

## CONSIDERATIONS CONCERNING THE SOIL PRESERVATION STATE IN THE BARLAD BASIN

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**Abstract.** Through its relief variety coefficient, the Barlad Plateau is registered as a standard territory, pointing a hilly region of which soil cover presents a pronounced diversity. Considering all this, it has two main corresponding pedogenetic areas: cernisoils and luvisols. The first characterize mostly Colinele Tutovei, while the luvisols appear dominantly in the Central Moldavian Plateau. Their physical, hydro-physical and chemical characteristics, as the relief conditions, to which the brainless usage mode is added, have increased considerably the vulnerability to erosion. In the present, on big surfaces of land, the erosion has even carried off the B horizon of the soils, coming to work even in the C horizon.

### Introduction

At present, a big part of the soils on the Globe is more or less modified by human activity, but mostly the ones in the agroecosystems. Consequently, man must not be considered as a simple factor or exterior agent, but as a component of the agrosystem itself, considering that he is often the origin of soil degradation or amelioration. Humans' attitude towards soil must reflect human-soil partnerships, relations that ensure the preservation of soil resources within the sustainable development of rural economy.

In our country, a lot of soils, more or less eroded or affected by other degradation phenomena, appear nowadays. They are found on extended areas in the Barladului basin, a hydrographic unit with a large extension inside the plateau with the same name.

### 1. Natural conditions

The Barlad Plateau constitutes the most extended subunit of the Moldavian Plateau. In spite of its geomorphologic non-uniformity, it is registered as a standard territory, indicating the presence of a typical hilly relief. The maximum altitude of

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the Barlad Plateau is reached in the Dorosanu Hill (568 m) and the lowest north of Mastacani (under 15 m). Most of its surface (35%) is found at an altitude of about 100-200 m, and the smallest part (14%) between 300-500 m.

Through its physiognomy, the Barlad Plateau, especially the northern part, looks somehow like the Sucevei Plateau, as the structural relief, represented by structural surfaces or spine-shaped interfluves, consequent and subsequent valleys, is frequent.

From a geological point of view, the northern part of the Barlad Plateau belongs to the superior Sharmatian made out of clay marnes, sands, sandstone and limestone, and south to Vaslui appears the Pliocene represented especially by sands and clay that are loessidised. The parental material of the soils is varied, being constituted of eluves and loess deposits on big areas, from the deluves on versants and colucvions on their basis, to which recent sediments of alluvial nature from terraces and meadows were added.

Climatically speaking, the Barlad basin belongs to several agroclimatic areas: hot drain area, subzone 4, moderate thermal sub-humid area, subzone 1 and 4 and humid cold area, subzone 3. The first area is characterized by high thermal resources (annual average  $T^0$  of 10,5-11,5<sup>0</sup> C, sum of temperatures over 0<sup>0</sup>C between 3900-4300 and low water resources (400-600 mm).

The moderate sub-humid thermal area has lower thermal resources (annual average  $T^0$  of 9,0-10,5<sup>0</sup>C; the sum of temperatures higher than 0<sup>0</sup>C is between 3600-3900, and the water resources are medium (450-800 mm). In the humid cold area, the thermal resources begin to recede. So, the annual average temperature is between 8,0-9,5<sup>0</sup>C, the sum of temperatures over 0<sup>0</sup>C lowers up to 3400, and the water resources are between 500-600 mm.

## 2. Soil cover

As a consequence of the pedogenetic conditions presented above, the soil cover of the Barlad basin is characterized by a certain diversity. However, it has two main pedogenetic areas: cernisoils and luvisoils. These intimately mingle, so the separation limit becomes sinuous, the luvisoils maintain themselves inside the higher interfluves and in the cernisoils area, as the latter enters deep, especially along the valleys, in the luvisoils area (fig. 1).

The soil cover of the Barlad basin comprises luvisoils (46,7%) and cernisoils (40,9%). To them, we can add, in small and very small percentages, some protisoils (11,7%), cambisoils, hidrisoils and salsodisoils associated with protisoils. Plus a series of erodosoils.

