



Short notes



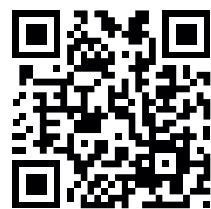
CITAB member Mário Gonzalez Pereira was the convener of the **European Geosciences Union** session NH.7.3

General Assembly of the European Geosciences Union, Vienna 2012

"Spatial and temporal patterns of wildfires: models, theory, and reality" comprised one of the themed sessions of the 2012 General Assembly of the European Geosciences Union (EGU GA2012) which took place in Vienna, from the 22nd to the 27th of April. This international event brought together geoscientists to discuss Earth, Planetary and Space Sciences. Co-conveners of this session included Ricardo Trigo (Faculdade de Ciências, Centro de Geofísica da Universidade de Lisboa, Portugal), Andrea Camia (EC - Joint Research Centre, Ispra, Italy), Marloes Penning de Vries (MPI Chemistry Mainz, Satellite remote sensing, Germany), Lieven Clarisse (ULB, Chimie Quantique et Photophysique, Brussel, Belgium) and Luigi Boschetti (University of Maryland, Geography, United States).

Oral and poster presentations covered several aspects of wildfire activity, namely variability in the spatial-temporal patterns of fire regimes, remote sensing and modelling of wildfires. **CITAB researcher Mário Gonzalez Pereira** coauthored three wildfire session presentations, one presentation in the "Climate Data Bias-Correction and Homogenization and Climate Trends and Variability Assessment" session, one presentation in "Synoptic climatology – methods and applications" session and one presentation in "Hydrological extremes: from droughts to floods" session.

For more information about CITAB Research Center, tag this code



Location and contacts

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Climate change on wine production: global overview and regional assessment in the Douro Valley

CITAB member João Santos was invited to present a scientific communication entitled "Viticultural zoning in Europe: climate change challenges" as part of the seminar organized by our key stakeholder ADVID (The Wine Cluster for the Douro Region), which took place at the Luso-American Development Foundation (Lisbon), on the 12th of April 2012, and at the Alfândega (Porto), on the 13th of April 2012. The seminar provided an outstanding opportunity to divulge important research developed by CITAB researchers and to improve contacts within both the scientific community and the winemaking sector.



Editors: Raul Morais, Samantha J. Hughes and Lígia Pinto

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

Issue 4 May 2012



Highlights and Editorial

We are pleased to announce another issue of our e-Newsletter which precedes our next hard copy issue.

This issue focuses on the achievements of young researchers who have completed their doctoral studies within key projects of the CITAB's Workings Groups. We actively encourage senior researchers to attract more PhD students and visiting workers from across the world as part of our internationalization initiative. Successful examples of international collaborations include Dr. Howard Thistlewood from the Pacific Agri-Food Research Centre, Summerland, British Columbia (Western Canada) who made valuable contributions to pest management and land use for biodiversity during his nine month stay at CITAB and Dr. Alberto Alvarez from the European Centre of Soft Computing (Spain) for his contribution to decision process modeling for effective image based meat quality assessment.

CITAB is currently drawing up collaborative protocols with several Brazilian Universities and research organizations to increase mobility of researchers between each country. CITAB will be offering PhD courses across the centre's scientific areas of expertise.

We are paying special attention to internationalization, especially since the European Horizon 2020 Programme will be launched very soon. This initiative will allow CITAB to raise its profile on the international stage as a either project partner or coordinator. We invite all readers to access our website (<http://www.citab.utad.pt>) and browse our main research topics.

Eduardo Rosa, CITAB's Director



Extremes and Climate Change, CITAB Workshop

The workshop "Extremes and Climate Change", part of the ClimVineSafe project, (PTDC/AGR-ALI/110877/2009), took place on March 7, 2012. Professor Joaquim Pinto, from the University of Cologne, Germany, gave the main lecture on the study of extreme events, in recent and future. Over 100 participants including students, teachers and researchers attended the workshop. Professor Pinto's talk started with a brief introduction to several IPCC climate change scenarios, followed by a description of statistical data for natural disasters (extreme temperatures, precipitation and severe windstorms) over the last century in Europe. Risk assessment and management for future occurrence of these events was also in focus. These studies, developed in collaboration with CITAB/UTAD members from the **SAC project – Agronomy, Climate Change and Environmental Studies** provide information on future impacts of climate change on important sectors such as agriculture, viticulture and wine production in Portugal.



