Plain language summary

Soil nutrients and water availability are key factors that influence where tropical trees grow but we still do not fully understand how these factors affect the trees’ physiology. Most studies have looked at tree characteristics one by one, but our research takes a more integrative approach by examining multiple characteristics together. We measured nine leaf characteristics related to how trees manage nutrients and water, for more than 500 individuals belonging to different tropical species in Amazonian forests. These tree species can grow either in various environments (generalist species) or in specific environments (specialist species). We tested the influence of a topographic gradient on each trait separately and on all traits together (trait syndrome). We showed that, (1) the environment had a greater influence on trait syndromes than single trait variation, (2) specialist species expressed different strategies for water and resource use, with a stronger trait syndrome in wetter environments, and (3) generalists did not show greater variation in individual characteristics compared to specialists but instead showed a flexibility in how their traits were coordinated in different environments. We suggest that looking at multiple traits together is important to understand how species are distributed across different environmental conditions.