OBAUC

Project title: Ornamental bush Architecture under urban conditions

Project duration: 15 months – Start date: 1/10/2016 End date: 31/12/2017

Key-words: Urban context, plant architecture response, water, light, compacted soil, transpiration model

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Total cost of the project: 31.3 k€
Financial support from « Objectif Végétal »: 25k€

Summary:

Context: Plants in cities are living in a stress-inducing environment characterized by unfavorable aerial conditions (high temperature, low air humidity, blast of wind, light reverberation, infrastructure shade…) and soil conditions (compaction, limited volume, contamination by heavy metals and polycyclic aromatic hydrocarbons…). Then, city managers are looking for plant species able to adapt in such an environment, but also able to guarantee aesthetic features, with low inputs and simple management. However, proposing plant species models fulfilling such conditions requires the understanding of plant development, depending on these abiotic environmental factors.

Goals: The aim of the project is to characterize plant-environment inter-relations, to understand and predict plant development. The specific goals are to analyze the combined effects of soil compaction, water supply restriction and shading on plant transpiration, plant biomass as well as aerial and root architecture. Modelling of plant transpiration and biomass production will be assessed.

Methodology: For this starter project, we will mimic urban environmental conditions in a greenhouse, with opened roof. Urban climate will be replicated from the Nantes Urban Environment Observatory (ONEVU) database (hydrological and meteorological data). Three environmental factors will be tested using rose bush as plant model. Modalities will include restrictive irrigation, vertical shading screen to represent urban infrastructures, and soil type. The control modality will be an uncompacted soil under water comfort condition (soil water content at field capacity) and without shade. Rose growth will be followed during one year. Several parameters around the climate, plant ecophysiology and architecture, and the soil will be measured. An existing soil-plant-atmosphere model predicting plant transpiration under water restriction will be used and adapted in the present project.