

CEF - Forest Research Center



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News

The International Day of Forests and the second anniversary of Coffee with Science: these were some of the many events that CEF researchers were involved in.



Research

The CEF researcher, Helena Pereira, was interviewed by APCOR to talk about her research into cork and cork oak.



Soon in CEF

Don't miss the next editions of Coffee with Science. Save the dates of these and other events that are going to involve CEF or CEF members on the next months.



PhD Thesis

"Effects of grazing exclusion and shrub encroachment on the ecosystem ecology of evergreen oak woodland" - This was the title of the thesis defended by Xavier Lecomte.



Publications

Take a look to the publications of CEF investigators on the last months.

HIGHLIGHTS



New CEF Coordinator

José Guilherme Borges

The Forest Research Centre (CEF) held the election for its Coordinator June 11-12. Professor José Guilherme Calvão Borges, Associate Professor at the School of Agriculture in the area of Forests and Forest Products was elected as the new CEF coordinator, succeeding Professor Margarida Tomé.

José Guilherme Borges has a Ph.D. from the College of Natural Resources of the University of Minnesota, USA. His research focus is on methods and systems to support forest ecosystem management planning and the provision of a wide range of ecosystem services.

Seminar

"The role of foresters in preventing and fighting wildfires"

The 2017 fire season has shown how vulnerable forests and rural populations are in Portugal. Increasing the resilience of our forests is largely a technical expertise of foresters. This seminar aimed to show the role of foresters in preventing and fighting wildfires, with the contributions of technicians who perform different functions in central and regional forest services, in municipal forestry offices and in forest landowners association, among others.

The seminar showed that, in the current context, foresters have to deal with complex problems related to major changes in the rural areas and to the severe impacts of forest fires. Their skills are not only the typical ones of forestry, but also others such as land use planning, rural sociology or emergency management.

The meeting was held on April 11 and was organized by the Forest Research Centre. Presentations are available in [CEF website](#).



Click the image above to watch the video about the seminar
"The role of foresters in preventing and fighting wildfires"

HOT TOPICS

The importance of riparian zones to protect and restore rivers



Safeguarding the banks and margins of streams and rivers has a key role in ensuring aspects of river health.

That's the major conclusion from the international paper "[Evaluating riparian solutions to multiple stressor problems in river ecosystems — A conceptual study](#)" published in the *Water Research* journal. The international team, included two researchers from CEF, Maria Teresa Ferreira and Maria do Rosário Fernandes

Protecting, planting and restoring native plants and their habitats alongside rivers provides food for aquatic organisms and prevents high temperatures in the fight against global warming. Bankside 'riparian zones' can also prevent some of the pressures on rivers that arise from activities in their wider catchment – such as farming – but not always.

Rivers provide critical human resources, such as clean water, food and recreation, but are threatened increasingly by pollution, physical modification and over-exploitation. While international efforts, such as the EU Water Framework Directive, aim at evaluating and restoring river health to protect biodiversity and people they are not always effective in reversing damage. A key need has been to evaluate why, and to find the options that work best under different circumstances.

The international team addressed this need during the EU MARS project by reviewing available scientific literature, asking which vegetation types were linked to successful restoration. They also evaluated how riparian management reduced impacts from nutrients, sediments and high temperatures, and whether biological quality could be improved.

While riparian revegetation had limited effects on nutrients, sediments and biological

quality, woody riparian vegetation consistently increased leaf-litter inputs to rivers (a key food source), also improving habitat quality in the form of woody debris and reduced water temperature. Positive effects were greatest where riparian management took place in the upper parts of rivers – where proportionately more river flow is affected by the riparian zone.



Leader of the study, Dr Christian Feld said “Land management such as farming or forestry are essential for the World - but can damage rivers downstream. We therefore need ways to reduce the unwanted effects, and management of the riparian zone has long been proposed as a cost-effective and local solution. Our evidence shows that riparian restoration can be effective in offsetting some problems, but not all. Bigger-scale problems such as pollution from agricultural chemicals or sediments will need bigger-scale solutions applied through improving the management of whole river catchments”.

