



## Stemflow-induced processes of soil water storage

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Compared to stemflow production studies only few studies deal with the fate of stemflow at the near-stem soil. To investigate stemflow contribution to the root zone soil moisture by young and adult babassu palms (*Attalea speciosa* Mart.), I studied stemflow generation, subsequent soil water percolation and root distributions. Rainfall, stemflow and perched water tables were monitored on an event basis. Perched water tables were monitored next to adult palms at two depths and three stem distances. Dye tracer experiments monitored stemflow-induced preferential flow paths. Root distributions of fine and coarse roots were related to soil water redistribution. Average rainfall-collecting area per adult palm was 6.4 m<sup>2</sup>, but variability between them was high. Funneling ratios ranged between 16-71 and 4-55 for adult and young palms, respectively. Nonetheless, even very small rainfall events of 1 mm can generate stemflow. On average, 9 liters of adult palm stemflow were intercepted and stemflow tended to decrease for high intensity rainfall events. Young babassu palms funneled rainfall via their fronds, directly to their subterranean stems. The funneling of rainfall towards adult palm stems, in contrast, led to great stemflow fluxes down to the soil and induced initial horizontal water flows through the soil, leading to perched water tables next to palms, even after small rainfall events. The perched water tables extended, however, only a few decimeters from palm stems. After perched water tables became established, vertical percolation through the soil dominated. To my knowledge, this process has not been described before, and it can be seen as an addition to the two previously described stemflow-induced processes of Horton overland flow and fast, deep percolation along roots. This study has demonstrated that Babassu palms funnel water to their stems and subsequently store it in the soil next to their stems in areas where coarse root length density is very high. This might partly explain the competitive position of babassu palms on pastures or secondary forests.