**ASYMMETRIC METABOLIC ACTIVATION OF PHOTOBIONTS AND MYCOBIONTS IN RESPONSE TO WETTING**

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Many green algal photobionts are known to activate photosynthesis from water vapor alone, with activation thresholds and rates varying with photobiont lineage and thallus structure. This vapor-induced activation has been primarily documented using chlorophyll fluorescence techniques, which reveal photobiont but not mycobiont activity. We use gas-exchange measurements in a specialized chamber to contrast photosynthesis and respiration rates in lichen thalli following slow vapor hydration (18 hours at ~100%) and liquid hydration across 14 lichen taxa representing a range of macrolichen morphologies and lineages from northern Minnesota, USA. We find that although vapor hydration is sufficient to completely activate photosynthesis in some chlorolichens, respiration remains low, sometimes even <10% of liquid-hydrated values. The cyanolichens included, two species of *Peltigera*, did not show any activation photosynthesis from vapor alone, but some low levels of respiration. No discernable effects of growth-form, substrate or habitat on activation levels were observed. The asymmetries in activation of assimilation and respiration have major consequences for the interpretation of lichen responses to climate: periods of vapor activation may drive carbon gain at low respiratory cost. Further experiments including microlichens and additional photobiont lineages are ongoing, and will be presented as well.