



Soil Quality under Riparian Forest at Different Stages of Ecological Succession and Cultivated with Sugarcane

Luiz Gabriel Silva (1), José Carlos Casagrande (1), Alexandre Colato (2), Marcio Roberto Soares (1), and Silvana Perissatto Meneghin (3)

(1) Federal University of São Carlos, Natural Resources and Environmental Protection, Araras - São Paulo, Brazil (lgs346900@gmail.com), (2) Federal University of São Carlos, Natural Sciences, Mathematics and Education, Araras - São Paulo, Brazil (bighouse@cca.ufscar.br), (3) Federal University of São Carlos, Biotechnology and Vegetal and Animal Production, Araras - São Paulo, Brazil

This work aimed at evaluating the quality of the soil through its chemical, physical and microbiological attributes, using additive pondered model, as well as studying the characteristics of the linear method of combination of data, figures of merit (FoMs), the process of assigning weights and standard score functions, using measurements collected in three areas (two riparian forests and a commercial crop of sugarcane) in two soil types (Oxisol and Podzol) located on the dam shores of Sugar Mill Saint Lucia-Araras/SP. The soil was sampled in the depths of 0-0.2 and 0.2-0.4m, and was determined some of its chemical attributes (nutrient content and organic matter, cationic exchange capacity – CEC, etc.), physical (particle size distribution, density and porosity) and microbiological (microbial biomass and basal respiration). Two models were built, one containing two hierarchical levels of FoMs (Mod1), and another containing three levels (Mod2), in order to try to isolate FoMs highly correlated from each other within a top-level FoM. At FoMs of Mod1 were assigned various combinations of weights, and those of Mod2 were assigned weights from three methods, distribution from fixed value, classification and pair-wise comparison. In the Mod1, in virtually all combinations of weights used, values of Soil Quality Index (SQI) were superior in older forests, while the most recent forest presented the lowest SQI, for both types of soil. The variation of SQI values obtained from the sets of weights used also differed between the combinations tested, with the set of values of the ancient forest showing smaller amplitude. It could also be observed that the sets of values of Oxisol showed higher SQI and lower amplitude in relation to that of Podzol. It was observed that these facts are due mainly to the soil organic matter content (MO), which differs between the vegetations and soil types, and influences many parameters used in the model. Thus, in the structures where MO had greater weight, the values of SQI have tended to be more discrepant between the combinations with upper and lower level of MO. In the case of Mod2, regardless of the method of allocation of weight used, it has not been possible to find clear distinction among the three physiognomies used, despite having been detected clear difference between the two types of soil, with the higher values to those presenting the Oxisol and Podzol. This situation can lead to consideration of what might be more interesting to use various combinations of random weights that a specific combination chosen empirically.