătrângeni and P_2- Galați.

1. Characterization of Stagnic Luvisols – Profile 1

Stagnic Luvisol (LV-st)-SRTS 2003 (Florea and Munteanu, 2003); ***Pseudogleized Luvic dark soil*** (BP pz)-SRCS-1980 (Conea et al., 1979).

Situated east-southeast of Pătrângeni; absolute altitude 420 m;

Longitude: 23°16'20

Latitude: 46°05'08

A. Soil Genetic Characteristics

Relief: the Ampoi Terrace – quasi-horizontal surface

Parental material: Holocene loamy alluvial-proluvial deposits

Global natural drainage: imperfect

Bioclimatic zone: broad-leaved trees-sessile oak forest

Usage: hayfield made of *Festuca rubra, Agrostis tenuis, Nardus stricta and Deschampsia caespitose*

B. Morphological Characterization

Aoț 0-14 cm; loam: brown coloured (10 YR 5/3) if wet, pale brown coloured (10 YR 6/3) if dry, small subangular polyedric structure, slightly tough in dry condition and friable in wet condition, clear passage.

Ao 14-32 cm; loam: dark yellowish brown-brown (10 YR 4/3-4/4) in wet condition, dark yellowish brown (10 YR 4/4) in dry condition, small polyedric structure, slightly tough in dry condition and friable in wet condition, gradual passage.

El 32-50 cm; loam: greyish brown (2.5 Y 5/2) in wet condition, light whitish grey (10 YR 7.5/1) in dry condition, weakly schistose subangular polyedric structure, slightly tough in dry condition and friable in wet condition, grassy roots, moist, gradual passage.

EBw 50-80 cm; dusty loam: light greyish brown (2.5 Y 6/2) with dark brown spots (7.5 YR 5/6), which are frequent in wet condition, whitish (5 Y 8/1) with darkish yellow spots (10 YR 6/6) in dry condition, small-mean subangular polyedric structure, tough in dry condition and friable in wet condition, small-mean frequent ferromanganese concretions, silica grains, rare grassy roots, moist, gradual passage.

Bt_1w 80-100 cm; dusty loam: greyish brown - light greyish brown (2.5 Y 5.5/2) with reddish yellow spots (10 YR 6/6) in wet condition, light greyish brown (2.5 Y 6/2) with big reddish yellow spots (7.5 YR 6/6) in dry condition, well developed

prismatic structure, thin clay skins on the faces of structural aggregates, extremely tough in dry condition, very firm in wet condition, plastic, adherent, very frequent small - mean ferromanganese concretions, ferromanganese accumulations, very thin and rare roots, gradual passage.

Bt_2w 100-135 cm; dusty loam: dark yellowish brown (10 YR 4/4) in wet condition, yellowish brown (10 YR 5/4) in dry condition, reddish yellow oxidation spots (7.5 YR 6/8) in wet condition and reddish yellow (7.5 YR 7/8) in dry condition and grey reduction spots (7.5 Y 6/1) in wet condition and white spots (7.5 Y 8/1) in dry condition, well developed prismatic structure, thin clay skins on the faces of structural aggregates, frequent small – mean ferromanganese concretions, often ferromanganese spots, very tough in dry condition, very firm in wet condition, plastic, adherent, moist.

C. Physical-Chemical Characterization

Analytical data from *Table 1* showed a texture differentiation in the profile of soil genetic nature (Id 1.3). Thus, the content of colloidal clay (<0.002 mm) had values comprised between 24.2 and 24.3% in Aoț and Ao horizons; it decreased at 22.0% in Ea eluvial horizon, increased at 23.8-24.8% in Ea and EB horizons and reached 32.1% in Bt_2w horizon.

