

SHORT TERM SCIENTIFIC MISSION (STSM) SCIENTIFIC REPORT

This report is submitted for approval by the STSM applicant to the STSM coordinator

Action number: CA16224

STSM title: European Raptor Biomonitoring facility

STSM start and end date: 29/10/2019 to 23/12/2019

Grantee name: Dragana Bošković

PURPOSE OF THE STSM:

Grantee, Dragana Boskovic from the Agriculture Faculty, University of Novi Sad, Serbia, was at the Instituto de Investigación en Recursos Cinegéticos (IREC), CSICUCLM-JCCM, Ciudad Real, Spain, from 29/10/2019 until 23/12/2019, where she cooperated with the research group of Prof. Dr. Rafael Mateo Soria. The aim of the STSM is the preparation of a proof of concept of the monitoring of some environmental contaminants in birds of prey. This research was aimed at four specific raptor species encompassing: common buzzard - *Buteo buteo*, common kestrel - *Falco tinnunculus*, tawny owl - *Strix aluco*, and barn owl - *Tyto alba*. The objective was to obtain data about the concentrations in the above-mentioned raptor species of second generation anticoagulant rodenticides (brodifacoum, difenacoum, bromadiolone and flocumafen), lead and mercury, in Europe through the past forty years. This information would be used to create a metadatabase with the information that is being requested to the authors of these publications. The potential deliverable of this is to create a map of Europe with the coverage of the monitoring and the detected concentrations up to now.

DESCRIPTION OF WORK CARRIED OUT DURING THE STSMS

During two months, the main part of the mission was reviewing published papers about concentrations of anticoagulant rodenticides, mercury, and lead in raptors in Europe. This review includes paper published between 1980 and 2019. Around 50 papers were obtained. A metadatabase was made with authors names, title of the paper, country where the monitoring was performed, years when monitoring was conducted, species that were studied, number of birds, as well as the statistical information of the concentration of contaminants, including average and geometrical mean, 95%CI, standard error, standard deviation, minimum and maximum concentration measured and limit of detection. Also, the area and the municipality where the birds were found were also obtained from the paper if it was available, as well as coordinates of those specific places. Samples included actively sampled birds (live birds) or passively (birds found dead), being the latest the majority. The last three variables of the metadatabase were for collecting data about for the cause of the death of birds (global or individual), the method that was applied in the analysis (HPLC, LC-MS, etc.) and the matrix that was used to analyze contaminants (mostly liver).

The contact information of the authors was assembled so that we could ask for additional data that are not put in the paper. Data that were requested from the authors are the concentration of the contaminant (mg/kg) in each bird for each contaminant. Coordinates of the place where birds were found were also requested if possible and the cause of death. Maps for each raptor species and for each contaminant were made to see the geographical coverage of the countries and the distribution of the detected concentrations of the pollutants under study. This information is being requested individually - from the authors in order to complete the metadatabase.

DESCRIPTION OF THE MAIN RESULTS OBTAINED

The result of the reviewing of published papers is the first step to create a metadatabase for the proof of concept of the biomonitoring of raptors in Europe. On the basis of this preliminary database I know what data should be obtained from the authors.

Maps of the geographical coverage of the biomonitoring studies were created, which is important to establish where is the best-monitored area and species and where are the gaps. These maps show that the biggest gaps are in the area of the Balkan including countries like Serbia, Bosnia, Croatia, Montenegro, etc. The best coverage is in the United Kingdom, Spain, Portugal, France, and Italy. The species with the best coverage is common buzzard - *Buteo buteo*. The lowest coverage is for the mercury for all species, usually including only around three countries. The matrix that was usually examined is liver but also there are brains, tissue, blood, feather, etc.

FUTURE COLLABORATIONS (if applicable)

Still, there is a lot of work that needs to be done. After contacting authors for getting information, there is an analysis that needs to be done to frame all the data in one unity. Therefore, compile the database, perform the meta-analysis and identify the constraints of the available information that should be considered in the development of the second phase of the proof of concept with newly collected and analysed samples between 2015 and 2020.