Comparison of sap flux density of a tree and a palm species and their responses to changing urban environments

*Weerapong Unawong[1], Thanrada Tancharoenlarp[1], Pornwipa Aunroje[1], Pantana Tor-ngern[1]

1. Department of Environmental Science, Faculty of Science, Chulalongkorn University, Bangkok, Thailand

Urban greening strategy has been proposed to mitigate air pollution and provide significant ecosystem services. One method to assist in planning strategies for water management in an urban setting is to study tree water use and its response to environments of different tree species. We measured sap flux density (J_s) of a tree (*Tabebuia argentea*) and a palm (*Ptychosperma macarthurii*) species in a roof garden by using Granier' s thermal dissipation method. The daytime and nighttime J_s were analyzed under rain-free and rainy conditions. The results showed that with high vapor pressure deficits (*VPD*), diurnal pattern of J_s in palms was higher than that in trees . In addition, in both rain-free and rainy conditions, palms have faster response of daytime J_s to *VPD* as compared to trees, suggesting their more sensitivity to changes in the evaporative demands. At night, trees and palms have no response to *VPD*, yet the nighttime fluxes were significant, ranging 18-23% and 20-25% of the daily sum J_s in trees and palms, respectively. The results implied that trees will have the better ability to tolerate climate change impacts such as droughts than palms due to its slower responses to the environments. In other words, trees use water more conservatively than palms. However, the impacts may not be too severe because of their mechanism to recharge the stem water storage as seen from significant nocturnal J_s. Thus, trees should be preferred to plant in an urban setting than palms because they would be less affected by changing from the environment. In addition, we suggest that maintaining trees water use by appropriate irrigation and selecting trees for planting with suitable species are the keys to maximise urban greening benefits.

Keywords: urban greening, water management, sap flux density, vapor pressure deficit, Tabebuia argentea, Ptychosperma macarthurii

