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Sediment dynamics in restored riparian forest with different widths and agricultural surroundings

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The riparian forests are essential to maintaining the quality of water resources, aquifer recharge and biodiversity. Due to the ecological services provided by riparian forests, these areas are considered by the law as Permanent Preservation Areas, being mandatory maintenance and restoration. However, the obligation of restoration and the extent of the Permanent Preservation Areas as defined by the Brazilian Forest Code, based on water body width, elucidates the lack of accurate scientific data on the influence of the size of the riparian forest in maintaining their ecological functions, particularly regarding the retention of sediments. Studies that evaluate the ideal width of riparian forests to guarantee their ecological functions are scarce and not conclusive, especially when we consider newly restored forests, located in agricultural areas. In this study, we investigate the dynamics of erosion and sedimentation in restored riparian forests with different widths situated in agricultural areas. The two study areas are located in a Semideciduous Tropical Forest inserted in sugarcane landscapes of São Paulo state, Brazil. The installed plots had 60 and 100 m in length and the riparian forest has a width of 15, 30 and 50 m. The characteristics of the sediments inside the plots were evaluated by detailed morphological and micromorphological studies as well as physical characterization. The dynamics of deposition and the amount of deposited sediments have been assessed with graded metal stakes partially buried inside the plots. The intensity, frequency and distribution of rainfall, as well as the occurrence of extreme events, have been evaluated by data collected from rain gauges installed in the areas. We expect that smaller widths are not able to retain sediments originated from the adjacent sugarcane areas. We also believe that extreme events are responsible for generating most of the sediments. The results will be important to support the discussion about an ideal width of riparian vegetation to ensure the retention of sediments and quality of water bodies.