

ECOLOGICAL AND AGRONOMICAL ASPECTS OF MEDITERRANEAN PLANTS FOR URBAN GREEN ROOFS

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The spreading of the new idea related to more sustainable towns leads to a wider use of green roofs since they create remarkable environmental advantages. In fact, they partially retain rainfall, thus reducing its flowing into infrastructures and urban waterways, they contribute to save energy, they may improve climate conditions and lead to a more sustainable use of soil. All these effects are demonstrated by many studies reported in bibliography resources. Also, from a more strictly ecological point of view, green roofs contribute in improving the quality of urban ecosystems since they increase urban biodiversity (Getter & Rowe, 2006). In Central and North Europe, as well as in North America, many buildings are covered by green roofs and they are mainly composed by *Sedum spp.* species (Oberndorfer *et al.*, 2007). The use of green roofs in Mediterranean countries is much more limited, although the floristic richness of this geographic and bioclimatic zone may provide many and different solutions.

A research project has been started in 2010 with the aim of selecting wild Mediterranean plants which may be suitable for green roofs, for their ecology and especially their adaptation to Summer drought (typical of the climate of the area). Moreover, the selected species should be adapted or adaptable to the urban habitat, considering precipitation patterns and water availability, temperature of air and substrate, and soil features.

The preliminary results of this research lead to the creation of a database which includes plants already used for green roofs, obtained from about 150 bibliographical references (including scientific papers and books, proceedings, websites, and pamphlets on agronomical and practical experiences). This database includes also information on phenological, ecophysiological and morphological features of each species. At the moment, about 290 floristic taxa have been found and among these, 85 have been proposed by researchers for green roofs in the Mediterranean area (Benvenuti & Bacci, 2010; Damas *et al.*, 2010; Provenzano *et al.*, 2010). The findings of some of the experimental cultivations reported in bibliography gave negative results, probably because the ecology of species was not fully adequate (e.g. species of marine cliffs, which are generally resistant but need a certain content of salts in the soil or substrate). In parallel, species have been also included in the database according to their syntaxonomical value, that clearly and syntetically expresses the ecological behaviour. In particular, in the database have been considered some species of the *Sedo-Scleranthetea*, *Parietarietea judaicae*, *Asplenietea rupestris* classes, and of the thermophylous Mediterranean garigues and pastures (preferably chameophytes, hemicryptophytes and geophytes). Other selection criteria consider a certain tolerance to drought stress, a preference for sunny conditions and the way root apparatus develop and expand since they could create problems to building structures.

The research is still ongoing and it will include a second phase with an experimental cultivation in the field of some selected species. This cultivation will be carried out for an adequate period of time in conditions simulating those of the roofs, with substrate poor in organic substance, testing also needs of watering.

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