Leaf Me to Die

Beaulieu, Marianne

The purpose of this experiment was to find the correlation between the complexity of leaf vein structure and the speed at which leaves dry, as determined by the rate of embolism formation. Matlab analysis of time lapse videos of leaves from four species (black oak, beech, rose of Sharon, and hydrangea) provided the rate of embolism formation by finding the number of pixels that darkened significantly between each frame. To quantify the complexity of the vein structure for each leaf, the box counting method was used to determine a fractal dimension. The correlation between the median rate of embolism formation and fractal dimension of each species suggested that less complex leaves dried out more slowly than those with more complex vein structures. This refuted the hypothesis that more complex leaves would dry more slowly. Understanding the relationship between these factors assists in selective breeding to make crops more drought-resistant and in monitoring droughts as they occur.

Awards Won: