**Methods for Systematic review for the tables:** 1) Leaf traits across a vertical gradient 2) Leaf metabolism across a vertical gradient.  
  
Relevant studies were searched in the databases: ISI Web of Science, Smithsonian online library and Google Scholar, using the following key terms: (leaf traits OR foliar traits) AND (inter-canopy OR intra-canopy OR canopy height) AND (e.g. chlorophyll OR e.g. LMA OR stomatal conductance); (leaf temperature and metabolism OR leaf thermal sensitivity OR leaf thermal tolerance OR leaf traits OR foliar traits) AND (within-canopy OR intra-canopy OR sun shade OR canopy height OR canopy gradient OR canopy profile OR canopy position) AND (temperate forests OR boreal forest OR conifer OR savanna OR tropical); (leaf\* temperature\* and metabolism OR leaf thermal\* sensitivity OR leaf thermal tolerance OR leaf\* traits OR foliar\* traits) AND (within-canopy OR intra-canopy OR sun shade OR canopy\* height OR canopy gradient OR canopy profile) AND (temperate forests OR boreal forest OR conifer OR savanna OR tropical).  
  
in Google Scholar, 600 articles were screened, using the key terms—(leaf temperature and metabolism OR leaf thermal sensitivity OR leaf thermal tolerance OR leaf traits OR foliar traits) AND (within-canopy OR intra-canopy OR sun shade OR canopy height OR canopy gradient OR canopy profile OR canopy position) AND (temperate forests OR boreal forest OR conifer OR savanna OR tropical). After screening the title and reading the abstract, 185 articles were most relevant. Herbaceous plant studies and seedling studies were excluded. These articles were added into Zotero folders: Leaf traits; Leaf Metabolism and Processes, accordingly, for further careful reading.  
  
Similar search was conducted with the Smithsonian online library with the key terms— (leaf traits OR foliar traits) AND (inter-canopy OR intra-canopy OR canopy height) AND (e.g. chlorophyll OR e.g. LMA OR stomatal conductance)— provided most relevant results among the set of keywords mentioned above, with the field refine function that included botany, ecology, biology, environmental sciences, and forestry. Out of 150 relevant articles screened, 26 were most relevant after screening the title and reading the abstract, out of which 22 were already acquired through Google scholar search, 4 new articles were added to the folder.   
  
For ISI Web of Science, search the key terms—(leaf\* temperature\* and metabolism OR leaf thermal\* sensitivity OR leaf thermal tolerance OR leaf\* traits OR foliar\* traits) AND (within-canopy OR intra-canopy OR sun shade OR canopy\* height OR canopy gradient OR canopy profile) AND (temperate forests OR boreal forest OR conifer OR savanna OR tropical)— yielded 410 relevant results, 37 were most relevant after screening the title and reading the abstract, out of which 24 were already acquired through the above process, 13 new articles were added to Zotero folders.  
  
Through the above process, 202 articles were acquired into Zotero folders. The articles were tagged after careful reading of each as ‘added to the table’, ‘irrelevant to the table, but relevant to the review’ (with a note on the reason), ‘irrelevant to the table and the review’ (with a note on the reason for exclusion). Articles that were not yet carefully read were tagged ‘yet to read’, which will be tagged as one of the above after reading. Articles shared by co-authors and references mentioned in other studies collectively were ~>32 studies. So far 40 relevant articles are added into the tables

**Methods for inclusion criteria:**

1. Defining the scope/ variables of interest
   1. Scope
      1. Trees—any type, anywhere in the world
   2. Independent variables of interest:
      1. Exposure
         1. Definition:
            1. Exposure to direct solar radiation, wind, etc.
            2. Leaves are at the same/ similar height, but in different light environments (e.g., sampled by a person standing on the ground, perhaps with a pruning pole)
         2. includes
            1. Sun/shade leaves (categorical comparison)
            2. Canopy permeability, or related (e.g., canopy openness, leaf area index above)
            3. Time-integrated metric of solar radiation
      2. Height
         1. Definition
            1. Height (on a tree) measured relative to the ground or the top of the canopy
            2. Leaves at different heights, with sampling standardized for light environment (e.g., all sun leaves)
      3. Undifferentiated height/exposure gradient
         1. Definition
            1. Measurements made within context of forest, where height and exposure covary (e.g., sampling at different heights, regardless of whether leaves are sun or shade)
         2. Includes
            1. Height within canopy
            2. Canopy position (when not standardized by height)
            3. Tree height
            4. DBH