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Year: Senior

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Stratigraphy of leaf structure and stable isotope ratios within a tropical rainforest canopy in West Africa: implications for primate feeding and isotope ecology

The composition of isotopic ratios of carbon, nitrogen, and oxygen within leaf tissues varies significantly from the lower to upper canopy in a dense forest. Location within vertical strata of the canopy may impact the ratios of isotopes within the tissue of leaves in a predictable and measurable way; this is referred to in primatology and plant physiology as “the canopy effect”. “The canopy effect” is useful in reconstructing the diet and habits of arboreal primates by comparing body tissue isotopic values to the values in the leaves they are consuming. To date, there is a lack of robust isotopic data available for most sites of primate research. Here we establish a comprehensive database of plant isotopic variability within a forest canopy of Taï National Park located along the Ivory Coast of West Africa. We found consistent patterns of fractionation of $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values within the canopy as well as trends in light availability, nitrogen content, and leaf mass per area (LMA) which may be drivers of stable isotope variability. This dataset is useful in the reconstruction of habit and diet of primates and arboreal animals within the forest and may reveal potential drivers of food preference with height.