Optimizing Urban Tree Soil Substrate for the City of Vienna

Erwin Murer (1), Peter Strauss (2), and Stefan Schmidt (3)

(1) Federal Agency for Water Management, Institute for Land and Water Management Research, Petzenkirchen, Austria (erwin.murer@baw.at), (2) Federal Agency for Water Management, Institute for Land and Water Management Research, Petzenkirchen, Austria (peter.strauss@baw.at), (3) HBLFA Schönbrunn, Wien (s.schmidt@gartenbau.at)

Many of the city garden managements in Central Europe encounter problems with the sustainable growing of trees in the cities. Tree root space is more and more limited by pavements and roads and is polluted by salt application during winter time. Thus, the life expectancy of the city trees is decreasing because the trees become more susceptible to diseases. Diseased trees are a safety risk. These challenges are additionally enforced by lower budgets to re-establish new trees.

To actively react on this challenge a new soil substrate for city trees has been developed and tested combining cost effectiveness with improved characteristics for water retention and nutrient delivery on one side and drainage capabilities on the other side. The new substrate should be inexpensive, easy and simple to produce and well miscible. Therefore, easily available materials have been tested which are river sediments that are delivered by annual floods; compost produced by a city owned composting plant and low cost dolomite chippings from quarries near Vienna. The final composition of the new Vienna tree substrate consists of 3 mineral components and one organic component. These are mixed in a relationship of 4 parts dolomite chippings, 3 parts sand and 3 parts of fluvial fine sediment and 2 parts of compost. After a laboratory phase to develop the new substrate, field testing of the newly developed substrate is presently carried out in three different types of field experiments consisting of 20 implementation sites distributed over the city of Vienna, with annual checking for the growth of trees, 2 implementation sites with sensors to measure the water and salt balance and 6 city lysimeters with implementation of enhanced facilities to monitor substrate and water behaviour. These facilities will be used to relate the growing factors in connection with the site properties, to developing of a fertilizer recommendation for urban trees and to make tests for the compatibility of the trees for road salt application and study the impacts of climate on city tree development.