Report on the outcomes of a Short-Term Scientific Mission[1]

Action number: **CA18221**

Grantee name: **Tendron Pauline**

Details of the STSM

Title: **:** Spatial analysis of insular ponds, a key habitat for amphibians and reptiles

Start and end date: 10/05/2022 to 07/07/2022

Description of the work carried out during the STSM

Description of the activities carried out during the STSM. Any deviations from the initial working plan shall also be described in this section.

(max. 500 words)

We focused on Croatian islands, the largest archipelago in the Adriatic sea where many aquatic species of amphibians, snakes or even turtles are found in numerous small freshwater bodies like ponds. In the current context of intensification of agricultural practices, an increasing number of habitats are affected but this was not quantified previously. To assess the potential risk of exposure to pesticides for amphibians and reptiles on these islands, it is essential to better understand the environments they are exposed to. We used QGIS software (version 3.10.1) to build a database of ponds on Croatian islands by georeferencing them from digital maps while selecting only the most adequate types of ponds for herpetofauna. Then, we targeted the variety of main agricultural fields which vary from one location to another and also from one island to another, and which have likely different effects on herpetofauna. To do that, we used CORINE Land Cover (CLC) 2018 dataset obtained from the European Environmental Agency (EAA), which coordinated the CLC project. This project provides access to a detailed and standardized inventory of land use for Europe. Land cover in relation with agriculture were chosen and correspond to the following categories : **211** (“non-irrigated arable land”), **212** (“permanently irrigated land”), **213** (“rice fields”), **221** (“vineyards”), **222** (“fruit trees and berry plantations”), **223** (“olive groves”), **221** (“pastures”), **241** (“annual crops associated with permanent crops”), **242** (“complex cultivation patterns”), **243** (“land principally occupied by agriculture with significant areas of natural vegetation”) and **244** (“agro-forestry areas”).

[1] This report is submitted by the grantee to the Action MC for approval and for claiming payment of the awarded grant. The Grant Awarding Coordinator coordinates the evaluation of this report on behalf of the Action MC and instructs the GH for payment of the Grant.

In absence of data on the use of pesticides on crops surrounding the ponds of Croatian islands, the identification of land use around each water body allows us to understand the potential risk for herpetofauna. To identify and quantify the extant of the land use that may affect insular herpetofauna, we extracted the land cover around each pond and at further distance by using R software (version 3.6.1). As shifts in agricultural practices vary across islands, comparisons of land use between islands will also allow to identify areas at higher risks and therefore to better assess future risks for undisturbed areas.

Grantee enters max 500 word summary here.

Description of the STSM main achievements and planned follow-up activities

Description and assessment of whether the STSM achieved its planned goals and expected outcomes, including specific contribution to Action objective and deliverables, or publications resulting from the STSM. Agreed plans for future follow-up collaborations shall also be described in this section.

(max. 500 words)

The first results indicated that almost half of the water bodies are located in agricultural areas. We also found that the percentage of agricultural surface varies from one island to another, with some islands still keeping wild landscapes whereas others are heavily impacted. On the islands most impacted by agriculture, herpetofauna may be more at risk. Even if we do not have access to precise data on the use of pesticides for crops in Croatia, it is known that permanent crops (e.g. vineyards, orchards or olive groves) might be some specifics areas of intensive use of pesticides. We found that 9% of ponds were located on permanent crops with the majority of these water bodies being situated around olive groves. Olive trees, which are a very common crop in Croatia, are chemically treated for pests therefore pose a risk to native species of herpetofauna and should be further assessed.

This project has provided useful information on the possible risks that reptiles and amphibians may face on insular environments, in relation to agricultural landscapes. It provided a detailed quantification of agricultural diversity and extents around pond environments and give bases for calculations needed in risk assessments. In fact, all CORINE Land cover crops categories were found as land use around the island ponds. Based on current results, this STSM project may produce various recommendations for future protection and management practices for insular ponds habitats.

This STSM has helped to strengthen the collaboration with the Croatian Institute for Biodiversity of Croatia. New projects are already under consideration as a follow up of this STSM and could lead us to a fine scale analysis of pond environments. Cross-validations between field and remote data including the presence of amphibians and reptiles species could be conducted and will allow to alert on the risks at pond and island levels for these peculiar environments for which more data and modelling are needed.

Grantee enters max 500 word summary here.