VERTOSOILS AND VERTIC SOILS FROM OLTENIA AND THEIR MAIN CROPPING FEATURES

POPESCU C., GRECU FLORINA, CONSTANTINESCU EMILIA
University of Craiova, Faculty of Agriculture

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ABSTRACT

The vertosols occupy a large area in the Central zone of Oltenia. They are soils that were formed on clay bedrock represented by swelling clays of montmorillonite that have the property to enlarge very much its volume in contact with water and to contract very strongly when dry, during drought periods. This property of montmorillonite as bedrock determine in the mass of the soil the apparition of cracks from several mm to several cm on horizontal and from several cm to several meters on vertical. The vertosols are present in complex with other vertic soils as vertic preluvosols and vertic luvosols. All these soils have a high clay content, they are compacted, they have a low water and air permeability. Generally, they are profound soils and manifest levigation and stagnogleysation processes having average – low fertility.

INTRODUCTION

The vertosols, during time, have had several names: ebonite, asphaltoid marshes, marshes, etc. In FAO classification (1970), marsh soils have been named vertosols. This name has been kept in the SRCS 1980 classificatio and in actual classification (SRTS 2012) are named vertosols. This name cames from the latin „verto" that means upside down, phenomenon that is often in the mass of these soils.

In the formation of these soils the bedrock is the decisive factor. These clays, repeatedly, enlarge their volume in contact with water and then, when drying, they contract very strongly, determining cracks in the mass of the soil of different sizes, with spherical faces of slippery between soil particles, oblique ($10\text{-}60^0$).

The formation of this soil is related to the presence of an excess of water because of some lakes or streams in the vicinity of zones occupied by these soils.

Within the researched zone the average annual temperatures are between $9\text{-}10^0$C, the average annual rainfall are between 500 – 600 mm and the vegetation is represented by oak woods. In Oltenia, the vertosols are encountered in complex with vertic preluvosols and vertic luvosols.

MATERIAL AND METHOD

In order to identify the vertosols and the vertic soils there have been carried out soil profiles. With every soil profile there were studied the morphological features, there were taken soil samples for laboratory analyses. All operations have been made according with ICPA Bucharest methodology.

RESULTS AND DISCUSSION

The vertosol is encountered in the southern part of the Getic Piedmont, at the shifting area to Oltenia High Plane. After analyzing the main features of this soil, there can be said that, as regard the size of the particles of this soil, the highest percent is occupied by clay, in the ABzyw horizon (56.8%). This soil is compacted; the bulk density has values of over 1.4 g/cm^3 and the total porosity has low values, between 42-47%.

The humus content is low (2.61%), the reaction is low acid (pH=6.2). within the colloidal complex predominates bases ions, the bases saturation degree is over 78% (fig. 1). On the depth of the soil profile it presents stagnogleysation processes.

In these conditions, the stagnoglaysated vertosol is a compact soil, with low permeability for water and air. This soil type can be hardly worked, the optimal time for farming works being short, of only 1-3 days.

