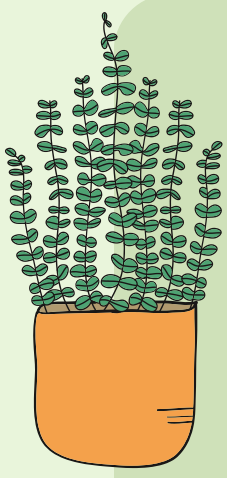
How Leaves Capture Pollution

Leaves and Air Pollution

When it comes to cleaning pollution from the air, leaves are nature's vacuum cleaners and brooms. By opening their stomata, leaves can absorb polluting gases (Like NO2) and remove them from the atmosphere. However, it is their physical properties which can make them excellent collectors of particulate matter pollution.

What is Particulate Matter?

Particulate matter (PM) is what we call tiny solid pieces of pollution. These particles are so small they can become airborne and lead to a variety of respiratory problems if inhaled. PM can be caused from the combustion in engines, wear on roads and vehicle brakes, and fires.

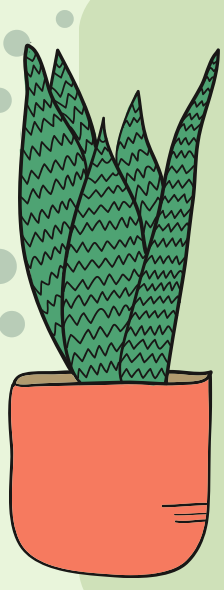


Hairs

One way in which plants capture PM is through tiny hairs on their surface. These hairs create little pockets of still air where PM can be deposited by the wind. The PM is then dislodged the next time it rains and washed into the soil. *Cotoneaster franchetii (*Franchet's cotoneaster) has super hairy leaves and has been found to capture high levels of pollution.

Wax

Some plants have a waxy surface to their leaves. This wax is sticky, and when PM comes into contact with the wax it adheres, removing the pollution from the air. *Thuja occidentalis (*White cedar*)* is an example of a plant that captures pollution this way.



Leaf Surface Roughness

Leaves may feel smooth, but in reality they have microscopic grooves on their surface which act as small pollution traps. The size and shape of these bumps, ridges, and grooves are important. Small grooves cannot capture large particles, and large grooves allow small particles to escape. Much like a lock and key, certain PM sizes fit into certain size grooves on the leaf's surface. *Hedera helix* (English ivy) has a good range of groove sizes and can therefore capture a wide range of PM.

Leaf Shape

In addition to the above physiological features of leaves, their shape is also important when it comes to capturing pollution. Lanceolate-shaped leaves have been found to capture more pollution, and dense leaf cover can block polluted air moving into an area, such as playgrounds.

Species Choice

We have to be careful when planting trees and other plants in urban areas to ensure we select the correct species. Some species produce volatile organic compounds (VOCs) which actually contribute to air pollution and exacerbate allergies.

Blanusa, T., Garratt, M., Cathcart-James, M., Hunt, L. and Cameron, R.W., 2019. Urban hedges: A review of plant species and cultivars for ecosystem service delivery in north-west Europe. Urban Forestry & Urban Greening, 44, p.126391.

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