

Titre du stage : Physiological indicators of population extinctions in wild lizards

Niveau du stage : M2 Recherche

Laboratoire d'accueil : Station d'écologie théorique et expérimentale, UMR 5321, Moulis, Ariège (<http://www.ecoex-moulis.cnrs.fr/>)

Responsable du stage :

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Références bibliographiques dans le domaine

1. Bestion, E., Teyssier, A., Richard, M., Clobert, J. & Cote, J. (2015). Live Fast, Die Young: Experimental Evidence of Population Extinction Risk due to Climate Change. *PLOS Biol.*, 13, e1002281
2. Le Galliard, J.F., Massot, M., Baron, J.P. & Clobert, J. (2012). Ecological effects of climate change on European reptiles. In: *Wildlife conservation in a changing climate* (eds. Brodie, J., Post, E. & Doak, D.). University of Chicago Press, Chicago, pp. 179–203
3. Monaghan, P. (2014). Organismal stress, telomeres and life histories. *J. Exp. Biol.*, 217, 57–66
4. Sinervo, B., Mendez-de-la-Cruz, F., Miles, D.B., Heulin, B., Bastiaans, E., Villagrán-Santa Cruz, M., et al. (2010). Erosion of lizard diversity by climate change and altered thermal niches. *Science* (80-.), 328, 894–899

Description du stage

Summary

An increasingly number of species are on the verge of extinction due to human activities. Although the pace of population extinction is higher than expected, monitoring population dynamic in the wild is often complicated or impracticable. Therefore the identification of ecologically relevant biomarkers of population state has recently become a central focus in conservation biology. Recently, we found that telomere length (i.e., non-coding DNA sequence protecting chromosomes) was an extremely promising marker of population extinction risk in the wild Common lizard (*Zootoca vivipara*). Our study also suggested multiple causes of telomere shortening ranging from genetic inheritance to multiple environmental 'stressful' conditions experienced in early life. During this master project, we want to depict the correlation with other physiological stress markers (oxidative stress measures) and to determine the maternal inheritance of telomere length. The study will include both cross-sectional comparative measures and experimental approaches.

Key objectives:

1. Examine the inter-population variation of telomere length in adult females and in their neonates, and the mother/neonate correlation.
2. Examine the inter-population variation in oxidative stress and the potential correlation with telomere length.
3. Determine the maternal effects resulting from experimental exposure to two thermal treatments during pregnancy.

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Study species and populations

The common lizard (*Zootoca vivipara*) is a small lacertid (adult body size ~ 50-70 mm), broadly distributed in all Eurasia and particularly found in cool-humid areas. In this study, we sampled 24 pregnant females (i.e., viviparous form) per population in the Massif Central region in France during the activity season in June 2017. Each population was characterized by key environmental determinant of extinction: relative changes in lizard abundance, altitude and microclimatic temperatures. We collected blood samples immediately after capture in all females. Due to impossibility of blood sampling in neonates, we collected a small portion of the neonate tail instead since this tissue was metabolic active in developing embryos. The candidate will be in charge to measure the blood indicators of oxidative stress measures (kit methods) and oxidative damage to DNA in female blood. Diverse measures will be also collected from neonate tail. The telomere measures will be realised in parallel thanks to a collaboration with Frédéric Angelier (CEBC, CNRS).

This internship will be supervised by Andréaz Dupoué (SETE Moulis, CNRS & iEES Paris, CNRS) and Jean Clobert (SETE Moulis, CNRS). The candidate should move at different places.

Candidate profile

Motivation and implication will be the key determinant of the selection procedure. Ideally, we would like this internship to apply for a PhD grant at SETE Moulis on a similar thematic (i.e., ecophysiological responses to extinction in the Common lizard from Massif Central) so the resume should include the details about the student academic results. Knowledge in ecophysiology, evolutionary biology, herpetology, and basic skills in lab and fieldwork will be appreciated.

Funding

This project is funded by the Agence Nationale de la Recherche (ANR); research project AQUATHERM that associates the CEREEP-Ecotron IleDeFrance (Saint-Pierre-lès-Nemours), iEES Paris, CEBC (Chizé) and the SETE Moulis (Saint Girons).

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