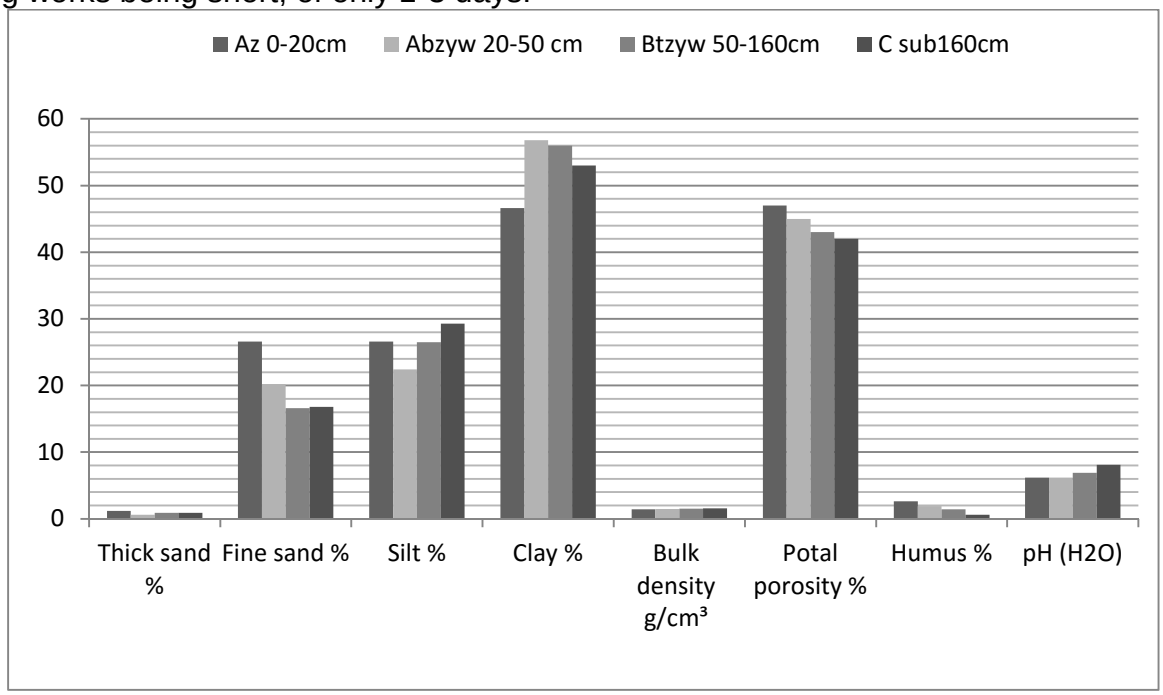

Fig. 1. The main physical and chemical features of stagnogleysated vertosol

The vertic preluvosol can be found in complex with the vertosol, in the central zone of Oltenia, on smaller surfaces, on the lands with better global drainage, represented by southern versants, with low declination and on plateaus.

The results of the laboratory analyses (fig. 2) show that from the shallow horizon there took place a high leaching of mineral colloids and the clay content is lower because of it (33.8%). Consequently, the bulk density is lower (1.36 g/cm^3) and the porosity has increased to 49%, the soil being more loosened. Within deeper horizons there is maintained a high content of clay and, consequently, a strong compaction and low permeability, properties that are specific to vertosols.

This soil type is low supplied by humus (2.15%), it has a low acid reaction (pH=5.8-6.6) and within the colloidal complex there predominates the bases ions and the basses saturation degree is over 70%.

From these data there can be said that in the shallow part of the soil profile has evolved toward preluvosol and in the deeper part there are kept evident features of vertosol.

The vertic luvosol has been found on larger surfaces in the central zone of Oltenia within vertosol areal, yet, more frequently, in the northern part on plain and depression terrains. With this soil, too, the size analysis shows a higher content of sand and lower of clay in the first horizons, as compared with the vertosol, because of leaching process that determines the migration of soil colloids downward.

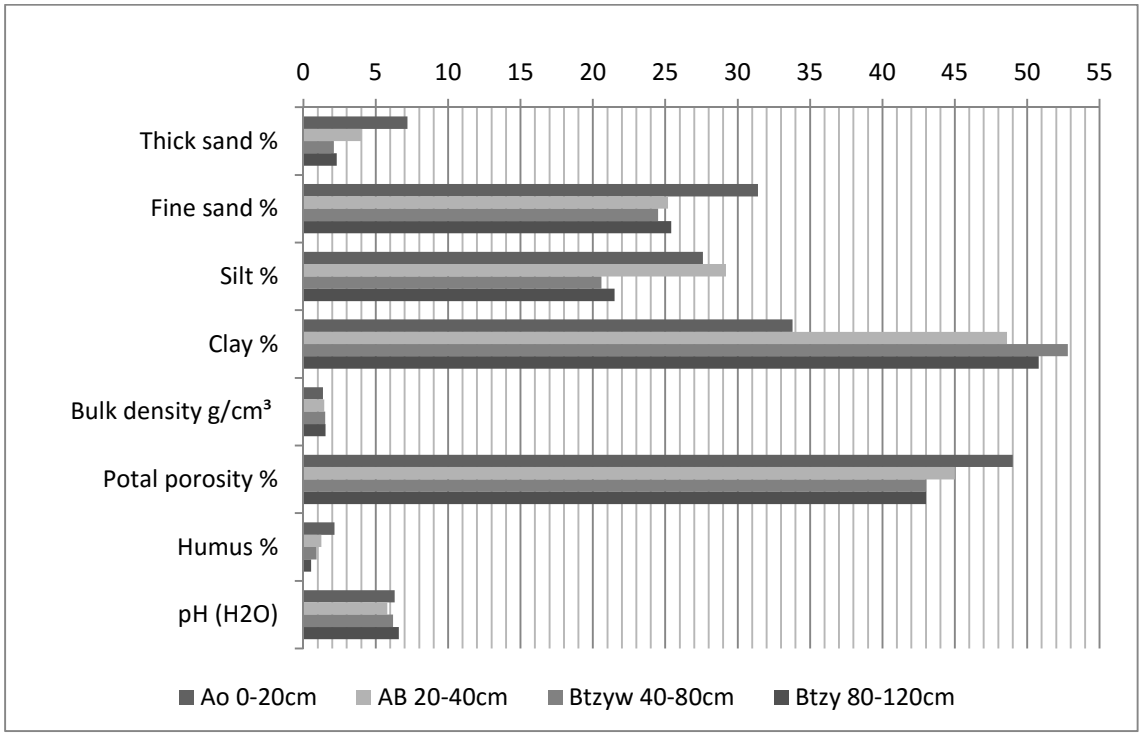

Fig.2. The main physical and chemical features of vertic preluvosol

In the shallow horizons the bulk density has lower values (1.37-1.43 g/cm^3) and the porosity is higher (46-49%). In these conditions the relations of soil with water and air are better. In the shallow horizons the clay content is higher (over 53%), the compaction is evident, the stagnogleysation processes are present, specific characteristics of vertosols (fig. 3).

