



UNIVERSITÀ DEGLI STUDI DI PADOVA
Corso di Laurea Magistrale in Forest Science
Introduction to GIS

“Lab Project Report”
SPECIES DIVERSITY OF LIZARDS IN THE CAUCASUS AND ADJACENT
TERRITORIES

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1. OBJECTIVES

The aim of this project is to investigate and display the spatial distribution of three species of lizards on a map so that we can see in which square one species, two species and three species are located.

We have 3 species of lizards with longitude and latitude coordinates in the Excel table.

At present, a large amount of data has been accumulated on the number and distribution of animal species. Cartographic analysis of these data can be aimed at studying the regularities of the spatial organization of the population of a species, the density of species, the establishment of geographical and genetic elements of the fauna, the methods of interpenetration of various faunistic elements, etc.

2. MATERIALS AND METHODS

The following geospatial data sources were used:

1. Lacerta_sp.xls

Excel file with longitude and latitude coordinates of each of the three lizard species.

The data was collected and provided by a researcher at the Zoological Institute.

2. OSM Standard (Open Street Map)

The following procedures have been carried out:

1. Adding layers

First, *add delimited text layer* (this is our combined table for 3 species), selected the coordinate system WGS: 84. Our coordinates are displayed on the map (source_points). Resave this file so that it is in the metric coordinate system (shape file).

Added map OSM Standard.

We can see our actions in the picture below (fig. 1)

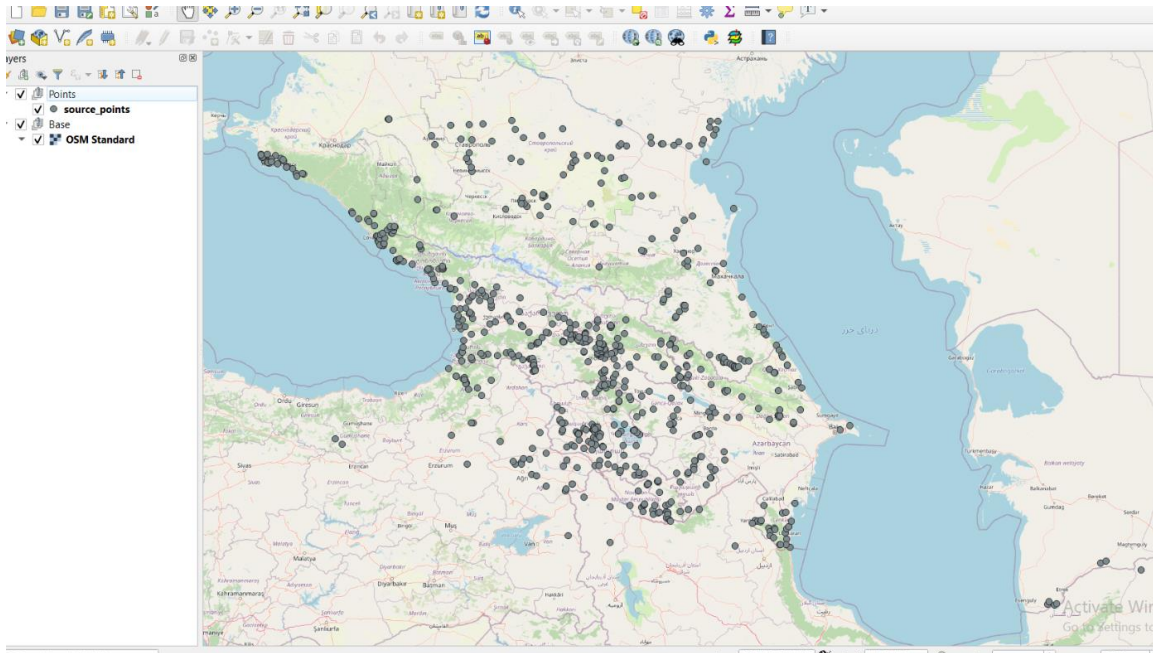


Fig. 1. Map with added coordinates

2. Layer *source_points*

We have source layer with three species, so our next action is to split this layer into 3 layers for each species of lizard. For this we use *Data Management Tools – Split Vector Layer*. Three species are separated and each has a different colour. This action is shown in Figure 2.

