

Ph.D. project

« The beginning at the end. Ageing and regeneration in native pines: resilience and vulnerability to a changing environment »

Context

Forests play a key role providing products, functions and services, harbouring a large part of terrestrial biodiversity, as well as being an essential tool for the mitigation of climate change and their derived impacts [26]. Forest dynamics analysis focuses on the different processes defining the life cycle of forest and trees: regeneration, competition, exclusion, maturity, senescence, decay and mortality. Research on forest ecology analyses focuses on the more or less steep change between phases, and on how the forest responds to different natural disturbances and environmental drivers, ranging from small scale gapopening to large scale processes involving fires, pests or drought. On the other hand, research on forest management uses the scientific knowledge from forest ecology to propose management alternatives mimicking the natural processes of forest dynamics. These alternatives aim to guarantee both the continuity of forest cover, as well as the provision of the ecosystem services that Society demands from forests. Traditional forest management has mainly focused on the intermediate phases of forest development, aiming to keep the forest in a spatio-temporal balance between the stand initiation, the stem exclusion stages and the stand understory reinitiation phases [59]. However, the dynamics associated with old-growth stages have been commonly ignored. In addition, regeneration management has aimed to promote a homogeneous renovation of the stands by different cuttings or even plantations, with little attention paid to regeneration alternatives focusing on increasing complexity or diversity of the stands. The BEGINPINE Project aims to fill in the gap in the scientific knowledge concerning the dynamics and management proposals of old-growth- and the stand initiation phases in pine forests. The project will focus on defining the role that old-growth forests may play under the current framework of multifunctional forest management and global change, and on providing effective tools that guarantee natural regeneration of managed forests.



Objectives and Methodology

The BEGINPINE Project aims to continue and deepen into the two main lines of the previous OLDPINE project (<https://oldpine17.wixsite.com/spain>): (i) to analyse the dynamics, relevance, vulnerability, ecosystem service provision, and management of old-growth pinewoods and (ii) natural regeneration of pinewoods. In the OLDPINE project we fixed the basis for comparing different functional mechanisms (resilience facing climate change, growth, **reproductive capacity, biomass allocation...**) among oldgrowth and young forests of *Pinus nigra*, *Pinus sylvestris* and *Pinus pinea*. Moreover, in OLDPINE we installed three new natural regeneration experiments on *Pinus pinea* in Andalusia, *P. sylvestris* in the Spanish Central Range and *P. pinaster* in inner Spain, and maintained the previously existing trials on natural regeneration for *Pinus pinea* in inner Spain.

Keywords: old-growth forests, forest dynamics, sustainable forest management, forest ecology, regeneration, climate change.

Location: The student will be based in Spain and Canada. In Spain the student will stay at the Department of Agroforestry Sciences at the University of Huelva (Spain). (www.uhu.es) and will be enrolled in the doctoral programme on Environmental Sciences, benefiting from a wide portfolio of courses on scientific and soft skills. In Canada, the student will stay at GREMA (Amos Campus- UQAT, <https://www.uqat.ca/recherche/grema/>) at the Forest Research Institute (IRF; <https://www.uqat.ca/programmes/irf/>) at the Amos campus of the Université du Québec en

Abitibi-Témiscamingue. The IRF is dynamic, multicultural and international and provides a quality environment for students to develop their research, with 12 professors and more than 60 graduate students working on very diverse topics such as forest dynamics, silviculture, genetics, biodiversity, ecophysiology and sustainable forest management. IRF students also benefit from professional development resources and opportunities (scholarships, participation in conferences, workshops) offered by the Centre for Forest Research (www.cef-cfr.ca). In addition, the student will be a member of the cold forest- international research group (<https://forets-froides.org/>), the Chair in Sustainable Forest Management (<http://chaireafd.ugat.ca/>) As part of this project, the student will also have the option of completing an international internship funded with our collaborators in Europe or Canada.

Supervision: Javier Vázquez Piqué (<http://www.uhu.es/franciscoj.vazquez>) and Miguel Montoro Girona (<https://bit.ly/34LfttX>)

Funding: \$23,000 annual scholarship for 3 years.

Preferred qualifications:

- Education: Master's degree in ecology or forestry with an interest in natural disturbances and silviculture effects in a context of sustainable forest management in the face of climate change.

- Requirements: Driver's license, ability to work in a multidisciplinary team and to carry out field work in remote locations. Skills in statistical analysis and scientific communication will be taken into account in the selection process. We are looking for a dynamic, autonomous, responsible and motivated person. The applicant has to be systematic and accurate, in combination with a curious and critical approach, be good at cooperation and at the same time able to work independently.

- EDI's principles: Priority will be given to candidates from under-represented groups (Aboriginals, ethnic and visible minorities, LGTBI, women).

Start date: March 2024

Project collaborators: Reyes Alejano (UHU), Anabel Calzado (UHU), Rafael Calama (CSIC-INIA), Marta Pardos (CSIC-INIA)

Are you ready to begin your Ph.D. on this fascinating topic? Send (1) your CV including contact information of three references, (2) a cover letter outlining their academic background and research experience, as well as (3) a academic transcript to Javier Vazquez Piqué (jpique@uhu.es) and Miguel Montoro Girona (miguel.montoro@ugat.ca). Review of applications will start on January 15, 2024 and continue until the position is filled.

A professional adventure in the great mediterranean and boreal forest awaits you!

Links :

- City of Amos : <https://amos.quebec/>
- City of Huelva (<https://turismo.huelva.es/en>)