Table 1- Physical characteristics of soil profile no. 1. E-SE Pătrîngeni – Stagnic Luvisol (LV st)

Horizon	M.U.	Au_1	Au_2	E	EBg	Bt_1g	Bt_2g
Horizon depth	cm	0-14	14-32	32-50	50-80	80-100	100-135
Sample depth	cm	0-14	15-30	33-48	60-75	83-98	110-125
Skelton	% g/g	-	-	-	-	-	-
Coarse sand (2.0-0.2 mm)	% g/g	0.0	0.0	0.0	11.2	10.3	6.1
Fine sand (International system) 0.2-0.02 mm	% g/g	44.3	50.4	46.9	25.6	29.6	29.3
Fine sand (American system) 0.2-0.05 mm	% g/g	14.2	13.2	11.4	11.2	13.1	12.5
Dust (International system) 0.02-0.002 mm	% g/g	31.4	25.4	31.1	39.4	35.3	32.5
Dust (American system) 0.05-0.002 mm	% g/g	61.5	62.6	66.6	53.8	51.8	49.3
Clay (<0.002 mm)	% g/g	24.3	24.2	22.0	23.8	24.8	32.1
Physical clay (< 0.01 mm)	% g/g	42.0	41.1	40.5	47.3	43.7	49.7
Texture class		L*	L*	L*	SL**	SL**	SL**

*L = Loam; **SL = Silt loam

The clay content in the clayish pseudogleized horizon (Bt_2w), which was higher by 8-10%, compared to Aoţ, Ao and Ea horizons, was determined by clay migration process, shown by the clay skins on the faces of structural aggregates. The dust content (0.02-0.002 mm) was non-uniform in soil profile, having values of 25-35%. The fine sand content (0.2-0.02 mm) had greater values (44-50%) in Aoţ, Ao and Ea horizons and decreased at 29% in clayish pseudogleized horizons Bt_1w and Bt_2w, while coarse sand (2-0.2 mm) lacked in Aoţ, Ao and Ea horizons and had low values (6-11%) in the rest of soil profile (EBw, Bt_1w and Bt_2w horizons).

From the texture point of view, it belongs to the category of loam texture soils in Aoţ, Ao and Ea horizons and dusty loam in EBw, Bt_1w and Bt_2w horizons.

Soil response was highly acid (pH 4.5-5.0) in Aoţ, Ao and EBw horizons and moderately acid (pH 5.1-5.2) in Bt_1w and Bt_2w horizons (*Table 2*). Base saturation degree (V%) had values of 22% in Aoţ horizons, 49-52% in Ao and Ea horizons, 59-73% in EBw and Bt_1w horizons and of 80% in Bt_2w horizon. From the base saturation degree viewpoint, Stagnic Luvisols are found in the category of oligo-basic soils in Aoţ horizon, oligo-meso-basic soils in Ao and Ea horizons, meso-basic in EBw and Bt_1w horizons and eubasic in Bt_2w horizon at the base of soil profile.

Table 2 – Chemical characteristics of soil profile no. 1. E-SE Pătrîngeni Stagnic Luvisol (LV st)

Horizon	M. U.	Au_1	Au_2	E	EBg	Bt_1g	Bt_2g
Horizon depth	cm	0-14	14-32	32-50	50-80	80-100	100-135
Sample depth	cm	0-14	15-30	33-48	60-75	83-98	110-125
Humus (Cx1.72)	%	2.81	1.6	1.06			
Total N	%	0.21	0.16	0.14			
pH of H_2O	pH unit	4.53	4.98	4.98	5.05	5.10	5.18
SB	me/100 g soil	2.67	6.23	5.93	6.27	10.79	14.98
Exchangeable Ca^{++}	me/100 g soil	2.46	4.48	4.18	3.67	6.12	8.97
Exchangeable Mg^{++}	me/100 g soil	0.01	1.51	1.54	2.37	4.40	5.54
Exchangeable K^+	me/100 g soil	0.13	0.13	0.11	0.11	0.13	0.21
Exchangeable Na^+	me/100 g soil	0.06	0.11	0.10	0.11	0.14	0.25
Exchangeable H^+	me/100 g soil	9.63	5.78	6.09	4.39	4.07	3.74
T	me/100 g soil	12.3	12.01	12.02	10.66	14.86	18.72
Exchangeable Ca^{++}	% (T=100)	20.0	37.3	34.8	34.5	41.2	47.9
Exchangeable Mg^{++}	% (T=100)	0.1	12.5	12.8	22.2	29.6	29.6
Exchangeable K^+	% (T=100)	1.1	1.1	0.9	1.1	0.9	1.1
Exchangeable Na^+	% (T=100)	0.5	0.9	0.8	1.1	0.9	1.3
Exchangeable H^+	% (T=100)	78.3	48.1	50.7	41.2	27.4	20.0
V 8,3	% (T=100)	22.0	52.0	49.0	59.0	73.0	80.0
P-AL	mg.kg-1	5.3	1.7	0.9	1.5	1.3	1.3
K-AL	mg.kg-1	74	74	55	55	73	94

