

Climate change shows a negative impact on biodiversity, by leading to a decrease in population size, loss of species genetic diversity, changes in species geographical distribution, and as a consequence, species extinction. However, taking into account that species may adapt to a changing environment, predicting how individual species will respond to climate change is a very complex challenge. Due to genetic diversity is an evolutionary basis for adaptation to changing environmental conditions, its estimation seems to be a fundamental aspect in assessing species' sensitivity to climate change.

The steppes are one of the richest and most species-diverse non-forested ecosystems. They are plant formations characterized by a lack of woody species. Steppes are formed in areas under the influence of continental climate - with hot and dry summer and cold winters with strong winds, preventing the development of woody vegetation. Steppes are also a very important repository of genetic resources and at the same time play a very important socio-economic role.

Within our project we decided to take a closer look at steppe species vulnerability and extinction risk in face of climate change, based on analysis of diversity at species- and genetic-level. We will explore the projected range shifts of steppe species and link with genomic data. It will allow us to see what is the contribution of adaptive variation in countering the negative effects of climate change. We will explore the connection between climate change and genetic erosion caused by gene flow via hybridization and introgression.

To do this we will use genome-wide sequencing (and more specifically, the DArTseq method), ecological niche modelling (ENM) as well as meta-analysis. Our research will cover virtually the entire steppe region of Euro-Asia.

Due to the integrative nature of our research, we will be able to predict the multilevel response of steppe species to climate change. The results of this project will help to identify and select steppe species and areas, which will be affected by rapid climate change, and because of it should be a priority for conservation. Thereby, the results will be helpful with improving the planning of future protection of steppe habitats and species.