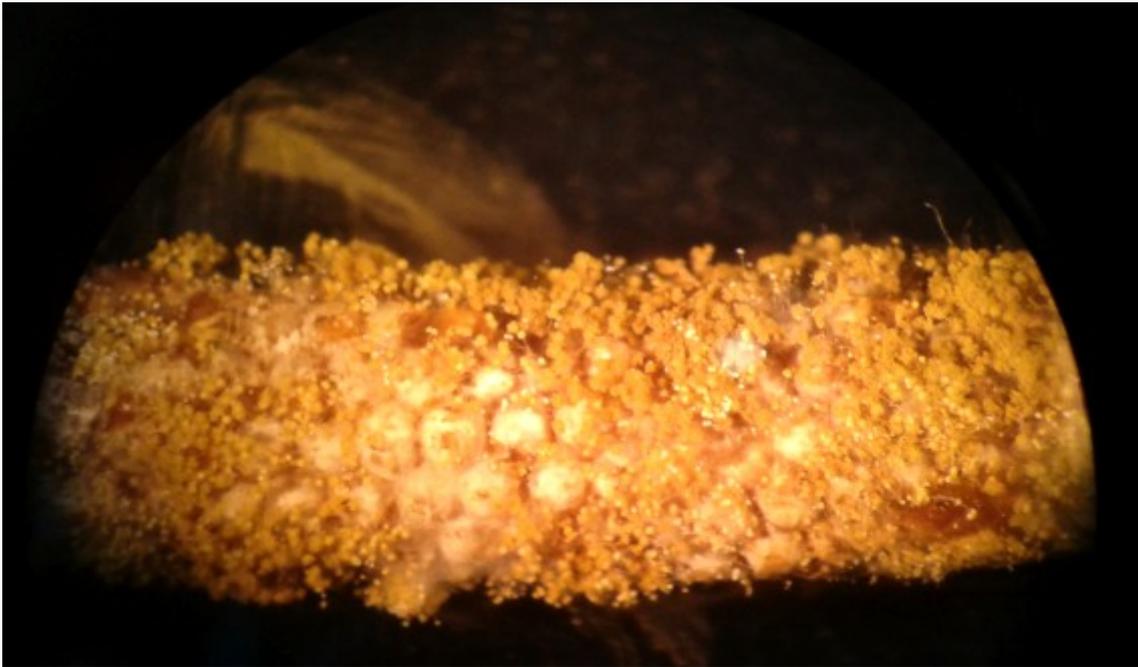
Professor Steve Ormerod - Co-Director of Cardiff University's Water Research Institute and study co-author, added: “This whole issue is one that needs more holistic, ecosystem management. Fresh water is a crucial human resource that needs care, maintenance and sometimes very expensive treatment before it can be supplied to people. Freshwater ecosystems are also losing biological diversity at an alarming rate globally because they are not well protected. We need to step up efforts to balance productive land use against these downstream costs - and our work shows that this needs a blend of local riparian solutions as well as improved large-scale thinking.”

The work was funded by the [EU MARS project](#).

Pine processionary moth: There is a fungus able to kill the eggs and larvae of this pest

The fungus *Metarhizium brunneum* is capable of causing a significant mortality of eggs and young larvae of two species of pine processionary moth (*Thaumetopoea pityocampa* and *Thaumetopoea wilkinsoni*).

This is the conclusion of an international study that had the participation of CEF (Forest Research Centre, School of Agriculture, University of Lisbon). The article, co-authored by the CEF researchers Manuela Branco and Hugo Gonçalves, and also by Arlindo Lima (LEAF, ISA) was published on the journal "[Biocontrol Science and Technology](#)".



During the investigation, bioassays were conducted to determine the susceptibility of egg masses and young larvae of two pine processionary moth species to two strains of the entomopathogenic fungus *Metarhizium brunneum*. Mortality of treated eggs by both strains ranged from 96% to 99% but not all of this was caused by *M. brunneum* since control groups also experienced egg mortality due to saprophytic fungi. Still, larvae hatched in the laboratory from eggs treated with *M. brunneum* were all killed by this fungus, acquiring *M. brunneum* conidia, whereas larval mortality was 0% in the control groups. Young larvae of both pine processionary moth species were also highly susceptible to two two strains of that fungus with larval mortality ranging between 94% and 100%, 8 days post-inoculation, with the vast majority of larvae being killed within the first 2–4 days.

