

Internship title				
Influence of sex and environmental conditions on the dynamics of wood formation in Cordillera cypress				
		M2	Semester	S10
Host laboratory		Silva (UMR 1434 AgroParisTech, INRAE, Université de Lorraine)		
Internship location		INRAE Grand Est – Nancy center, Champenoux		
Name of internship supervisors			Cyrille Rathgeber Anne-Sophie Sergent	
Spéciality	AFEE	SGUEI	ACGPP	CRE
Summary of the internship				
<p>Scientific background</p> <p>The Cordillera cypress is an endemic conifer species of the Patagonian Andes whose geographical range covers contrasting climatic conditions. Patagonia is affected by both strong warming (mainly caused by the depletion of the ozone layer on the regional climate) and a significant reduction in the amount of annual rainfall. These climatic disruptions are affecting the cypress forests of the Cordillera, which are experiencing high mortality and major dieback throughout their whole distribution range.</p> <p>We monitored the xylogenesis of Cordilleran cypress in order to better assess its sensitivity to environmental factors and to detect the first signs of decline. In particular, we will examine the influence of environmental conditions (mesic vs. xeric sites), climatic variations (contrasting growth years) and individual development (male vs. female trees) on the dynamics of wood formation.</p> <p>Aim of the internship</p> <p>The main objective of the course will be to assess the influence of the sex (male or female) of the trees studied on the dynamics of wood formation, the final structure of the ring formed and sensitivity to climate.</p> <p>Material and method</p> <p>For four years, from 2018 to 2022, we monitored the growth of Cordilleran cypress trees growing in a closed, mixed and irregular forest on a hill near San Carlos de Bariloche (Patagonia, Argentina). Each year, we selected around twenty healthy, dominant trees, equally divided between males and females on two plots: one mesic and one xeric. Wood microcores were taken regularly (almost every week) from the selected trees throughout the southern growing season. In all, almost 1,700 microcores were collected over the four growing seasons monitored. In addition, in 2018, point dendrometers were installed on four trees near the mesic plot.</p> <p>Expected results</p> <p>In this project, we aim to study how environmental factors affect wood formation, tree-ring structure and the resulting xylem functions, with a particular focus on adaptation to water</p>				

stress in a cold and dry environment. These results will contribute to a better understanding of the mechanisms of drought-induced mortality in Cordillera cypress. The trainee will focus more specifically on the question of the effect of sex and site conditions on the dynamics of wood formation.

Operational Context

This internship is part of the Lahuan project (funded by the ARTEMIS Program of the Lorraine University).

Duties and tasks of the trainee

This course will include

- Learning to preparing microcores for anatomical sections;
- Learning to make anatomical sections;
- Observing anatomical sections, classifying and counting xylem cells in formation;
- Carrying out morphological measurements and characterising the structure of tree rings;
- Analysis of the anatomical data obtained;
- Analysis of dendroecological data already acquired;
- Presenting and interpreting the results;
- Writing a summary report in the format of a scientific article.

Skills to be acquired/developed during the course

During this course, the trainee will be able to develop his skills in:

- Wood anatomy laboratory techniques;
- Microscopy and image analysis;
- Data analysis, data presentation, R programming language;
- Scientific writing and presentation of results;
- English.

Skills we're looking for

The candidate will need to demonstrate good interpersonal skills, organisational skills and autonomy in order to interact with the research team and the different project stakeholders and report on his/her work.

The candidate should have a basic knowledge of:

- Forest ecology and wood anatomy;
- Data analysis, data presentation, R programming language;
- Scientific writing and presentation of results;
- English language skills.

Contact

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Start of the internship:
From January to March

End of the internship:
June or September