

## RESEARCH REGARDING THE CONNECTION BETWEEN THE PRODUCTIVITY OF THE RESORT AND THE RENDZIC SOILS IN TRASCAU MOUNTAINS

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**Abstract.** *The Trascau Mountains are an extension to the north-east of the Metaliferi Mountains. They have a very complex petrographical structure, represented by basalts, crystalline schists, sandstones, limestones, crystalline limestones, gneisses, dacites etc. All these have determined the formation of a very diverse relief (ridges, volcanic hills, abrupts, ravines, caves) and thus a very diverse soil covering. Four rendzic soil profiles were assessed and analyzed, found in the forest area of Trascau Mountains. Because of the extremely diverse microrelief conditions in the territory, most of the soils are skeletal, with low and medium edafic volume, some even superficial. The forest resorts in this area have at best a medium production capacity, because of the relief conditions and the skeletal soils.*

**Keywords:** soil, Metaliferi Mountains, microrelief, edafic volume.

### INTRODUCTION

The Trascau Mountains are an extension to the north-east of the Metaliferi Mountains, bordered at the north and north east by the Ariesului Valley, by Abrudului Valley at the west, Ampoiului Valley at the south, Muresului Valley at the south-east and Aiudului Valley at the east. The Trascau Mountains are included in the Apuseni Mountains group.

They are located on a surface of approximately 700km<sup>2</sup>, with a very complex petrographical structure, represented by basalts, crystalline schists, sandstones, limestones, crystalline limestones, gneisses, dacites etc. All these have determined the formation of a very diverse relief (ridges, volcanic hills, abrupts, ravines, caves) and thus a very diverse soil covering.

As a morphological unit, the Trascau Mountains have slightly undulated plateaus in the north and west side, where isolated heights appear, with almost vertical escarpments. The valleys crossing the massive are highly deepened into its hard rocks, forming numerous ravines and rifts, and the forming depressions are peripheral, except for Trascau Depression. The differences between the depressions and the ridges vary from tens to hundreds of meters.

The abrupt slope of the terrains and the low water retention capacity in the mostly superficial soils, is favorable to the formation of torrent phenomenon in certain basins, with a high erosion danger, through the soil and rock migration on the escarpment. This is the reason why most basins have a protection role for waters and soils.

## MATERIAL AND METHOD

For this study, four rendzic soil profiles were assessed and analyzed in the forest area of the Trascau mountains.

The physical and chemical characteristics were established based on the analysis of the currently used methods in the pedology laboratories, in the following way: the granulometric analysis after the Kacinski procedure; the apparent density through metal cylinders method, with 100cm<sup>3</sup> volume; the humus after the Tiurin method; the total nitrogen with the Kjeldahl method, with decay at 35°C in H<sub>2</sub>SO<sub>4</sub>; the mobile phosphorus was established with the Egner-Riehm Domino method, through extraction in aluminum lactate acetate, at a 3.75 pH; the mobile potassium was established through the same method as the phosphorus; the Ph was determined potentiometrically in water slurry; the carbonates, through the gas-volumetric method Scheibler.

In correlation with the climatic, geo-morphological, vegetation and soil conditions, we have identified several types of resorts. The classification of the resorts was made directly, by using the characteristic elements of the resorts (the average annual temperature, average annual rainfall, winds, global potential trophicity, changeable basis, acidity, alkalinity, accessible humidity, edaphic volume, length of the bioactive period) and indirectly, by using the indications of the forest vegetation.

The method used was the one given by the indications of forest vegetation and soil types.

## RESULTS AND DISCUSSION

### **Profile 1 Rendzic leptosol**

#### ***Pedogenetic conditions***

*Location:* Trascau Mountains, UP IV Geoagiu

*Relief:* kneaded escarpment with south-west exposure and 30-40% slope, profile located in the upper third, daily frequent rock areas.

*Parental material:* limestones and talus materials;

*Use:* beech forest (*Fagus sylvatica*)

The soil is superficial, skeletal, with a fine, argillaceous texture, very rich in humus.

#### **Morphological description**

Am horizon: is 30 cm thick, dark-brown color, because of the high humus content (20.4). The skeletal content is high, 13.06%, clay-argillaceous texture, mildly acid reaction. The base saturation degree has a high value (V%=94.87)

A/R transition horizon: 15 cm thick, brown-dark grey color, 71% skeletal content, high humus content (17.8%); the pH has a neutral reaction (pH=6.76). It has an argillaceous texture, the base saturation degree is 95.65.

R horizon: represented by limestones and talus materials;

**Profile 2 Rendzic leptosol*****Pedogenetic conditions***

*Location:* Trascau Mountains, UP I Bedeleu

*Relief:* kneaded escarpment with west exposure and 35% slope, profile located at an altitude of approximately 700m, on Ariesului Valley.