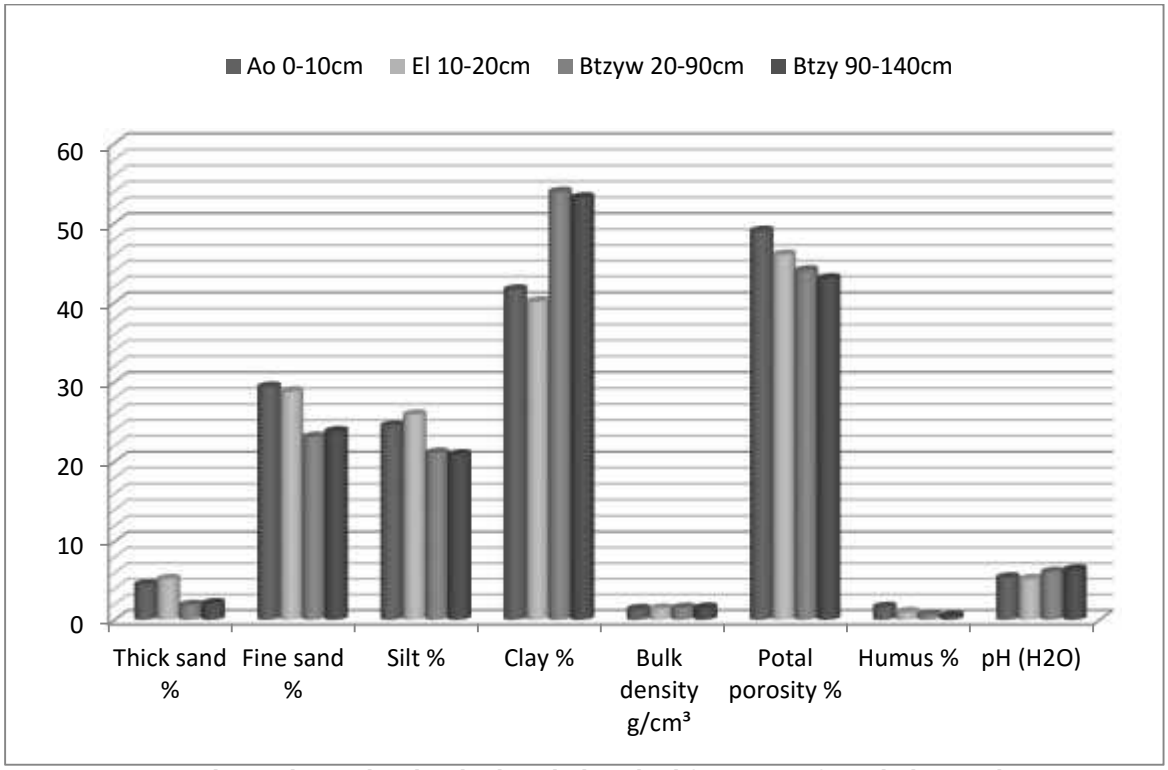

Fig.3. The main physical and chemical features of vertic luvosol

The humus supplying by humus is lower (1.65%), the reaction is acid in the first horizons (pH=5.2-5.4). within the colloidal complex predominates hydrogen ions, the basses saturation degree in the leached horizon is of 54%.

CONCLUSIONS

The vertosols have a high absolute age and this is why their soil profile is profound, formed, in the shallow horizon by an Ao horizon of dark color, the texture is clay-silty or clayey, the structure is large, massive, with shiny faces of slippery, fine porous, compact. The passing to the BTzyw horizon is made through an AB transition horizon. Within the specific Btzyw horizon the texture is clayey (over 50% clay), the structure is still massive, with evident clay pellicles at the surface of soil aggregates, with reclined slippery faces, the opening cracks are filled with darker material from shallow horizon.

The vertosols are considered relict soils being formed in a milder and more humid climate. Due to the changing of natural conditions when these soils were formed these soils evolve in present time toward other soil units that are specific to a certain zone.

As regard the cropping, the vertosols and the soils evolved on vertosols have a high clay content, they are heavy soils, compact, impermeable. They can hardly be worked, the optimal period for farming works being very short.

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