

Abstract: To manage cities according to the principles of sustainable development, the crucial need is to understand the ecology of the urban matrix and the potential reasons of reduced biodiversity in such environment. My Ph.D. thesis is about the distribution patterns of owls *Strigiformes* and woodpeckers *Picidae* assemblages within the urban matrix. Owls and woodpeckers are responsible for key functions in ecosystems because they affect trophic networks and shape the abundance and distribution of other organisms, such as rodents and saproxylobionts. At the same time, the ecology of owls and woodpeckers in the urban environment remains poorly studied to date. The field survey of owls and woodpeckers was carried out using a cartographic method combined with playback stimulation on 60 sample plots (1 km × 1 km) randomly distributed within the city of Krakow. To examine the spatial distribution of owls and woodpeckers, the set of environmental variables was used. The variables were determined using GIS techniques and field works.

Owls are nocturnal predators that locate prey by acoustic signals, while the intensive ambient noise may reduce their foraging efficacy. The aim of this dissertation was to answer the question whether the traffic noise present in urban matrix limits the occurrence of owls. Five owl species were recorded in the study area. The occurrence of the tawny owl *Strix aluco* was positively correlated with the area of the largest wooded patch and negatively with nocturnal noise emission. The occurrence of the long-eared owl *Asio otus* was correlated positively with the area of grassland and negatively with the nocturnal noise emission. Nests occupied by the long-eared owl were of lower noise level compared to non-occupied nests. The number of owl species correlated positively with the landcover diversity index and negatively with the nocturnal noise emission.

Woodpeckers are strongly attached to tree dieback because they feed on saproxylic insects present in dead wood and excavate cavities in weakened or dead trees. Tree maintenance practices applied in frame of urban greenery management is a factor that reduces the occurrence of dead wood and in consequence can have a negative effect on woodpeckers populations. The aim of this dissertation was to explain the spatial distribution of dead wood and to test if the availability of dead wood is related with occurrence, abundance and species richness of woodpeckers in urban matrix. The survey of living trees, snags, fallen logs, and dead tree branches (present in the crowns of live trees) was carried out in 10 m and 50 m buffers delineated around 546 sample points. Sample points were selected in layers of different types of urban green space. Dead tree branches were the most common form of dead wood in urban greenery (44% of buffers of 10 m). Snags were recorded on 4% of the plots, and fallen logs were not recorded at all. Eight woodpecker species were recorded in the study area. The abundance and species richness of woodpeckers positively correlated with the total basal area of dead tree branches in private gardens and forests, the density of snags in forests and the density of mature trees (dbh > 50 cm) in private gardens. The availability of trees and the availability of dead wood had a positive effect on the probability of occurrence of various woodpecker species and diversified habitat niches among species. The habitat-niche-volume positively correlated with the species abundance in urban environment.