**Luvisoils** appear predominantly in the Central Moldavian Plateau, as in the superior Colinele Tutovei. Their existence inside these units is correlated with the loam-clay deposits, mostly loessidised, situated on the highest areas of the land.

They are represented by typical luvisols, most of them under the forest and white luvisols; the latter occupy the least watered and forested surfaces of land. On the versants, luvisols are associated with some protisoils.

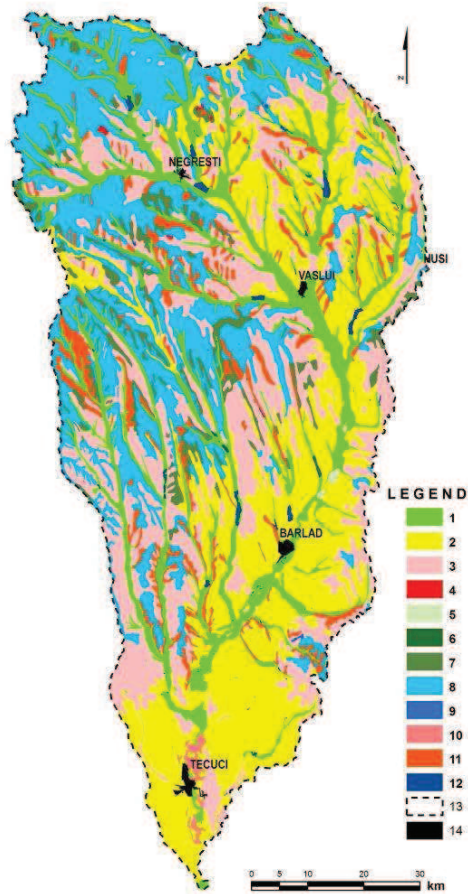


Fig. 1 - Bârlad basin – soil map

- 1. Aluviosols; 2. Cernozeams; 3. Faeozems; 4. Rendzinas; 5. Eutricambosols;
- 6. Districambosols; 7. Preluvosols; 8. Luvisols; 9. Stagnosols; 10. Solonetz;
- 11. Erodosols; 12. Lakes and moors; 13. Basin limit; 14. Cities

**Cernisoils** are mostly represented by greic soils (39%). These make the transition towards the lower parts of the relief in the direction of the inferior

Colinele Tutovei and the north of the Vaslui Depression (Colinele Viisoarei). It covers the flat surfaces of the interfluves and the ones with a slight slope, with a glacis versant aspect, constituted on the surface of loessoid materials or loam-clay. The other cernisoils like cernosioms, including the cambic and argic complete the soil landscape in the north of the Vaslui Depression, Colinele Viisoarei and Colinele Tutovei.

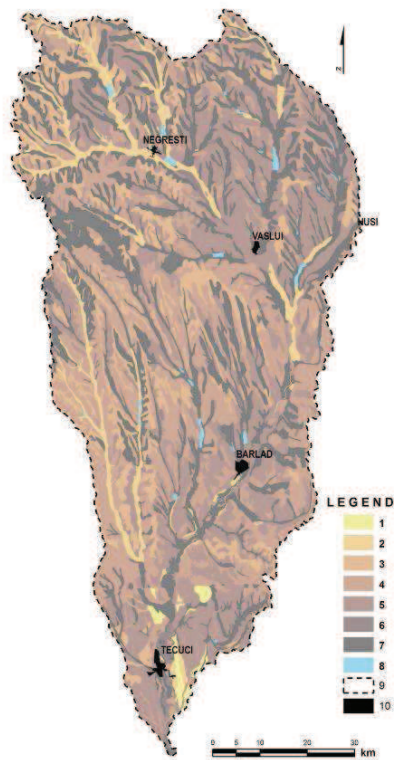


Fig. 2 - Barlad basin – soil texture map (in the upper horizon)

1. Sandy; 2. Sandy loam; 3. Loam sandy; 4. Loam; 5. Loam-clay; 6. Clay; 7. Varied texture;
8. Lakes and moors; 9. Basin limit; 10. Cities.

