CITAB Newsletter

Centre for the Research and Technology of Agro-Environmental and Biological Sciences

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Highlights and Editorial

The content of this electronic edition of the CITAB newsletter clearly shows that the centre's strategy for increasing critical mass, developing high quality research through internationalization, collaboration and multisdisiciplnarity in agroforestry and the study of the environment is bearing fruit. We are proud to announce that the bid for an international doctoral programme "Agricultural production chains - from fork to farm", has been approved for funding by the FCT, the national Science and Technology funding body. The international FP7 project *"EUROLEGUME - Enhancing of legumes growing in Europe through sustainable cropping for protein supply for food and feed"* has also been approved for funding, as well as several smaller QREN and ProDer funded projects conceived to meet the needs of key stakeholders. At the same time CITAB has cemented major collaborative links by signing protocols with major national research centres and vital stakeholders in key sectors. CITAB is a centre that is synonymous with excellence in applied science.

Eduardo Rosa, CITAB's Director

CITAB's International Doctoral Programme "Agricultural production chains - from fork to farm" is approved for FCT funding

CITAB's proposal for an international Doctoral Programme in **"Agricultural production chains - from fork to farm"**, submitted to the FCT in February 2013, has been approved for funding from a total of 238 applications of which only 51 will be funded by the FCT. The partners involved in this successful and innovative bid with CITAB are the Chemistry Centre of Vila Real /UTAD, the University of Minho, the University of Wageningen (Netherlands) and the Polytechnic University of Valencia (Spain).

The Doctoral Programme, based on a thorough analysis of stakeholder needs in the area, the career prospects of the graduates and EU policy for research (HORIZON 2020), will allow the recruitment of 32 PhD studentships between 2014 and 2017, enhancing research in Agricultural Sciences and optimizing private sector competitiveness in Portugal. Designed from the *demand side* rather than the *supply side* and using international benchmarking criteria to attract overseas students, the Doctoral Programme will include a structured educational component and training through research that will reinforce links between host institutions and the stakeholders at different levels through participation in seminars and make students aware of the sectors technological challenges.

The strong interdisciplinary and excellence of the different national and international institutions involved will provide high quality advanced education in the Agro-Food sector in stimulating scientific and technological environments via high quality research projects, promoting entrepreneurship and the integration of qualified students in the job market. We strongly believe that this DP fills an educational gap at national level and will strengthen the national projection of the Portuguese institutions.

In this edition

Collaborative Protocol creating a Consortium for Promotion and Competitiveness of Research in the Agrarian Sector (CPECIA)

A collaborative protocol, signed on April 4th 2013 at UTAD, created a **Consortium For Promotion And Competitiveness Of Research In The Agrarian Sector** (CPECIA) between CITAB, the Centre for Functional Ecology (CEF) at the University of Coimbra, the Animal and Veterinary Research Centre (CECAV) at UTAD and AgroBioPlant – CITAB's Research Group based at the University of Minho.

The main objective of this consortium is to harness synergies to increase critical mass and boost scientific activity and training in Agricultural, Animal Agri-business, Agro-environmental and Forest chains. Consortium members will promote the use of Emerging Technologies to innovate and increase competitiveness of these chains. The consortium will meet agrarian sector development needs in Portugal, working in close cooperation with the business community and active social partners. The participating research centres will occupy in a very strong position to face the challenges posed by new Common Agricultural Policy the demands of the European research programme Horizon 2020.

Prof. Estelita Vaz (CITAB - UMinho),Prof. Miguel Rodrigues (CECAV), Prof. Helena Freitas (CEF), Prof. Eduardo Rosa (CITAB).

Collaborative Protocol with the Confederation of Farmers of Portugal (CAP)s

Prof. Helena Freitas (Vice-Chancellor of the UCoimbra), Prof. Rui Vieira de Castro (Vice-Chancellor of the UMinho), Prof. Carlos Sequeira (Chancellor of UTAD), Mr. João Machado (President of CAP) and Eng. Luis Mira (Secretary-General of CAP).

A collaborative protocol, forming the Consortium for Promotion and Competitiveness of Research in the Agrarian Sector, was signed on April 4th 2013 between UTAD, the University of Coimbra, the University of Minho and the Confederation of Farmers of Portugal (CAP).