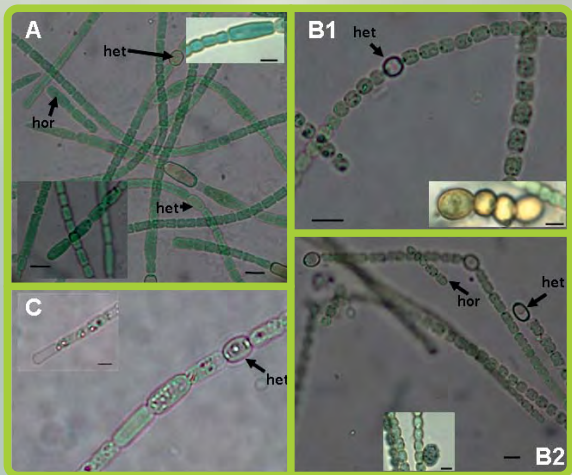
In this edition



Smart, self-powered wireless data acquisition platforms for precision agriculture applications

Within **BE** key project, a major advance in intelligent systems regarding in-field data gathering procedures within the precision agriculture context was accomplished by CITAB member **Dr. Samuel Matos**. Its innovative study has led to the conception, implementation and field evaluation of the sMPWiNodeZ platform (a small data acquisition station) which combines standard technologies such as IEEE 802.15.4/ZigBee and IEEE 1451 and exploits several environmental energy sources to ensure its energy sustainability. One major achievement is that sMPWiNodeZ allows a plug-and-play operation of heterogeneous sensors to monitor important agro-environmental parameters without local user intervention. The sMPWiNodeZ «smart» station relies on the full implementation of a smart-sensors standard in WSN applications in precision agriculture practical and research applications, a huge step in simplification of data acquisition procedures. Samuel successfully defended his doctoral thesis "Smart self powered wireless data acquisition stations for precision agriculture applications" in April 2012.

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Impact of herbicides on non-target organisms in sustainable rice production systems

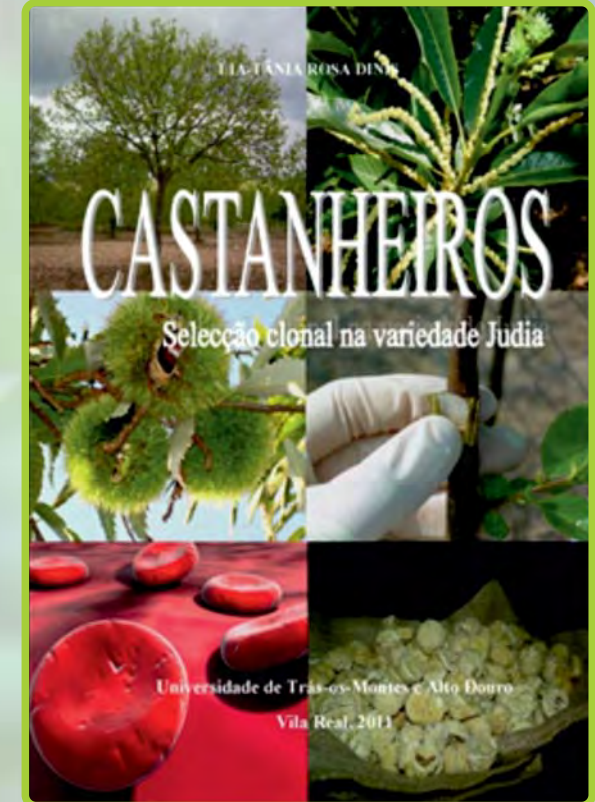
Under the **SAC Project "Agronomy, climate change and environmental studies"** a important study about the effects of herbicides on rice has been accomplished. Rice is a major food crop and the staple food for over half of the world's population and rice fields are frequently exposed to environmental contamination by herbicides and cyanobacteria. CITAB member **Dr. Victor Galhano** has studied the impact of herbicides that can lead to the damage of macromolecules and to a decrease of oxidant defenses in a wide range of non-target microorganisms including cyanobacteria. Cyanobacteria are a large, diverse and widely widespread group of Gram-negative prokaryotes that can perform oxygenic plant-like photosynthesis. Their biological nitrogen fixation capacity makes them very useful in nitrogen biofertilization programs in rice fields. Modern rice agriculture demand for agrochemicals and cyanobacteria are challenged by the high levels of xenobiotic residues left in the paddy soil. Bentazon and molinate, the active ingredients of the commercial herbicides *Basagran*® and *Ordram*®, used in integrated weed management programmes in Portugal. Findings from studies on three strain/herbicide combinations - *A. cylindrica* exposed to *Basagran*®, *N. muscorum* exposed to *Ordram*® and *N. muscorum* exposed to *Basagran*® recommend the regular but cautious use of bentazon in rice fields and a reduction or ban of molinate due to its high toxicity and harmful effects on autochthonous paddy microorganisms, particularly diazotrophic cyanobacteria. Victor Galhano successfully defended his doctoral thesis in January 2012.

