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Remoteness and richness of reptile communities in the Western Palaearctic

The knowledge of species distribution is largely incomplete, and known biodiversity can be particularly low in remote areas. The aim of this study was evaluating the importance of remoteness of a region in determining known species richness of reptiles. We analyzed the relationships between the richness of three major groups of reptiles (turtles, amphisbaenians and lizards), bio-climatic variables and accessibility in the Western Palaearctic. We mapped on a grid the presence records for 480 native species in the Western Palaearctic, and we used spatially explicit methods (spatial eigenvector mapping and Bayesian autoregressive models) to build regression models. For each grid cell, accessibility was measured as the average travel time to the nearest city. Reptile richness was highest in areas with wide elevation range, high average temperature and annual precipitation. Reptile richness was also associated with intermediate cover of natural vegetation, and limited evapotranspiration. Furthermore, when taking into account environmental variables, known richness was strongly related with accessibility, and decreased in the most remote areas. We identified areas where climatic features would suggest high reptile richness, but in which accessibility is low. In these areas, actual richness is probably higher than the known values. Within the study area, known reptile richness is lower than expected in the Western North Africa, in the South of the Arabian peninsula and in the Central Asia mountains. Integrating accessibility measures into ecological models can help to identify areas where focusing monitoring and conservation actions.

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Mingling among the *Darevskia raddei* cimplex

Due to its geographic location, the Caucasus region connects species from three different continents in a heterogeneous landscape, creating an environment prune to the development of speciation events and multiple endemisms. Among them, the lacertid genus *Darevskia* is a group of rock lizards radiating and diversifying in the region. Among their highly polymorphic members a number of parthenogenetic forms are present result from the hybridisation between bisexual *Darevskia* species. However, the origin of these forms lacks an explicit spatiotemporal context. One of the most interesting bisexual species in the group is *Darevskia raddei* which is responsible for the motherhood of some unisexual forms, namely *D. unisexualis, D. uzzeli* and *D. bendimahiensis* and *D. sapphirina*). Fruthermore, this species is considered conspecific to *D. nairensis* and *D. (raddei) vanensis*, two forms of unclear status which link to the parthenogenetic forms need to be clarified. This, this study aims to reach a global comprehension of the three putative bisexual taxa within of the *D. raddei* complex (*D. raddei, D. nairensis* and *D. (raddei) vanensis*), and their phylogenetic relationships with the parthenogenetic forms they theoretically parented. A phylogenetic analysis was conducted on samples of the *D. taddei* complex, ranging from Turkey, Armenia, Georgia and Iran. Maximum Likelihood and Bayesian methods were applied on a combination of mitochondrial and nuclear

markers. Namely, three mtDNA (cytochrome b, ND4 and 12s) and two nDNA (MC1R and c-mos) markers were used. Our results confirm that *Darevskia raddei* (sensu lato) is the proposed maternal species for at least *D. unisexualis, D. uzzeli, D. bendimahiensis, D. sapphirina* and *D. rostombekowi*, as already supported by previous studies. However, it does not support a genetic differentiation between the three forms described within the complex, which are to be considered conspecific. Moreover, there is reinforced evidence that the three parthenogenetic forms considered arose more than once in the history of the genus, from different lineages of the bisexual parents.

E. García-Muñoz & M.A. Carretero

"ECO-SCIENCE": influence of climate change on the adverse effects causes by pesticides, using amphibians as a model. First results

Over the past thirty years, climate change has produced an enormous biodiversity loss as well as a shift in species distribution ranges. Amphibians epitomize the modern biodiversity crisis, and global climate change may be directly and indirectly responsible for amphibian's decline. Although amphibians are considered less sensitive to direct temperature shifts than other groups, small changes can trigger cascade effects when thermal disturbance is combined with pollutants. Among these indirect consequences, temperature changes have been demonstrated to modify the lethal and sublethal effects of contaminants in biota. Most studies addressing the adverse effects posed by contaminants to several amphibians species have been performed at moderate, constant ambient temperature of approximately 20 ºC, which is an oversimplification of what happens in the environment. In fact, there is fragmental but strong evidence suggesting that temperature induces changes in acute toxicity of chemicals. This information is essential because only the interaction between environmental factors and the ecosystem into which the pesticides are introduced will determine the real ecotoxicological implciations of such pesticides. Much of the interest on amphibian global declines is currently focused on the role of pesticides as single causative factors. Now, studies as the one proposed here, exploring the interactions between climate change and pesticides contamination, will provide a better understanding of the responses of species to future environmental changes and, hence, the basis for prevention, management and mitigation measures. As a first step in this research, we studied the effects of a widespread fungicide (Carbendazim) in different developmental stages of *Bufo calamita*, a widespread amphibian, at three different temperatures. Result showed that an increase of temperature turn lethal sublethal concentration. In addition, the combined effects of temperature and chemical increase the proportion of malformed individuals. These first results, hence, support the hypothesis of synergy been contaminants and global warming. The implications of climate change on the adverse effects causes by pesticides in amphibians are discussed.