TITLE	**WITHIN-CANOPY EXPERIMENTAL LEAF WARMING INDUCES PHOTOSYNTHETIC DECLINE INSTEAD OF ACCLIMATION IN TWO NORTHERN HARDWOOD SPECIES**
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ABSTRACT	Northern hardwood forests are experiencing higher temperatures and more extreme heat waves, potentially altering plant physiological processes. We implemented in-situ leaf-level warming along a vertical gradient within a mature forest canopy to investigate photosynthetic acclimation potential of two northern hardwood species, Acer saccharum and Tilia americana. After 7 days of +3°C warming, photosynthetic acclimation was assessed by measuring differences between heated and control photosynthetic rates (Aopt) at leaf optimum temperatures (Topt). We also measured the effects of warming and height on maximum rates of Rubisco carboxylation, stomatal conductance, transpiration, and leaf traits: leaf area, leaf mass per area, leaf nitrogen, and leaf water content. We found no evidence of photosynthetic acclimation for either species, but rather Aopt declined with warming overall. We found slight shifts in LMA and Narea, leaf traits associated with photosynthetic capacity, after 1 week of experimental warming. T. americana LMA and Narea was lower in the upper canopy heated leaves than in the control leaves, contributing a shift in Narea height distribution in the heated leaves. T. americana showed evidence of greater resiliency to warming, with greater thermoregulation, physiological plasticity, and evapotranspiration. As expected, Aopt of A. saccharum increased with height, but Aopt of T. americana was highest in the sub canopy, possibly due to constraints on leaf water balance and photosynthetic capacity in the upper canopy. Thus, models relying on canopy height or light environment may incorrectly estimate vertical variation of photosynthetic capacity. If these species are not able to acclimate to warmer temperatures, we could see alteration of plant carbon balance of these two key northern hardwood species.
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