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URBAN STRESS ADAPTATION AND PHYTOREMEDIATION POTENTIAL OF CRASSULACEAE

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Abstract

Progressive urbanization degrades urban environments through rising temperatures, the urban heat island (UHI) effect, salinization, pollution, and altered stormwater management. These stressors limit the growth and long-term performance of vascular plants. This review provides a comprehensive overview of current knowledge on the adaptive potential of succulents in degraded urban environments, focusing on representatives of the family Crassulaceae. Literature was searched using the Scopus, Web of Science, and Google Scholar databases, focusing primarily on publications published between 2000 and 2025. Studies were selected based on their relevance to physiological adaptations, environmental stress tolerance, phytoremediation potential, and the application of succulents in green roof systems.

Unlike previous reviews, which have mainly focused on green roofs or phytoremediation as separate topics, the present study integrates the diverse ecological functions of succulents within urban environments. Available evidence indicates that members of the Crassulaceae family, particularly species of the genera *Sedum* and *Hylotelephium*, are highly tolerant of water deficit, elevated temperatures, salinity, periodic flooding, and soil contamination. They can accumulate pollutants and capture atmospheric particulate matter. However, important research gaps remain, particularly regarding the combined and long-term effects of multiple urban stressors. Despite these knowledge gaps, succulents appear to be promising as a multifunctional component of urban vegetation.

Key words: biofilters, Crassulaceae, phytoextraction, soil salinity, urban heat island

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