

## SHORT TERM SCIENTIFIC MISSION (STSM) SCIENTIFIC REPORT

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

**Action number: CA18221**

**STSM title: GIS analysis on the distribution of amphibians and reptiles across agricultural landscapes in Europe**

**STSM start and end date: 01/02/2020 to 05/04/2020**

**Grantee name: Matteo Lattuada**

### PURPOSE OF THE STSM:

The purpose of the STSM was to determine the distribution of amphibians and reptiles across agricultural landscapes in Europe.

The objective is important to address the risk of environmental exposure for herpetological fauna. Thus, a broad-scale analysis should serve to establish the basis upon which assessment of risks at the ecosystem level can be built.

### DESCRIPTION OF WORK CARRIED OUT DURING THE STSMS

The work carried out was mostly aimed to collect and gather chorological information about herpetofauna in continental Europe and to investigate their relation with crops.

Spatial information on species occurrences was collected on GBIF for the years 2014-2020. Additional data were already available in the framework of the [NA2RE](#) project.

Land use spatial information were based on the last available [Corine](#) Land Cover dataset, from 2018. This is a Pan-European project lead by the European Environmental Agency (EEA) aimed to classify 44 types of land use for 39 countries at the resolution of ~100 m<sup>2</sup>. We used this data to calculate the proportion of 5 types of crops of interest for the UTM 50 km and UTM 10 km, which are standardized grids created by the EEA for analytical purposes. Then, we also extracted the land use at the exact GPS location of the recorded species presence. These created datasets were used to infer crop effects on species presence at the three different resolution levels.

Effects of crops on presence/absence of herpetofaunal species were initially investigated with General Linear Models for the datasets UTM 50 km<sup>2</sup> and UTM 10 km<sup>2</sup>, whereas for the dataset at GPS resolution we used a Chi-square comparison.

### DESCRIPTION OF THE MAIN RESULTS OBTAINED

The main results consisted of the mapping of the distribution of herpetological fauna in continental Europe at three resolution levels: UTM 50 km<sup>2</sup> and UTM 10 km<sup>2</sup> grids, and at GPS location. Furthermore, for the first two datasets, we aggregated information on the proportion of agricultural crop types derived by the 2018 Corine Land Cover dataset. For the last dataset, we assigned the land use type extracted from the 2018 Corine Land Cover dataset to every species observation. These new datasets will be used for further analysis and research.

Finally, preliminary GLM models suggested that the number of species with a significant effect for every crop types increased at higher resolution, recording 8 species, 5 reptiles and 3 amphibians, in the 50 km<sup>2</sup>

UTM grid and 15 species, 5 reptiles and 10 amphibians at the 10 km<sup>2</sup> UTM grid. The Chi-square test to examine if the proportion of crop types in presence locations was equal to absence locations was rejected for 76% of amphibian species and 69% of reptiles, implying that the majority of the species favor specific crop types.

The first results were already presented by Dr. Sillero the 4-5 March 2020 at the 1<sup>st</sup> general meeting in Ljubljana

**FUTURE COLLABORATIONS (if applicable)**

We established collaboration between the host and sending institutions. Furthermore, as Matteo finished the STSM tasks a few days in advance, he used this time further networking with the CICGE employees not directly related to the PERIAMAR COST action. This created a base for possible future collaborations.