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THE WEST PLAIN – A PHYSIO-GEOGRAPHICAL CHARACTERISATION BASED ON DATA FROM FOREST MANAGEMENT PLANS

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Key words: *forest, soil, altitude*

INTRODUCTION

The West Plain is located in Romania's west part, between the national border with Hungary and Serbia which are also its west limit. The West Hills, Zarand Mountains and Oaş Mountains are its east limit. The total surface is of approximately 17 100 km2 and represents 7% of Romania's surface (Figure 1). The plain is distributed on approximately 520 km north-south, while the east-west part varies between 10 km near Oradea city and 120 km near Mureş river. The plain belongs to the Pannonia Basin, formed during the middle Neozoic by fragmenting and lowering the crystalline sector from the West Carpathians. The West Plain was formed on crystalline schist and Cretaceous deposits (Proterozoic-Paleozoic-Mesozoic); the Neozoic added sediments with detrital formations of variable depth. Gabrens reach 3000-5000 m, while horst blocks can reach only hundred meters. The West Plain was formed through the sedimentation of the Pannonia Sea with sediments brought by rivers from the Neogene up to the present. The average altitude is of approximately 100 m, with a maximum altitude of 174 m in Vingăi Plain and a minimum altitude of 80 m on Timiş river inferior course.

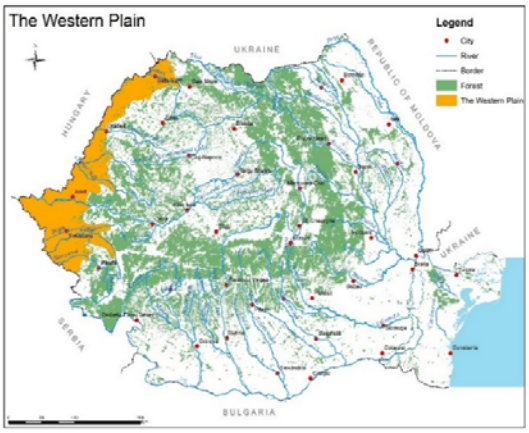

Figure 1. Romania – The Western Plain
(Forest Map of Romania Based on Forest Ecosystem Types)

The West Plain has a plain climate, moderate with oceanic and sub-mediterranean influences. The average annual temperature reaches 11°C in the south and 10°C in the north. Annual average precipitations reach 600-700m, being higher than in other areas of our countries. This aspect is caused by the geographic position and the cover offered by mountains and west winds. The west winds predominate, together with Austral (southwest), a Mediterranean component that is dry during summer and frosty during winter.

We can say that the climate fund has an oceanic nuance in the north and center and a sub-mediterranean one in the south.

The main soils are Molisols (chernozrms, paheozioms) characterized by humus and an increased fertility. These are accompanied locally by salty soils and hydromorphic soils, meadow soils and sandy soils (in Carei Plain).

The plain's surface has a very low slope, while the rivers have meander and divagated courses, with frequent outings from their riverbed. Portions of fields that decrease slowly are named subsidence plains of divagation plains.

Furthermore, we can also encounter tabular plains (Aradului Plain and Careilor Plain) and piedmont plains (Vingului Plain, Cermeiului Plain, Miersigului Plain) (Posea Gr. 2006).

The three plain types (piedmont, tabular and of subsidence) are three levels and also three genetic types of plains from the West Plain, similar with Arges-Siret area from the Romanian Plain. Usually, fields are divided in high plains and low plains.

Two climatic subunits can be distinguished: north and central-south. The north subunit has lower solar radiation values and a colder, more humid climate, with longer winters, possible blizzards and other winter phenomenon. The central-south subunit is under the action of south, Mediterranean masses that ensure higher precipitations and temperatures, a longer warmer interval, tender winters and fast transitions towards spring (Gr. Posea 1995).

The forest stands from this area offer diverse ecosystem services: non-wood forest products (Tiwary et al., 2020; Pleşca et al., 2019), forest fruits (Vechiu et al., 2019; Tudor et al., 2020), cigenetic

areas (Dincă et al., 2018; Ciontu et al., 2018; Timiş-Gânsac et al., 2018), biodiversity (Cântar et al., 2019; Dincă et al., 2019; Timiş-Gânsac et al., 2020; Dincă et al., 2020), protection (Dincă et al., 2019; Hinkov et al., 2018; Dincă et al., 2020) etc.

