

Summary

The functioning of urban parks ecosystems in example of Dąbrowa Basin

The investigation was carried out in the area of urban parks which are located in the area of Sosnowiec, Będzin, Dąbrowa Górnicza, Czeladź and Wojkowice. In this area there are urban parks with different surfaces (sizes), origin periods and functions, hence their selection for analysis in this dissertation. 10 parks were selected for detailed research (Grabek, Jordana, Hallera, Zielona, Sielecki, Środula, Leśny/Kuronia, Góra Zamkowa, Syberka Dolna and Wojkowice). Chosen urban parks are representative in these areas, because they were created as one of the first (1), partly have a natural character (designed on the edge and within the existing forest) (2), have a relatively large areas (3) and present modern ways of managing city greenery. The main purpose of the work is to recognise the mechanisms and reason of changes in space and time within city parks under the influence of natural and anthropogenic factors in shaping the structure and functioning of urban park ecosystems in this region. The following research tasks were used to achieve the main goal: (1)- determination of the rate of changes taking place in urban parks based on ancient cartographic materials, mapping and verification of contemporary landscape elements and infrastructure in separate parks, (2)- studying and determining the reasons of floristic diversity between individual parks and assessing the role of city parks in maintaining biodiversity, (3) - recognising and comparison of morphology and physicochemical of soils properties in forested areas and in open areas (lawn) within the analysed parks as habitats for plants and (4) - analysis and evaluation of the importance of urban parks in the Dąbrowski Basin in the formation of the ecological system in the areas of cities.

In most of the studied parks, the structural elements forming the parks space should be considered tree areas (tree stands) of various shapes and sizes (some patches form an anthropogenic forest - Park Wojkowice, Jordana), open water surfaces (Grabek, Leśna) and often mowing meadows (Środula, Dolna Syberka). In a few cases, where the park was established in the area of existing forests, forest complexes and non-forest species are close to natural character, taking into account their species composition referring to the habitat (Park Zielona, Wojkowice, Leśna). The parks of the Dąbrowski Basin are an inseparable element of the city's ecological natural system, as well as part of the urban green network. These parks

are connected by ecological corridors, especially by river ones (Czarna Przemsza, Brynica), which create opportunities for animal and plant migration.

The conducted analyses showed that in the last 80 years there were significant changes in time and spaces, both within the studied urban parks and their direct surroundings. It was closely related to the development of industry and the progressing urbanization of urban areas in the Dąbrowski Basin. Changes occurring on the surface and individual elements within the studied parks were conditioned by historical and economic factors. In the case of Góra Zamkowa and Sielec parks, these changes were directly related to the existing castles and their functioning, and other parks mainly socio-economic conditions played an important role.

As a result of investigation on vascular plants in the analysed parks, a total of 426 vascular plant species were found. The most species occur in the parks: Grabek (288), Sielec (252) and Góra Zamkowa (249), while the least - in Zielona Park (153), where the low intensive human activity is observed. The identified species belong to 83 families and 247 genera. Taxa are mainly represented by the following families: *Asteraceae* (32), *Poaceae* (30), *Rosaceae* and *Fabacea* (18). Species diversity within the anthropogenic ecosystems of urban parks is observed at all its levels. The reasons of high biodiversity in these ecosystems are determined by both factors natural and anthropogenic, also resulting from the introduction of species (native and non-native) and the creation of new habitats and micro-habitats.

The analysed soils differ from each other in terms of morphology and profile structure resulting from the genesis and the method of reclamation / revitalization of areas designated for urban parks. The analysed soils mostly belong to order of anthropogenic soil and fulfil almost all the conditions (criteria) characteristic for this group of soils, such as the presence of artefacts, anthropogenic horizons (remains of walls, foundations, pavements), which have a significant impact on the physical and chemical properties of the soil (increased content of organic carbon Corg, total phosphor Pt and the degree of saturation with basic cations) during its development.

The analysis of changes occurring within the parks of the above-mentioned cities and the database thus created will be used in the future for further analysis of these objects and their comparison with other such objects, for example in terms of vegetation changes. Due to this fact, the spatio-temporal changes of this type of areas should be an element of constant

interest of scientists and local government officials responsible for their management. Due to this, documentation, monitoring and protection of the oldest and most valuable fragments of city parks (urban forests), linked to the history of the urban organisms in which they operate, are important.