

ASPECTS CONCERNING SOIL EROSION IN THE BARLAD RIVER BASIN

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Abstract

Through its relief variety coefficient, the Barladului Highlands is booked 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 luvisoils. The first characterize mostly Colinele Tutovei, while the luvisoils appear dominantly in the Central Moldavian Highlands.

Their physical, hydro-physical and chemical characteristics, as the relief conditions, to which is added the brainless usage mode have increased considerably the vulnerability to erosion. At present on big surfaces of land, erosion has even carried off the B horizon of the soils, coming to work even in C horizon.

INTRODUCTION

At present, a big part of the Earth's soils are more or less modified through human activity, but mostly the ones in the agroecosystems. Consequently, man must not be considered 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 the soil must reflect human-soil partnerships, relations that assure the preservation of soil resources inside the durable development of the rural economy.

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

MATERIAL AND METHODS

The soil cover of the Barlad basin was charted in several stages: Sc. Mateescu, A. Miloșovici, Fl. Predel, C. Tutunea, C. Sorocinski (1961), C. Tutunea (1963), M. Parichi (1963, 1984), OJSPA Vaslui (1980), on scales varying 1:50,000 and 1:200,000. The material used for writing the present paper is based on the research in the 1961-1984 periods. Mapping was made on a 1:50,000 scale by the complex study method. Analytical used data were obtained after the analysis effectuated on

the soil samples in the Pedologic Service inside the Geologic Prospecting Enterprise of Research Institute for Soil Science, Agrochemistry and Environmental Protection of Bucharest laboratories.

On the basis of these materials were brought definitions concerning the soil cover of the Barlad basin and concerning the preservation state of the soils in the actual conditions.

RESULTS AND DISCUSSION

The Barladului Highlands constitute the most extended subunit of the Moldavian Highlands. Through its geomorphologic un-uniformity, it is booked as a standard territory, indicating the presence of a typical hilly relief. The maximum altitude of the Barladului Highlands is reached in the Dorosanu Hill (568 m) and the lowest north to Mastacani (under 15 m). Most of its area (35%) is found at an altitude of about 100-200 m, and the smallest part (14%) between 300-500 m.

Through its physiognomy, the Barladului Highlands, especially the Northern part looks alike somehow with the Sucevei Highlands being frequently spread the structural relief represented through the structural surfaces or spine-shaped interfluves, consequent and subsequent valleys.

Under a geologic report, the Northern part of the Barladului Highlands belongs to the superior sharmatian made out of clay marnes, sands, sandstone and limestone, and South to Vaslui appears the pliocen represented especially through 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 adds recent sediments of alluvial nature from terraces and meadows.

Climatically, the Barladului basin belongs to severs agroclimatic areas: hot drain area, subzone 4, moderate thermal sub-humid area, subzone 1 and 4 and humid cold area, subzone 3.

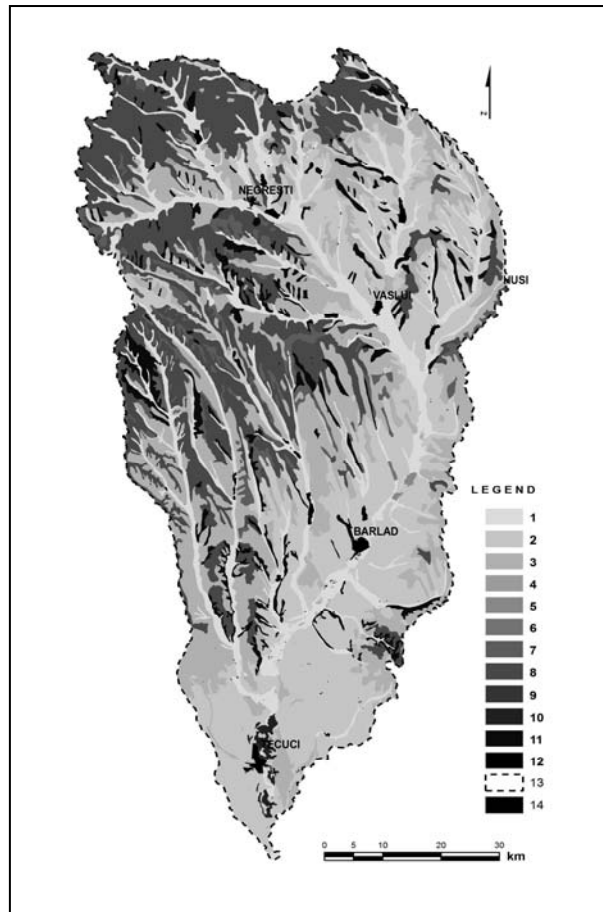
The first area is characterized through high thermal resources (T^0 annual average temperature of 10.5-11.5⁰ C, sum of temperatures over 0⁰C between 3900-4300⁰C and low water resources (400-600 mm annual rainfall).

The moderate sub-humid thermal area has low thermal resources (T^0 annual medium of 9.0-10.5⁰C; the sum of temperatures higher than 0⁰C is between 3600-3900, and the water resources are medium (450-800 mm).

In the humid cold area, thermal resources begin to recede. So, the annual medium temperature is between 8.0-9.5⁰C, the sum of temperatures over 0⁰C lowers up to 3400, and the water resources are between 500-600 mm.

A following of the pedogenetic conditions presented above, the soil cover of the Barlad basin is characterized through sort of diversity. Considering all that, it has

two main pedogenetic areas: cernisoils and luvisols. These intimately intermission, so the separation limit becomes sinuous, the luvisols maintain inside the higher interfluves and in the cernisoils area, as they deepen, especially along the valleys in the luvisols area (Figure 1).