The total capacity of cation exchange (T 8.3) was low, with values of 12-19 me/100 g soil in the entire soil profile. Among the exchangeable cations, in soil adsorption complex, Ca^{++} had the highest values (2.5-8.9 me/100 g soil), Mg^{++} had values of 0.01 at 5.54 me/100 soil, while K^{+} and Na^{+} had very low values of 0.13-0.21 me/100 g soil, respectively, 0.06-0.25 me/100 g soil. The sum of exchangeable bases (SB) had extremely low values (2.67 me/100 g soil) in Aoț horizon, very low values (5.9-6.3 me/100 g soil) in Ao, Ea and EBw horizons and low values (11-15 me/100 g soil) in Bt1w and Bt_2w horizons.

The exchangeable hydrogen (H+) had very high values (9.6 me/100 g soil) in Aoț horizon and mean values (4.1-6.0 me/100 g soil) in the rest of profile.

The humus content is low-very low, having values of 1.06-2.81%. Total nitrogen supply was mean, with values of 0.140-0.210%, mobile phosphorus supply was very low (5.3 ppm) in Aoț horizon and extremely low (0.9-1.7 ppm) in the rest of profile and mobile potassium supply was low-very low (55-94 ppm) in the entire soil profile.

2. Characterization of Alic-Stagnic-Albic Luvisols – Profile no. 2

Alic-Stagnic-Albic Luvisol (LV ab-st-al)-SRTS-2003(Florea and Munteanu, 2003); ***Pseudogleized-Albic holoacid Luvisol - SP pz/ho***-SRCS-1980 (Conea et al, 1979).

Location: S Galați; absolute altitude 430 m;

Longitude: 23°17'18

Latitude: 46°05'11

A. Soil Formation Conditions

Relief: Metaliferi Mountains, north side low slopes

Parental material: deluvial loamy deposits with substratum made of Tortonian sandstone and conglomerates

Natural global drainage: imperfect

Bioclimatic area: broad-leaved trees-*Quercus petraea* forests

Usage: weakly developed hayfields containing species like *Festuca rubra, Agrostis tenuis* and *Nardus stricta;* rare trees of *Betula verucosa*.

B. Morphological Characterization

Ao_1 0-2 cm; dusty loam: dark grey (10 YR 4/1) in wet condition, grey-light grey (10 YR 5/1-6/1) in dry condition, schistose crust, friable in wet condition, slightly tough in dry condition, dry, clear passage.

Ao_2 3-15 cm; dusty loam: dark greyish brown (10 YR 4/2) in wet condition, greyish brown (10 YR 5/2) in dry condition, small subangular polyedric structure, tough in dry condition, firm in wet condition, slightly adherent, moist, frequent ferromanganese spots, thin, frequent grassy roots, clear passage.

Ea 15-30 cm; sandy loam: grey (10 YR 5/1) in wet condition, light grey (10 YR 6/1-7/2) in dry condition, weak schistose structure, slightly tough in dry condition, firm in

wet condition, small ferromanganese concretions and frequent ferromanganese spots, moist, thin, frequent grassy roots, clear passage.

EBw 30-45 cm; sandy loam: grey (10 YR 5/1-6/1) with frequent dark brown spots (7.5 YR 5/6) in wet condition, light grey (10 YR 6/1-7/1) with frequent yellow-brown spots (10 YR 6/6) in dry condition, small-mean angular polyedric structure, ferromanganese spots and frequent small-mean ferromanganese concretions, thin, rare grassy roots, tough in dry condition, friable in wet condition, moist, gradual passage.