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Clonal selection on Chesnut Judia variety

Following **SAC Project "Agronomy, climate change and environmental studies"** objectives, CITAB member **Dra Lia-Tânia** has investigated how climatic conditions influence the development and productivity of chestnut, var. Judia. Major project achievements of thgis breeding program include the constitution of a germplasm bank with thebestgenotypes, producers offruits with higher added value, in order to disponibilize plant material for chestnut grafting. Results also indicate that summer temperature has a decisive influence on chestnut production. Accumulated optimal temperature was determined, being 2100°D/2200°D (between May and October). Nuts from trees situated in the coldest localities had higher levels of water, protein, soluble sugars, total phenols, starch content, a clear prevalence of polyunsaturated fatty acids and best antioxidant properties. Controlled pollination of Judia variety with pollen from Negral and Lada revealed that ovules already contained a megaspore mother cell in mid-July. being the nuts from egral pollination, bigger and more elongated than those from last one. Dra Lia-Tânia successfully defended her doctoral thesis in December 2011.



Control of the olive fly in the context of sustainable olive production

The **EI Project "Disturbance and management of agro-forest ecosystems"** continues to make groundbreaking progress in the development of biological control methods for the environmentally sustainable management and control of the olive fly *Bactrocera oleae* (Rossi) in traditional Mediterranean olive groves. CITAB member **Dr. Fátima Gonçalves** has developed a temperature based model to predict insect activity in the field in order to identify the occurrence of the most damaging life stages. She has also studied the relationship between fruit infestation and fly capture in two types of commercial traps, carried out laboratorial studies of entomopathogenic fungi that attack fly pupa, evaluating how they can be used to act against the olive fly and has tested a naturally derived insecticide (spinosad). The findings of these studies will improve olive fly monitoring, permit better timing of control measures, within the north of the Iberian Peninsula and improve understanding of economic thresholds. Fatima successfully defended her doctoral thesis before an international jury thesis in September 2011.





Protect is Knowing and SeivaCorgo: 2 Biodiversity regional projects

Vila Real's Biodiversity Conservation Programme is divided into two major initiatives: "Protect is Knowing" project, dedicated to the study of biodiversity in the Natural Park of Alvão and "SeivaCorgo" biodiversity project, that focuses on the Natura 2000 area and the Corgo River basin. These projects are funded by Axis III - Environmental Valorization and Qualification – of the the Regional Operational Programme of the North.

These projects reflect the strategy and environmental policies that have been drawn up over the last few years for the city of Vila Real to solve clearly identified problems in several studies and sectorial plans. They follow guidelines, objectives and actions recommended through spatial planning, as well as sectorial and special plans. The "Protect is Knowing" project will intervene in three classified areas: Protected area of Natural Park of Alvão; Classified area of the Site Alvão/Marão; Areas of public water domain, specifically water courses that form part of the Corgo river basin under the "Seiva Corgo" initiative.



CITAB radio broadcasts promote scientific culture and literacy

Universidade FM Radio has been broadcasting weekly radio programmes on themes covering all areas of scientific knowledge under the coordination of **CITAB members Carla Amaral, Edna Cabecinha & Fontainhas Fernandes**. Part of the "Science in Symphony" project (funded by FEDER COMPETE and the Agência Nacional Ciência Viva), the broadcasts transmit interviews with researchers and lecturers from all of UTAD's faculties, divulging organized activities such as workshops, seminars and conferences. The programmes are also broadcast by other radio stations that cover the national territory.

Upcoming events



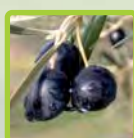
International Meeting on Biology and Conservation of Freshwater Bivalves

Will take place from the 4th - 7th September 2012 at the Agricultural School of Polytechnic Institute of Bragança (ESAIPB), Portugal, and will bring together international experts in freshwater bivalve biology and conservation, aiming to create a network of expert knowledge, establish collaborative projects and develop global directives for the protection and conservation of this important faunistic group.



