



Plant competition and the implications for tropical forest carbon dynamics

Stefan Schnitzer

Marquette University, Milwaukee Wisconsin, USA

Tropical forests store more than one third of all terrestrial carbon and account for over one third of terrestrial net primary productivity, and thus they are a critical component of the global carbon cycle. Nearly all of the aboveground carbon in tropical forests is held in tree biomass, and long-term carbon fluxes are balanced largely by tree growth and tree death. Therefore, the vast majority of research on tropical forest carbon dynamics has focused on the growth and mortality of canopy trees. By contrast, lianas (woody vines) contribute little biomass relative to trees. However, competition between lianas (woody vines) and trees may result in forest-wide carbon loss if lianas fail to accumulate the carbon that they displace in trees. We tested this hypotheses using a series of large-scale liana-removal studies in the Republic of Panama. We found that lianas limited tree growth and increased tree mortality, thus significantly reducing carbon accumulation in trees. Lianas themselves, however, did not compensate for the carbon that they displaced in trees. Lianas lower the capacity of tropical forests to uptake and store carbon, and the recently observed increases in liana abundance in neotropical forests will likely result in further reductions of carbon uptake.