Bt_1w 45-60 cm; dusty loam: dark yellowish (10 YR 5,5/4) in wet condition, very pale brown (10 YR 7/4) in dry condition, reddish yellow oxidized spots (7.5 YR 6/8) in wet condition and reddish yellow ones (7.5 YR 7/8) in dry condition, moderately developed mean angular polyedric structure, thin discontinuous skins of clay, ferromanganese spots and frequent small-mean ferromanganese concretions, moist, tough in dry condition, firm in wet condition, plastic, adherent, rare thin grassy weeds, gradual passage.

Bt_2w 60-80 cm; dusty loam: dark yellowish brown (10 YR 4/4) in wet condition, yellowish brown (10 YR 5/4) in dry condition, frequent reddish yellow oxidized spots (7.5 YR 6/8) and grey reduction spots (7.5 Y 6/1) in wet condition, yellowish brown (10 YR 5/4) with reddish yellow oxidized spots (7.5 YR 7/8) and light grey reduction spots (7.5 YR 7/1) in dry condition, weakly defined prismatic structure, clay skins on the faces of structural aggregates, small-mean ferromanganese concretions and ferromanganese spots, tough in dry condition, firm in wet condition, plastic, adherent, moist, gradual passage.

Bt_3w 80-100 cm; dusty loam: yellowish brown (10 YR 5/4) in wet condition, light yellowish brown (10 YR 6/4) in dry condition, reddish yellow oxidized spots (7.5 YR 6/8) and grey reduction spots (7.5 Y 6/1) in wet condition and reddish yellow oxidized spots (7.5 YR 6/8) and light grey reduction spots (7.5 YR 7/1) in dry condition, weakly defined prismatic structure, thin clay skins on the faces of structural aggregates, small ferromanganese concretions and frequent ferromanganese spots, moist, very tough in dry condition, firm in wet condition, plastic, adherent.

C. Physical-Chemical Characterization

Analytical data show a textural differentiation in soil profile (Id 1.2) (*Table 3*).

The content of colloidal clay (< 0.002 mm) had values of 28.9% and 26.9% in Ao_1 and Ao_2 horizons and decreased at 18.3-19.3 in Ea and EBw horizons, increased gradually at 20.8 % in Bt_1w horizon, reaching 31.1% in Bt_3w horizon.

The high colloidal clay content in pseudogleized clay horizons, especially in Bt_3w horizon, was determined by soil formation process of clay illuviation, also emphasized by clay skins on the faces of structural aggregates.

Table 3 – Physical characteristics of soil profile no. 2. S Galați - Alic-Albic-Stagnic Luvisol (al-st- ab LV)

Horizon	M.U	Au_1	Au_2	Ea	EBg	Bt_1g	Bt_2g	Bt_3g
Horizon depth	cm	0-2	2-15	15-30	30-45	45-60	60-80	80-100
Sample depth	cm	0-2	2-15	15-30	30-45	45-60	65-80	85-100
Skeleton	% g/g	-	-	-	-	-	-	-
Coarse sand (2.0-0.2 mm)	% g/g	10.7	8.0	9.6	10.5	11	10.1	7.2
Thin sand (International system) 0.2-0.02 mm	% g/g	24	28.6	32.0	28.1	27.1	26.0	27.5
Thin sand (American system) 0.2-0.05 mm	% g/g	13.6	13.2	14.4	13.6	10.3	10.6	10.2
Dust (International system) 0.02-0.002 mm	% g/g	36.4	36.5	40.1	42.1	41.1	39.3	34.2
Dust (American system) 0.05-0.002 mm	% g/g	46.8	51.9	57.7	56.6	57.9	54.7	51.5
Clay (<0.002 mm)	% g/g	28.9	26.9	18.3	19.3	20.8	24.6	31.1
Physical clay (< 0.01 mm)	% g/g	48.8	47.6	40.9	43.2	43.7	46.7	39.6
Textural class		SL*	SL*	SSL**	SSL**	SL*	SL*	SL*

*LP = Silt loam; SSL = Sandy silt loam

The colloidal clay content in Bt_2w and Bt_3w horizons was higher, compared to Bt_1w horizon. This may be explained by the fact that an intense clay destruction took place, which was caused by strong debasification until the level of Bt_2w horizon. This high debasification in the first side of the clay horizon is a characteristic of alic subtypes of Luvisols.