*Parental material:* limestones and talus materials;

*Use:* beech forest (*Fagus sylvatica*)

**Morphological description**

Am horizon: is 25 cm thick, dark-black color in wet stage, because of the high organic material and humus content (18%). It does not have stable structure aggregates, it has a clay-argillaceous texture, mildly acid reaction, low CaCO<sub>3</sub> content. The base saturation degree has a high value (V%=95.13)

A/R transition horizon: 10 cm thick, brown-dark grey color, high skeletal content (53%), high humus content, neutral reaction (pH=6.6). It has an argillaceous texture, it is not effervescent when treated with chlorine hydride, but with highly effervescent rock components. The base saturation degree is high (V%=94.66).

R horizon: appears at a depth of 35 cm and is represented by limestones;

**Profile 3 Rendzic leptosol*****Pedogenetic conditions***

*Location:* Trascau Mountains, UP I Bedeleu

*Relief:* kneaded escarpment with south-west exposure and 5-10% slope, profile located at an altitude of 710m.

*Parental material:* limestones and talus materials;

*Use:* beech forest (*Fagus sylvatica*)

**Morphological description**

Am horizon: is 25 cm thick, dark-black color in wet stage, because of the high organic material and humus content (18%). It does not have stable structure aggregates, it has a clay-argillaceous texture, mildly acid reaction, low CaCO<sub>3</sub> content. The base saturation degree has a high value (V%=95.13)

A/R transition horizon: 10 cm thick, brown-dark grey color, high skeletal content (53%), high humus content, neutral reaction (pH=5.8). It has an argillaceous texture, it is not effervescent when treated with chlorine hydride, but with highly effervescent rock components. The base saturation degree is high (V%=94.66).

R horizon: appears at a depth of 35 cm and is represented by limestones;

**Profile 4 Rendzic leptosol*****Pedogenetic conditions***

*Location:* Trascau Mountains, UP IV Poiana Aiudului

*Relief:* kneaded escarpment with west exposure and 15-25% slope.

*Parental material:* limestones and sandstones;

*Use:* beech forest (*Fagus sylvatica*)

### Morphological description

Am horizon: is 25 cm thick, dark-black color in wet stage, because of the high organic material and humus content (18%). It does not have stable structure aggregates, it has a clay-argillaceous texture, mildly acid reaction, low CaCO<sub>3</sub> content. The base saturation degree has a high value (V%=95.13)

A/R transition horizon: 10 cm thick, brown-dark grey color, high skeletal content (63.6%), mild acid reaction (pH=6.4). It has an argillaceous texture, it is effervescent when treated with chlorine hydride, because of its rock components. The base saturation degree is high (V%=91.63).

R horizon: appears at a depth of 32 cm and is represented by limestones and sandstones;

**The forest resort** was studied in its detailed ecologic correlation, between the vegetation and its development environment.

The classification of the resorts was made directly, by using the characteristic elements of the resorts (the average annual temperature, average annual rainfall, winds, global potential trophicity, changeable basis, acidity, alkalinity, accessible humidity, edaphic volume, length of the bioactive period) and indirectly, by using the indications of the forest vegetation. The identified forest resorts belong to *the mountain-pre-mountain forest floor* and *the hill floor of oak-beech forests*.

#### **The mountain-pre-mountain forest floor**

The relief is fragmented, with a mostly fast slope. The annual average temperature is 6.5 Celsius degrees, with rainfalls between 600-900 mm. The main characteristic is represented by the highly skeleted superficial soils. The limiting ecological factors are accessible water, trophicity and edafic volume. The main resort types are:

Mountain-pre-mountain Pm beech forests, rendzic, wooden vegetation represented by beech. The associated forest type is the beech forest on rendzic soils.

Mountain-pre-mountain Pi beech forests, low edafic rendzic, rendzine associated soils, forest type associated with beech forest on rendzic soils.

#### **Hill floor of oak-beech forests.**

The natural forest vegetation is represented by the oak and beech forests, with artificially added resinous trees.

The relief is moderate, with mostly moderate slopes, the underlayer is represented by sandstones.

Vertically, this floor is located between 400 and 800 m, with rainfalls varying between 500-700 mm.

The limiting ecological factors are the low aeration, the active acidity.

The resorts found on this floor:

*Oak forest hills, Pi, rendzic, low edafic;*

*Oak forest hills, Pm, rendzic, low edafic with Asperula-Asaria.*

## CONCLUSIONS

In Trascau Mountains, because of the complexity of the pedographic structure, the rendzines are the most frequent. The morphology of the profile (type Am-A/R) reveals that the studied soils show characteristics of the rendzine genetic soil type.

The edaphic volume is low, because of the fact that the profile is generally superficially moderate, or even highly skeletal.

The productivity of the resorts, is low and medium, determined mostly by the edaphic volume of the soil, the humidity rate, soil acidity and trophicity.

The production capacity of the forest resorts is medium and inferior, considering the relief conditions and the skeletal soil types.

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