



Allergenic potential of urban green spaces, case study from Poznań, Poland (Central Europe)

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Greenery is a crucial element in urban spaces, influencing their overall appearance, attractiveness, and climate. Greenery improves mental and physical health, reducing the morbidity of city residents by offering mental relaxation and relieving stress. Urban greenery stimulates physical activity and minimizes exposure to noise and excessive temperatures (WHO 2017). However, poorly planned and managed green spaces can have a negative impact on health, primarily in the context of allergic diseases caused by pollen grains (Carinanos and Casares-Porcel 2011). It is estimated that pollen allergy currently affects approximately 20-30% of the population, with the highest prevalence observed in urban areas (Samoliński et al., 2014). One contributing factor to this phenomenon is the rise in the number of allergenic ornamental plants in cities and the homogeneity of plant species in green spaces. This homogeneity involves a preference for only specific plant species, leading to a loss of biodiversity (Carinanos and Casares-Porcel, 2011). Consequently, instead of serving a health-promoting function, green areas become unpleasant for a significant number of inhabitants. The primary objective of this study is to evaluate the allergenic potential of green urban spaces in the city center of Poznań, Western Poland.

The inventory of green areas has been carried out in various green spaces in Poznań, including parks, squares, streets, and alleys. The detailed inventory of parks comprises the following: 1) determining the location of each individual tree using a GPS application, 2) identifying trees through morphological methods with the assistance of an identification key and providing detailed descriptions of their genus and species, 3) measuring physical characteristics such as height and trunk diameter according to the Tree Girth Measurement Rules (Gach, 2013), 4) enumerating tree species, 5) determining and classifying the allergenic potential of tree species (based on the allergy prevalence retrieved from clinical studies).

The inventory was conducted in 10 parks, covering all the streets and alleys of Poznań city center. A total of 5,000 trees from 80 species were documented, representing 46 genera and 27 plant families. The most abundant genus was *Acer*, followed by *Tilia* and *Aesculus* as the second and third most common genera, respectively. Approximately 83% of all plants could be described as allergenic, e.g. *Platanus*, *Betula*, *Fraxinus*, *Carpinus*, *Juniperus*, *Taxus*, and *Corylus*. About 23% of the recorded trees possess allergenic potential at levels 3, 4, or 5, constituting nearly a quarter of the total trees in the inventory, which is approximately 1,000 trees. Specifically, 5% of the total trees have an allergenic level of 3, 11% at level 4, and 7% at level 5. It is worth noting that the fourth most popular genus is highly allergenic *Platanus*.

The areas with high density of allergenic plants in Poznań has been determined. Consequently, the areas with potentially hazardous exposure to allergenic pollen were selected. These initial findings are crucial for guiding future tasks, such as conducting local pollen exposure assessment experiments.

Keywords: pollen allergy, Poznan city center, urban green spaces

References:

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