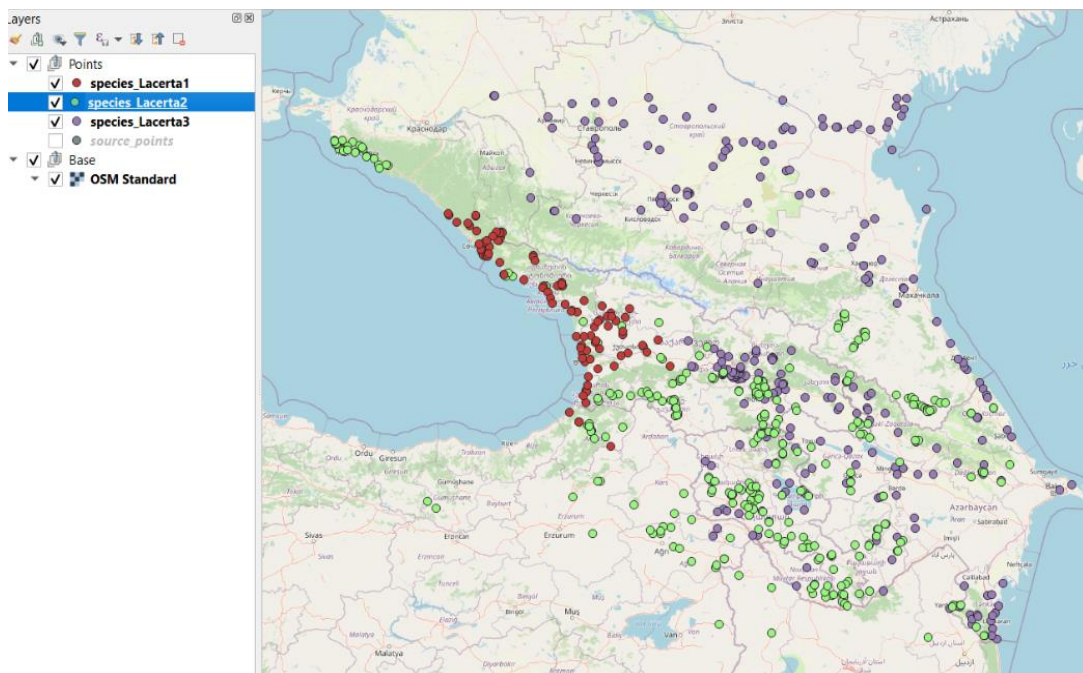


Fig. 2. Map of separation of three species of lizards in the territory

3. Grids creation

To create we use the tool – *Create Grid*. Select *grid extent on canavis* and then set all the parameters we need. We got the first grid, but we need to make a selection of polygons (hexagon) in this grid (only those that contain species are needed). Use the tool – *Select by Location* and set the necessary parameters (see fig. 3).

