

DISEASES-ON-WINGS: The effect of climate change on dynamics of zoonoses in migratory birds and bats across Europe



Background

Climate change changes the distribution ranges of species, which leads to novel interaction between species in rapidly altering environmental conditions. These new interactions facilitate the transfer of pathogens from one host species to another. Migratory animals, such as some bat – and bird species can react rapidly to climate change by shifting their distribution ranges towards the poles. These migratory movements allow for the swift transport of pathogens from overwintering area to breeding area and vice versa. So far, the potentially zoonotic pathogens, which may cause harm to humans, have been studied very little in migratory birds and bats in Finland. We also have little information on how climate change will affect exposure to pathogens found in migratory animals. Zoonotic (animal-transmitted) diseases pose at present one of the biggest threats to humans, and outbreaks often occur as consequence of a change in the ecology of the host.

Aims

Our Diseases-on-Wings consortium studies pathogens migrating bird and bat species carry in Europe and aims to predict the effects of climate change on the occurrence of animal-transmitted diseases in Finland. The end-product of the project will be a tool for public authorities, which helps predict the risk posed by zoonotic diseases in changing climatic conditions.

Approach

Our project combines sample collection coordinated by the researchers with citizen science methods. Examples of citizen science methods include the “Faeces depository”, in which citizens perform sterile collection of bat faeces from their attics, and “Intestine goldmine, in

which in cooperation with the Finnish Wildlife agency, we instruct hunters to collect the offal of the birds they have collected for our analyses.

We also utilize European-wide data from natural history museums on distribution and migratory patterns of birds and bats, and medical database information dating back several decades on zoonotic diseases and pathogen diagnostic findings. These data are combined with predictive distribution models of migratory birds and bats and overlaid with pathogen occurrence models.

Diseases-on-Wings is a multi-disciplinary research consortium combining ecological modelling, large observational datasets and microbiological methodology. The consortium shares knowledge to assist in policy making and for the general public.

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