Portuguese Congress of Malacology

CITAB invites scientists to participate in the Portuguese Congress of Malacology (7th – 9th September 2012, auditorium of the IPB in Bragança). The Congress will include a visit to Montesinho Natural Park to observe populations of the protected freshwater pearl mussel. A workshop on the list of protected species will be led by Dr. Mary Seddon, director of the IUCN Mollusc Specialist Group, will take place.



VI National Olive Symposium

Will take place from 15th – 17th November 2012 at Mirandela aimed to promote contacts between researchers, technicians, farmers, students, exporters, politicians and other interested parties to exchange knowhow leading to increased profitability and sustainability of the Portuguese olive industry. Issues under discussion will be new cropping systems of olive groves; soil management, fertilizer application, plant protection, water availability, quality and effect of olive oil and olives on health.

EndNote short course given to CITAB members

CITAB promoted two very popular short courses on "EndNote" reference management software for its members in January and February 2012. The short course, organized by Dr **Samantha Jane Hughes** and Dr **João Carrola**, covered the main concepts and principal functions of the software for beginners. EndNote allows users to "build" and manage themed libraries of scientific literature, generate bibliographical lists and format articles a simple way. Dr João Carrola taught the EndNote course which was devised to give specific training and new skills to CITAB researchers wishing to enhance their skills in the area of scientific databases and bibliographic management software.



CITAB's EndNote course, aimed to give specific training and new skills to university lecturers, CITAB researchers and students generated a lot of interest. The second EndNote course in February 2012 was given to a packed auditorium.

Project Start-up: Maximizing ecosystem services provided by Porto Wine Region vineyards

The recently launched project "Maximizing ecosystem services provided by Porto Wine Region vineyards" combines activities of **CITAB's EcoIntegrity (EI)** and **Sustainable Agro-food Chains (SAC)** research groups. Project participants include UTAD, the Association for the Development of Viticulture in the Douro region (ADVID) and Sogevinus Quintas SA. The project is funded by PRODER 4.1 "Cooperação para a Inovação", and managed by Companhia Geral da Agricultura das Vinhas do Alto Douro S.A. The project promotes the development of an integrated habitat strategy for vineyards in the Porto Wine Region to enhance their functional biodiversity so that producers can guarantee the supply of ecosystem goods and services such as biological control of pests, diseases or weeds, soil fertility, provide clean air and water, mitigate climate change, increase aesthetic values, and protect locally rare animals or plants.



CITAB Seminar - Research Methods in Biomechanics

Held on March 15th, 2012, Professor Antônio Carlos Shimano (DBMRAL, LB, FMRP, University of São Paulo) gave a talk on "Experimental applied biomechanics: concepts and activities" and Professor Edson Capello Souza (UNESP, Faculty of Engineering, Bauru, University of Porto, FEUP, Porto) gave a talk on "Bioengineering – Development of methodologies of biomechanical systems project". The content of both talks explained methodologies in the Biomechanics of the Musculoskeletal System. The seminar focused on learning-oriented practice of high quality research and knowledge transfer of biomechanics in conceptual frameworks supported by ecosystem management approaches to promote ecosystem and human health sustainability through a more active lifestyle- Seminar participants included students and professionals involved in the preparation of products and services in these areas.





Modelling the landscape genetic structure and dispersal patterns of endangered Red-billed (*Pyrrhocorax pyrrhocorax*) populations in Portugal: new insights for conservation and management



The Red-billed Chough (*Pyrrhocorax pyrrhocorax*) is a bird species with an unfavourable conservation status on a global level, and is classified as endangered in the Portuguese Vertebrate Red Data Book. In Portugal, the Red-billed Chough has a restricted distribution area with less than 1000 individuals dispersed in fragmented populations (Douro Internacional, Peneda-Gerês, Alvão/Barroso, Serra da Estrela, Serra de Aire e Candeeiros and Sagres). The "Red-bill Project" coordinated by the Laboratory of Applied Ecology (integrated in the **Ecointegrity Project**) has been studying the biology, ecology and behaviour factors related to these populations (http://flavors.me/p_pyrrhocorax). This innovative study integrated in the "Red-bill Project" aims to understand how landscape/environmental features influence dispersal patterns and genetic structure of Red-billed Chough metapopulation in Portugal, considering the recent/ongoing and historical microevolutionary processes. In addition, taking into account

the landscape changes, genetic diversity, fragmentation and peripheral isolation of populations will be predicted plausible scenarios of dispersal patterns. All relevant data will be applied in the development of a conservation strategy based on genetic diversity, landscape features and natural resources. The multidisciplinary team of this project is now working in the characterization of Red-billed Chough populations, including the capture, banding and collection of biological samples of adult and juvenile birds (Figure), supported by self funding technical projects and by FCT through grants SFRH/BD/77872/2011 and BI/Unidade4033_2.



