Institute: Institute of Environmental Sciences

Topic: The Assessment of interspecific interactions between sympatric carnivores in the Carpathian Mountains

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Background information:
In functioning ecosystems, there are strong interspecific links between trophic levels, so called trophic cascades, where top carnivores suppress carnivore guild members on lower trophic levels, ultimately affecting the growth and distribution of species further down the trophic ladder, such as herbivores and producers.
Interspecific interactions determine species distribution and abundance, and that makes this a key factor in large carnivores conservation. Studies on interspecific killing have shown that in case of very similar body sizes competitors prefer to avoid direct conflicts. Humans have significantly altered the nature of these trophic interactions though multiple pathways, including the extermination of top carnivores, facilitating biological invasions, landscape transformation, and human activities such as pet-keeping. For example, large carnivores such as wolves (*Canis lupus*), brown bears (*Ursus arctos*), and lynxes (*Lynx lynx*) were heavily persecuted during the 20th century, when their numbers reached record lows across Europe. Put under strict protection near the end of the 20th century, these top carnivores are now recovering in some parts of Europe, including Poland.
Although humans have kept pets for thousands of years, the number of domestic cats (*Felis catus*) and dogs (*Canis lupus familiaris*) moving through the environment have likely also increased through time as human populations grew and expanded and as pet-keeping became more fashionable. Feral domestic cats and dogs are currently considered one of the top threats to biodiversity around the world and can generally be considered novel members of wild carnivore guilds.

The main question to be addressed in the project:
In this project will focus on how to:
1) determine the status, structure, and behaviour of carnivore communities across multiple gradients of anthropogenic disturbance, including landscape configuration and use, hunting pressure, and the presence of top, alien, and domestic carnivores,
2) to evaluate the effect of how the presence of large carnivore as top predators affects the distribution and behaviour of native and domestic mesocarnivores,

Information on the methods/description of work:
The use of non-invasive methods including camera trapping. The study will be performed in the Carpathian Mountains, mainly with the ongoing cooperation with the national parks. The records from camera traps will be evaluated and processed by multidimensional statistical analyses and GIS models.

Special requirements from the student:
General knowledge at the level of graduated biology with focus on wildlife ecology. Experience with the use of camera traps and field work. Very good command of English and good of Polish.
Experience in using statistical and GIS analyses.

Place/name of potential foreign collaborator:
Dr Aimee Taillian, Norwegian Institute for Nature Research, Norway

Reference(s):
Lewis, J. S., Bailey, L. L., VandeWoude, S., & Crooks, K. R. (2015). Interspecific interactions between wild felids vary across scales and levels of urbanization. Ecology and evolution, 5: 5946–5961. https://doi.org/10.1002/ece3.1812.
Manlick, P.J. & Pauli, J.N. (2020). Human disturbance increases trophic niche overlap in terrestrial carnivore communities. PNAS, 117: 26842-26848 https://doi.org/10.1073/pnas.2012774117.

Rich M., Thompson C., Prange S. and Popescu V. D. (2018). Relative Importance of Habitat Characteristics and Interspecific Relations in Determining Terrestrial Carnivore Occurrence. Front. Ecol. Evol. 6:78. doi: 10.3389/fevo.2018.00078