Collaborating members will develop a plan to strengthen technical and scientific cooperation through integrated research activity at UTAD, UCoimbra and UMinho through the following activities: organization of seminars and workshops to disseminate information and knowledge transfer in the areas of Engineering Technology, Agri-Environmental Technologies, Environment, Biodiversity and Animal Science; creating communication channels to assess the specific needs of the chains; Establishing guidelines to promote more practical research; participation in joint R & D and Innovation projects; organization of training courses.

CITAB cements collaboration with the Instituto Federal de Educação, Ciência e Tecnologia da Paraíba (IFPB), Brazil

INSTITUTO FEDERAL DE EDUCAÇÃO, CIÊNCIA E TECNOLOGIA PARAÍBA

A Memorandum of Understanding, signed between CITAB and IFPB in December 2012, pledges to define mutual strategic areas of cooperation and scientific exchange activities and consider the possibility of establishing a CITAB research nucleus for Agricultural and Environmental Sciences at IFPB. The IFPB provides basic, higher, basic and professional education and training at nine different campuses across Paraiba.

Training methodologies will be developed in food science, microbiology (ecotoxicology) and hiperspectral imagery. Suggested areas for collaborative research include soil quality, emission of greenhouse gases, microbiology and organic waste, vegetable physiology and climate change and valorisation of coconut fibre and other co-products associated with the agroforestry industry.

Cooperation with Brazil: mobility of researchers

Brazilian university lecturer Professor Renato Farias do Valle Junior (Federal Institute of Triângulo Mineiro – Campus Uberaba, Brazil) is carrying out research at CITAB as part of a CAPES funded Post-doctoral internship that started in January 2013.

Renato is studying "Diagnosis of environmental conflict and physicochemical characterization of water resources in the Basin of Rio Sordo as a subsidy to environmental planning" as part of the CITAB EI project "Biodiversity, biotechnology and environmental assessment".

The main objective of Renato's research includes the development of a plan for agricultural sustainability through the characterization of areas of environmental conflict in the Rio Sordo river catchment, by analyzing the physicochemical parameters of water at different sampling points and identifying activities that impact the water quality along the river Sordo, taking into account the Portuguese Environmental Law. The project's findings will be used to diagnose impacts and propose and develop environmental remediation projects in the River Sordo catchment area. Renato will be leaving in December after a one year stay.

Prof. Renato Farias on field work carrying out fieldwork in the Basin of Rio Sordo.

Cooperation with Turkey: promoting mobility of researchers

Visiting Turkish lecturers meeting with CITAB researchers.

Two Turkish university lecturers visited the Department of Forest Sciences and Landscape Architecture (CIFAP) at CITAB/UTAD on the 28th March this year as part of the LLP/Erasmus Teaching Staff Exchange Programme. Professors Gokhan Sen and Burak Aricak of the Faculty of Forestry at Kastamonu University, Turkey visited the CIFAPs facilities and gave talks on "Forest and Forestry in Turkey" and "The Forestry Organization and its relationship with local people in the eastern black sea region of Turkey" and "Comparison of Quickbird Images to Spot Satellite Images For Determining Forest Road Construction Area And Impact Zone Area", as part of the EI project "Biodiversity, environmental assessment and biotechnology". There was a mutual exchange of information about GIS and forest road construction and forest economy and policy.

Involvement of CITAB in cooperation with University of León

A group of CITAB/UTAD members participated in a research seminar called *Adopción y Difusión de Innovaciones Medioambientales en Sistemas Agroalimentarios Locales* at the University of León (Spain)on 2012, December 17th. The seminar was organized by the Department of Economics and Statistics at the University of León as part of the "Proyectos de campus de excelencia internacional con universidades de Portugal (IPB, UTAD, UMinho, Uporto) y Brasil (UNISUL)". Future research initiatives between the two institutions were discussed.

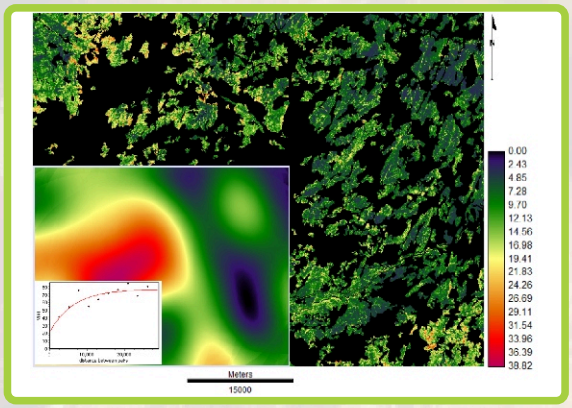
UTAD researchers at Uleón.

