

PEDOGEOGRAPHICAL OBSERVATIONS IN THE PLAIN BETWEEN THE JIU AND THE DANUBE

ANCA-LUIZA STĂNILĂ*, M. PARICHI*, P. URSARU**

*Spiru Haret University, Faculty of Geography and Geography of Tourism of Bucharest

**E.S.R.I. Romania

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Abstract

The plain territory between the Jiu and the Danube correspond, under geomorphologic report, to the two big subdivisions of the Oltenia Plain: Blahnitei Plain (Mehedintiului) and Calafat-Bailesti Plain. Between the Jiu and the Danube the soils are characterized by a pedoclimatic locality, this being determined mostly by the relief floorridge.

On the sands formed in some massives disposed on more alignments developed a large scope of soils containing from eutric arenosols up to lamellar red preluvosols, and the presence of water at low depth helped the release of some Hydrisols or even salsodisols.

In the Jiu Danube Plain territory dominant are cernisols represented by chernozems, haplic chernozems, luvic chernozems, to which are added some luvisols meaning tipic preluvosols or red preluvosols, as some eutricambosols. Hydrisols and salsodisols are not absent, and in the lower areas there are fluvisols represented by entic fluvisols and eutric fluvisols. Locally, in the Blahnitei Plain you can find Histosols represented by turbosols.

INTRODUCTION

The fact that in Romania there is drought is not an accident, it is a normal situation with certain periodicity. Usually, the drought seasons have a higher frequency in the southern areas of the country, with a higher accent in the plain between the Jiu and the Danube. In this part of the country the phenomena seems to amplify as a following of light textural soils, sands and sandysoils presence, with physic and hydrophysic characteristics less favorable of which surfaces exceeds 100,000 ha.

On amplifying or reducing the meteorological drought effects, an important factor is the chemical composition of the soil. For example, the low content of humus and other soil nutrients increases the strength of the drought.

Reportedly, the direct influence of drought in the areas most affected by these phenomena takes place through the aridization of the soil humidity regime; referring to the degradation of the quantity of water entered and kept in the soil in troughs.

At the same time, the main physical, biological and biochemical processes in the soil whose deployment is conditioned by the presence of water slows down or ceases altogether.

MATERIAL AND METHODS

The risk to drought is related to the ability of soil to retain and provide needed water to plants. A ranking of soils in this regard requires specific data processing. Therefore the grouping of soils and land vulnerability report was based on other criteria. We had to view hot-dry climate (average annual temperature is between 10.5-11.5 °C, the amount that go over 10 °C temperatures of 1500-1800 °C, the warmest month temperatures frequently exceed 23 °C, and the absolute maximum reaches up to 42 °C, mean annual precipitation below 500 mm and the vegetation period not exceeding 300 mm), soil type and texture (medium and coarse textured chernozems and arenosols), fragmentation of relief, groundwater depth (mid-large, predominantly from 5 m) and salted soil.

RESULTS AND DISCUSSION

The plain territory between the Jiu and the Danube correspond under geomorphologic report to the two big subdivisions of the Oltenia Plain: Blahnitei Plain (Mehedintiului) and Calafat-Bailesti Plain.

In the limits of this territory there are a high plain known as the Salcuta-Segarcea Plain, a glacia surface called Caraula-Desnatui and the terraced plain of the Danube.

The relatively good global drainage in the southern half becomes imperfect, as we ease up the Danube and that happens because the parental material of the sandy loessoid soil becomes, going north, a little delicate, with clay content. The water table is at depths of over 10 m.

The climate data analysis over a long period (1896-1985) situates the whole Plain territory between the Jiu and the Danube in a hot-droughtly climate, characterized through high values of the termic resources, the modest water resources, on large extensions of terrain with soil accessible humidity resources and stress termic stress and water important parameters.

The annual medium temperature is between 10.5 and 11⁰C. The sum of temperatures higher than 0 °C (global) is situated between 4200-4300 °C, and of the ones over 10 °C (real) between 1500-1800 °C. The temperatures of the hottest month (July) can exceed 23 °C (22.5-23.5 °C), the absolute maximum goes up to 42 °C, and the minimum frequently goes up to - 29.2 °C.

In the climatic and morphologic conditions of the territory, the water table is situated at different depths. It can be found at over 20 m in the north of the region

and at depths (0-5 m), from which influences the soil in a bigger or smaller manner, in the south (Figure 1).

