NORTH BARAGAN AT EAST FROM IENCII VALLEY (VIZIRU PLANE) SOIL COVER CHARACTERIZATION

BĂRĂGANUL NORDIC LA EST DE VALEA IENCII (CÂMPIA VIZIRU) CARACTERIZAREA SOLURILOR

NICOLETA BALABAN*, E. GEORGESCU*, IOANA PĂNOIU*

****University of Agronomical Sciences and Veterinary Medicine from Bucharest, Romania***

Abstract: *In this paper, authors collective presents some aspects concerning by soil covers characterization existence in North Baragan Plane at east from Iencii Valley (Viziru Plane). These pedological studies were realized for a detailed knowledge at soil resources from area, knowledge that is absolutely necessary for practiced of durable and effective agriculture.*

Rezumat*: În această lucrare, colectivul de autori prezintă câteva aspecte legate de caracterizarea învelişului de sol existent în Câmpia Bărăganului Nordic la est de Valea Iencii (Câmpia Viziru). Acest studiu pedologic a fost realizat pentru o cunoaştere cât mai amănunţită a resurselor de sol din regiune, cunoaştere ce este absolut necesară în vederea practicării unei agriculturi durabile şi eficiente.*

Key words: *plane, soil type*
Cuvinte cheie*: câmpie, tip de sol*

INTRODUCTION

Because of natural condition, Romanian agriculture can become, as result of considerable efforts one redoubtable opponent for the agriculture of the other countries member of the European Union. For that thing was realized is necessary in first way o good knowledge at soil resources, and then an effective exploitations of them.

For this reason through present studies we try a detailed knowledge at soil resources from North Baragan at east of Iencii Valley (Viziru Plane), for practicing of the durable and effective agriculture.

MATERIALS AND METHOD

The research was made in period 2003-2007, in North Baragan Plane at east of Iencii Valley (Viziru Plane), like continuations of these effectuated by numerous researchers in this region.

Pedological studies it has made in conformity with "Pedological studies elaboration methodology" made by I.C.P.A.—Bucharest, and soils type was established in conformity with "Romanian system of soils taxonomy—2003".

RESULTS AND DISCUSSION

Territory that we refer, North Baragan Plane at east of Iencii Valley (Viziru Plane), is placed in east extremity at Romanian Plane.

As result of researches effected and as result of environment factors interactions (rocks, relief, clime, vegetations, etc) in North Baragan Plane at east of Iencii Valley (Viziru Plane) it has made in evidence o relative large range by soils banded in Cernisoils and Salsodisoils classes.

Cernisoils classes occupy over 85 %from plane surface and are represented in territory through subtype diversity.

Proxycalcaric chernozems are been spread especially on plane surface, cvasi-horizontal, relative drainage, constituted by loess deposits.

Physic and hydro-physic characteristics (figure 1). Proxycalcaric chernozems texture is indifference on profile and can be clayey-sandy, clayey. The most clay quantity it has observed in transition horizon (22.3 %). It has presented aerate, apparent density on 0-100 cm deeper been between 1.17-1.30 g/cm^3, and total porosity on same deeper, hasn't exceeded 57 %. Regarding aeration porosity, it was maintaining average-bigger on profile (18-28 %). Under penetration resistance aspects values ranged between 18-24 kgf/cm^2 situated these soils in sub average category. Withered coefficient of the proxycalcaric chernozems in average (8.0 – 9.5 %), utile water capacity it has framed in 15.8-17.3 % intervals, and field capacity is first bigger (21.6-26.2 %). Soils permeability is generally big-very big, presented values that exceeded frequently 28 mm/h in first 50 cm from surface.

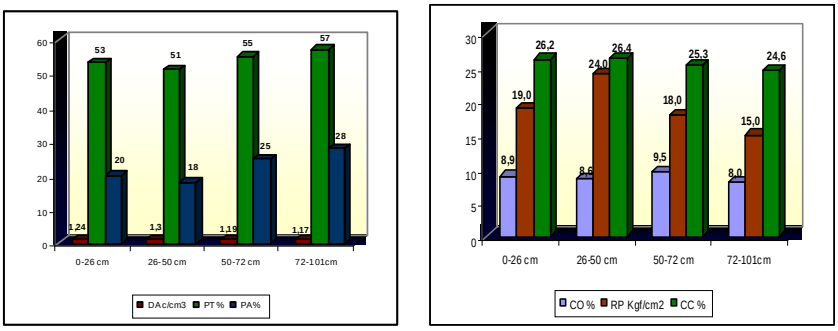

Figure 1. Physical properties of proxycalcaric chernozems

Chemical characteristics. Because of carbonates presence, pH values are highly elevated, at surface 8.2-8.6 and arrived at 8.4-8.5 in Cca horizons as result of growing $MgCO_3$ content. Humus content at these soils is situated between 2.5-2.9 %, and total nitrogen content between 0.10 and 0.13 %. C/N report oscillating between 13.5 and 15.7. As result phosphorus, this present values by 305-340 ppm and potassium bigger by 345 ppm. Proxycalcaric chernozems present one average-small microelements furnishing, as regard zinc, cupper, active manganese and boron, but manifest molybdenum deficiency (0.20-0.23 ppm).