CITAB Doctorate in Modelling and mapping aboveground biomass for energy usage and carbon storage assessment

CITAB researcher **Dr. Hélder Viana** successfully defended his doctoral thesis before an international jury thesis in November 2012. Part of the CITAB EI Project Biodiversity, Environmental Assessment and Biotechnology project objectives, Helder modelled and mapped aboveground biomass (AGB) for energy usage and carbon storage assessment in stands of *Pinus pinaster* Aiton, *Eucalyptus globulus* Labill. shrublands.

The study, partially supported by a FCT grant (ref: SFRH/PROTEC/49626/2009), was supervised by Professor José Tadeu Marques Aranha, from CITAB/UTAD and developed in collaboration with Professor Luis Ortiz-Torres and Daniel Vega-Nieva, from Escuela Universitaria de Ingeniería Técnica Forestal da Universidad de Vigo, and Professor Warren B. Cohen from the College of Forestry of Oregon State University.

Biomass fuel composition and combustion properties analysis.



Mapping forest biomass and carbon stocks.

Estimates of AGB stocks are essential for studying ecosystem dynamics as carbon sinks and their role in mitigating climate change in vulnerable Mediterranean ecosystems. Accurate measurements of aboveground biomass and knowledge of biomass characteristics and combustion properties are also necessary for assessing biomass as an alternative energy source. The results of Hélder's studies have provided specific systems of additive nonlinear allometric equations for estimating maritime pine and eucalyptus AGB stocks, and a set of specific equations to predict the shrubland AGB stocks.

Hélder also determined carbon content in tree biomass components and the shrub pool, showing that these ecosystems store significant amounts of carbon and differ from other ecosystems. Fuel characteristics and biomass combustion properties of the different stands were evaluated, allowing assessment of the potential of forest biomass for industrial scale energy production in Portugal. Different mapping approaches, remote sensing imagery and spatial predictions models were compared to spatially assess AGB and carbon stocks. Results revealed significant differences in accuracy between methodologies. The results of this study provide an important contribution to estimating the carbon uptake and energy potential in Mediterranean-type ecosystems.

A new FCT funded PhD Studentship in Industry (BDE) to promote the study of the fertirrigation in chestnut growing

The project (ref. SFRH/BDE/52061/2012), coordinated by CITAB-SAC researchers Professor José Gomes Laranjo and Professor Afonso Martins, was prepared with the stakeholder Hubel Verde, a company that has been providing, services, product engineering and agronomic technology to reduce risks and maximize client satisfaction since 1995. Project research, carried out by Maria Margarida Oliveira Mota, aims to increase production and improve chestnut quality in conjunction with a rational management of natural resources and the financial interests of a farm. The project will explore the introduction of innovative technologies related to irrigation management and the use of liquid fertilizers. Experimental trials in the Sortegel orchard will promote an innovative approach in the management of chestnut trees such as the implementation of fertirrigation. Fertirrigation is an agronomic practice that provides precise supplies of readily assimilated chemical elements according to preset production goals and considered to be a balanced solution to the intensification of fruit growing.

The ADAPTACLIMA II Project is now underway

The ADAPTACLIMA II project team.

The approved European Project "Adaptación al Cambio Climático en el Sudoe" (SOE3/P2/E477), known as ADAPTACLIMA II, started on November 8th 2012 in Miengo (Cantabria, Spain).

ADAPTACLIMA II is a collaborative, 30 month long project that brings together the activities of CITAB's Biosystem Engineering and EcoIntegrity research groups. The project aims to develop actions in the INTERREG SUDOE region by capitalizing on the findings and recommendations of previous projects and studies and disseminating them to the general public and the private sector. Information and awareness resulting from ADAPTACLIMA II will be used to build a tool to help define European economic policy.

Project partners collaborating with UTAD include ADAPTACLIMA II of France (Mancomunidad de Municipios Sostenibles de Cantabria; Junta de Andalucía Consejería de Medioambiente Servicio de Información y Evaluación Ambiental - Red de Información Ambiental de Andalucía; Asociación para el Desarrollo del Valle del Alagón (Adesval); Asociación Ibérica de Municipios Ribereños del Duero (AIMRD); Xunta de Galicia Dirección Técnica de Construcciones Instituto Galego de Vivienda e Solo (IGVS); NEIKER-Instituto Vasco de Investigación y Desarrollo Agrario; Association Climatologique de la Moyenne-Garonne et du Sud-Ouest (ACMG); Chambre d'agriculture de la Dordogne and Bodegas Faustino). UTAD based ADAPTACLIMA II research will focus on the sustainability of river systems by developing effective responses to problems associated with climate change and promoting sustainable production chains of natural products that provide commercial and ecological products, ecosystem services and public goods that promote better quality of life and human health.

