



NEW!
Starting **Oct-Dec 2021**
(Fieldwork travel)

2* MSc THESIS TOPICS

GROWTH RESILIENCE TO DROUGHT IN MIXED FORESTS PLANTATIONS : effect of tree diversity, climatic and site conditions in multiple species

Tree diversity can improve the **resilience** of forests plantations to increasing **drought stress** expected under CC. However, tree species mixing can have contrasting effects on tree and stand functioning depending a) the trait profile of the tree species and mixture composition, and b) the growth and climatic conditions in the pre-/post-drought period. The aim of this study is to improve our understanding of the effects of tree diversity on the **radial growth** response (**resistance, recovery, resilience, sensitivity**) to recent droughts.

Methodology and Workload

- **Fieldwork** wood-coring campaign (**Oct-Dec 2021**)
- **Dendrochronological** analysis by measuring tree ring width, wood density and wood anatomy (**Spring 2022**)
- Statistical analysis to determine the radial growth responses to drought and tree diversity effect

Prerequisites:

- Interest in fieldwork and new methods in dendrochronology (Xray scanning, wood anatomy)
- Availability for travelling in **Oct-Dec 2021**
(5 travels of ca. 1 week each, flexible dates)
- Basic knowledge of statistical analysis (R software)
- Fluency in English
- Willingness to work in a team and independently

OPPORTUNITIES:

- **Fieldwork and travel** to different sites in Europe (GER, BEL, FRA, AUT)
- **Participation in the largest network of tree diversity experiments (TreeDivNet)**
 - Development of new dendrochronological approaches
- **Collaboration with multiple scientific partners in an international project**
 - Possibility to publish in international scientific journals

MORE INFORMATION:

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Chair of Silviculture
University of Freiburg

mixforchange.cirad.fr
treedivnet.ugent.be

NEW – starting
Date flexible from
February 2021



2* MSc TOPICS

TREE DIVERSITY, FERTILIZATION AND DROUGHT EFFECTS ON FINE ROOT PRODUCTION

Background and aims

Fine roots are a neglected part of ecological research, although they respond quickly and dynamically to environmental change and play an important role in nutrient and carbon cycling. So far, the positive relationship between tree diversity and ecosystem functioning is predominantly analyzed for aboveground processes. Thus, the overall aim of this study is to enlighten the belowground dynamics in response to tree diversity, N+P fertilization and drought (2019) and disentangle the effects of different tree diversity levels from tree identity effects.

Methods and work load

- Analysis of already excavated root biomass, species identity and morphology (including image analyses with WinRhizo, etc.) ~ two months, **starting from February or later**
- statistical analyses and writing the thesis

Prerequisites

- Interest in lab work and statistical analyses
- Fluency in German and/or English
- Willingness to learn new methods and work in a team as well as independently

We offer:

Participation in the largest network of tree diversity experiments worldwide
www.treedivnet.ugent.be

Interesting work in the root lab of the Chair of Silviculture, contributing to the IDENT experiment Freiburg

Possibility to publish in international scientific journals



MORE INFORMATION:

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Chair of Silviculture

Master thesis – Tree-related microhabitats in Oriental beech (*Fagus orientalis*) and Northern red oak (*Quercus rubra*)

Albert-Ludwigs-Universität
Freiburg

Institut Waldbau/ Chair of
Silviculture

If you are interested, please
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Freiburg, 14.10.2020

Tree-related microhabitats are recognised as important substrates and structures for biodiversity in forests. The retention of both existing and future tree microhabitats is one important aspect to take into consideration in forest management. Giving tree microhabitats increased attention will help sustain and increase the habitat value for biodiversity also in managed forests. ¹

The master student will help to collect data for *Fagus orientalis* and *Quercus rubra* in the field, based on a catalogue of tree microhabitats. The evaluation of the data will result in tree species related models for the abundance of microhabitats.

Requirements:

- Enjoy field work, also under difficult conditions (cold, steep etc.)
- Solid background in forest ecology
- Drivers' license
- Basic knowledge of statistical analysis (preferably R software)

Timing:

- Data collection will take place in:
 - Fall 2020/Spring 2021



¹ Kraus, D., Bütler, R., Krumm, F., Lachat, T., Larrieu, L., Mergner, U., Paillet, Y., Rydkvist, T., Schuck, A., and Winter, S. 2016. Catalogue of tree microhabitats – Reference field list.

Masterarbeit - Baumbezogene Mikrohabitate in Orientbuche (*Fagus orientalis*) und Roteiche (*Quercus rubra*)

Baumbezogene Mikrolebensräume sind als wichtige Substrate und Strukturen für die biologische Vielfalt in Wäldern anerkannt. Der Schutz sowohl bestehender als auch zukünftiger Baum-Mikrohabitate ist ein wichtiger Aspekt bei der naturnahen Waldbewirtschaftung. Die Masterarbeit trägt dazu bei Baum-Mikrohabitaten mehr Aufmerksamkeit in nicht-heimischen Baumarten zu widmen, umso Habitatstrukturen für die biologische Vielfalt in bewirtschafteten Wäldern besser einschätzen zu können.¹

Der Master-Student wird dabei helfen, Daten für *Fagus orientalis* und *Quercus rubra* im Feld zu sammeln, basierend auf einem Katalog von Baum-Mikrohabitaten. Die Auswertung der Daten wird zu baumartenbezogenen Modellen für die Häufigkeit von Mikrohabitaten führen.

Anforderungen:

- Freude an der Feldarbeit, auch unter schwierigen Bedingungen (kalt, steil etc.)
- Gute Kenntnisse der Waldökologie
- Führerschein
- Grundkenntnisse der statistischen Analyse (vorzugsweise R-Software)

Zeitplan:

- Die Datenerhebung findet statt in: Herbst 2020/Frühjahr 2021



¹ Kraus, D., Bütler, R., Krumm, F., Lachat, T., Larrieu, L., Mergner, U., Paillet, Y., Rydkvist, T., Schuck, A., and Winter, S. 2016. Catalogue of tree microhabitats – Reference field list. Integrate+ Technical Paper. 16p.

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Bei Interesse bitte melden
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Freiburg, 14.10.2020