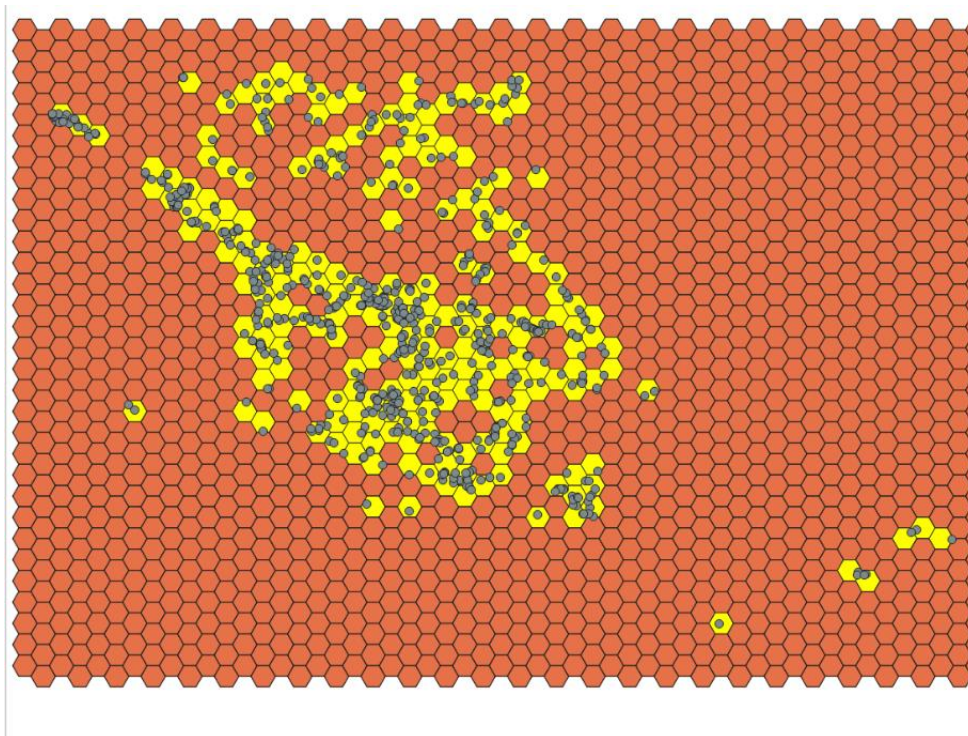


Fig. 3. Map of grid

4. Points calculation

The next step is to count the number of lizards of each species that are within one hex. Using the tool – *Count points in polygon*. Calculated the number of points of one species, but it is also necessary to calculate the number of points of the second and third species.

Attribute table and *Field Calculator* were used for this. The calculation was made using the *conditionals*. All these actions are reflected in the generalized figure 4. The final counting result is shown in Figure 5.