Epycalcaric chernozems are surrounded by proxyicalcaric cherzozems or in west, in plane relief conditions, maybe easily acclivity, drained relatively, on loess deposit been in the most part cultivated.

Physic and hydro-physic characteristics (figure 2). Like the proxyicalcaric cherzozems are indifference texturally, at all deep maintained clayed. The bigger clay quantity appear in Ap horizon limit (30 %) after that has maintain relative constant on profile (25-27 %) under 152 cm deeper, after that deep become clay-sandy. Aerate (1.16-1.39 g/cm^3) but has a total porosity very big (52-57 %) and aeration porosity big average.

As regards the hydro physic indexes, these have the following values: withered coefficient approximate 10-11 %, water capacity in field between 26-28 %, and utile water capacity has maintained fewer than 17 % (18 %). Permeability, team

through hydraulic conductivity present bigger values (12-17 mm/h) just in first 80 cm after that becomes average and even small (3,0 mm/h).

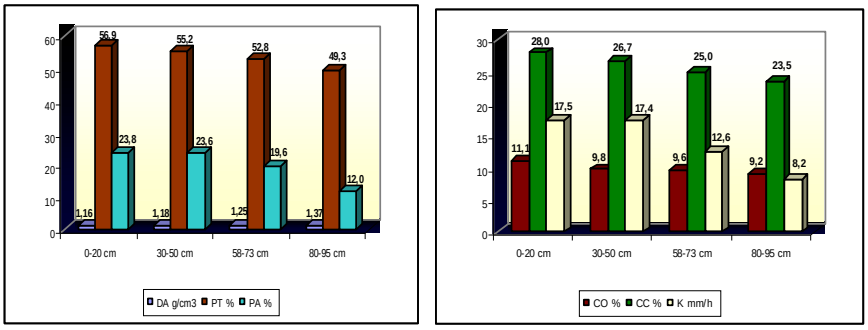

Figure 2. Physical properties of epycalcaric chernozems

Chemical characteristics. pH values show a neuter-week alkaline reaction (7.2-8.3) at the epycalcaric chernozems, and humus content exceeded little 3 % (3.24 %). The other values are relative close by proxycalcaric chernozems. Appera weaker furnish with nutrients (N, 0.128–0.171%; P, 10– 25 ppm and K, 93–188 ppm).

Proxycalcaric moist-phreatic chernozems. These soils appear with bigger frequency in territory. Spread area depends by micro depressions presence that hydrostatic level at the water batch is between 3 and 5 meters.

Physic and hydro-physic characteristics. Proxycalcaric moist-phreatic chernozems has undifferentiated texture and has characterized through small values of the apparent density on profile (1.14 – 1.39 cm^3), a large total porosity (51-57 %) and large aeration porosity (17-28 %). For deep 0-120 cm, hydro-physic value indices are: 10.4 % withered coefficient; 25.5 % water field capacity; 15.1 % utile water capacity. Carry away water capacity is present large-very large (16-24 %) while permeability is superior auto morph proxycalcaric chernozems.

Chemical characteristics. Proxycalcaric chernozems moist phreatic present a week alkaline reaction (pH=7,7-8,0), a relative equal humus content (2,66 %), but distributing on bigger deeper (120 cm), pH light alkaline that on soil profile base has cause large quantities of $MgCO_3$ and sometime sodium bicarbonate appearance in soil solution. Supplying with nutrients is average (0,144 %, nitrogen; 22 ppm, phosphorus; 225 ppm, potassium).

Epycalcaric chernozems, moist-phreatic appear on limited surfaces in comparison with proxycalcaric chernozems, moist phreatic.

Physic and hydro-physic characteristics. Epycalcaric chernozems, moist phreatic has predominant a clayey texture that become clayey-sandy on profile base. Clay content of these soils has maintain thus between 22-23 % until 80 cm deep. Are aerate soils, average values at apparent density register on deep by 200 cm been 1.18 – 1.42 g/cm^3, and the values of the total porosity by 45-50 %. Values of the aeration porosity are small in superior horizon limits (11-15 %), but grow brusque in transition horizon (26 %) after that decrease step by step until profile base (7-12 %). Withered coefficient values, at the field capacity and until water capacity it has ranged in 5-9%, 20-24 % and respectively 13-18 % interval. Water and air permeability of the epycalcaric

chernozems, moist-phreatic is large excessively, these values oscillating between 16-60 mm/h on deep 0-120 cm.