The dust content (0.02-0.002 mm) had values of 36% in Ao_1 and Ao_2 horizons, increased at 39-42% in Ea, EB, Bt_1w and Bt_2w horizons and decreased until 34 % in Bt_3w. The thin sand content (0.2-0.02 mm) was relatively constant in soil profile, having values of 26-32%, like coarse sand (2.0-0.2 mm), with values of 7-11%. From the texture viewpoint, it is found in the category of dusty-loam soils, except Ea and EBw horizons, which are sandy-loam soils.

Soil response was extremely acid (pH 3.5 in Ao_1 horizon, very highly acid (pH 3.9-4.4) in Ao, Ea and EBw horizons, highly acid (pH 4.7) in Bt_1w horizon and moderately acid (pH 5.2-5.4) in Bt_2w and Bt_3w horizons (*Table 4*).

Base saturation degree (V%) had values of 3.8-8.3% in Ao_1, Ao_2 and Ea horizons, 11-23% in EBw and Bt_1w horizons and 51.1-62.9% in Bt_2w and Bt_3w horizons. From the viewpoint of base saturation degree, Alic-Stagnic-Albic Luvisols are found in the category of extremely oligo-basic soils in Ao_1, Ao_2 and Ea horizons, oligo-basic soils in EBw and Bt_1w horizons and oligo-meso-basic in Bt_2w horizon and meso-basic soils in Bt_3w horizon.

Table 4- Chemical characteristics of soil profile 2. S Galați - Alic-Stagnic -Albic Luvisol (al-st-ab LV)

Horizon	M.U.	Au_1	Au_2	E	EBg	Bt_1g	Bt_2g	Bt_3g
Horizon depth	cm	0-2	2-15	15-30	30-45	45-60	60-80	80-100
Sample depth	cm	0-2	2-15	15-30	30-45	45-60	65-80	85-100
Humus (Cx1.72)	%	5.44	2.39	1.49	0.68	0.36	0.58	0.27
Total N	%	0.356	0.198	0.176	0.091	0.082	0.074	0.055
pH of H_2O	pH unit	3.38	3.89	4.20	4.42	4.73	5.19	5.39
SB	me/100 g soil	0.68	0.65	0.81	0.93	1.96	4.96	9.74
Exchangeable Ca^{++}	me/100 g soil	0.27	0.43	0.54	0.58	1.25	3.04	5.56
Exchangeable Mg^{++}	me/100 g soil	0.14	0.10	0.14	0.19	0.46	1.35	2.98
Exchangeable K^{+}	me/100 g soil	0.19	0.06	0.06	0.06	0.06	0.06	0.13
Exchangeable Na^{+}	me/100 g soil	0.07	0.06	0.07	0.09	0.18	0.50	1.07
Exchangeable H+	me/100 g soil	17.15	10.55	8.95	7.50	6.54	4.75	5.75
T	me/100 g soil	17.83	11.20	9.76	8.43	8.50	9.71	15.49
Exchangeable Ca^{++}	% (T=100)	1.5	3.8	5.5	6.9	14.7	31.3	35.9
Exchangeable Mg^{++}	% (T=100)	0.8	0.9	1.4	2.2	5.4	13.9	19.2
Exchangeable K^{+}	% (T=100)	1.1	0.6	0.7	0.8	0.8	0.7	0.8
Exchangeable Na^{+}	% (T=100)	0.4	0.5	0.7	1.1	2.2	5.2	6.9
Exchangeable H^{+}	% (T=100)	96.2	94.2	91.7	89	77	48.9	37.1
V 8.3	% (T=100)	4.0	6.0	8.0	11	23	51.0	63.0
P-AL	mg.kg-1	3.0	3.2	3.3	2.9	3.1	2	
K-AL	mg.kg-1	73	127	73	59	59	42	

The total capacity of cation exchange ($T_{8.3}$) was low (11-18 me/100 g soil) in Ao_1 and Ao_2 horizons, very low (8-10 me/100 g soil) in Ea, EBw, Bt_1w and Bt_2w horizons and low (15 me/100 g soil) in Bt_3w horizon.

