

TITLE: TERRACES AND COVER CROPS ENHANCE MICROBIAL ACTIVITY OF SOIL IN A NO-TILLAGE SYSTEM IN THE SOUTH-CENTRAL REGION OF THE STATE OF PARANÁ.

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ABSTRACT:

An estimated 90% of production systems in the state of Paraná adopt the no-tillage system (SPD) as a strategy to improve soil quality. However, the adoption of the SPD has mistakenly induced the suppression of other supportive conservation practices to protect soils by producers, such as agricultural terraces and contour farming. The objective of this study was to investigate the effects of terracing and the use of cover crops on the microbial soil parameters. The experiment was conducted in crop under the no-tillage area in the city of Guarapuava, PR, Brazil, where three mega-plots (each with 11,000 m²) were established: mega-plot 1, with the adoption of soil management and the cultivation process carried out by most producers in the region, without the mechanical practice of flow control (terraces); mega-plot 2, called good management practices in which the no-tillage system is conducted with a base crop rotation equal to that of mega-plot 1, with the use of autumn cover crops aiming at permanent soil cover; and mega-plot 3, in which the soil management and the cultivation process are carried out as in mega-plot 1, but they are associated with mechanical practices of flow control (with level terraces). The soil was sampled (0-10 cm) three times between January/19 and July/2020. The microbiological parameters microbial biomass carbon (MBC), microbial biomass nitrogen (MBN), microbial respiration, metabolic quotient (qCO₂), number of mycorrhizal spores, and acid phosphatase activity were evaluated. As a result, differences between experimental mega-plots 2 and 3 were observed concerning all microbial parameters, except the number of mycorrhizal spores. In addition, the values of microbial indicators from mega-plots 2 and 3 differed significantly from those exhibited by mega-plot 1, excluding MBN. The qCO₂ showed an opposite trend with higher values in non-terraced mega-plot 1. We conclude that mega-plot 1 present poorer soil quality parameters due to the lack of additional measures to control surface runoff. Conversely, the adoption of complementary conservation practices (agricultural terraces and cover crops) enhanced soil microbial activity, contributing to the sustainability of the crops.

Keywords: conservation agriculture, microbial indicators, soil quality

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