

PROPOSAL OF FINAL PROJECT

year 2021–2022

Research group or lab:

Institution: Departament de Biologia Evolutiva, Ecologia i Ciències Ambientals

Supervisor(s): Antigoni Kaliontzopoulou, Urtzi Enriquez-Urzelai

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Title of the project: Diversification of the Palearctic true frogs (*Rana*): geography, climate and morphological evolution

Tasks: This project will use published phylogenetic, climatic and morphological data to test hypotheses about the evolution of brown frogs of the genus *Rana*. To this end, the student will first compile all published data, and then use biogeographic and comparative analytical techniques to test specific hypotheses. Therefore, the main tasks of the project are data treatment and statistical analyses for addressing evolutionary hypotheses. The student is expected to produce a manuscript for publication at the end of this TFM.

Physical work address: Departament de Biologia Evolutiva, Ecologia i Ciències Ambientals and remotely

Training requirements: Some familiarity with the R statistical environment, or at least a strong will to learn; good use of English; high motivation for the objectives of the project.

Description of the project:

This project will integrate phylogenetic, morphological and climatic niche information to investigate the processes underlying species diversification and phenotypic evolution in the genus *Rana* (brown frogs) and compare these processes in the two radiations that occurred in it: one in the Americas and the other in Eurasia. Specifically, based on a published phylogeny and available morphological and climatic data, we will use phylogenetic comparative methods to evaluate the relative role of ecological, geographic and evolutionary factors in shaping these two radiations. The main objectives of the project are: 1) to reconstruct the biogeographic history of the two radiations within *Rana* and investigate the role of geographic barriers in each continent; 2) to test whether diversification rates varied through time and between the two radiations, or whether they are instead uniform; 3) to study body size and ecologic niche evolution, and their potential role in shaping species diversification. Using this remarkable model system, this study will provide a better understanding of the evolutionary processes that shape the distribution of biodiversity across different geographic areas.

Comments: This is a project largely focused on database development and computational techniques, taking advantage of published data. It is adequate for a student motivated to learn and develop her/his skills in evolutionary analyses, and it can be largely conducted remotely, if necessary, with regular meetings with the supervisor to steer the project.