Four projects approved for funding: CITAB forges links with the private sector

CITAB has 1 QREN funded project and 3 ProDer funded projects underway. All of these projects involve links with businesses in the private sector as part of funded initiatives to incentivize R&TD in Business.

The QREN funded R&D project **"AlertCast - Implementation of a Network Information for promoting chestnut quality"** aims to help reduce loss of chestnut crops through pests and disease in collaboration with the "Farming Cooperative of Penela da Beira" (CAPB). The 7 member CITAB research team will advise the CAPB in several areas of expertise to implement strategies to obtain information on meteorology, tree phenology and the biological cycles of the chestnut pests.

The ProDer funded project **"IrrigOLive - Deficit irrigation in olive, in the region of Terra Quente Transmontana, to optimization water resources, productivity and olive oil quality"** is currently assessing different deficit irrigation strategies in the region of "Vilariça" Valley of Trás-os- Montes. The stakeholder is "VIAZ", a wine and olive oil production and commercialization company which will be collaborating with CITAB/UTAD, ESAB/IP Bragança, ICETA and U. Évora.

The ProDer funded project **"Developing processes and Technologies aiming the production of ink disease resistant chestnut rootstocks, compatible with national varieties certified with molecular markers"** has been running since 2013. The project Consortium, led by "Certifruteiras.com Lda", also comprises Bioespaço Energia Lda, EFAO- Earth for all Organization, Escola Superior Agrária de Coimbra, Instituto Nacional de Investigação e Veterinária, Patrícia Andreia Dinis Figueiredo and CITAB/UTAD.

"GreenVitis - Effects of soil management on productivity and sustainability of grape vineyards system" is the third ProDer funded project underway in CITAB in collaboration with "Quinta do Vallado", a member of the Association of Douro Wine Producers (ADVID). GreeVitis includes a total of seven UTAD research teams. Pilot studies employing different soil management practices are being carried out at "Quinta do Vallado" vineyards to monitor soil plant water associations, grapevine quality, nutrient cycling efficiency, effects on pathogens and pests and patterns of productivity.

Short notes

Prof. Simone Varandas receiving National Geographic Inaqua Fund award.

CITAB/LEF Researcher wins the prestigious Lisbon Oceanariaum/National Geographic

CITAB/LEF-UTAD researcher Professor Simone Varandas has won a 15,000€ award for the "PAELORIS" project submitted to the prestigious Lisbon Oceanariaum/National Geographic Inaqua Fund. The "PAELORIS" project aims to characterize and quantify native species of freshwater bivalves in the coastal lagoons of Barrinha Mira, Mira, Vela, and Braças using traditional morphological methods. Results will advance knowledge of these species in lentic systems and promote the natural heritage protection and conservation of these ecosystems.

The coastal lagoons of Barrinha Mira, Mira, Vela, and Braças are highly productive and sensitive natural wetlands, forming part of the Mira, Gândara and Gafanhas Dunes Natura 2000 site. The communities of freshwater mussels form part of these wetland systems and are of particular importance in ecosystem function. Once abundant in epicontinental aquatic ecosystems, freshwater mussels are now one of the most threatened groups of organisms and are at risk of extinction. The Inaqua jury voted unanimously for PAELORIS project since it exemplified preservation measures that contribute decisively to the conservation of Portugal's lagoons, estuaries and river ecosystems.

CITAB researchers form part of RefCast - Portuguese Chestnut Association

In a public ceremony that took place on the 26th February 2013 at UTAD, 34 associated members signed the statutes that constitute RefCast - Portuguese Chestnut Association. The main objectives of RefCast, which will be based at UTAD, are to act as an interprofessional organization to defend the interests of those involved in the chestnut industry at national and international level. Specific development of actions via partnerships with Research Centres will promote chestnut R&D to: increase chestnut orchard productivity; valorize fresh or transformed chestnut consumption and promote the benefits of chestnut consumption; c) promote chestnut marketing; organize or promote scientific and technical seminars, open days, technical visits and cookery demonstrations and represent the chestnut industry before Portuguese and International authorities. RefCast - Portuguese Chestnut Association derives from the Chestnut Portuguese Network, which was created in 2010, with the aim to strengthen the Portuguese Chestnut Sector.

