

## ***"A matter of taste". Is urban food good for birds?***

While the urbanisation process is growing rapidly and its sprawl continues to consume native landscapes, the original structure of habitats is switching into a fragmented picture of small-size patches where human settlements dominate the scene. Although the idea of city life has generally been attractive for people, the combination of characteristic variables such as environmental pollution, traffic congestion and built areas extension are negatively affecting the quality of living and make city-dwellers wonder about the place they live in.

Birds, for example, have already shown to react to the new and challenging variables found in the urban landscape. Their ability to cope with novel environmental conditions is a determining factor for their survival in the city. We know that urban landscapes differ broadly and markedly from more natural and semi-natural contexts, especially due to the daily-combined occurrence of novel factors like altered weather conditions, new predator communities and increased disturbance levels (i.e. sound, light and air pollution). Importantly, it seems that behind the decision of birds to leave or to stay, food resources may emerge as paramount: in fact, while most sensitive species are the first to disappear (urban avoiders) others are almost totally dependent on human settlements especially because of food provisioning overwinter, which results in an overpopulation in the new human-generated environment (urban exploiters). An additional and intermediate group of birds, so-called adapters- are shown to inhabit both natural and urbanised areas.

Much of what we know about this adaptation phenomenon to the urban environment comes from studies on two small passerine birds, which are both adapters: great tits (*Parus major*) and blue tits (*Cyanistes caeruleus*). These birds are well-known for the ability to switch their diet from one of primarily insects during the breeding season (for adults and to rear chicks) to one essentially granivorous / omnivorous during the winter (foods that are often provided in feeders). Previous studies emphasized strong life-history trait variation between rural and urban individuals, which often culminates in a reduced reproductive performance in populations inhabiting cities. Since food resources are key drivers in avian reproductive success, there is a general belief that their role may be determinant in such substantial differences. Yet, understanding key mechanisms that are likely to vary on a rural-urban gradient in terms of food resources remains a major challenge. In addition, the presence of supplementary food and its impact on parental breeding performance have been hardly investigated in free-living populations. People interested in birds often provide food in feeders with the best intentions, but this may actually be the cause of reduced performance in urban birds. Our project is an opportunity to address this issue.

Our main objective is to characterize natural and human-generated food resources and their influence on birds' reproductive success in a gradient of urbanisation. The study will be carried out in a nestbox population of tits at eight sites within the city of Warsaw. We will analyse how natural food availability (arthropods) in proximity of the breeding site is reflected in offspring's diet by means of video recording inside a nestbox. We will also check if artificial food (supplemented in feeders) affects parental feeding rates and their body condition. Our research will contribute to a better understanding of the footprint of cities on the ecology and behaviour of wild animal species, with a particular focus on food resources availability in an era of rapidly expanding urban settlements. Ultimately, by monitoring free-living populations in a gradient of urbanisation, our project will aim to (i) quantify what birds eat and (ii) evaluate the effects of natural and artificial food resources on their condition and reproductive success.