

Title: Green infrastructure: Toolbox for reduction of air pollution in urban areas

Presenter: Dr. Stanislaw Gawronski (Full Professor, Faculty of Horticulture, Biotechnology and Landscape Architecture, Warsaw University of Life Sciences)

Related RISH mission: Mission 1: Environmental Diagnosis and Regulation of Circulatory Function
Mission 5: Quality of the Future Humanosphere

Air pollution remains a major issue in many countries in the world and poses a serious threat for human health (life span and wellbeing) and for the environment. The most relevant air pollutants in urban environment are particulate matter (PM), volatile organic compounds, ozone, nitrogen oxides and, in some cities, sulphur dioxide. According to World Health Organization.(2015) every year 4.3 million deaths occur from exposure to indoor air pollution and 3.7 million deaths are attributed to outdoor air pollution. Apart from applying technical measures to decrease emission of pollutants, cities should attempt to generate a more profound and integrated relationship with nature, both inside the cities and also beyond their boundaries. Plants, as sessile organisms, developed unique defense mechanisms allowing them to survive in very polluted sites and tolerate high accumulation of toxic compounds in their tissues. These capabilities allow plants, together with associating microbiomes, play an important role in biofiltering of ambient air by absorbing gaseous pollutants and adsorbing PM onto leaf surfaces and what is worth note they are able to clean up air from many pollutants simultaneously. The impact of urban green infrastructure on ambient air pollution is quite well recognized and the challenge now is its intensifying as a major task of phytoremediation. Urban green infrastructures services in addition to well known functions provide additional benefits to human and environmental health and microclimate.

Nowadays many people spend most of the time indoors where the air is often more polluted as the outside because there are additional emitters of pollutants. Plants biofiltering indoor air referred as indoor phytoremediation in recent years, is of great interest because of 1) the low cost, 2) ease of implementation and maintenance of this environmental friendly technology and 3) the possibility of the choosing species with surprisingly high efficiency of uptake air impurities. It can be assumed that with the properly chosen and designed plant species there is chance to create in humanosphere surrounding as a sanctuary for safe and pleasant life. Therefore, in urban areas greenery, both indoor and outdoor, can be considered as a "green liver" of the cities, and an important element of the architectural vision of the Smart Cities.