# POST-DOC POSITION

## Role of genetic load in woody plant adaptation (Perfit)

**Starting Date:** July 2022
**Duration:** 14 (+9) months
**Location:** UMR BIOGECO
**Proportion of work:** full-time
**Salary:** depending on experience (2 596 to 3 439 euros gross per month)
**Desired level of education:** PhD
**Experience required:** PhD + postdoc experience

A 14 months (+9) position supported by Bordeaux Plant Science (BPS) research program is available at the UMR BIOGECO in Bordeaux, France. This post-doc position is one of 19 offered positions as part of Bordeaux University excellence BPS program, which will provide access to many scientific events and resources. The successful candidate will work on the project Perfit.

**Job description:**

This postdoctoral project proposes an innovative approach to the study of adaptation in woody plants through the characterization of the role of the genetic load, i.e. the effect of deleterious or disadvantageous mutations, on the response of plants to their environment. These mutations can have deleterious effects on fertility, growth or survival, thus hindering tree populations (domesticated or wild) in their ability to adapt to environmental changes. The deleterious alleles are under negative selection, a form of selection whose role in the architecture of adaptive traits remains little studied in trees.

The postdoc will identify the endogenous and environmental factors that modulate natural selection (positive or negative) and through it, their effect on fitness/productivity in several tree species, from tropical to temperate trees, and from wild to cultivated species. This work will provide a comprehensive view of how genetic load and negative selection modulate adaptation.

**Main activities:**

The postdoc will use already available genomic data from several woody plant species, including temperate forest trees such as maritime pine (*Pinus pinaster*), sessile oak (*Quercus petraea*) and beech (*Fagus sylvatica*), the fruit trees apricot (*Prunus armeniaca*, domesticated and wild) and cherry (*Prunus*

*avium*), grapevine and the rainforest trees *Symphonia globulifera* and *Dicorynia guianensis* to estimate genetic load, the genomic architecture of traits and to study the correlation of genetic load with estimates of fitness components and production traits, e.g. survival, reproduction, productivity, wood quality specialised metabolites and responses to biotic and abiotic stresses.

**Environment:**

The candidate will be based at the UMR BIOGECO in Pierroton (Cestas) and will be under contract to the University of Bordeaux. He/she will have access to the INRAE Genotoul computing cluster. He/she will be supervised by Myriam Heuertz (UMR BIOGECO, Cestas-Pierroton) and Véronique Decroocq (UMR BFP, Villenave d'Ornon), in connection with the project leader Santiago González-Martínez (UMR BIOGECO, Cestas-Pierroton). Regular meetings will be held with the entire consortium for consultation on the analyses to be conducted and interactions on the interpretation of the results.

**Bordeaux** is an easy-going and enjoyable UNESCO world heritage city with many cultural, social, sportive events, famous for its vineyards and only one hour away from marvellous sand beaches.

**Skills:**

We are looking for an evolutionary biologist or bioinformatician interested in molecular evolution. Experience in the analysis of high-throughput sequencing data in a population genomics context is essential. Experience in quantitative genetics will be a plus. The candidate should have a good publication record in line with his/her career stage and good writing skills in English.

**Selection process**: The candidate will submit their application, consisting of a letter of motivation and a CV (including list of publications, if applicable), to Santiago González-Martínez, Véronique Decroocq and Myriam Heuertz **before 2022/05/15**.

**Team/lab website:**
https://www6.bordeaux-aquitaine.inrae.fr/biogeco

**Selected publications:**
📌 González-Martínez, S.C., Ridout, K., Pannell, J.R., 2017. Range Expansion Compromises Adaptive Evolution in an Outcrossing Plant. *Curr. Biol*. 27, 2544–2551.e4.
📌 Groppi, A., Liu, S., Cornille, A., Decroocq, S., Bui, Q.T., … Decroocq, V., 2021. Population genomics of apricots unravels domestication history and adaptive events. *Nature Communications*. 12:3956.
📌 Schmitt, S., Tysklind, N., Hérault, B., Heuertz, M., 2021. Topography drives microgeographic adaptations of closely related species in two tropical tree species complexes. Mol. Ecol. 30, 5080–5093.

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