Results were consistent across the two pine processionary moth species, showing that the pathogenicity of *M. brunneum* to both eggs and young larvae might be promising for biological control of these insect pests. The study also showed that non-target parasitoids of pine processionary moth eggs were also susceptible to *M. brunneum*. Further work is required to understand and reduce the *M. brunneum* effect on non-target insects.

Local adaptation to climate change in Europe: An overview

Europe's climate change vulnerability pushes for initiatives such as the European Adaptation Strategy and the associated Covenant of Mayors for Climate and Energy.

What are the triggers and barriers, for which sectors and for which risks and how is adaptation funded?

This paper examines 147 Local Adaptation Strategies in Europe. Key triggers were incentives via research projects, implementation of EU policies and the increasing frequency of extreme climate events. Insufficient resources, capacity, political commitment and uncertainty were the main barriers. Prioritized sectors reflected the main local vulnerabilities - flood protection and water management, built environment and urban planning. Differing patterns of adaptation planning and adaptive capacity were identified among different regions in Europe. Large municipalities generally fund adaptation locally, whereas international and national funding appears to be more important for adaptation in less urban or densely populated territories. The database of LAS described in the present study can be expanded and used to increase the understanding of and promotion of local adaptation action in Europe and beyond.



This article "[Adaptation to climate change at local level in Europe: An overview](#)" was written by a multidisciplinary team within the [ClimAdaPT.Local Project](#), including the CEF researchers Francisca Aguiar and João Silva.



NEWS

ALTERFOR project

3rd cross-project meeting

CEF researchers organized the [ALTERFOR](#) 3rd cross-project meeting. The meeting took place at the Portuguese Catholic University in Porto in the period June 12-14.

This project involves twenty academic and non-academic organizations from nine countries across Europe. It's main goal is to develop innovative and robust approaches to forest management in order to address the challenges of the 21st century.

The meeting encompassed several working sessions with 48 participants from partner organizations and a Travellab visit by 60 national and international researchers as well as Portuguese forestry stakeholders to the case study area in Vale do Sousa. The Portuguese participation in ALTERFOR is coordinated by CEF and involves a non-academic partner, the AFVS (Forest owners' Association of Vale do Sousa).

The ALTERFOR project is supported by the European Comissions' Horizon 2020 research and innovation programme.



New Interreg-Sudoe CERES project

Kickoff meeting



The kick-off meeting of the new Interreg-Sudoe CERES project, took place on the 19th and 20th of April 2018, in Toulouse.

CERES aims to improve connectivity of forest and riparian ecosystems in the SUDOE space and to develop predictive models relating vegetation types with biodiversity, ecosystems services and management actions. The project involves research partners, forest owners' associations and national and local forest authorities, from France, Spain and Portugal.

CEF was represented by the researchers Maria Teresa Ferreira and Maria do Rosário

Fernandes. The other members of the project are Maria Manuela Branco, José Carlos Franco and Pedro Segurado.

"Physiological and molecular adaptation to climate change in forest trees"

Workshop

The CEF researchers, Raquel Lobo-do-Vale and Filipe Costa e Silva, participated in the Workshop "Physiological and molecular adaptation to climate change in forest trees". The event took place from February 26 until March 1, 2018, in Rehovot, Israel.

Raquel Lobo-do-Vale made a presentation with the title "On the variability of cork oak responses to increasingly dry years" and Filipe Costa e Silva talked about "Cork oak stripping: carbon and water balance at tree and ecosystem level".

The workshop consisted in 3 days of working sessions and one field trip to the Yatir Forest and the Dead Sea. It was organized by the Weizmann Institute of Science and the Volcani Center, supported by [EVOLTREE](#) network.

Click in the following [IMAGE](#) to see more photos of the event.



"Inland waters and XXI century challenges"

Conference of the Iberian Association of Limnology

The [XIX Conference of the Iberian Association of Limnology](#) took place from 24 to 29 June 2018, at the University of Coimbra. The focus of the event was "Inland waters and XXI century challenges: from scientific knowledge to environmental management".