Among the exchangeable cations in soil adsorption complex, Ca^{++} had low values in Ao_1 horizon (1.5 me/100 g soil), increased gradually in soil profile (3.8-14.7 me/100 g soil) in Ao_2, Ea, EBw, Bt_1w horizons and reached 31-36 me/100 g soil in Bt_2w and Bt_3w horizons; Mg^{++} had values of 0.8-5.4 me/100 g soil in Ao_1, Ao_2, Ea, EBw and Bt_1w horizons and of 14-19 me/100 g soil in Bt_2w and Bt_3w horizons; K^{+} had values of 0.6-1.1 me/100 g soil, while Na^{+} with very low values (0,4 me/100 g soil) in Ao_1 horizon, increased gradually and

reached 6.9 me/100 g soil in Bt_3w horizon.

The sum of exchangeable bases (SB) had extremely low values (0.7-2 me/100 g soil) in soil profile, except Bt_2w horizon with very low values (5 me/100 g soil) and Bt_3w horizon with low values (10 me/100 g soil).

The exchangeable hydrogen (H+) had very high values (9-17 me/100 g soil) in Ao_1, Ao_2 and Ea horizons, high values (6.5-7.5 me/100 g soil) in EBw and Bt_1w horizons and mean values (4.8-5.8 me/100 g soil) in Bt_2w and Bt_3w horizons.

The humus content had mean values (5.4 %) in Ao_1 horizon, low values (1.5-2.4%) in Ao_2 and Ea horizons and very low-extremely low values (0.3-0.7%) in the rest of soil profile.

The total nitrogen supply was mean (0.356-0.176%) in Ao_1, Ao_2 and Ea horizons and very low (0.055-0.091%) in the rest of soil profile; the mobile phosphorus supply was extremely low (2-3.3 ppm) in the entire soil profile and the mobile potassium supply was low (73-127 ppm) in Ao_1, Ao_2 and Ea horizons and very low (42-59 ppm) in EBw, Bt_1w, Bt_2w and Bt_3w horizons.

CONCLUSIONS

Stagnic Luvisols were delimited on the Ampoi Terrace. They were formed on quasi-horizontal areas, on Holocene loam alluvial-proluvial deposits, used as hayfields. Their morphological profile belongs to the type *Ao, El, EBw* and *Btw*.

They are characterized by a textural differentiation in soil profile (Id=1.3). Soil response is highly acid (pH 4.5-5.0) in upper and transition horizons and moderately acid (pH 5.1-5.2) in Btw horizons. From the viewpoint of base saturation degree, they are found in the category of oligo-meso-basic soils in upper horizons, meso-basic in the transition horizons EBw and Bt_1w and eubasic in Bt_2w horizon at the basis of soil profile.

Alic-Stagnic-Albic Luvisols were delimited in the lower side of the Metaliferi Mountains on slightly bent slopes with north exposure. They were formed on loam deluvial deposits with substratum made of Tortonian sandstone and conglomerates, below weakly developed hayfield. Luvisols have a morphological profile of the type *Ao, Ea, EBw* and *Btw*. They are characterized by a textural differentiation of soil profile (Id 1.2). Soil response is extremely acid-highly acid (pH 3.5-4.4) in upper and transition horizons, highly acid (pH 4.7) in Bt_1w horizon and moderately acid in Bt_2w and Bt_3w horizons. From the viewpoint of base saturation degree (V, %) they are found in the category of extremely oligo-basic soils in upper horizons, oligo-basic in transition horizons EBw and Bt_1w, oligo-meso-basic in Bt_2w horizon and meso-basic in Bt_3w horizon.

Highly acid soil response (pH 4.7) in Bt_1w horizon and base saturation degree (V=11-23%) in transition horizons EBw and Bt_1w

have contributed to framing these soils in Alic subtype (Florea and Munteanu, 2003). This subtype is not found in SRTS 2003. The analysed soils do not fulfil all the conditions for being framed in Alosols (Rizea and Florea, 2008; xxx 1988).

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