Chemical characteristics. Epycalcaric chernozems, moist-phreatic reactions, in A horizon is week alkaline, and humus content exceed 2.5 %. Total nitrogen content is by 0.138-0.139 %, and as regard C/N report, this oscillating between 11.8 and 12.7. Cations exchange capacity (T) at Am horizon present values by 25-35 me/100g soils. Bases saturation degree (V) in the most frequent cases exceeded 90 % (90-100 %). In exchange bases constitutive, calcium and magnesium are net predominates.

Nutrient supplying at epycalcaric chernozems moist-phreatic is generally average both with nitrogen (0,142 %) and with phosphorus (39 ppm) and potassium (193.5 ppm). Regard as microelements, zinc contents has low value (0.88-1.02 ppm) and mangan (14.5-21.7 ppm), but average with cupper (5.5-6.15 ppm) and boron (0.60-0.68 ppm).

Gleyic chernozems appear locally, in central part at the territory where there are micro depressions clear defined by gullies type.

Physic and hydro-physic characteristics (figure 3) are relative good: undifferentiated texture, usually average (clayey); are aerate, apparent density values on deep 0-120 cm varied between 1,26 – 1,42 g/cm^3; total porosity is situated between 46,5-52,9 %, withered coefficient is more then 9 %; field water capacity is 23-27 %, and utile water capacity in first 60 cm from surface is present big or very big (12,9-15,9 %).

Regard as chemical characteristics, because of carbonates presence, gleyic chernozems present a very week reaction from Am horizon, with large value on profile base (8.6 in CGo) while $CaCO_3$ content grow. Humus content varied between 2.66 and 3.24 %.

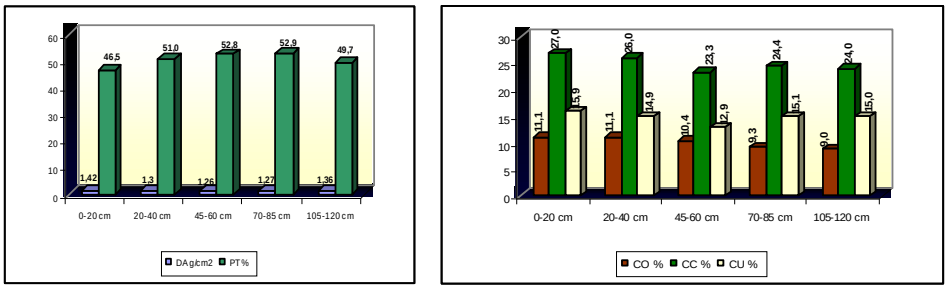

Figure 3. Physical properties of gleyic chernozems

Gleyic-hyposalic chernozems present a small area of spreading, been localized in central part at the plane, approaching of the salty lakes.

Under physical and hydro-physical characteristics, gleyic-hyposalic chernozems is present in this way: are not differentiated on profile, been usually clayey in first 90 cm from surface, after that become clayey-sandy; aeration porosity is strong-average in first 70 cm, after that decline accentually, become very small; water and air permeability at *gleyic-hyposalic* chernozems, is good; withered coefficients between 9,3-10,8; utile water capacity on deeper 0-90 cm ranged in interval 12.3-13.8 %.

Chemical characteristics is present in that way: reaction is week alkaline in superior horizon (7.3) and moderate alkaline on profile base; humus content on this soils is average (3,1-3,4 %) and decline step by step on profile; total nitrogen varied between 0,134 - 0,174 %;

phosphorus appear in smaller quantities (10 - 17 ppm), and potassium average values (140-200 ppm).

*Hyposodic chernozem*s are soils with local spreading. Thus, soils have signalized in east part of the Tudor Vladimirescu locality in limits of the micro depressions large areas by oblong form, by gullies type.

Hyposodic chernozems *present physical and hydro physical* characteristics less optimum for culture plants: are not texturally differenced; are not aerate soils, apparent density values registered on 0-75 cm deeper been by 1,26 – 1,37 g/cm^3; total porosity is small-average; withered coefficient values is maintaining average (8-10 %); water capacity is generally very big (18-21 %), while field capacity present small values (28-29 %); water and air permeability at the hyposodic chernozems is generally average. (3.4-6.6 mm/h).

And chemical characteristics prove that soils value: reaction in superior horizon is week-moderate alkaline (8.4-8.8) but become strong alkaline; small moderate content by humus (2.5-3.7 %) and nitrogen (0.138-1.178 %); supplying with N is moderate (0.138-0.178 %) and P supplying is necessary adequate (6-13 ppm) and K (107-135).

Haplic and luvic chernozems (in gullies). Presence of these soils in territory is tight in correlation by numerous gullies existence. As part of the micro-relief forms, *luvic* chernozems occupy central part at those, where and water quantity's resulted from precipitations is bigger, when *haplic* chernozems correspond contact band, gullies - plan surface. Parental materials are represented through loess.

