PP-269

Soil Ecosystems and Vegetal Species: Artificial Neural Networks Modeling

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Aim of the study: The function of soil ecosystems is an essential parameter in the conservation or extinction of plant species. Soil quality may be indicated by the degree of organic carbon and nitrogen stratification. This organic matter at the surface also intervenes in erosion, the conservation of water and its infiltration. This quality has a direct effect on the plant species that populate these soils. To analyze such factors, it is very difficult if not impossible to model them by conventional mathematical techniques. In this study, we propose a system based on artificial neural networks.

Material and Methods: Artificial neural networks possess the ability to model complex systems. Their application is well adapted to these problems. A system is constructed with input variables (degrees of stratification of organic matter into carbon and nitrogen, water conservation) and an output variable that expresses the offending species. A learning phase of the network is carried out on half the analyzed variables. The other half is used for network testing.

Results: After the learning phase of the network, it becomes possible to predict the result at the output of the system from the input of the variables at the input. The proposed system will then make it possible to predict the nature of the species that survive under the conditions of the parameters fixed at the input of the system.

Keywords: Vegetal species, soil ecosystems, intelligent systems, ANN.