

Climate Species Lists: A Combination of Methods for Urban Areas

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Abstract : Higher temperatures, seasonal changes in precipitation, and extreme weather events are increasingly affecting trees. To counteract the increasing challenges of urban trees, strategies are increasingly being sought to preserve existing tree populations on the one hand and to prepare for the coming years on the other. One such strategy lies in strategic climate tree species selection. The search is on for species or varieties that can cope with the new climatic conditions. Many efforts in German-speaking countries deal with this in detail, such as the tree lists of the German Conference of Garden Authorities (GALK), the project Stadtgrün 2021, or the instruments of the Climate Species Matrix by Prof. Dr. Roloff. In this context, different methods for a correct species selection are offered. One possibility is to select certain physiological attributes that indicate the climate resilience of a species. To calculate the dissimilarity of the present climate of different geographic regions in relation to the future climate of any city, a weighted (standardized) Euclidean distance (SED) for seasonal climate values is calculated for each region of the Earth. The calculation was performed in the QGIS geographic information system, using global raster datasets on monthly climate values in the 1981-2010 standard period. Data from a European forest inventory were used to identify tree species growing in the calculated analogue climate regions. The inventory used is the compilation of georeferenced point data at a 1 km grid resolution on the occurrence of tree species in 21 European countries. In this project, the results of the methodological application are shown for the city of Zurich for the year 2060. In the first step, analog climate regions based on projected climate values for the measuring station Kirche Fluntern (ZH) were searched for. In a further step, the methods mentioned above were applied to generate tree species lists for the city of Zurich. These lists were then qualitatively evaluated with respect to the suitability of the different tree species for the Zurich area to generate a cleaned and thus usable list of possible future tree species.

Keywords : climate change, climate region, climate tree, urban tree

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