**Protisoils** are represented by aluviosoils and regosoils. The first are distinctive to Barlad, Vaslui, Tutova, Zeletin plains and other tributaries of the Barlad River, while regosoils appear frequently on versants. Considering the grainmetric composition (texture), in the Barlad basin prevail clay, loamy and clay- sandy soils.

On the meadows, the dominant texture is the sandy one and on the versants most of the soils have a varied texture (fig. 2).

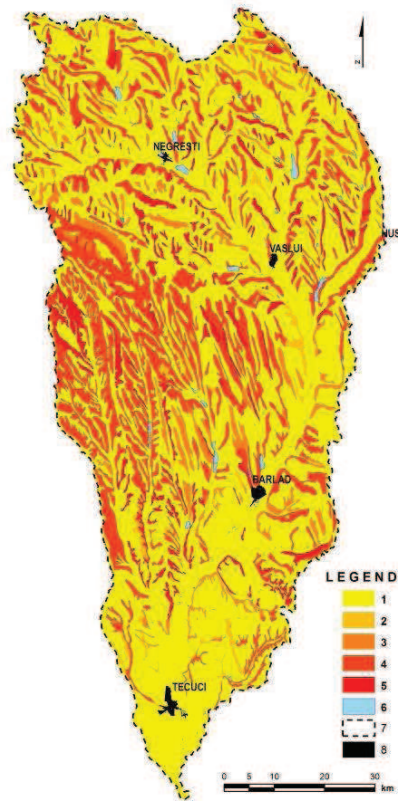


Fig - 3. Bârlad basin – soil erosion map

1. Lands with unappreciable erosion, in which under 5% of the A horizon of the soils was affected and with a clogging danger;
2. Weakly eroded lands, with an A horizon of the soils affected between 5-25%;
3. Moderate eroded lands, with an A or E horizon of soils affected 25-50%;
4. Highly eroded lands, with an A or E horizon of soils affected 50-75% and even part of the transition horizon;
5. Intensely eroded lands, where the erosion went over the transition horizon, B horizon, at some soils even C horizon;
6. Lakes and moors;
7. Basin limit;
8. Cities.

### 3. The soil preservation state

The vulnerability to erosion of the soils of the Barlad basin depends mostly of their grainmetric structure, relief (shape, pitch, slope length, versants), vegetation cover degree and climate. This way, soils with a fine texture, clay-loamy, containing a big quantity of colloidal clay, enlarge their volume by humidification, diminishing their porosity and infiltration, while soils with a light (sand-clay) and medium (sand-clay-loam) texture produce faster leaks than the clay ones during high intensity rains.

As a consequence of physic and hydrophysic soil characteristics, of the way they are used, of the crop structure and of the applied agrotechnique, to which we can add their forestation degree, the soil cover of the Barlad basin is currently in a relative medium erosion stage (Fig. 3). Particularities:

- Lands with unappreciable erosion, in which under 5% of the A horizon of the soils was affected and with a clogging danger;
- Weakly eroded lands, with an A horizon of the soils affected between 5-25%;
- Moderate eroded lands, with an A or E horizon of soils affected 25-50%;
- Highly eroded lands, with an A or E horizon of soils affected 50-75% and even part of the transition horizon;
- Intensely eroded lands, where the erosion went over the transition horizon, B horizon, at some soils even C horizon.

These soils represent a big ratio in Colinele Tutovei, as in the west of the Central Moldavian Plateau in the north of the basin.

### Conclusions

In the mentioned pedogenetic conditions, the north and south-east part of the Barlad basin (Central Moldavian Plateau, Colinele Viisoarei) are unappreciably or weakly affected by erosion.

High and intense erosion is characteristic to the superior Colinele Tutovei where it affects 50-75% of the territory.

Big surfaces of land (versants) in the Barlad basin are affected by numerous slides, solifluxions and tumbling.

### Aknowledgements

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