Five CEF members participated in this event with oral communications and two posters:

- Francisca Aguiar, M. Rosário Fernandes, Maria Teresa Ferreira. [Tools for macrophyte-based monitoring and research.](#)
- Gonçalo Duarte, Miguel Moreira, Luís da Costa, Paulo Branco, Maria Teresa Ferreira, Pedro Segurado. [The Portuguese Historical Fish Database.](#)

The Special Session titled “Bringing interdisciplinary actions into river and riverine management” was organized by Francisca Aguiar and Rosário Fernandes from the CEF research group ‘ForProtect’.



CEF members (from left to right): Ivana Lozanovska, Rosário Fernandes, Francisca Aguiar, Gonçalo Duarte, Susana Amaral

International Day of Forests

21st March, 2018



Click the image above to watch the video of the celebrations of the International Day of Forests in CEF

The International Day of Forests was celebrated on CEF with a Toast to the Forest.

Such was a moment of informal socialization, with a small break to watch the FAO movie about this year thematic on Forestry "Forests and Healthy cities".

António Fabião, Professor of the School of Agriculture, told us about the story on the Celebrations of the Tree Day, and how it later become the International Day of Forests.

EWLP 2018

European Workshop on Lignocellulosics and Pulp



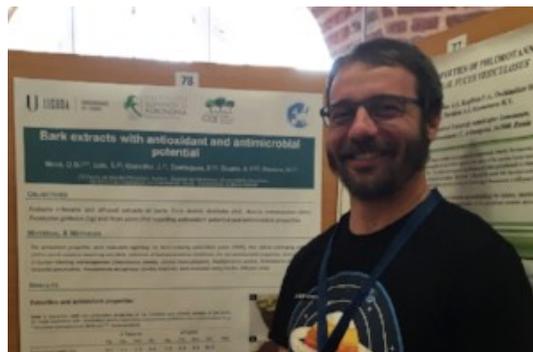
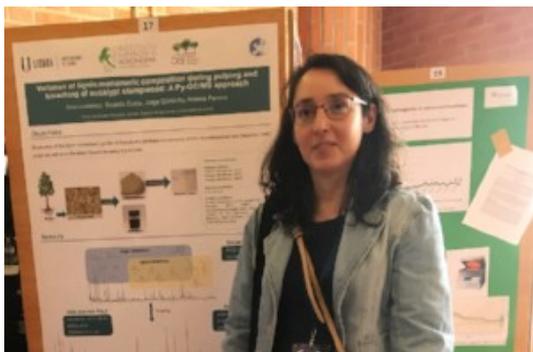
The CEF researcher, Jorge Gominho, participated as speaker in the "15th European Workshop on Lignocellulosics and Pulp", that took place from the 26 to the 29 of June in Aveiro. He talked about "Stumpwood a novel raw-material in the context of biorefineries", a work that had also the participation of two other CEF researchers: Ana Lourenço and Helena Pereira.

The Conference occurs every two years, in a different European city, being a reference for researchers and students for the high standard presentations in the field of lignocellulosics and pulp.

Posters of several researchers of the CEF were also presented in the event:

- Ana Lourenço, Ricardo Costa, Duarte Neiva, Jorge Gominho, Helena Pereira. [Variation of lignin monomeric composition during pulping and bleaching of eucalypt stumpwood: A Py-GC/MS approach.](#)
- Rita Simões, Carla Pimentel, Joana Ferreira, Isabel Miranda, Helena Pereira. Chemical characterization of lipophilic extractives in young phloem of maritime pine (*Pinus pinaster* Aiton) and stone pine (*Pinus pinea* L.)
- Joana Ferreira, Helena Pereira. [Characterization of *Betula pendula* outer bark regarding cork and phloem components in a biorefinary context.](#)

- Duarte M. Neiva, Ângelo Luis, Jorge Gominho, Fernanda Domingues, Ana P. Duarte, Helena Pereira. Bark extracts with antioxidant and antimicrobial potential.



Riparian forests at Eco-Schools

“Do you know what riparian forests are? And why these fragile ecosystems are essential for biodiversity conservation and human well-being?”

Those were the topics of the participation of the CEF researcher Maria do Rosário Pereira Fernandes in a seminar that took place on 21th of March at Colégio Bartolomeu Dias in Loures.