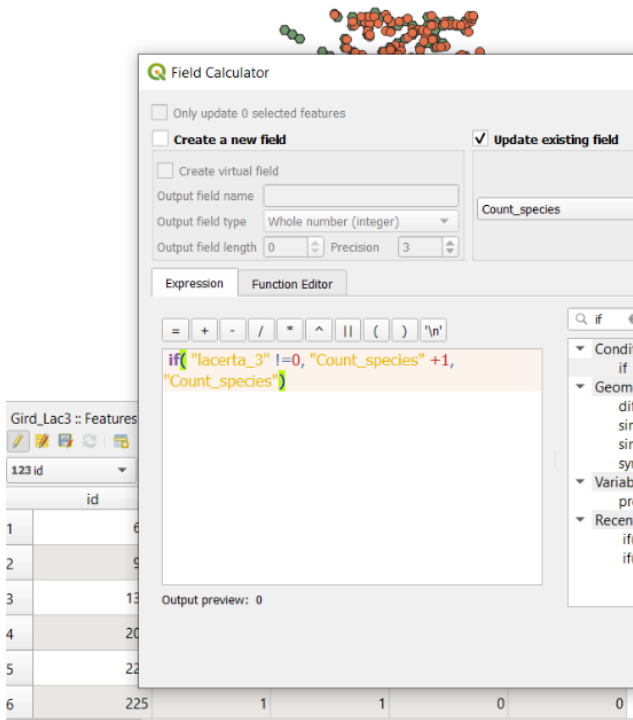
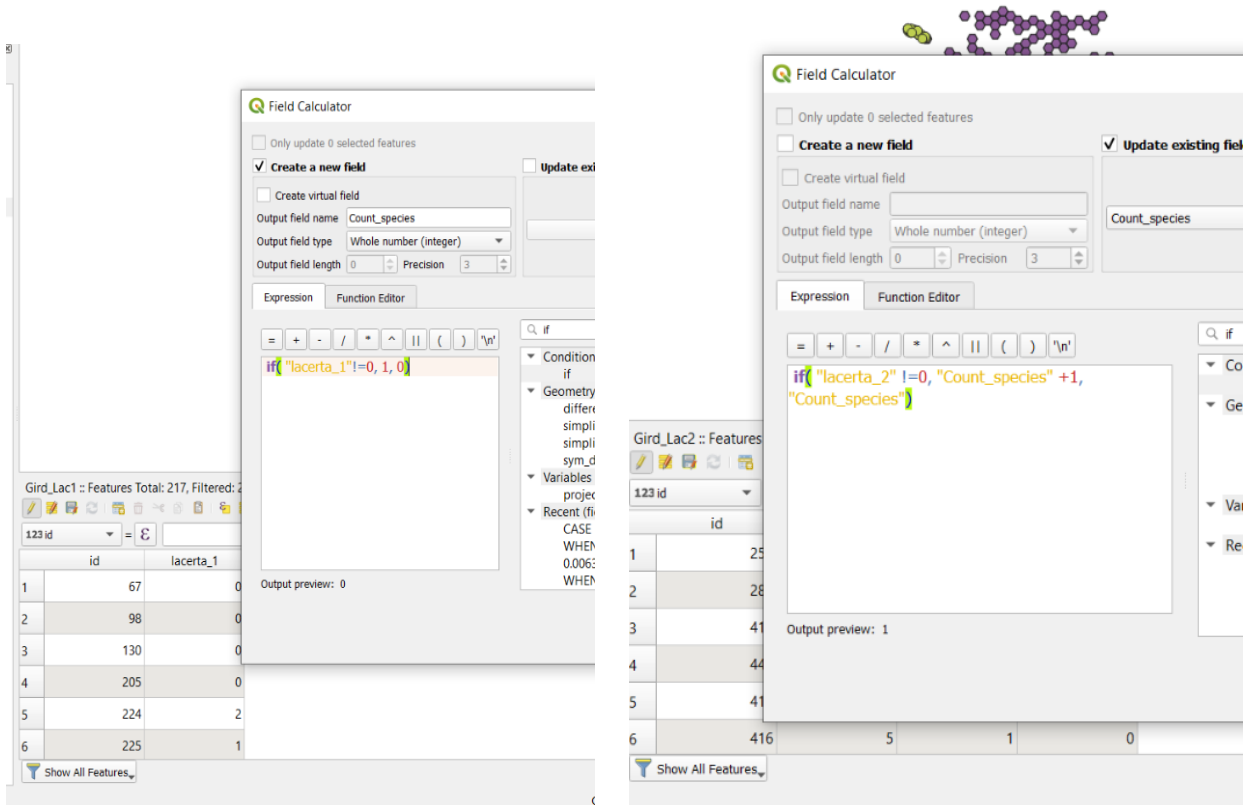