MATERIAL AND METHODS

The present study is based on data collected from forest management plans of national forests (managed by RNP Romsilva) located in the West Plain. Namely, data from 4 forest districts were used: Satu Mare, Bihor, Arad and Timiş. The database is extremely vast, which ensures a good statistical representation of the obtained results. The following elements were analyzed from a total surface of 17125 ha: soil types, configuration, altitude, field usage. Calculations and graphics were realized with Excel, while maps were created with the ArcGIS program.

RESULTS AND DISCUSSIONS

Climatic conditions, humidity, the rock and even relief have determined a diversity of soil types that belong to a number of different classes (Fig. 2). On the most part, the soils have a high fertility. From a geographic perspective, the soils are distributed from west to east due to the relief's particularities and from south to north, according to latitude and wind masses. As such, molisols appear associated with vertisols and gleyosols south of Mureş, while in the north, luvisols are associated with pseudogleyc and gleyic soils (F. Grecu 2010)

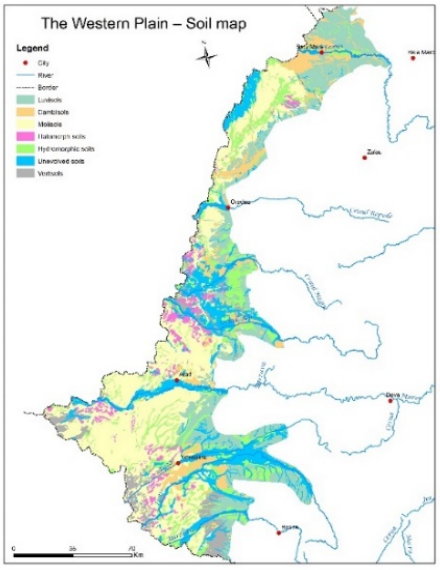

Figure 2. The Western Plain – Soil map
(Soil Map - Generalized from 1:1000,000 soil Map of the Atlas of Romania, 1978)

Luvisols are present in high plains. They are soils with a very good fertility, being used in agricultural cultures.

Cambisols – dystric cambisols and eutric cambisols are found in Timiş, Bega valleys, in Banatului Plain, or on the valleys of Crişul Negru, Someş, Crasna and Barcău.

Molisols are predominant in the west part, in low plains, on dry fields (chernozem) and on fields with higher humidity (gleyic chernozem). Portions of cambic chernozem appear at the transition towards high plains. These are fertile soils favorable to drained cultures.

Halomorph soils are connected with areas with salt excesses in low plains. They are represented by solonetz and solonceag, used mainly for grazing.

Hydromorphic soils are widely spread, being connected to water excess and phreatic levels especially in low plains. This class includes gleyic and pseudogleyic soils.

Unevolved soils, which include psamosols, cover large areas from Carei Plain where large areas of sands are present. These soils are used for grapevines or forest plantations, being fertile for vegetable cultures.

Vertisols covers low surfaces in Timişului Plain, Oravița and in Tăuț river valley, being strongly connected to the clay substratum (Figure 3).

The majority of soils can also be found in other geographic areas from Romania and have different chemical properties caused by geologic, geomorphologic and altitude differences (Crisan et al., 2020; Oneț et al., 2019; Enescu et al., 2019).

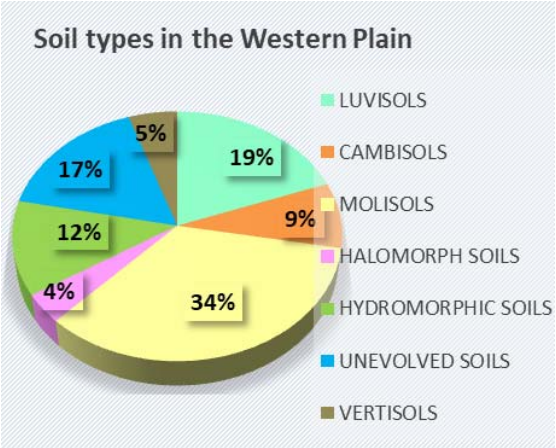

Figure 3. The Western Plain – Soil map

The main West Plain subunits are Banatului Plain, Crişurilor Plain and Someşului Plain(Figure 4).

Banatului Plain is located in the south part and represents approximately half of the West Plain.

The vegetation is zonal and azonal.