CITAB's RefCast team comprises José Gomes Laranjo, Jorge Ferreira Cardoso, Afonso Martins, Teresa Pinto, Rosário Anjos, Guilhermina Marques, Paula Oliveira, João Paulo Moura, Paula Arnaldo, Fernando Raimundo and Luís Martins.

CITAB researcher Paulo Fernandes appointed to the Board of Directors of the International Association of Wildland Fire

CITAB researcher Paulo Fernandes was appointed to the Board of Directors of the International Association of Wildland Fire (IAWF) in February 2013. The IAWF (http://www.iawfonline.org/), an independent professional organization that assists communication and provides leadership, was formed to promote better understanding of wildland fire and provide a resource for scientific and technical knowledge, education, networking and professional development. Paulo Fernandes is an internationally recognized expert on wildland fire with over 1500 citations of his work which covers aspects of fuel and fire behaviour modelling, the effects and effectiveness of prescribed burning and fuel treatments, fire danger rating, fire-induced tree mortality, landscape pyrodiversity and fire regime analysis.

Short notes & Upcoming events

CITAB organizes first National Forum on Biodiversity

The city of Vila Real is a shining example of biodiversity conservation in Portugal. With about half the of the region's territory included within the national territories list of hazardous areas, Vila Real municipality has developed an ambitious biodiversity conservation programme called "SEIVACORGO" in collaboration with UTAD. SEIVACORGO combines species preservation measures, public participation and aspects of local development.

Biodiversity is a particularly relevant issue for the local council of Vila Real due to its exceptional location and natural conditions, which hosts an unusual variety of species and habitats of great conservation value. CITAB/UTAD has played a very important role in scientific research and improving knowledge in areas such as regional biodiversity and nature conservation and the UTAD campus currently houses one of the largest botanical gardens in Europe.

After three years of the SEIVACORGO programme, Vila Real welcomed several experts in ecology, agronomy, environment and sustainable development to the first major National Forum on Biodiversity. The event was held at Vila Real´s municipal theatre on the 21st and 22nd of March this year and organized by the Municipality of Vila Real and CITAB.

A Female blue butterfly, *Maculinea alcon.*, a threatened species with priority conservation status in several European countries.

Vulnerable Gold-striped salamander *Chiogloss lusitanica.*

CITAB spreads the word of science in regional schools

CITAB researchers and high school students.

CITAB researchers visited the high school Agrupamento de Escolas Morgado Mateus last November, to highlight the importance of environmental protection and pollution effects on freshwater organisms. Students observed zebrafish lab experiments showing how chemicals affect zebrafish embryo development and fish histopathology. CITAB researchers also emphasized the important role of wild fish populations in the study of environmental effects on aquatic communities, ecosystems and humans.

CITAB researchers have also successfully demonstrated electronics and information technologies such as a web platform dedicated to the biodiversity of the Vila Real district, an electronic system to detect illegal connections to sewer systems and an SMS-based system to monitor water quality.

Upcoming events - Advanced courses

Postgraduate course "Oxidative Stress and Oxidants", 3-14th June 2013
MSc and PhD course organized by CITAB-UM, part of the PhD program BioPlant and Master courses of Biology Department (University of Minho). The course is theoretic and practical orientated (www.map.edu.pt/bioplant/).

International Training Course in "Gaseous emissions from animal manure and biowastes: processes and measurement" 28th June to 6th July 2013
MSc and PhD course organized by CITAB and by Instituto Superior de Agronomia, part of the Marie Curie International Initial Training Network Project "ReUseWaste-Recovery and Use of Nutrients, Energy and Organic Matter from Animal Waste" (http://www.reusewaste.eu/).

"The Virtual Fields Method" intensive course
CITAB is organising a course on the Virtual Fields Method at the University of Trás-os-Montes e Alto Douro (UTAD) that will be take place on the 8th July 2013 (http://home.utad.pt/~jmcx/VFMCourseUTAD/). The course will be given by Professor Fabrice Pierron, who is currently Professor of Solid Mechanics at the University of Southampton, UK.

Location and contacts

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