



Evolutionary Conservation Genomics: Investigating local adaptation in the spring leaf phenology of European white oaks



Brief Description

Each decade, tree leaves are starting to develop earlier in Spring because of our warming climate. The timing of bud opening and leaf growth is an important fitness trait. Early budburst increases the growth period, but risks leaf damage from late frost. The timing of budburst is determined by the environment and by local genetic adaptation. The ACORN (<https://www.acorn-biodiversa.net/>) project at WSL is looking at local adaptation in three species of European white oaks (*Quercus* spp.) to help guide future oak seed movement and planting. As trees are sessile, 'assisted migration' through movement of seeds is a key way to prepare forests for the future. To study adaptation in white oaks, we have established three common garden experiments (WSL/Vienna/Ankara) of three species of white oaks collected from across Europe. This common garden will form the basis of Genome-Wide Association Analyses (GWAS) and quantitative genetic studies of fitness-related oak traits.

In this Master thesis, you will look at budburst variation within the WSL common garden to identify differences in spring leaf development between oak species and provenances, and perform a GWAS analysis to map the genes that potentially control this trait. The aim is to improve our understanding of variation in white oak budburst across Europe, so that we can incorporate this trait into guidelines for future plantings. In this project you will work in the experiment at WSL measuring spring budburst (this occurs from April to early June) and work with genomic data.

Requirements

You have a background in biology, environmental science, or bioinformatics. Understanding of evolutionary biology/ecology is essential. You have knowledge of population genetics and evolutionary genomics. Experience in a programming language (R/python/bash) and willingness to learn bioinformatic skills is important. You are an independent worker with good time management skills. You must be available for data collection in Spring 2023. Disabled and minority applicants are welcome. Please get in contact if you are interested.

Offers

You will work in a team of world class evolutionary and conservation genomics researchers, who will provide support in the conceptual and analytical aspects of the thesis. Dr Deborah M Leigh will supervise the thesis in collaboration with Dr Christian Rellstab. Your working place will be at WSL Birmensdorf. The working language of the lab is English.

Contact

Deborah Leigh deborah.leigh@wsl.ch / Christian Rellstab christian.rellstab@wsl
<https://www.wsl.ch/de/mitarbeitende/leigh.html>

Time

Spring 2023 on.