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Object: Post-doc position

Experimental evolution of the transcriptome in the fungus *Zymoseptoria tritici* in response to stable and fluctuating environmental conditions

A post-doctoral researcher position (12 month, renewable once) is available to work in collaboration with both of our groups from April 2023.

Project Organisms react to changes in their environment by adjusting the expression of their genes. This happens at two radically different time scales: during the individual lifetime, and an evolutionary time scale, as a consequence of adaptation. We are interested in understanding how these two processes interact, and how the structure of gene regulatory networks constrains or facilitates the response to changing environments.

Our model species is *Zymoseptoria tritici*, a fungal plant pathogen that can be cultivated as yeast-like clones in lab conditions. Previous experiments have demonstrated that the adaptation of this species to different temperature conditions (including cool, warm, and fluctuating temperatures) was quick, and RNAseq analyses before and after experimental evolution evidenced deep changes in the transcriptome as a consequence of the experimental treatment. Interestingly, thousands of genes have also lost or gained a sensitivity (plasticity) to temperature.

The objective of this post-doctoral project is to design, run, and analyse a series of experimental evolution studies in which different environmental factors (such as temperature, food, or chemicals) are manipulated to distinguish the roles of adaptation, plasticity, and genetic constraints on the evolution of the transcriptome. Questions to be addressed include (i) How do complex environmental scenarios affect the evolution of the transcriptome? (ii) How do initial gene expression correlations constrain plastic and evolutionary response? and (iii) Is expression plasticity a general feature of the transcriptome, or is its evolution specific to some environmental factors?

Context The position will be part of a 3-year project funded by the French National Research Agency (ANR). The small research consortium includes 2 PIs (Arnaud Le Rouzic and Anne Genissel), a PhD Student, an ANR-funded technician, and the current post-doc. This project aims at understanding and predicting the evolution of transcriptomes under stable and fluctuating selection combining both theoretical and empirical approaches.

The post-doc will be co-advised by both PIs. He/she will be formally based at [EGCE](#) (Institute for Ecology and Evolution, [IDEEV](#)), and will perform the experimental work at [BIOGER \(Agro-Campus\)](#). Both institutes offer an exciting and active scientific life; they are located 3 km apart, on the new research campus of Paris-Saclay, 35 km south of Paris.

Relevant references

Jallet, A. J., Le Rouzic, A., & Genissel, A. (2020). Evolution and plasticity of the transcriptome under temperature fluctuations in the fungal plant pathogen *Zymoseptoria tritici*. *Frontiers in Microbiology*, 11, 573829.

Chevin, L. M., Leung, C., Le Rouzic, A., & Uller, T. (2022). Using phenotypic plasticity to understand the structure and evolution of the genotype–phenotype map. *Genetica*, 150(3-4), 209-221.

Petit, A. J., Guez, J., & Le Rouzic, A. (2022). Correlated stabilizing selection shapes the topology of gene regulatory networks. *bioRxiv*, 2022-08.

Profile We are looking for a motivated early career evolutionary biologist, with a PhD degree obtained after 2018. Previous experience with experimental evolution would be appreciated, including lab work with micro/macro-organisms, basic molecular biology (DNA and RNA extraction), population genetics, and bioinformatics skills.

Application Formal applications (CV and cover letter) have to be sent on the [CNRS job portal](#). Please include a short-list of your favorite publications, representative of prior work.

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