PhD fellowship (UNIVERSITÄT BORDEAUX)
Bewerbungsfrist: 29.05.2019

Understanding natural establishment of Pedunculate oak (Quercus robur) forest stands in the pine-dominated landscapes of the Landes de Gascogne

SUPERVISORS: Arndt HAMPE (https://scholar.google.com/citations?user=WFzkF44AAAAJ&hl=en)
Santiago GONZALEZ-MARTINEZ (https://scholar.google.es/citations?user=2cTrtvIAAAAJ&hl=en)
RESEARCH UNIT: UMR 1202 BIOGECO (http://www6.bordeaux-aquitaine.inra.fr/biogeco)
Institut National de la Recherche Agronomique (INRA) and Université de Bordeaux

We seek a candidate interested in competing for a three-year PhD fellowship bestowed by the Doctorate School 'Science et Environnements' of the University of Bordeaux. The competition will take place on 2th4th July and consists of an oral presentation of 10 minutes followed by 5 minutes for questions by an interdisciplinary jury. A total of 28 projects will compete for 3 fellowships. The deadline for the submission of applications is 29th May. Candidates should possess a master related with forest ecology or genetics. The competition can be held in English, yet at least basic knowledge of French is recommended because the postgraduate programme at Bordeaux University largely relies on this language. Please contact Arndt Hampe (arndt.hampe@inra.fr) for further informations.

PROJECT DESCRIPTION:

Extensive maritime pine plantations are the dominant landscape element in the Landes de Gascogne (SW France), yet oaks have been vigorously expanding in abundance and spatial extent across the area during the last decades. Spontaneously established oak stands represent important foci of biodiversity within the pine-dominated landscape that exert significant beneficial effects on the health and physical stability of surrounding pine plantations. Promoting natural regeneration of oak across the Landes forest landscape can thus help sustain biodiversity, improve forest resistance to a wide array of natural and anthropogenic disturbances and facilitate management and silviculture. To be successful, natural oak regeneration must be facilitated by simple yet essential measures such as thinning or vegetation control. This requires a sound understanding of the biological mechanisms involved in oak recruitment and the establishment of new forest stands. This PhD thesis will combine detailed demographic field studies with extensive genetic analyses to investigate the dynamics of naturally established oak stands and their ecological determinants in the Landes de Gascogne landscape.

The student will reconstruct the fine-scale establishment history of selected Pedunculate oak (Quercus robur) stands and assess how tree recruitment and gene flow via pollen and seeds shape the genetic structure and diversity of these patches. Exhaustive genotyping with Single Nucleotide Polymorphism (SNP) markers will be combined with phenotypic measurements of relevant functional traits to gain insights into their short-term evolutionary potential. The project will enable the student to receive training in a research unit with outstanding molecular, quantitative genetic, and ecological know-how of the model species and facilities for high-throughput analysis in forest tree genomics. Field studies will involve the mapping and monitoring of target plants as well as the design and execution of experiments. Data analyses include the use of geographic information systems, spatial and landscape genetics analyses, as well as pedigree reconstructions and estimations of quantitative genetics parameters. The PhD project will provide the student with cutting-edge expertise within a field of rapidly growing interest – ecological forest genomics - and enable him/her to integrate joint genetic and ecological thinking in the design and development of future research programs.

The PhD thesis is closely associated to the EU-funded research project "Unraveling the potential of spontaneous forest establishment for improving ecosystem functions and services in dynamic landscapes" (SPONFOREST). This project is coordinated by the main supervisor and involves eight research teams from France, Spain, Portugal and Germany. The student will be integrated in the project consortium and experience regular exchanges with internationally renowned experts and with other students from the different partner teams (including the participation in formal project meetings).