

PROPERTIES OF *SEDUM* SPECIES APPRECIATED FOR VEGETATED ROOFTOP SYSTEMS – A REVIEW

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Abstract. There are many reasons for which sedums are used in green roofs arrangements. Their ability to adapt to different ecological conditions, low maintenance, their capacity of purifying the air and the soil are some of the results obtained so far by researchers. Each species has its qualities and it must establish the final scope of arrangement to use appropriate plants.

Keywords: biodiversity, green roof, microclimate, water flow

INTRODUCTION

The installation of vegetative rooftop systems seems to exist from the earliest times when, in areas where there was no wood, humans used clay and sod as building materials (Monterusso et al., 2005). Even green roofs are carefully engineered to function as high-performance infrastructural elements, they are living systems, so they grow and change over time. They become mature, die, and regenerate as the roof is exposed to disturbances because of the environmental conditions. Solar radiation is rarely evenly distributed, climate changes every year, growing media and roof drainage are modifying overtime. Extensive roofs have a thin layer of soil and can be grown sedums designed to be self-sustaining and require minimum maintenance (Molineux et al., 2009). Sedums were recommended because they easily adapt to the environmental conditions on rooftops (Berghage et al. 2007). The performances of *Sedums* were tested in different ecological conditions, experiences were made on every continent with very diverse purposes (Al-Busaidi et al., 2013).

Aims and objectives. The purpose of this paperwork is to present the reasons why *Sedum* species can be recommended in green roofs designs and to promote new species that have proven to be as precious as the most common species of the genus, in these kind of arrangements.

RESULTS AND DISCUSSION

Researchers have proved that *Sedum* plants can influence the biodiversity, the waterflow circuit, the regulation of temperature, humidity, generally, the microclimate of the building's rooftop. Green roofs have significant benefits in creating new habitats for birds and insects (Al-Busaidi et al., 2013), energy conservation by reducing insolation (Wong et al., 2003), improve the microclimate by evapotranspiration and reduce roof temperatures (Kohler et al., 2002). In the Mediterranean climatic conditions the green roof is able to reduce the cooling load by 11% for thermostatically controlled buildings (Sfakianaki et al. 2009).

Castleton et al., 2010 concluded that old buildings with poor insulation received the largest benefit from a green roof. The *Sedum* species are able to easily adapt to dry areas because of their low level of transpiration during the day, thus reducing the amount of water

lost. Green roof with sedums has a higher runoff coefficient than those with more developed vegetation. To prove the results, researchers used as vegetal material sedums like: *S. album*, *S. sexagularer*, *S. reflexum*, *S. kamchatikum*, *S. spurim*, *S. acre*, *S. aizoon*, *S. kamtschatikum* 'Weihenstephaner Gold', *S. mexicanum*, *S. nussbaumerianum*, *S. xrubrotinctum*, *S. sarmentosum*, *S. sieboldii*, *S. spectabile*, *S. spurium* 'Purpurteppich' (Gromaire et al., 2013; Tan and Sia, 2005). Research on reducing the pollution using plants was approached on all continents, from Europe to various research centers in the USA and Asia, and especially in China and Japan, where air quality is poor. In the category of succulents was identified *Sedum album*, whose absorption properties of PM10 suspended particles in the atmosphere have been proven by Speak et al. in 2012. *Sedum album* has the capacity to absorb 0.42 g/m² per year of PM10 (Speak et al., 2012), *Sedum alfredii* is a lead hiper-acumulator (Lu and Zhang, 2014), while *Sedum spectabile* Boreau species can rarely transport Cr from root to the aboveground organs, but, Cd, Hg and Co could be easily transported (Wang et al., 2008).

Plants with good results in the phytoremediation process must also fulfil a other tasks to be suitable in landscaping green roofs, such as: tolerance for all substances at the site; a high growth rate and a developed biomass without exceeding the specific dimensions of a green roof set-up in an intensive or extensive system; tolerance to prolonged drought, increased heatstroke and high temperature, tolerance to pH changes and optimal development on thin substrate (Sarma, 2011).

CONCLUSION

The acclimatization of newly introduced taxons of *Sedum* in culture and their promotion for green roof designs in Romania, can increase the diversity of plants suitable for this category of landscape.

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