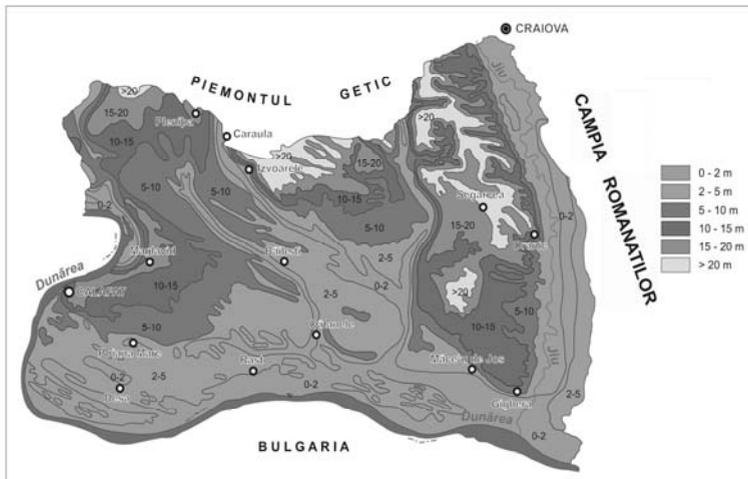


Fig. 1. The Plain between the Jiu and the Danube – water table depth map, sc. 1: 500.000

The mineralization degree of the water table is on most of the surface relatively low (0.5-1.0 residuum sec, g/l), except the slight depressionary areas or with a water table level at low depth.

The season oscillations of the water table generally have relatively big amplitudes (1-2 m). The can be observed easier in the waved relief.

Between the Jiu and the Danube the soils are characterized through a pedoclimatic locality, this being determined mostly by the relief floorridge. On a distance of about 30-35 km from the Danube to the north in which the absolute altitude of the relief goes up to 125 m is the change from calcic chernozem (formed on loessic sediments and loess) from the lower terrace of the Danube to haplic chernozem, luvic chernozem and red preluvosols (Figure 2).

On the sands formed in some massives disposed on more alignments developed a large scope of soils containing from eutric arenosols up to lamellar red preluvosols, and the presence of water at low depth helped the release of some hidrisols or even salsodisols.

As resulted from the soils map in the Jiu-Danube Plain territory, dominant are cernisols represented through chernozems, haplic chernozems, luvic chernozems, to which are added some luvisols meaning tipic preluvosols or red preluvosols, as some eutricambosols. Hidrisols and salsodisols are not missing, and in the lower areas there are fluvisols represented by entic fluvisols and eutric fluvisols. Locally, in the Blahnitei Plain you can find histosols represented through turbosols.

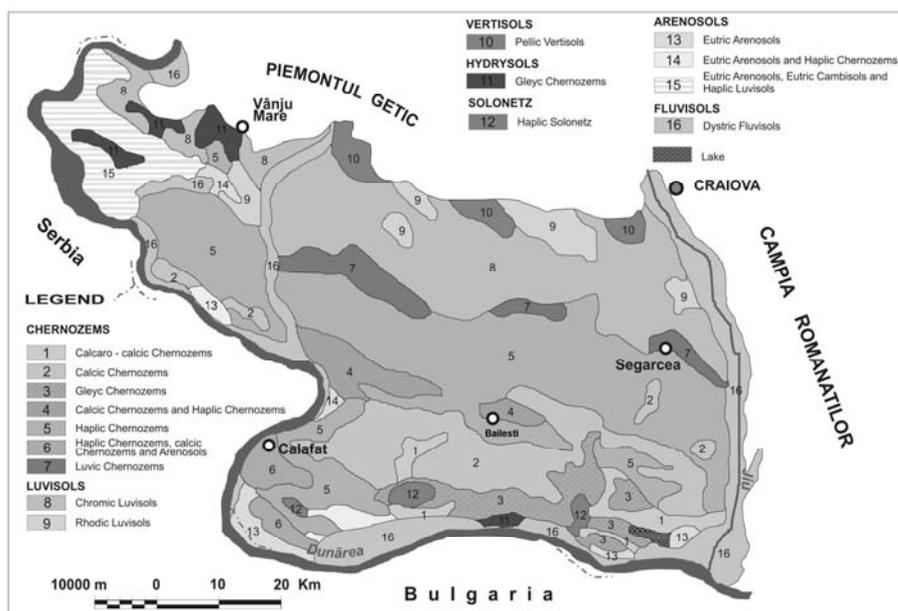


Fig. 2. The Plain between the Jiu and the Danube - soil map

Vulnerability (from 0% to 100%) results from the latency of a phenomena to produce damage. In case of soil drought there is risk concerning the capacity of the soil to retain and give the plants the necessary water. Considering more criteria (climatic area, soil type and texture, relief fragmentation and slope, water table depth, erosion and salting) in Jiu-Danube Plain we have differenced six units united in three soil drought vulnerability groups. All are situated in the limits of the hot-dry climatic area (Figure 3).

The first two groups refer to hard and moderate vulnerable soils, and the third group contains the soils vulnerable only to long droughts.

A. Lands with highly vulnerable soils (130,960 ha; 26%)

Lands with sandy sols, on wind waved relief

Such lands appear in Calafat-Bailesti Plain, in the area of the two main cities Calafat-Bailesti between Ciuperceni and Desa, and also on half of Blahnitei Plain. Arenosols, chernozems and haplic sandy chernozems represent the most drought affected soil category.