Physical, chemical and agro-productive characteristics. *Haplic* chernozems texture is clayey, clay content (<0,002 mm) been ranged between 27.2 % in Am horizon and appreciatively 31 % in Bv, result one indices of the textural differences by approximate 1.1. It has present relative aerating, apparent density been ranged between 1.20 – 1.44 g/cm^3 and total porosity is average-big (46-54 %). Permeability is generally good, that present large value only in ploughed horizon after that become average on profile. Reaction is week acid at the surface (pH 6.91) after that become neuter in closed horizons (7.1-7.3). Humus content at *haplic* chernozems from gullies although is smaller (2.26-2.97 %) comparative with region chernozems, decline gradually on profile. Saturation bases degree is between 91-93 %.

Haplic and luvic moist-phreatic chernozems (in gullies). These soils were formed in same rocks and clime conditions that we refer upper with difference that were influenced phreatic, hydrostatic water level situated usually at deep between 3-4 m. They were encountered in south part of plane, in gullies.

Siltic - haplic chernozems. Through Viziru plane soils, siltic - haplic chernozems occupy the smaller surface. These soils appear only in northwest part of the territory, close to Romanu locality, where has formed in conditions of the large Aeolian relief with dunes and inter-dunes. Dune inter-dune amplitude arrived 2-3 m. Sand fossilize plane loess sediments and has blotting on south.

Physic and hydro-physic characteristics. *Siltic - haplic* chernozems it isn't presented texture on profile and appears light settling. (Volumetric weight 1.44 g/cm^3; porosity 48 %). Has smaller field water capacity (8.5 %), smaller withered coefficient, but a good water permeability (33 mm/h).

Chemical characteristics. Are soils with small humus content (1.1 %) and nitrogen (0.100 %). At the surface pH values varied between 6.3-7.3. Cationic exchange capacity (T) is very small (7.3-7.5 me/100 g soil), and saturation bases degree is mezzo basic in superior horizon (75 %), and eubasic on profile (86 % in transition horizon).

Salsodisoils class, are presented in territory through the two soils types well know: solonchaks and solonetz. Because of the pedomorpho-genetic conditions, these soils formed

associations where first term represent solonchaks (Gleyic solonchaks and gleyic solonetz) or solonetz (gleyic solonetz).

Gleyic solonchaks and gleyic solonetz appear locally in some gullies situated in frame of large micro depression areas, at north from Tichilesti locality and on extended areas in Ianca valley river side. Parental material is by fluvial and loess nature.

Physic, hydro-physic and chemical characteristics has present in this way: small on profile; has a total porosity average (44-48 %) and a small-medium permeability (0.6-8.-mm/h); soils reaction are light-moderate alkaline; humus and nitrogen content oscillate between large limits (1.9-3.8 %). Humus reserve on 1 cm depth is ranged between 60 and 360 t/ha, and nitrogen reserve between 4 and 20 t/ha.

Agro productive characteristics. Because of high minerals content, surfaces occupied with solonchaks are utilized like natural lawns witch low forager value. Solonchaks amelioration is very expensive, demanding many works, beginning with descending of the phreatic water level under critical deep, associated with cleaning of the minerals from soils measures. Lawns improvement it can be realized through supra sowing with halophyte species, with some foraging value.

Gleyic solonetz and g*leyic solonchaks* have a smaller spread area. These appear only in north half of the territory, in frame of large micro depression oriented NV-SE, from Braila approaching, on bottoms that forming Salty Lake.

Gleyic solonetz has finding in north part of the Viziru plane, when occupy the lowest part of the micro depression, with aquifer batches near to surface. These appear in some gullies by moderate dimensions 0.5 – 2 km^2), with oval shape and NE-SV orientation. Physical and chemical low properties of these soils determined a low fertility, and low pretability and favourability. Usually are utilized for low quality lawns.

CONCLUSIONS

North Baragan plane at east of Iencii Valley (Viziru Plane) is situated in east extremity of the Romanian Plane and present a soil cover formed by relative large scale of soils types, jointed in Cernisoils and Salsodisoils classes. Dominant soils for studied areas were from Cernisoils classes that occupied over 85 % from surface.

From agro productive point of view, on plane territory we meet soils with a relative good fertility.

BIBLIOGRAPHY

1. OANEA, N., Pedologie Generală, Ed. Alutus, Miercurea Ciuc, 2005.
2. POSEA, G., CRUCERU, N., Geomorfologia României, Ed. F.R.M., Bucureşti, 2002.
3. ***, Harta solurilor, foaia Brăila, scara 1: 200 000, reactualizată.
4. ***, Studii pedologice complexe pe teritorii comunale, scara 1: 10 000, OSPA – Braila.