CITAB joined COST Action PF1004

This action, entitled "Enhance mechanical properties of timber, engineered wood products and timber structures", deals with timber and wood-based engineered products, which are becoming very important as structural materials, especially in the drive towards sustainable technologies and construction. For structural wooden products, it is very important to improve their properties to be more competitive and reliable as a sustainable low-carbon material and a major contributor to affordable buildings.

The Action aims to boost the performance of structural timber products/construction, thereby improving use of timber in

construction in existing and new applications. A recent meeting has been held at the Zagreb University from 19-20 April. Two presentations from CITAB were made: (i) J. Xavier, "Wood and wood products characterisation from full-field measurements" and (ii) N. Dourado, "Ductile and brittle quasi-static mechanical behaviour of dowel-type wooden joints". These two projects are the result of on-going collaborations with other national and international researchers.



CITAB cooperation with Brazilian Universities in the field of wood properties

Giving continuity to the institutional cooperation between the CITAB and several Brazilian Universities, the CITAB investigator **Jose Luis Lousada** went to Brazil for a working visit to the University of S. Paulo (USP/ESALQ), UNESP (Botucatu), and Federal Rural University of Rio de Janeiro (UFRRJ).

This collaboration has been developed based on two CAPES/GRICES (UTAD/USP) research projects: (i) Growth, biomass, carbon sequestration and wood properties of *Eucalyptus grandis* with mineral and organic fertilization and (ii) Manufacture of MDF panels with a blend fibers of *Saccharum sp* (cane sugar) associated with fibers of *Eucalyptus grandis*: anatomical characterization and physico-mechanical properties. From this joint effort has been published 5 articles in JCR journals and presented 5 papers at conferences. UTAD has received several PhD students from USP/ESALQ, who developed research activities in the areas of the evaluation of physical, chemical, anatomical, and mechanical properties of wood and panels. Currently, a PhD student of UFRRJ is found at UTAD during one year to develop research activities in the areas of the vitreous transition temperature, diffusion and drying of wood.



New applications of spatial analysis for pest management and sustained biodiversity on regional landscapes in high-value crops in Canada and Portugal

Dr. Howard Thistlewood, a research scientist at the Pacific Agri-Food Research Centre, Summerland, British Columbia in western Canada, recently completed a nine month stay at CITAB. Funded by the Biological Resource Management for Sustainable Agricultural

Systems programme of the OECD Co-operative Research Programme, Dr. Thistlewood worked with Professor Laura Torres and Professor José Aranha (CITAB **Ecointegrity** Group) in the project "**Disturbance and management of agro-forest ecosystems**". The Douro Valley shares many characteristics with the Okanagan Valley in Canada, including large areas of wine and fruit production, challenging terrain with related micro-climates, water shortages, mixed land use, and strong interest in sustainable agriculture. Dr. Thistlewood applied and compared new spatial methods for the management of pests and land use for biodiversity across different types of land use. Dr Thistlewood is also a consultant for the new PRODER 4.1 funded EI/SAC led project "Maximizing ecosystem services provided by Porto Wine Region vineyards". Using GIS with aerial photography, land use, land cover and biological data, Dr Thistlewood together with Professors Aranha e Torres has devised a theoretical structure for layers of biological and agronomic inputs.

Dr. Thistlewood participated in CITAB symposia, scientific meetings and formed part of a PhD jury. He co-authored a scientific article and was an invited speaker at ISA, Lisbon. Several meetings with local producers and extension staff provided Dr Thistlewood with training in European sustainable agriculture production methods. Dr. Thistlewood shared North American expertise in "soft" pest management methods.

CITAB forges internationalization

In July 2011, Dr. Carsten Müller of Cardiff University was appointed consultant for the project "Increasing functional biodiversity in olive groves to enhance conservation biological control of insect pests". Dr. Müller is Head of Analytical Facilities in the School of Biosciences at Cardiff University, and a referee for the European Science Foundation. The project receives FEDER Funds of the Programa Operacional Factores de Competitividade (COMPETE) and National Funds from FCT (PTDC/AGR-AAM/100979/2008).