THE ANNALS OF "VALAHIA" UNIVERSITY OF TARGOVISTE
2012

THE INFLUENCE OF LEGUMICULTURE PRACTICE OVER THE SOIL EVOLUTION IN TARGOVISTE PLAIN

Ciulei Constantin Sorin
Valahia University of Târgovişte
E-mail: sorin0200@yahoo.com

Abstract

The integral value of finacial resources, premises creation for establishing most appropriate structures of cultures and usesand of some technologies of their own for each land category that needs pedological and ecological information..
On the piedmont Plain of Targoviste , took place a different evolution on the soil types., because the pedogentics conditions and due to antropic evolution caused by the legumiculture practice.
Eutric Fluvisols, Chromic Luvisols and Eutric Cambisol soils from nearby Targoviste, have evolved in mollic subtypes due to several years fertilisation with mineral and especially organic fertilizer.

Keywords: fluvisol, horizon, reaction, texture

1. INTRODUCTION

Piemont Plain of Targoviste is a subunite of Roumanian Plain and is situeted on the lower course of Ialomita River. It is delimited in north by Curvature Subcarpathians, on east by Pitesti Plain and on south by Titu Plain..
It is a higher plain, with evolved soils, so we encount over heer cambisols, luvisols and fluvisols situated in Ialomita's meadow.
For ensuring the fresh vegetables necessary, most of the time, the periurban areas are beeing transformed in vegetable basins. This kind of situations are most in the south part of the country (Bucureşti, Piteşti, Buzău, Craiova) but also close to Iasi, Cluj, etc.
This phenomennon take place also in the periurban area of Targoviste, this area becoming (especialy Serbian area) a real vegetable basin.
Pedoclimatic conditions favors the vegetable practice beacause there are present here Eutric Fluvisols from Ialomita's meadow, but also Eutric Cambisols, Chromic Luvisols, this types of soil alowing successufuly practice of legumiculture.
The river deposits submitted by Ialomita River and the parental materials represented by sand, gravel, clays due to average annual precipitation conditions of 560 mm/ year, and annual average temperatures of 9.9^{0} C, have determined the formation of fluvisols.
Eutric Cambisols and Chromic Luvisols were formed from parental materials richer in basic elements (clays), due to higher relief emerged from the influence of Ialomita river flooding. This kind of soils occupies significant areas, most of them being taken in culture.

2. MATHERIAL AND METHODS

There have been made 10 main soil profiles and 25 soil surveyes (secondary soil profiles) regarding morphological characterization of the soil shell and the collection of the pedological and agrochemical samples. From chemical point of view we followed:

- humus content (determined by Tiurin method),
- CaCO content (determined by gas meter method with Scheibler calcimetrum),
- soil reaction (potentiometric determined in watery solution),
-the phosphorus and mobile potassium content (deteremined by Egner Reichm Domingo method),
-nitrogen index (IN) determened by calculating as the level of base saturation (V%). The base saturation (V%) had been calculated by means of the sum of exchangeable hydrogen (SH).

From physical point of view we followed the percentages determining of the granulometric fractions that are entering in the composition of the mineral part of the soil (using Kacinski method).

3. RESULTS AND DISCUSSIONS

In the Ialomita's meadow fluvisols have been formed over the recent fluvial deposits, represented by sand, clay and gravel, rich in basic elements, in the presence of a vegetation specific to the steppe zone (*Quercus species*) and to the young forest (W*illow tree*, *Poplar species*).
There were in our attention especially the fluvisols from nearby Targoviste which had been taken into use most for the legumicol culture. The soil vegetables cultivation needed a continue fertilization with mineral fertilizers, but more of that, with organical fertilizers used for growing the content of organic matter in order to improve aerohydric system and there fertilization
So, typical Eutric Fluvisols have evolved to Mollic Fluvisols, explaining this way that are present only on vegetable ocupated areas .
Eutric Fluvisols presents sequence of horizons ***Ao-A/C-C.***
Horizon Ao = 0-22 cm (it is frequently met at the top an Ap horizon and on the bottom An), brown-brown – dark yellowish colour. (10YR4/4), clayish, polyhedral structure, loose, moist, smooth transition;

Horizon C = 22-70 cm ; is representated by stratified fluvial parent materials, often presenting contrasting texture.
Soil reaction is maintained low (pH >7,2) all along the profile , the base saturation degree is > 95%, humus content is low (~1,5%) and supply nutriens also low.

Figure 1. Structure on the Eutric Fluviosol profile
Source: author

Table 1. Analytical data specify to physical and chemical characteristics of the Eutric Fluvisols.

Horizon	Depth of sample (cm)	pH	Humus	IN	P_2O_5 mg /100 ppm	K_2O mg /100 ppm	V%
Ao	0-23	7.33	1.53	2.18	66.3	99.6	100
A/C	23-35	7.25	1.15	1.47	25.7	92.1	100
C_1	35-58	7.20	0.53	1.73	4.4	92.1	94.6
C_2	58-81	8.10			4.4	85.5	98.2
C_3	86-108	7.80					94.6

Mollic Fluvisols presents sequence of horizons ***Am – A/C –C.***
Horizon Am = 0-39 cm , on the top it separates an Ap horizon characterized by medium grain structure developed, rough texture medium.
Horizon C = 40-85 cm; it is represented by fluvial parent materials that are in most of the cases sand, often stratified, with often contrasting texture.
Soil reaction is variable from law accide (pH 6,7) to neutral – slightly alkaline at Am horizon level and the degree of base saturation takes values between 89,1 and 100%.
Calcium carbonate CaCO3 apears on the bottom of the soil profile (2,4% in horizon C) being washed because the irrigations.
It presents a midle level of nitrogen and potassium supply, but low on phosphorus.

