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Effects of land use on of soil micronutrients at the plot scale in an acid environment

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Land use practices affect soil properties and nutrient supply. Very limited data are available on the heavy metal extractability in northwest Spain. The aim of this study is to analyze long-term effects of land use on the supply, variability and spatial distribution of soil nutrients, which was undertaken by comparison of a forest and a cultivated stand, rich in organic matter content. The study was carried out in an acid, rich in organic matter soil developed over sediments at the province of Lugo, northwestern of Spain. Adjacent plots with were marked on regular square grids with 2-m spacing. Fe, Mn, Zn and Cu were extracted both by Mehlich-3 and DTPA solutions and determined by ICP-MS. General soil chemical and physical properties were routinely analyzed. In arable land microelement concentration ranges were as follows: Fe (100 and 135 mg/Kg), Mn (7.6 and 21.5 mg/Kg), Zn (0.6 and 3.7 mg/Kg), Cu (0.2 and 0.7 mg/Kg). In forest land, the limits for these concentration were: Fe (62 and 309 mg/Kg), Mn (0.2 and 2.1 mg/Kg), Zn (0.2 and 2.9 mg/Kg), Cu (0.1 and 0.2 mg/Kg), Microelement concentrations extracted both with DTPA and Mehlich-3 were higher in the cultivated than in the forest stand, being Fe-DTPA the exception. Coefficients of variation were higher for the microelement content of the soil under forest. Principal component analysis was performed to evaluate associations between extractable microelements and general physico-chemical properties. At the study scale, nutrient management is the main factor affecting the agricultural site, whereas soil-plant interactions are probably driving the higher variation within the forest site. Results are discussed in the frame of organic matter decline with conventional tillage and sustainable land use.