

## Assessing the Impact of Leaf Morphological Traits of Urban Green Infrastructure on Capturing Atmospheric PM<sub>10.5</sub>, PM<sub>2.5</sub> and Carbon

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Incorporation of strategic green infrastructure to urban settings can efficiently clean the polluted atmosphere. Macro and micro morphological traits in leaves play an important role in immobilizing atmospheric PM and carbon. This study explores if there is a relationship between the selected morphological traits like; hairs, trichomes, epi-cuticular waxes, leaf texture and leaf size and the amount of PM and carbon accumulated in leaves. To understand this phenomenon in a tropical urban setting, 11 abundant street tree species; *Tectona grandis*, *Cassia fistula*, *Terminalia catappa*, *Polyalthia longifolia*, *Plumeria obtusa*, *Madhuca longifolia*, *Ficus benjamina* var. *benjamina*, *Mangifera indica*, *Pongamia pinnata*, *Ficus religiosa*, and *Acacia pycnantha* in Colombo, Sri Lanka were selected. PM<sub>10.5</sub> and PM<sub>2.5</sub> trapped on both surface and wax layer of leaves were measured using a gravimetric method. Carbon content of each species were estimated using an oven drying method. The leaf surface morphology was examined using the SEM (Scanning Electron Microscope). Standard MANOVA was followed to identify the relationship among the variables. An index for their relationship was built using Principal Component Analysis (PCA). The index showed that, *Madhuca longifolia* is the best species while *Pongamia pinnata* as the least able species to capture surface and in-wax PM<sub>10.5</sub> and PM<sub>2.5</sub>. In conclusion, leaf size and leaf shape were the major determinants of capturing PM from the atmosphere. Although micro structures showed positive relationship it can be concluded that they are not crucial properties in immobilizing PM. In terms of carbon accumulation, *Polyalthia longifolia* showed highest percentage while *Tectona grandis* showed the least. All species showed significant difference among each other in sequestering carbon. Unlike PM when it comes to sequestering atmospheric carbon, morphological traits affect differently.

**Keywords:** Atmospheric PM<sub>10.5</sub>, Atmospheric PM<sub>2.5</sub>, Carbon content, Leaf Micro-morphological traits, SEM images

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