Fig. 4. Point counting process

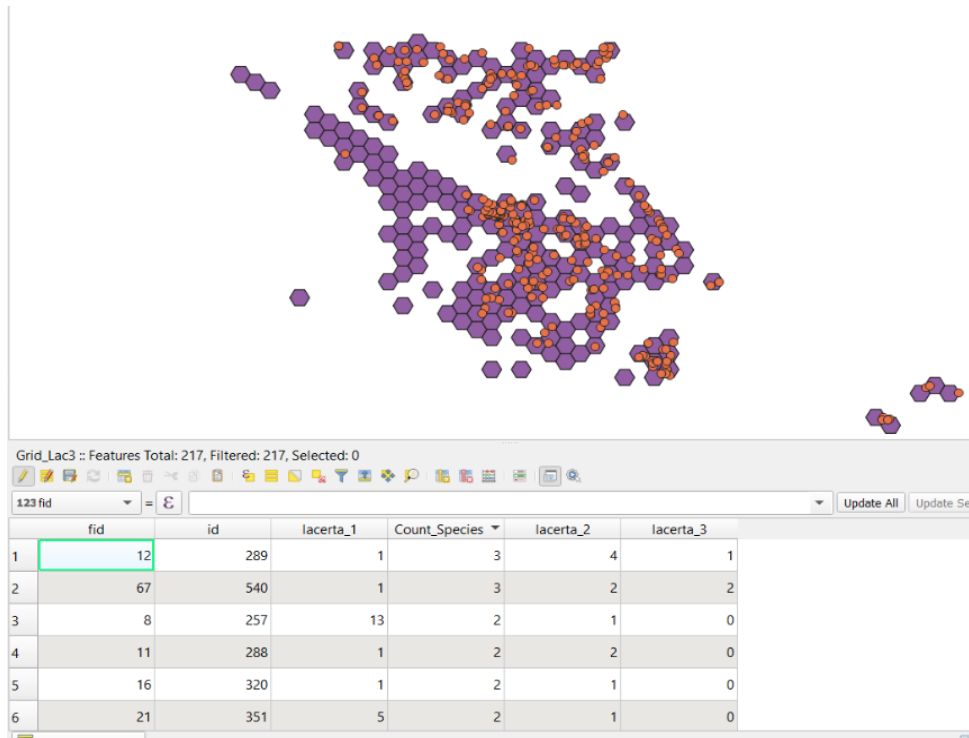


Fig. 5. Displaying the counting process on the map

5. Map parameters and properties

The necessary parameters have been selected to maximize the display of the number of species (*Layer properties – Symbology/Labels*) (see fig. 6).

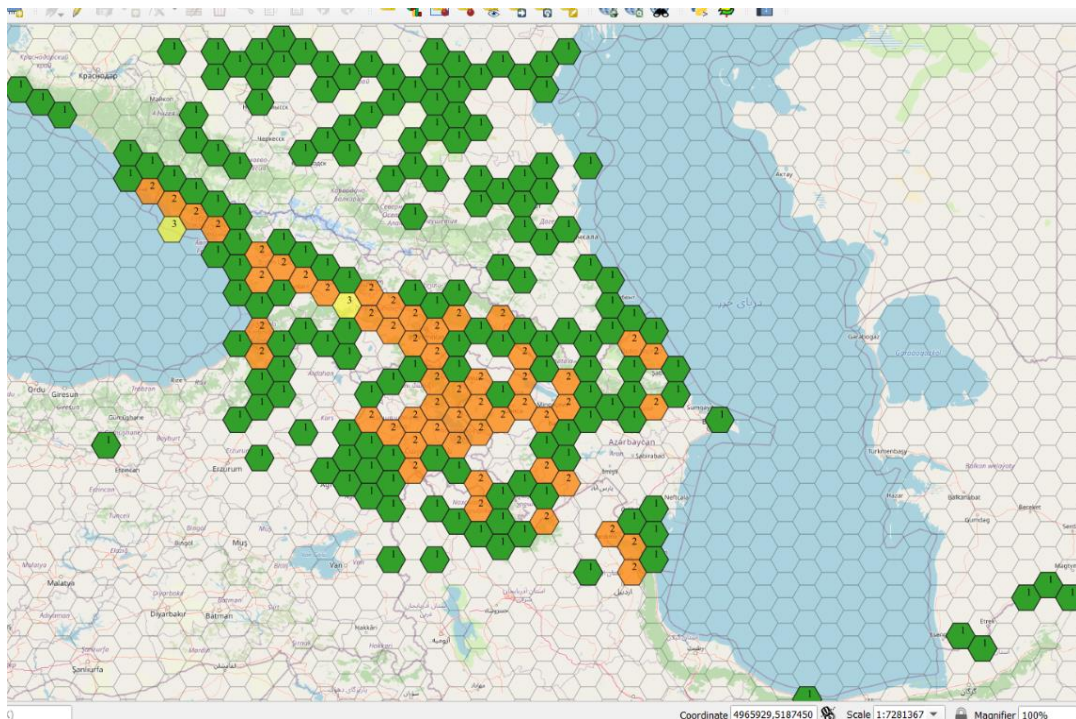


Fig. 6. Map of species diversity of lizards in the Caucasus

3. RESULTS

The map (see fig. 7) illustrates the species diversity of 3 species of lizards in the Caucasus and adjacent territories. As we can see from the resulting map, most often you can find only one species of lizard (green hexpolygons). Two species of lizards are less common (yellow hexpolygons). Three species of lizards are observed only in two areas (red hexpolygons). In the adjacent area near the Caspian Sea, we can observe only one species of lizards.

