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Are rubber-based agroforestry systems effective in controlling rain splash erosion?

wenjie Liu

Xishuangbanna Tropical Botanical Garden, Chinese Academy of Sciences, Mengla, Yunnan Province, China (lwj@xtbg.org.cn)

In order to evaluate the influence of different types of rubber-based agroforestry systems on soil erosion processes, rainfall and throughfall erosivity (splash erosion potential) were measured in an open field environment and under different vegetation types using 640 sand-filled Tübingen splash cups. Our results indicated that the splash erosion potential under rubber monoculture were, on average, 3.12 times higher than those in open fields. This suggests that splash erosion is the most significant erosion process in this forest type because of its high percentage of exposed mineral soil and a single, high canopy. Splash erosion potential under the agroforestry systems was, except for the rubber and tea system (0.87 times the open), higher than that of the open environment (ranging from 1.22 to 2.18 times greater). However, in all but one system (the rubber and orange system) there was a significant reduction in splash erosion beneath these multiple canopies compared to that of the monoculture, especially for the rubber and tea system (0.27 times the monoculture) where it had a high sub-canopy closure and a low sub-canopy height. The erosion potential under the forest is greatly related to the forest structure, especially height and canopy cover. These results indicate that low height with high sub-canopy coverage ultimately controls the amount of splash erosion. This occurs regardless of the potential increase by the above canopy, and this highlights the importance of selecting low near-surface intercrops for constructing rubber-based agroforestry systems. This also accentuates the importance of an intact litter layer in the rubber plantations to protect the soil against splash erosion. Disturbance of these forests by latex tapping activities, herbicide application and removal of the litter layer during fertilization, for example, will lead to higher actual splash erosion rates inside the forests in comparison with an open environment.