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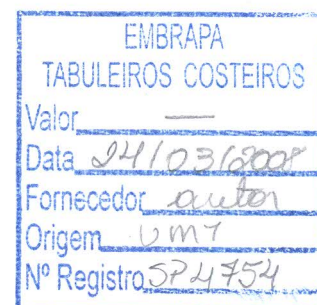
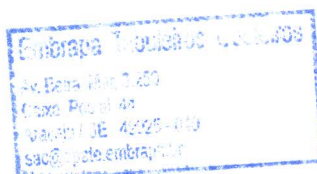
**Evaluating the Sensitivity of Biological and Biochemical Soil Properties across An Induced Gradient of Soil Degradation.**

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Biological and biochemical soil properties (BPs) have been increasingly proposed as suitable indicators of soil quality. Accordingly, the BPs should be highly sensitive to changes in soil quality due to management and, consequently, they should indicate soil degradation in its early stages. However, few studies have validated BPs as soil quality indicators by correlating them with simultaneous or later changes in important soil functions. Additionally, many contradictory results have been reported in the literature questioning the validity of BPs as soil quality indicators. In order to study these questions, a gradient of soil disturbance was experimentally created through tillage events applied 0, 1, 2, 3 or 4 times from July to October of 2006 in a 12-year fallow area under a fine-loamy kaolinitic isohyperthermic Typic Fragiudults located on the Brazilian Coastal Tableland. Sixty days after the last tillage event the experimental plots were sampled at 0 to 20 cm depth and analyzed for specific soil chemical and physical properties. In addition, sub samples were analyzed for enzyme activities ( $\beta$ -glucosidase, acid phosphatase, laccase and FDA), respiration, microbial biomass C (MBC), qCO<sub>2</sub> (respiration:MBC) and qMIC (MBC:soil organic matter). The disturbance treatments significantly decreased the soil water holding capacity, field hydraulic conductivity, total soil organic matter and CEC measured at pH 7. Among the BPs, MBC and the activities of  $\beta$ -glucosidase and FDA were negatively affected across the disturbance gradient. The laccase activity, though, was positively affected while phosphatase activity and respiration were not affected. A comparison of the degree of sensitivity among the affected soil variables did not show statistical differences between physical, chemical and BPs. These results suggest that although many BPs and indicators of soil functions have responded in a similar way to the tillage events, BPs were not more sensitive to soil degradation than other indicators.

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