NGC - Next Generation Conservation: preserving the continuum of life in space and time

Given the present biodiversity crisis and the limited resources to preserve it, one of the major international goals is to improve the status of biodiversity by safeguarding species and genetic diversity in conservation areas¿ networks (Convention on Biologic Diversity Aichi Targets - strategic goal 6). Standard conservation prioritization approaches use species as currencies for biodiversity, disregarding that some species are more similar to each other than others, and that intra- specific genetic diversity is essential to allow adaptation to environmental changes and maintenance of evolutionary processes. Evolutionary processes and adaptive potential are often overlooked since phylogenetic and genetic data are unavailable for most organisms. Thus, addressing evolutionary processes in conservation planning requires understanding of historical processes that shaped current spatial biodiversity patterns to identify effective surrogates. This project aims at developing a novel and general framework to assist in delineating priority conservation areas, optimized to preserve biodiversity at different evolutionary levels, while accounting for adaptive potential and evolutionary and spatial dynamics under climate change. To develop this framework, we will study spatial patterns of diversity of Iberian amphibians at different evolutionary levels (inter- and intra-specific) to infer the historical, geographic and environmental factors underlying those patterns. We will then investigate whether the relevant factors may constitute effective surrogates for genetic diversity in data-limited taxa, and develop generalized conservation planning rules based on our findings. We will combine molecular, spatial and decision analyses in order to answer the following questions: Are species distributions efficient surrogates for inter- and intra-specific diversity? Which environmental or geographic variables can be used as efficient surrogates for inter- and intra-specific diversity? Are priority conservation areas identified based on neutral diversity alone also suitable to preserve the adaptive diversity? How can we optimize priority conservation areas to simultaneously preserve inter- and intra-specific diversity (both neutral diversity and adaptive potential)? Which areas should be preserved and managed in order to represent and ensure persistence of overall evolutionary amphibian diversity in the IP while accounting for predicted future climate changes?