This event was part of the “Eco-Schools” program from the international Foundation for Environmental Education developed in Portugal by ABAE (European Blue Flag Association).

The program, which has the objective of promoting environmental education for sustainability, was attended by an audience of 120 young and curious students.



Chemistry at Lisbon University & 2018 Summer School

26-29 June

The College of Chemistry of Lisbon University (CQUL) brings together researchers, professors and students from 6 Schools of the University of Lisbon with activity in Chemistry, aiming to increase the cohesion and collaboration.

The event was carried out by researchers from Lisbon University, through oral, flash and panel communications, grouped by the different Divisions of the CQUL: Energy & Environment, Life & Health, Materials and Technology & Industry. The “2018 Summer School” aims to provide some in-depth training on special topics delivered by distinguished

invited speakers and to promote contacts of students with academic and industrial sectors.

Posters of several researchers of the CEF were presented in the event:

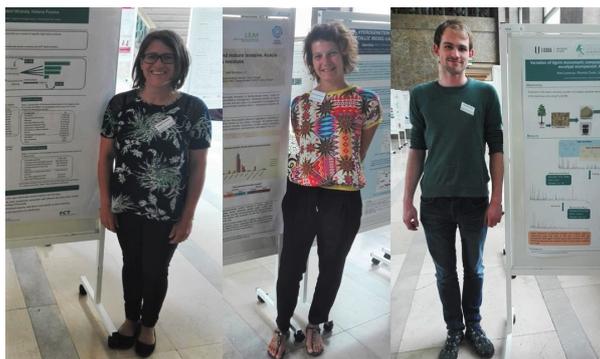
- Ricardo Costa, Ana Lourenço, Duarte M. Neiva, Jorge Gominho, Helena Pereira. Lignin monomeric variation during eucalypt stumps pulping and bleaching.

- Ricardo Costa, Ana Lourenço, Jorge Gominho, Helena Pereira. Chemical composition of cork, phloem and xylem of *Quercus suber* L. from different provenances.

- Joana Ferreira, Helena Pereira. Valorization of *Quercus faginea* barks.

- Barbara Soares, Isabel Miranda, Helena Pereira, Suzana Ferreira-Dias. Polyphenols from olive oil industry residues: extraction, identification and their antioxidante properties.

- Catarina Chemetova, António Fabião, Henrique Ribeiro, Jorge Gominho. Chemical characterization of young and mature invasive *Acacia melanoxylon* biomass residues.



World Fish Migration day

The 3rd edition of the World Fish Migration Day took place on April 21, 2018.



One of the initiatives that took place in Portugal to celebrate the date involved the participation of CEF researchers in its organization. The event "Using experimental models as a means of testing new solutions for fish migration" was also organized by researchers from CERIS and LNEC, where the action took place.

A number of key aspects related to fish migration and the current status of the fragmentation of rivers and streams, as well as their solutions (fish passages) in Portugal, were initially discussed with the participants. It was also carried out a passability test on a experimental low-

head ramped weir with native cyprinid species (the most frequent and abundant fish group in the Portuguese rivers), the Portuguese nase and the Southern Iberian chub.

This experiment was used to evaluate their transposition capability across this type of structures, frequently found in our rivers.

"Adaptive forest management in climate change"

Workshop

The CEF researchers Conceição Caldeira, Raquel Lobo-do-Vale and Vanda Oliveira were invited speakers at the Workshop "Adaptive forest management in climate change". The workshop, organized by the Union of the Mediterranean Forest (UNAC), took place at the Arts and Culture Centre of Ponte de Sor on 7 March.

This meeting is part of a set of workshops denominated "+ Knowledge/ha", aiming at sharing knowledge and innovation for the improvement of management practices.

Presentations:

- Conceição Caldeira: "Strategies for adaptive forest management"
- Vanda Oliveira: "Climate influence on cork growth"
- Raquel Lobo-do-Vale: "The combined effects of drought and warming on growth and mortality of stone pine"



Click the image above to watch the video about the Workshop
"Adaptive forest management in climate change"

Third Landcare course

A total of 20 students and 10 teachers from Greece (University of Athens), Spain (University of Santiago de Compostela), Portugal (School of Agriculture) and Italy (University of Pisa and CNR-ISE) participate in the 3rd Landcare Course, within the framework of the [LANDCARE project](#). The CEF researchers Teresa Ferreira and Patricia Rodriguez Gonzalez took part of the event.

