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Journal of Climatology & Weather Forecasting

Editorial

Designing Vegetation Barriers For Urban Air Pollution Abatement

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EDITORIAL

Although vegetation can act as a buffer between traffic emissions and nearby places, the best configuration and plant composition for such Green Infrastructure (GI) is currently unknown. We looked at the literature on GI factors that affect ambient air quality, with a focus on vegetation barriers in open-road situations. The findings were analysed critically in order to uncover principles for effective barrier design, and plant selection recommendations were made using relevant geographical scales. We compiled data on 12 significant features for 61 tree species as part of an early inquiry into potential species for UK urban GI, and developed a supplementary plant selection framework. The selection of plants that display certain biophysical properties can promote air pollution mitigation if the magnitude of the intervention, the context and conditions of the site, and the target air pollutant type are taken into account. The presence of trichomes and ridges or grooves in the leaf micromorphology of super-micrometre particles is favourable. Although we discovered a comparative dearth of investigations investigating such contaminants, stomatal features are more important for sub-micrometre particle and gaseous pollutant uptake. Although appropriate vegetation height, form, and density are dependent on planting configuration in relation to the local physical environment, small leaf size and high leaf complexity are generally good macro morphological traits. Appropriate species selection can reduce biogenic volatile organic compound and pollen emissions, albeit their impact varies depending on scale and context. Several key areas for further research were highlighted during the compilation of evidence-based recommendations for practitioners in this review.

Air pollution is a major global concern, the most serious environmental threat to human health, and the cause of one out of every nine deaths each year. It's especially concerning in cities, where high pollution concentrations and prospective victims congregate. The effects of climate change on atmospheric conditions and weather variability are exacerbated by predicted global population expansion, rising urbanisation, and consequences of climate change on atmospheric conditions and weather variability.

In addition to the numerous policy, technological, and cultural changes required to minimise emissions at the source, mitigation of on-going ambient air pollution is critical to reducing human exposure. Appropriate Green Infrastructure (GI) is widely acknowledged as one of several possible passive air pollution mitigation techniques, and the literature on the beneficial impacts of plants and vegetation on air quality is extensive. To reduce air pollution, emphasise the advantages of using porous (green) barriers rather than solid obstacles (such as walls and parked cars). GI's cost-effective multi-functionality has been demonstrated in numerous research, owing to the diversity of ecosystem services that may be delivered or improved, including as ambient cooling and microclimate management (which bears additional gains in reducing local energy consumption and related emissions) Climate change mitigation and adaptation, enhanced mental and physical health, biodiversity support, and storm water attenuation This last point is especially important when it comes to air quality. In an article about the complex, intertwined relationship between air pollution and climate change, Tibbett's claims that addressing one often leads to addressing the other.

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Received: June 02, 2021; **Accepted:** June 15, 2021; **Published:** June 22, 2021

Citation: Julie J (2021) Designing Vegetation Barriers for Urban Air Pollution Abatement. J Climatol Weather Forecast. 9:292.