Abstract

The CO_2 diffusion pathway from the atmosphere surrounding the leaf to the chloroplast stroma is composed of several parts, where each part poses certain resistance to the CO_2 flux. The CO_2 diffusion from the sub-stomatal cavities to the stroma is limited due to mesophyll conductance (g_m), which includes CO_2 movement in gas, liquid and lipid phases. The mesophyll conductance is influenced by factors that are both internal (e.g. leaf anatomy and leaf age) and external (e.g. irradiance, temperature). Internal factors exhibit rather long-term responses of g_m, while external factors are involved in short-term changes. For these rapid changes are probably responsible aquaporins. g_m significantly influences the rate of net photosynthesis, almost in the same range as a stomatal conductance does. The limitation of photosynthesis given by mesophyll conductance is not fixed and varies among species and plant functional groups. Due to continual increase of CO_2 concentration in the atmosphere, variability in g_m can lead to enhanced competitive potencial of some plant species.