Nature as a template for a new concept of extensive green roofs

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Green roofs have become a highlight in urban ecology, particularly in temperate climates. They reward the buildings and the surrounding environment with reduced heating and cooling energy consumption, water runoff and heat-island effect. Unfortunately, most plant coverings originate from the temperate climate and do not exhibit the necessary adaptations for survival during extended dry periods. Therefore, green roofs are currently unpopular in regions with a Mediterranean climate. Moreover, designs should be adjusted to future conditions derived from climate change. In order to improve the popularity of green roofs in Mediterranean regions and to prepare industry in temperate regions for upcoming climate change, other types of vegetation need to be hosted. This research focuses on the search for new potential plant species originating from natural habitats in the (sub)Mediterranean region, where the vegetation exhibits vital adaptations for survival under extreme environmental conditions.

A vegetation study was conducted in Southern France during the growing season of 2011. The collected information was augmented with phytosociological data. Description and analysis of the selected habitats provided general information about local plant species and selected environmental variables. A thorough comparison, based on plant traits, between the (sub)Mediterranean plant list and a general extensive green roof plant list will be made. This innovative plant-trait-based approach will result in a list of potentially suited plant species for use on extensive green roofs. Subsequently, the selected species will be tested and monitored for two consecutive years on experimental platforms in two locations under different climate regimes: Avignon in France (Mediterranean climate) and Leuven in Belgium (Temperate climate). Ultimately, a list of suitable (sub)Mediterranean plant species, as well as recommendations for implementation, substrate depth and maintenance of the extensive green roofs under study will be suggested.

This work offers perspectives for further industrial-driven research and for broad scale application. Comparing the performance of local plant species with generally applied green roof species can influence plant selection and result in site-specific improvements of functioning, biodiversity and habitat value.

The presented poster summarizes the general project, with a focus on the first part of the research, namely the vegetation study.