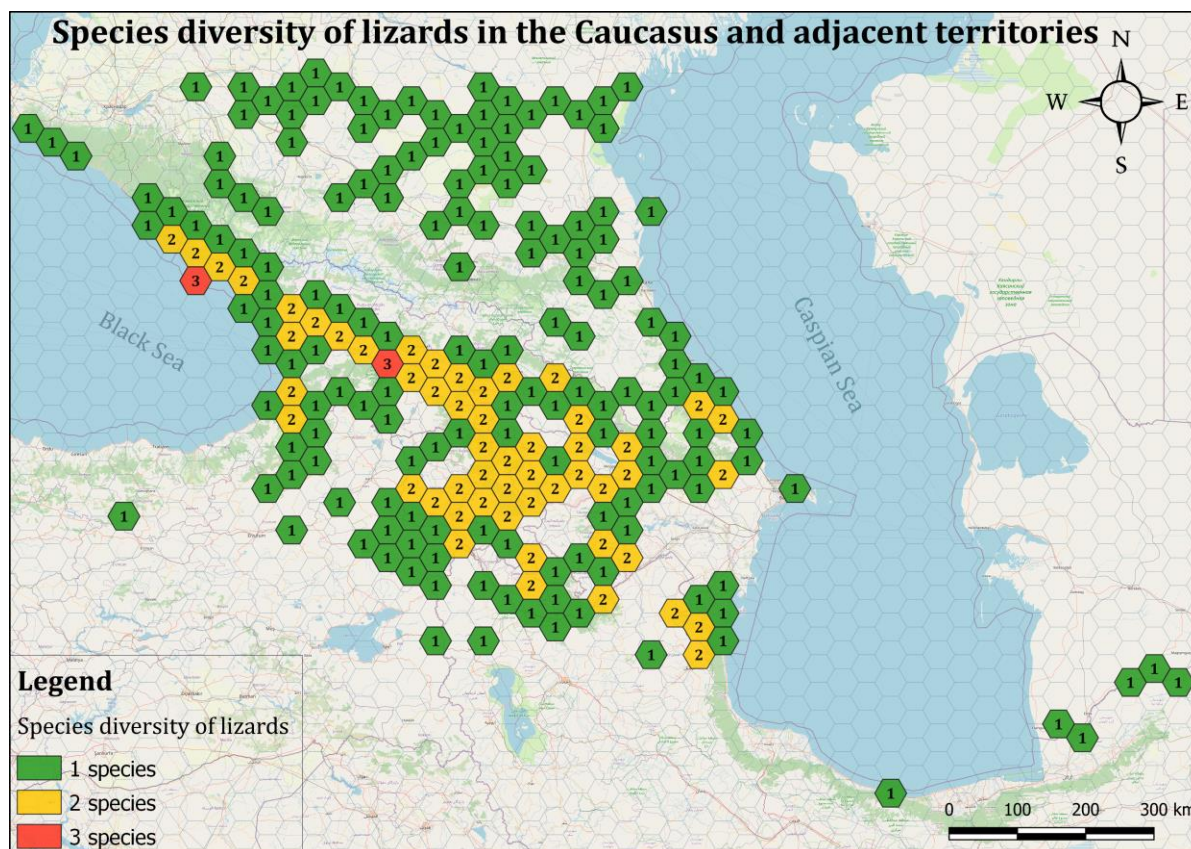


Fig. 7. Map of species diversity of lizards in the Caucasus

4. ANALYSES AND CONCLUSIONS

From the results reported in the previous section we can understand that with the help of the tools of the QGIS program, the stated aim of the project was solved. The result is displayed graphically on the map.

In my opinion, the role of such research is of great importance, for instance, for the development of measures for the conservation and management of wildlife.