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Spatial distribution of total nitrogen and pH in karst field Livno (Bosnia and Herzegovina)

Igor Bogunović (1), Paulo Pereira (2), Radica Ćorić (3), and Stjepan Husnjak (4)

(1) University of Zagreb, Faculty of Agriculture, Department of General Agronomy, Zagreb, Croatia (igor.bogunovic@gmail.com), (2) Mykolas Romeris University, Environmental Management Centre, Vilnius, Lithuania, (3) Faculty of Agronomy and Food Technology, University of Mostar, Mostar, Bosnia and Herzegovina, (4) Department of Soil Science, Faculty of Agriculture, University of Zagreb, Zagreb, Croatia

In Dinaric karst, the poljes with flat floors often provide the only arable land in karst environments, where due to different geomorphological and pedological conditions in addition to karst mountains, soils have a high quality. Nevertheless, these landforms have specific hydrological regimes and potential for crop production. Total nitrogen (TN) and soil pH are important for crop production, and little information is available in Dinaric karst environment. A better understanding of TN and pH spatial distribution is relevant to soil management and is a valuable information for stakeholders and policy makers. The aim of this work is study relationships between TN, pH and co-variates (distance from lake-DFL, distance from hills-DFH, longitude, latitude and altitude); and their spatial variability using kriging and co-kriging methods in a karst field of Livno (Bosnia and Herzegovina). A total of 187 soil profiles were analyzed. The results showed that TN in the studied region had an average of 0.791%, while pH was 6.46. TN showed a high heterogeneity with coefficient of variation (CV) of 94.7%, while soil pH CV was moderate (11.1%). TN and pH had a significant negative correlation. All these variables had significant correlations with auxiliary variables, with exception of pH which is insignificantly correlated with altitude. The experimental variograms were best fitted with the exponential model leading to ranges of 2635 m and 6064 m for TN and pH, respectively. The spatial dependence was moderate for pH and strong for TN. Co-kriging increase pH prediction using longitude as co-variate. The usage of the other co-variates did not increase prediction of TN. The most accurate maps showed that pH had high levels in the southern and eastern parts of the study area. TN had a high content in central part of the area of interest, corresponding to Histosols location.