The course was held in the Natural Park of San Rossore, Pisa, Italy from the 11th till the 23rd of March. It organized by the CNR-ISE (National Research Council/Institute for

Ecosystem study, Italy). The company West System, focused on greenhouse gases measurements, also participated actively.

During these days different activities were organized combining presential lessons, virtual tools and field practices to study the main drivers of degradation and the different restoration techniques to face current environmental threats across Southern Europe, such as soils contamination and waste management, degradation of wetlands and rivers, wildfires and coastal degradation. During the stay, the students and teachers visited the facilities of Belvedere (waste management), the monte Pisani (wildfire), Torre del Lago (coastal erosion) and San Niccolò (wetland restoration).



Field trip to Herdade do Areeiro e Caneira



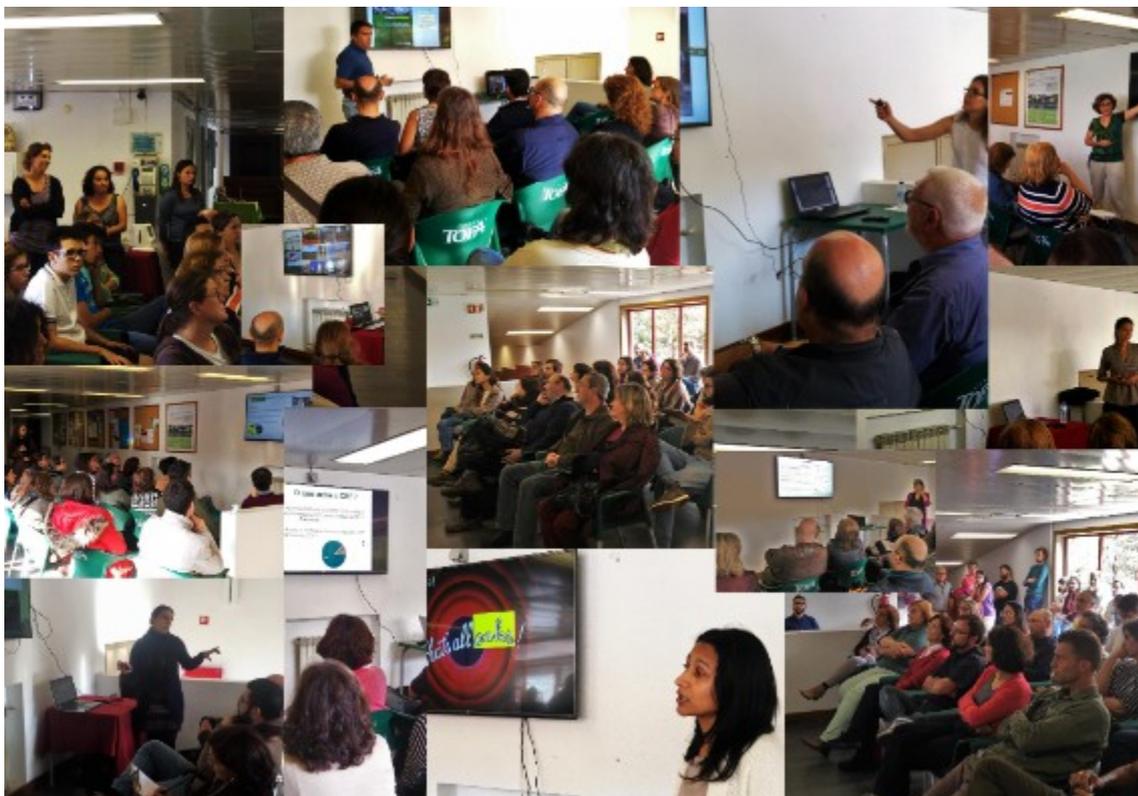
On the 2nd of May, the students of Forestry II of Forestry Engineering and Natural Resources from the School of Agriculture (ISA) went to *Herdade do Areeiro e Caneira*, in Coruche. They were wonderfully welcomed by the owner Rita Bonacho and by the technician of the Forest Owner Association of Coruche Mariana Ribeiro Telles. The students were accompanied by CEF/ISA Professors Helena Almeida, Paula Soares and Manuel Madeira and also by Engineer Paulo Marques.