1. Aluviosoils; 2. Cernozeams; 3. Faeozeams; 4. Rendzinas; 5. Eutricambosols;
6. Districambosols; 7. Preluvosols; 8. Luvosols; 9. Stagnosols; 10. Solonetz;
11. Erodosols; 12. Lakes and slops; 13. Basin limit; 14. Cities

The soil cover of the Barlad basin compasses luvisols (46.7%) and cernisoils (40.9%). To them adds in small and very small percents some protisoils (11.7%), cambisoils, hidrisoils and salsodisoils associated with protisoils. To these add a series of erodosoils.

Luvisols appear predominantly in the Central Moldavian Highlands 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 through typical luvosoils, most of them under the forest and white luvosoils, the last occupy surfaces of land less watered and forested. **Cernisoils** are represented mostly through 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).

The other chernisoils like chernosioms, including the cambic and argic complete the soil landscape in the north of the Vaslui Depression, Colinele Viisoarei and Colinele Tutovei.

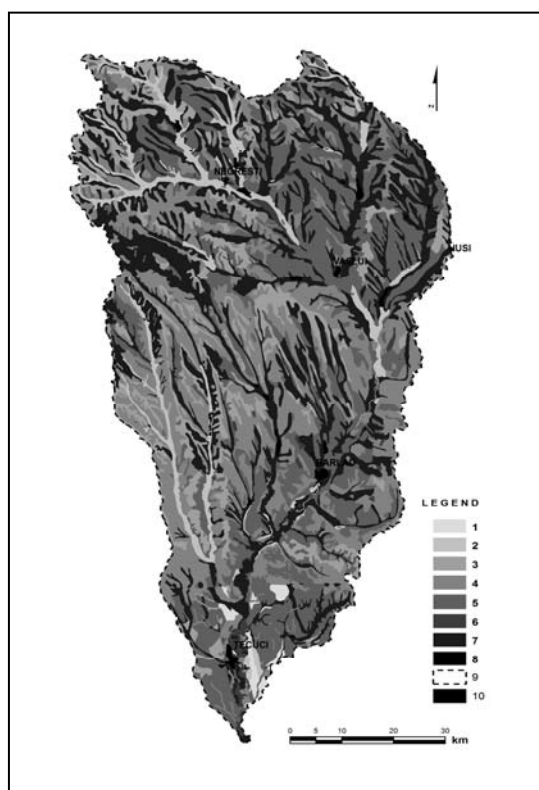


Fig. 2. Barladului basin - soil texture map (in the upper horizon)

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

Protisoils are represented through aluviosoils and regosoils. The first are distinctive to Barladului, Vasluiului, Tutovei, Zeletinului fields and other tributaries of the Barlad, while regosoils appear frequently on versants.

Under a grainmetric composition report (texture) in the Barladului 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 (Figure 2).

The soil preservation state

The vulnerability to erosion of the soils from Barladului basin depends mostly of their grainmetric structure, relief (shape, pitch, slope length, versants), vegetation cover degree and climate. so, the soils with a fine texture, clay-loamy containing a big quantity of colloidal clay, through humidification they enlarge their volume, abridging porosity and infiltration, while the soils with a light texture (sand-clay) and medium (sand-clay-loam) during rain with high intensity produce faster leaks than the clay ones (Figure 3).

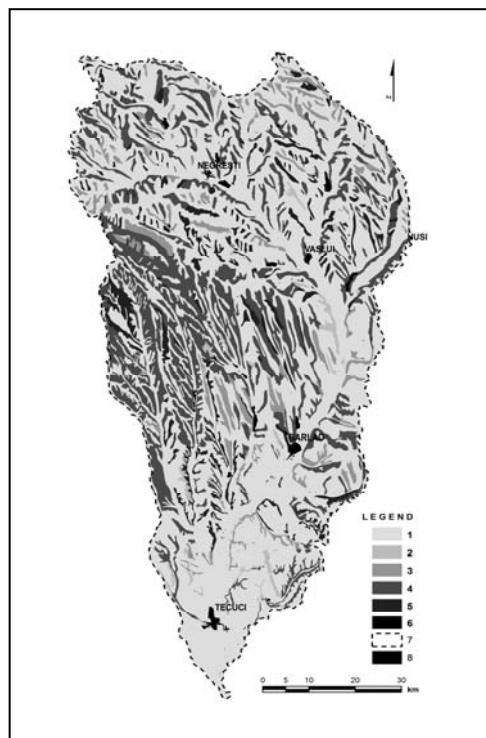


Fig. 3. Barladului basin - soil erosion map

- 1. Lands with unappreciable erosion, in which under 5% of the A horizon of the soils was affected and with a clogging danger;
- 2. Slightly 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 a part of the transition horizon;
- 5. Intense eroded lands, where the erosion went over the transition horizon, B horizon, at some soils even C horizon;
- 6. Lakes and slops;
- 7. Basin limit;
- 8. Cities

As a consequence of the physical and hydrophysical soil characteristics, the way they are used, the crop structure and applied agrotechnique, to which adds their forestation degree, currently the soil cover of the Barlad basin is in a relatively medium erosion stage.

These soils have a high rate in Colinele Tutovei, as in the west of the Central Moldavian Highlands in the north of the basin.

CONCLUSIONS

1. In the mentioned pedogenetic conditions, the North and South-East part of Barlad basin (Central Moldavian Highlands, Colinele Viisoarei) present themselves unappreciable or weakly affected by erosion.
2. High and intense erosion are characteristic to the superior Colinele Tutovei where affects 50-75% of the territory. Big surfaces of land (versants) from the Barladului basin are affected by numerous slides, solifluxions and tumbling.

ACKNOWLEDGEMENTS

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