SOIL QUALITY AS AFFECTED BY AGROFORESTRY AND GRASS BUFFERS IN GRAZED PASTURE AND ROW CROP SYSTEMS

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ABSTRACT

Establishment of agroforestry and grass buffers within agroecosystems is believed to improve soil quality. Soil enzyme activities and water stable aggregates have been identified as sensitive soil quality indicators to evaluate early responses to soil management. However, only a few studies compared these parameters among buffers, grazing pastures, and row crop systems. The objective of this study was to compare the activities of selected enzymes, water stable aggregates (WSA), soil organic carbon (SOC), total nitrogen (TN), and bulk density (Db) as soil quality parameters among four management treatments: grazed pasture (GP), agroforestry buffer (AgB), grass buffer (GB) and row crop (RC). Two soil depths (0-10 and 10-20 cm) were analyzed in all treatments for two consecutive years, 2009 and 2010. The enzyme activities, WSA, SOC, TN, and Db were determined by standard procedures. Most of the soil quality indicators were significantly greater in perennial vegetation treatments compared to row crop management indicating that perennial vegetation provides favorable conditions for greater enzyme activities and other soil quality indicators. Although there were numerical variations, the trends in response of quality parameters were consistent between years. Soil enzyme activities were significantly correlated with soil organic carbon content. Assessing changes in selected soil quality indicators appears to be a useful tool to determine soil management effects as well as trends in soil degradation.