



Evaluation of soil quality indicators in paddy soils under different crop rotation systems

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Soil quality, by definition, reflects the capacity to sustain plant and animal productivity, maintain or enhance water and air quality, and promote plant and animal health. Soil quality assessment is an essential issue in soil management for agriculture and natural resource protection. This study was conducted to detect the effects of four crop rotation systems (rice-rice-rice, soya-rice-rice, fallow-rice and pea-soya-rice) on soil quality indicators (soil moisture, porosity, bulk density, water-filled pore space, pH, extractable P, CEC, OC, OM, microbial respiration, active carbon) in paddy soils of Verona area, Northern Italy. Four adjacent plots which managed almost similarly, over five years were selected. Surface soil samples were collected from each four rotation systems in four times, during growing season. Each soil sample was a composite of sub-samples taken from 3 points within 350 m² of agricultural land. A total of 48 samples were air-dried and passed through 2mm sieve, for some chemical, biological, and physical measurements. Statistical analysis was done using SPSS. Statistical results revealed that frequency distribution of most data was normal. The lowest CV% was related to pH. Analysis of variance (ANOVA) and comparison test showed that there are significant differences in soil quality indicators among crop rotation systems and sampling times. Results of multivariable regression analysis revealed that soil respiration had positively correlation coefficient with soil organic matter, soil moisture and cation exchange capacity. Overall results indicated that the rice rotation with legumes such as bean and soybean improved soil quality over a long time in comparison to rice-fallow rotation, and this is reflected in rice yield.

Keywords: Soil quality, Crop Rotation System, Paddy Soils, Italy