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DO TREE SPECIES FROM SEASONALLY DRY FOREST DIFFER IN THEIR SENSITIVITY TO DROUGHT AND LOGGING, HOW DOES THIS IMPACT ON BIOMASS AND DEMOGRAPHY?

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Tree species in tropical forest may decline as a result of drought and various human impacts. We aimed to assess whether the tree species of a seasonally dry Atlantic forest has experienced any significant change in above-ground biomass (AGB) and demography over a 12-year period (1996-2008), during which a severe drought was reported. We tested the hypothesis that tree species respond differently to drought and logging. In March 1996, 2002, 2003, 2004 and 2008 all live trees (≥10cm dbh) were measured in four 50 m x 50m replicate plots in each of the two stands, unlogged (US) and logged (LS). We assessed the variation in occurrence and abundance of tree species, AGB, recruitment and growth. Climatic variables were compared among the three periods: (1) Drought onset, 1996-2002; (2) Drought, 2002-2004; (3) Post-Drought, 2004-2008.
The lowest recruitment (US=0.24; LS=0.00%yr^{-1}) and the highest mortality (US=5.2;LS=10%yr^{-1}) rates occurred during the drought. There was a sharp decrease in AGB from the drought onset period into the extreme drought, associated with increased tree mortality. The number of dead trees increased especially in the LS where only 3 species died during the drought onset period, reaching 38 during the drought. The distribution of the AGB by species indicated that biomass is concentrated in rather few species, with only 15 species accounting for about 80% of the total AGB in most censuses. *Metrodorea nigra* alone accounted up to 40% of total AGB in both stands. Using a drought impact factor (which considered the AGB before (1996) and after (2004) the drought) for each main species, our results showed that *Pseudopiptadenia contorta* was the species with the highest drought impact factor. *Paratecoma peroba* and *Parapiptadenia pterosperma* only suffered a high impact of drought in LS. *P. peroba,* the main tree logged in the past, had a decrease on its AGB contribution in LS. In conclusion, tree species differed in sensitivity to drought and logging impact, especially in terms of mortality and AGB.

WATER RELATIONS AND CARBON ACQUISITION AS INDICATORS OF SLOW CLIMATE CHANGE EFFECTS ON TREES IN A TROPICAL MOUNTAIN FOREST IN SOUTH ECUADOR

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The effects of increasing moisture on the mountain rain forest of the South Ecuadorian Andes was investigated, using the daily total water consumption (TWC) and the instantaneous water use efficiency (WUE, ratio of CO_2 uptake per water loss by transpiration) of three representative tree species, namely *Vismia tomentosa*, *Spirotheca rosea* and an as of yet unknown Lauraceae as test objects.

Seasonal changes as well as a long-term (18 months) increasing trend of the precipitation regime caused an inverse reaction of the TWC of the test trees, which could be explained by a rather unlimited water supply to the trees from the water-saturated soil. Transpiration followed mainly the atmospheric demand of water vapor, and increasing moisture hence reduced water loss by transpiration. Concomitant measurements showed the hypothesized increase of WUE in *V.t.* and *S.r*. but no clear reaction of the Lauraceae. Accompanying measurements of the stem extension growth showed undiminished growth of *V.t* and *S.r.* but suspended growth of the Lauraceae during the wettest months which fits well with the responses of WUE to the increase in humidity. While TWC can be continuously monitored with the heat dissipation technique, WUE is determined by leaf porometry in campaigns for which access to the canopy is required. The method can be used in combination with remote sensing data to identify more suitable indicator trees.