In this Forestry lecture, given by Manuel Madeira, forest problematic areas were identified by Rita and Mariana and several soil profiles were analysed with the intent of explaining the problems and proposing alternatives/improvements.



Coffee with Science

Second anniversary



Congratulations to COFFEE WITH SCIENCE! In the edition of May, on the 24th, we celebrated the second anniversary of this event!

This time, our guest was the researcher Paula Soares who spoke about:

- "Silviculture /Technology and Forest/ The Maritime Pine Tree".

Coffee with Science aims to present researchers and the research work developed at the Forest Research Centre in a relaxed and informal way. Once a month we have cake, coffee and science for free at CEF's hall.



ThinkForest science-policy seminar

The CEF researcher, Margarida Tomé, participated in the Seminar "[Using the bioeconomy to prevent forest fires](#)" held in Madrid. The Professor from the School of Agriculture was part of the round table discussion on "Forest bioeconomics, forest fires and politics".

The seminar organized by the EFI - European Forest Institute took place on May, 29.



RESEARCH

Cork-related investigation

A fascinating adventure

The CEF researcher, Helena Pereira, was interviewed by APCOR (Portuguese Cork Association) to talk about her research into cork and cork oak.

In this video, the former coordinator of the Forest Research Centre refers that cork-related investigation has been a fascinating adventure and it was the beginning of her life as a researcher. Helena Pereira also adds that one of the aspects that had always fascinated her in this area of research was the concept of sustainability associated to this natural product, cork.



Click the image above to watch the interview of Helena Pereira about cork research

SOON IN CEF

Calendar

EVENTS

LandCare for the future

Santiago de Compostela

Final Conference of the Erasmus+ Project LANDCARE. The organization includes some members of CEF: the researchers Teresa Ferreira (Coordinator of Portuguese partner) and Patricia Rodriguez Gonzalez.

[More information on the conference's Website](http://www.landcareforfuture.com/)

DATE

16 to 18
of July
2018



Coffee with Science

CEF's Hall

July - Xavier Lecomte

September - Vanda Oliveira

October - Juan Guerra

November - Francisca Aguiar

Once a month

14h - 14h30



PhD THESIS



Xavier Jean François Lecomte

PhD: Forestry and Natural Resources

Thesis: Effects of grazing exclusion and shrub encroachment on the ecosystem ecology of evergreen oak woodland

Date: 10/04/2018

Supervisor: Maria Conceição Brito Caldeira

Co-supervisors: Miguel Bugalho, João Santos Pereira

PUBLICATIONS



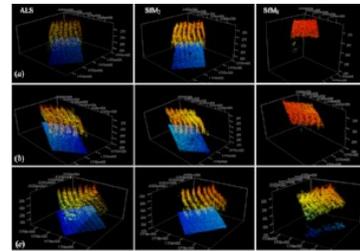
[Adaptation to climate change at local level in Europe: An overview](#)

[Advancing towards functional environmental flows for temperate floodplain rivers](#)

[A generalizable monitoring model to implement policies to promote forest restoration – A case study in São Paulo - Brazil](#)

[Assessment of the indirect impact of wildfire \(severity\) on actual evapotranspiration in eucalyptus forest based on the surface energy balance estimated from remote-sensing techniques](#)

Chemical composition of barks from *Quercus faginea* trees and characterization of their lipophilic and polar extracts



Comparison of ALS- and UAV(SfM)-derived high-density point clouds for individual tree detection in *Eucalyptus* plantations

Compositional variability of lignin in biomass



Economic outcome of classical biological control: A case study on the *Eucalyptus* snout beetle, *Gonipterus platensis*, and the parasitoid *Anaphes nitens*

Effectiveness of a multi-slot vertical slot fishway versus a standard vertical slot fishway for potamodromous cyprinids

Effects of riverine landscape changes on pollination services: A case study on the River Minho, Portugal