The zonal vegetation is developed on secondary steppe areas and forest patches. In the west part we can found forests with brown and soft oak and hawthorn, while in the east we can found mixed with pedunculate oak and ash.

The azonal vegetation overlaps on forests from the nonfloodable meadow. Here we can find willow and poplar parks.

Crişurilor Plain is situated in the inferior basin of Crişului Repede, Alb and Negru and represents 21% of the total surface of the West Plain. Forests appear in lower areas and are represented by pedunculate oak, ash, elm, poplar and willow, while poplar and willow parks appear in the meadow area.

Someşului Plain is located in north West Plain and represents 20% of the surface. Due to the extension of agricultural fields, forest vegetation is narrow and appears as pedunculate oak, hornbeam and elm forest patches.

Forests from Romania are managed based on forest management plans. These include soil profiles, with soil samples being sent to laboratories in order to identify them.

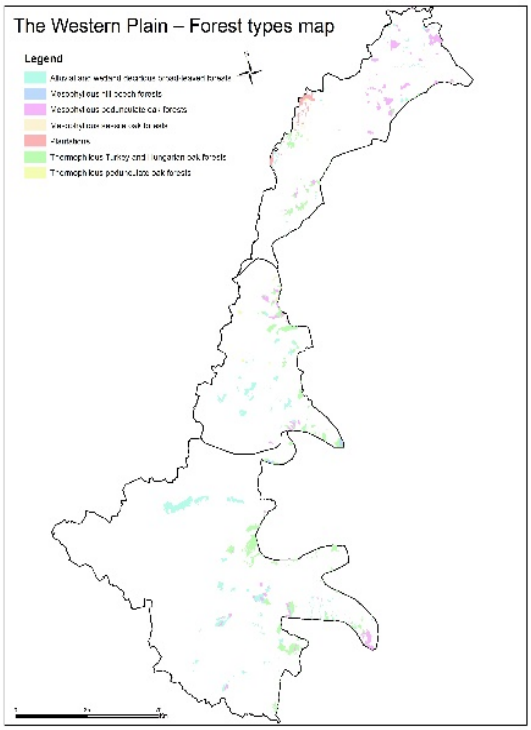

Figure 4. The Western Plain
(Forest Map of Romania Based on Forest Ecosystem Types)

As it was expected, field configuration in the forest area of West Plain is 87 % plain, while undulated fields occupy 13% (Figure 5).

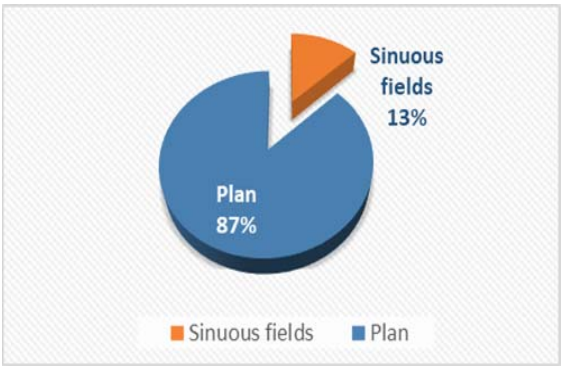

Figure 5. Field configuration in the West Plain

CONCLUSIONS

The West Plain occupies a rather narrow portion in our country (20-60 km) and has a very weak slope. Low plains are situated on river courses, which have small percolation pants and sinuous riverbeds, causing waters to frequently burst from the banks.

Natural conditions (plain, moderate climate with oceanic and sub-mediterranean influences, its geographic position, soils with a high fertility) ensure a favorable potential for agricultural activities. Over 90% of the plain's surface is represented by agricultural fields, 4% by territorial fund, another 4% by forests, cities, communication means and unproductive fields and 1.5% by rivers (Gr. Posea 1997).

ABSTRACT

The study of a vast territory can be analyzed based on data from specialty studies and from forest management plans; data from forest management plans characterize the area covered by forests and are extremely detailed for small surfaces of only a few hectares. The present paper has used such data, namely from the forest management plans of all national forests located in the West Plain. According to the data, field configuration is 83% plain, and only 13% undulated; the average altitude is of 100 m, while the total surface of km^2 is represented by agricultural fields (90%), with only 4% as forest fund.

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*** SOIL MAP 1978 Generalised from 1:1000,000 Soil Map OF THE ATLAS OF ROMANIA.

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