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November 30 – December 3, 2021, Novi Sad, Serbia

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BOOK OF ABSTRACTS

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Influence of Geological Settings and Land Use on Physico-Chemical Properties of Soils in the Fruška Gora Mt., Serbia

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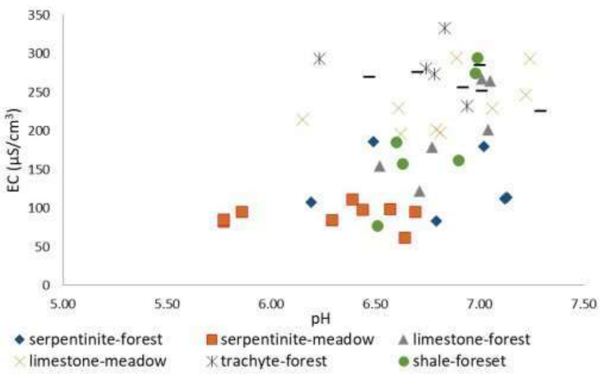

Figure 1. Correlation between pH and electrical conductivity (EC) for forest and meadow soils on different bedrock.

During the last few decades there has been an increase of the land degradation and unsustainable land management recognized as one is one of the key drivers of this process **[1]**. Increased agricultural exploitation of pastures and forests and changes in land use often leads to land quality degradation and can be a cause of land loss through erosion. Therefore, the protection of land, as an important non-renewable natural resource, is recognized as one of the priorities **[2]**.

The objective of this study was to determine the impact of geological substrate and land use on: physico-chemical properties of soil and size and stability of soil aggregates. Seventeen soil samples of forest soil and 30 samples of meadow soil developed on different bedrock from Fruška Gora slopes were analyzed: forest soil on serpentinites, marls and trachytes, and meadow soil on serpentinites, marls, shale and loess. The Fruška Gora is located in the northern part of Serbia and stretches between the Sava and the Danube rivers. The maximum length of this mountain is 75 km along the east-west direction, and along the north-south direction the maximum width is about 15 km, while the total area is 500 km^2. After air drying following parameters were determined on all soil samples: grain size, electrical conductivity (EC), pH, available ions (Na^+, K^+, Ca^{2+}, Mg^{2+}), sodium adsorption ratio (SAR) **[3]**, and organic carbon (Corg). Aggregate stability was determined using the aggregate size of 2-4 mm. Five grams of material was immersed in water and after 10min water was drained with a pipette and the soil was dried. Percentage of stable aggregates was determined from the weight difference. Analysis of variance was used to determine whether the relationship between tested parameters exists.

The highest sand content was found in the trachytes soil (35.15%), while the clay content was the highest in the forest marl soil (27.84%). The content of silt is highest in the soil sample above forest serpentinites (76.61%). Most abundant size fraction of soil aggregates was 8-4 mm. The most stable aggregates are 4-2 mm over loess and trachytes, and the least stable soil aggregates are over forest serpentinites. Furthermore, meadow soil aggregates are more stable than forest soil aggregates. It can be concluded that the stability of soil aggregates is associated with high pH and EC values, because the most stable aggregates, above the loess, have the highest average pH value (6.90) and high EC (259.8), and others in stability aggregates, above trachytes, have the highest EC (282.4 µS/cm^3) and high pH value (6.70) (Fig. 1).

There is no statistically significant difference in pH, Eh, EC, and SAR values between the analyzed forest and meadow soils, but there is a statistically significant difference in the Corg content. Therefore, it can be concluded that the land use does not have a significant influence on the pH, Eh, EC and SAR values, but that the content of Corg largely depends on the presence of vegetation and the degree of land use.

Taking into account all results it can be concluded that the analyzed physico-chemical properties of the soil depend more on the geological setting, and less on land use.

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