Soils (arenosols, chernozems), like the parental material, have a sandy texture on the dune peaks and sandy-clay in the interdunes, low cohesion and weak structure, which makes them irritable to deflation. They contain under 10% clay <0.223 mm, have a low absorption surface and wide lacunar spaces so a high permeability for

water and air, but a low capacity to retain water, this leading to the accentuation of the drought phenomena.

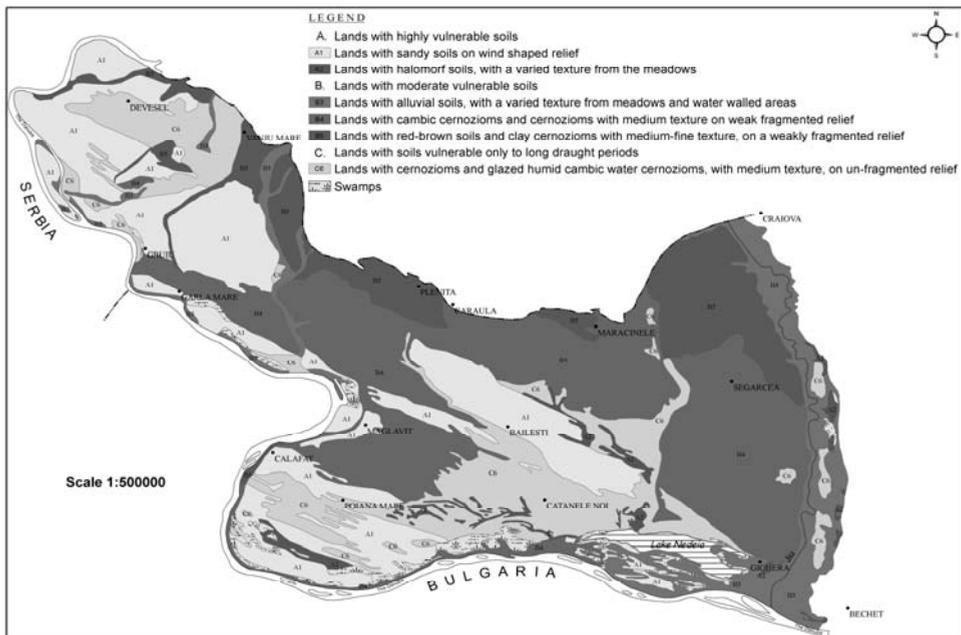


Fig. 3. The Plain between the Jiu and the Danube - the land grouping map considering drought vulnerability

Lands with salsodisols, with a varied texture from the meadows

In this category were included the land surfaces with solonete type soils.

You can find them in the Danube's meadow and in Jiu's and Desnatui's meadows.

In this case along the climatic drought we can also talk about physiological drought, the last one being determined by the impossibility of water providing to the plants as the water in the soil is characterized through a high content of salts.

B. Lands with moderate vulnerable soils (281,960 ha; 56%)

Lands with eutric fluvisols, with a varied texture from meadows and water walled spaces

Most parts of this refer to the Danube's and Jiu's meadows.

Apparently uniform, the relief of the two meadows show a series of deserted meadows and small depression areas, from which some are pretty wide and deep (0.3-1.5 m), swamped or even full with water (Lake Nedeia).

The materials from which they are constituted are layered and are characterized through wide texture diversity. On them appear fluvisols (entic fluvisols and eutric fluvisols), and also a series of hidrisols (gleyc chernozems, distric gleiosols) and salsodisols (haplic solonetz).

Land with haplic chernozems and medium texture chernozems, on a weakly fragmented relief

Are represented in Calafat-Bailesti Plain (240,000 ha) and also appear in the south of Blahnitei Plain between Gruia and the confluence of the Danube with Drincea.

In these conditions, the soil cover is dominated by chernozems and cambic chernozems. Erodosols appear on the versants and in the lengthen of some valleys haplic chernozems.

Lands with red preluvosols and middle-fine texture luvic faeozioms, on weakly fragmented relief

Reduced as expansion they appear at the northern extremity of the territory, at the contact with the Getic Piedmont, where the climate maintains hotter and dryer. The medium annual temperature goes up to 11°C (10.5°C), but in the summer months (July-August) it goes over 22°C.

Lands with soils vulnerable only in long drought conditions (91,760 ha; 18%)

This kind of lands correspond to the parts with a low depth water table situated in the dry climate. Two important parts from the Danube's terraces are overlapped, weakly drained (with a water table between 2-5 m).

The soil cover is in this case made out of semicarbonatic chernozems, water table humid and cambic chernozems, also water table humid, soils characterizes through a high fertility level.

CONCLUSIONS

1. In Romania, the drought seasons have a higher frequency in the southern areas of the country.
2. Considering more criteria (climatic area, soil type and texture, relief fragmentation and slope, water table depth, erosion and salting) in Jiu-Danube Plain we have differenced six units united in three soil drought vulnerability groups.
3. The first two groups refer to hard and moderate vulnerable soils, and the third group contains the soils vulnerable only to long droughts.

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