TITLE	**PHOTOSYNTHETIC AND RESPIRATORY ACCLIMATION OF UNDERSTORY SHRUBS IN RESPONSE TO *IN SITU* EXPERIMENTAL WARMING OF A WET TROPICAL FOREST**
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ABSTRACT	Despite the importance of tropical forests to global carbon balance, our understanding of how tropical plant physiology will respond to climate warming is limited. In addition, the contribution of tropical forest understories to global carbon cycling is predicted to increase with rising temperatures, however, in situ warming studies of tropical forest plants to date focus only on upper canopies. We present results of an *in situ* field-scale +4°C understory infrared warming experiment in Puerto Rico (Tropical Responses to Altered Climate Experiment; TRACE). We investigated gas exchange responses of two common understory shrubs, *Psychotria brachiata* and *Piper glabrescens*, after exposure to 4 and 8 months warming. We assessed physiological acclimation in two ways: (1) by comparing plot-level physiological responses in heated versus control treatments before and after warming, and (2) by examining physiological responses of individual plants to variation in environmental drivers across all plots, seasons, and treatments. *P. brachiata* has the capacity to up-regulate (i.e., acclimate) photosynthesis through broadened thermal niche and up-regulation of photosynthetic temperature optimum (Topt) with warmer temperatures. *P. glabrescens*, however, did not upregulate any photosynthetic parameter, but rather experienced declines in the rate of photosynthesis at the optimum temperature (Aopt), corresponding with lower stomatal conductance under warmer daily temperatures. Contrary to expectation, neither species showed strong evidence for respiratory acclimation. *P. brachiata* down-regulated basal respiration with warmer daily temperatures during the drier winter months only. *P. glabrescens* showed no evidence of respiratory acclimation. Unexpectedly, soil moisture, was the strongest environmental driver of daily physiological temperature responses, not vegetation temperature. Topt increased, while photosynthesis and basal respiration declined as soils dried, suggesting that drier conditions negatively affected carbon

	uptake for both species. Overall, *P. brachiata*, an early successional shrub, showed higher acclimation potential to daily temperature variations, potentially mitigating negative effects of chronic warming. The negative photosynthetic response to warming experienced by *P. glabrescens*, a mid-successional shrub, suggests that this species may not be able to as successfully tolerate future, warmer temperatures. These results highlight the importance of considering species when assessing climate change and relay the importance of soil moisture on plant function in large-scale warming experiments.
LINK	https://www.frontiersin.org/articles/10.3389/ffgc.2020.576320/full