Evaluating riparian solutions to multiple stressor problems in river ecosystems — A conceptual study

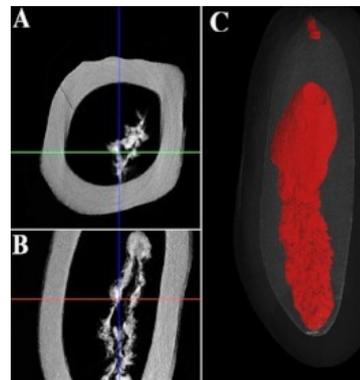
Evidence that divergent selection shapes a developmental cline in a forest tree species complex



How does season affect passage performance and fatigue of Potamodromous Cyprinids? An experimental approach in a vertical slot fishway.

Limited resilience in hotspots of functional richness: the Mediterranean riparian shrublands

Linking forest policy issues and decision support tools in Europe



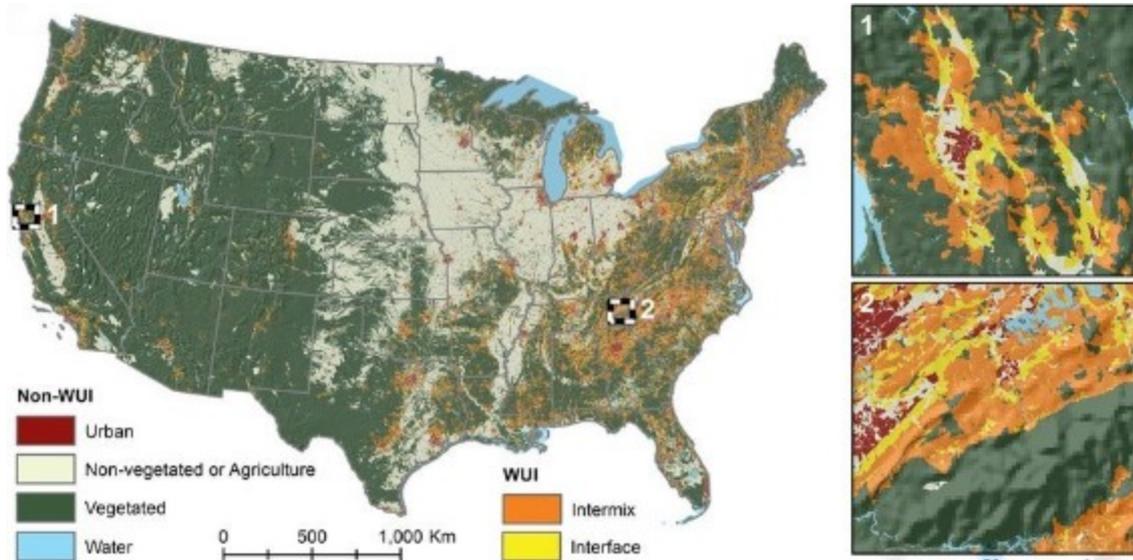
Micro X-ray computed tomography suggests cooperative feeding among adult invasive bugs *Leptoglossus occidentalis* on mature seeds of stone pine *Pinus pinea*

Pattern recognition of cardoon oil from different large-scale field trials

Production and characterization of particleboards from cork-rich *Quercus cerris* bark

Quantifying *in situ* phenotypic variability in the hydraulic properties of four tree species across their distribution range in Europe

Rapid growth of the US wildland-urban interface raises wildfire risk



Screening of the antioxidant and enzyme inhibition potentials of portuguese *Pimpinella anisum* L. Seeds by GC-MS



Significant mortality of eggs and young larvae of two pine processionary moth species due to the entomopathogenic fungus *Metarhizium brunneum*



Species-specific, pan-European diameter increment models based on data of 2.3 million trees

The effect of hypoxia and flow decrease in macroinvertebrate functional responses: A trait-based approach to multiple-stressors in mesocosms

Tree differences in primary and secondary growth drive convergent scaling in leaf area to sapwood area across Europe

Understory effect on tree and cork growth in cork oak woodlands

Volatile diterpene emission by two Mediterranean *Cistaceae* shrubs

Where wildfires destroy buildings in the US relative to the wildland–urban interface and national fire outreach programs



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