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Effect of various ecological conditions and land use on microbiological processes in connection with C-and N-cycles

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Japan and Hungary have very different climatic and ecological capabilities due to their geological locations. Japan has a maritime climate, while Hungary has continental. In Japan, the most important soil parent materials are volcanic (the Andosols formed on this) and alluvial origin, sediment (paddy field), while in Hungary in the Great Plains the most important bedrock is the loess, on which mainly the fertile chernozem soils are formed among others. The two countries have different soil types, they cultivate various crops, they use other cultivation methods and of course their impacts of these factors on soil properties also have different. Soil samples from experiments in Numata (Japan) region of a grass vegetation, a forests and an apple orchards without fertilizers and fertilizer treatments as well as soil of a rice paddy field were examined. The Hungarian soil samples origin from Debrecen-Latokep and Gorbahaza long-term fertilization experiments from tree treatments (control, medium and high doses of fertilizer doses), the test plant was corn. The aim of our cooperation was to compare the most important physical, chemical and microbiological properties of soils from the Japanese and Hungarian fertilization experiments. The Japanese Andosols have significantly higher moisture and organic matter content than the Hungarian soils, these properties heavily influenced on the mineral nutrients and microbial processes in soils. Japanese soils had higher microbial biomass (MBC), urease activity and nitrate exploration than Hungarians. At the same time Hungarian soils had higher saccharase activity and carbon-dioxide production compared to the Japanese soils. The fertilizer application slightly increased the values of MBC in the Hungarian soils, while the urease activity and nitrate exploration were increased significantly. The microbial activity of Japanese soils decreased according to land use, in the following order: forest, grassland as well as apple orchards.