Table 2. Analytical data characteristic to physico – chemical properties of Mollic Fluvisol

Horizon	Depth of sample (cm)	pH	Humus	IN	P_2O_5 mg/ 100 ppm	K_2O mg/ 100 ppm	V%
Am	0-28	7,55	2.25	2.23	68.5	96.5	100
A/C	28-43	7.42	1.57	1.51	26.4	94.6	100
C_1	43-64	7.23	0.75	1.87	7.5	91.2	100
C_2	64-85	7.87			6.5	86.2	97.5
C_3	85-112	7.92					96.6

Figure 2. Horizon A structure, fertilized left, right unfertilized (Fluvisol)
Source: author

Eutric Cambisols are defined by the presence of a horizon Bv with V%> 55% and on the bottom or in spots (> 50%) colours in yellow shades of 5YR with values > 3,5 on the wet material.
This type of soils presents an Bv horizon with higher degree of base saturation (V > 55%). Therefore, the leaching and debasifications is weak to moderate, for which there were no processes of migration and separation of clay, Bt horizon, but a Bv horizon characterized by darker color than the parental material, polyhedral structure and total washing calcium carbonate.
This young soils considerated , are beeing spread in Ialomita's meadow, most on the higher areas, less likely to floodi.

Mollic Cambisols has a Am – Bv – C profile.
Horizon Am has a *15-40* cm, brown colour, clay texture and structure grain or of 15 – 40 cm, brown sau chiar glomerular usually welll developed.
Horizon Bv grows to a depth of 80- 120 cm , it has brown-yellow colour, similar texture with A horizon, and poliedric structure, very well developed, specific to this horizon. se It developes to a depth of 80 – 120 cm .
Horizon C it is represented by parenthal material, generally rich in calcium carbonate or basic cations, ant

it formes at variables depths , frequently under 100 -120 cm.

Table 3. Analytical data characteristic to physico – chemical properties of Mollic Cambisols

Horizon	Depth of sample (cm)	pH	Humus	IN	P_2O_5 mg /100 ppm	K_2O mg /100 ppm	V%
Am	0-30	6.85	3.23	2.06	13.8	174.6	88.4
A/B	30-43	6.75	1.21	1.04	1.0	214.6	85.8
Bv	43-65	5.85	0.74	0.58	2.4	260.9	78.8
Bv	65-85	5.65					76.9
B/C	85-108	5.85					81.3

Chromic Luvisols are met in the interfluvial fields , and they are formed by clay deposits. A ocric horizon has resulted due to weaker bioaccumulation, and the levigation led to clay migration and separation of Bt horizon.

The charatcteristic phenomenon in the genesis of these soils is the formation of large amounts of iron oxides and hydroxides, which printed to ground the reddish color , color determined also by warm climates with dry periods, specific to areas where this soils are formed.

Chromic Luvisols presents ***Ao-Bt-C or Cca*** profiles.

Horizon Am is 25 – 40 cm thick, dark brown (darker shade), clay loam and grains or polyhedral structure.

Horizon Bt is 90 – 130 cm thick with reddisher shades than Am, clay loam texture and specific structure for this horizon is prismatic; at neoformations, more obvious clay films lining the faces structural aggregates;

Horizon C or Cca occurs on the bottom of the soil profile, represented most often by parenthal material, rarely presenting carbonate calcium accumulation, in which the soil is strong effervescence and has a more yellowish color.

Luvi-Chromic Phaeozema occupy small areas limit of Ialomita meadow and terrace area and have a humus content of 2.5 to 3.5%; degree of base saturation fall below 80%, and pH to almost 6; supply of nutrients and mycrobiological activity are relatively good.

Figure 3. Chromic Luvisols in the OMV Sarbi, Dta area
Source: author

Table 4. Analytical data characteristic to physico - chemical properties of Luvi-Chromic Phaeozema

Horizon	Depth of sample (cm)	pH	Humus	IN	P_2O_5 mg /100 ppm	K_2O mg /100 ppm	V%
Am	0-35	5.95	3.55	1.82	8.4	162.0	79.0
A/B	35-65	6.00	1.24	1.00	1.3	117.0	83.8
Bt	65-110	5.80					72.1
Bt	110-130	5.80					74.4
B/C	130-155	5.85					79.5

4. CONCLUSIONS

Because of this pedogenesis conditions and Ialomita river in Targoviste Plain was possible to form fluvisols, soils with low fertility, caused by a low in nutrients and organic matter and poor aerihidric regime.

In higher areas in contact with flood Ialomita, because the relief and parent material represented by clays, under the influence of alteration and eluvial-iluvial processes formed Eutric Cambisols and Chromic Luvisols.

By filling these areas with vegetable crops, Eutric Fluvisols, Chromic Luvisols and Eutric Cambisols evolved into subtypes mollic.

Mollic Fluvisols are more fertile compared to Eutric Fluvisols showing a higher humus content (> 3% vs. 1.9% mollic and the typical fluvisols in horyzon A), a thickness greater than the horizontal, a better supply with nutrients, a aerohydric regime more favorable and intense microbiological activity.

A similar situation we observed with Eutric Cambisols and Chromic Luvisols a long vegetables grown and heavily fertilized with organic fertilizer. I met them humus content> 3.5% (Luvi-Chromic Phaeozema) or 3.25% (at Mollic Cambisols), significantly higher than the corresponding types that have other agricultural use.

Also the mollic subtypes are found forming a glomerular or grain structures very well developed in the A horyzon presenting thicknesses between 26 and 35cm.

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