

2015 Activities Report

CITAB

Compiled by
**CITAB Executive
Committee**

Edited by
**Samantha Jane Hughes
& Lígia Pinto**

- Sustainable Agro-food Chains - SAC
- EcoinTEGRITY - EI
- Biosystems Engineering - BE

Index

1	Executive summary	3
2	Objectives and Achievements.....	4
2.1	Unit Description	4
2.2	General Objectives	5
2.3	Scientific Objectives.....	6
2.4	Funding	8
2.5	Main achievements.....	9
2.6	Outreach activities	18
3	Productivity metrics.....	20
3.1	– Publications in peer reviewed journals.....	20
3.2	– International projects	35
3.3	– National projects.....	36
3.4	– Industry contract research	39
4	List of CITAB Members in 2015	40

1 Executive summary

The 2015 Activity Report Plan marks CITABs transition into the 2015-2020 Strategic Programme (SP). The SP is built upon previous strategic planning based on consolidation of research strategies with focus on key areas, internationalisation and improving critical mass. CITAB has undergone significant growth in scientific critical mass and integrated members over the preceding years, indicating scientific progress and growing vitality of the unit. The growing profile of CITAB continues to attract researchers from various national institutions that identify with CITABs strategy. To this end CITAB welcomed yet more members during 2015.

The 2015-2020 SP is founded on two thematic areas:

- **Sustainability of Agri-food and Forestry Ecosystems in a changing environment;**
- **Technology & innovation in Agri-food and Forestry chains for a more competitive bio economy.**

Each thematic area comprises a set of tasks specifically designed to meet CITAB's vision of innovative scientific and technological knowledge drawn up in accordance with stakeholder needs, with the aim of making Agri-food and Forestry chains more competitive and sustainable. The tasks have also been developed to maximise integrated research and productivity among the centre's 3 research lines of Sustainable Agro-food Chains, EcoIntegrity and Biosystems Engineering. As well as our mission to create opportunities for stakeholders through scientific and technological innovation in agri-food and forestry chains, SP research will also contribute to environmental sustainability.

Following a classification of VERY GOOD, finance for the centre was set at just 200.000, 00€ which is the equivalent to amount awarded for pluriannual funding. No extra budget was given for SP. This implies that extra funding must come from other sources- such as projects and contracts with companies.

The number of scholarships and skilled human resources are extremely relevant for the implementation of the SP. Since the number of scholarships is still under the set rate of one scholarship/integrated member, most of the pluriannual funding has been allocated to contracting Masters, PhD and Post-Doctoral fellows to better support the intensive workload of the tasks of each thematic strand.

2 Objectives and Achievements

2.1 Unit Description

CITAB core activities focus on interdisciplinary research on agro-food, forestry and the environment, with input from engineering technologies to enhance development of agro-food and forestry production chains in Portugal. Implemented in 2015, the Strategic Project (SP) presents a new phase in the life of CITAB, characterised by a more streamlined approach, focused into two thematic areas that contribute to resolving societal and private sector issues in agriculture and forestry production chains and their impact on the natural environment. The SP aims to balance scientific excellence with benefits and consequences across multiple dimensions that embrace environmental sciences and socioeconomic needs.

CITAB's activities are based upon on the contribution of integrated members (members with a PhD) and collaborators (members without PhD), selected and assessed using international benchmarking criteria. Most CITAB members are primarily lecturers; therefore the Unit offers an international doctoral programme and supports post-graduate courses offered by the host institution and others centres of learning. CITAB is managed using a bottom-up approach. The Directorate (1 Director and 2 Vice-Directors) is supported by the Executive Committee (ExCo; 6 members- 2 from each Working Group and headed by the ExCo president) to form a two-way link between CITAB members and the Directorate for policy and research development.

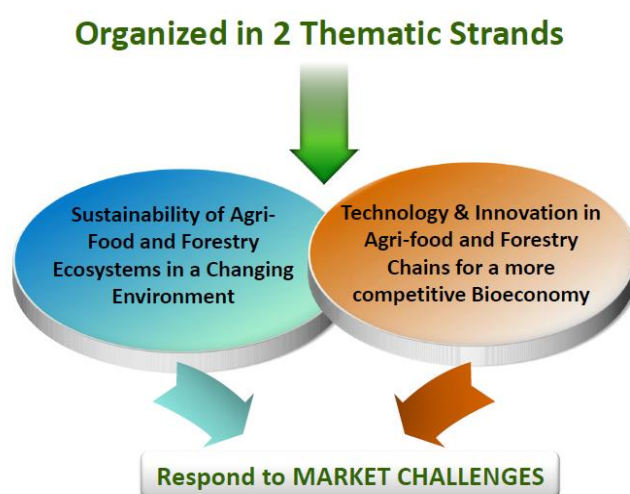
The ExCo is also responsible for compiling information and collaborating in the development of actions to promote CITAB's visibility on local, regional, national and international platforms. Both the Directorate and the ExCo meet approximately once a month. Research group members also hold regular meetings to evaluate group progress according to the Plan of Activities for the current year. The Scientific Council meets a minimum of 4 times a year, as stipulated by regulations. Given the considerable size of the Unit, a secretary is contracted to deal with all administrative duties, provide support to the Directorate and the ExCo. A dedicated press officer divulges the centre's activities at national and international level.

2.2 General Objectives

The SP aims to contribute to resolving societal and private sector (such as small and medium enterprises - SMEs) problems in agriculture and forestry production chains and their impact on the natural environment. The SP achieves this by balancing scientific excellence with benefits and consequences across multiple dimensions, embracing both environmental sciences and socioeconomic needs. The SP is multidisciplinary, addressing both benchmark science and the human dimension of contemporary issues.

The SP is built upon strong challenges, research priorities and objectives drawn up by consulting stakeholders, public institutions and private and public associations in the agriculture and forestry production sectors. The SP has also been developed in line with the objectives of the 2014-2020 National Programme for Rural Development (PDR), the Portugal 2020 national strategy for improving competitiveness and internationalization of economic activities and the international Horizon 2020 programme. By developing the SP in tandem with key national and international strategies, CITAB will reinforce its relevance in the development and implementation of national and international policies and obtain additional finance to support tasks that will contribute to meeting SP objectives.

The two SP research topics have been validated by CITAB's Stakeholder Committee, the Scientific Advisory Committee, and Scientific Council. The research topics take into account national and regional needs to boost capacity and fill gaps in science. The predicted outcomes are drawn up in accordance with the FCT finance requested for the Strategic Programme as well as other sources of finance.



The overall objective of this far reaching SP is to provide a model for developing sustainable yet competitive agri-food and forestry chains practises. The R&D initiatives from each strand aim to serve as pilot projects for agri-food and forestry chains and environmental issues. This will boost competitiveness, empower stakeholders and SMEs, sustain livelihoods, promote responsible stewardship and governance of the natural environment and the ecosystem services it supplies.

2.3 Scientific Objectives

Research priorities to meet SP objectives must be economically efficient, environmentally compatible and driven by sustainable socioeconomic paradigms. Thus, the SP focuses research efforts into two strongly multidisciplinary thematic strands (TS) that build on existing areas of expertise to meet specific goals within the broader objectives set out above (Table 1).

TS1 - Sustainability of Agrifood and Forestry Ecosystems in a Changing Environment - addresses how impacts affect agri-food and forestry chains systems as well as the biodiversity and ecosystem services to develop effective measures that contribute to sustainable strategy development, planning and decision making. TS1 brings together researchers in a multidisciplinary environment to develop tools and methodologies that assess how impacts from agriculture, forestry, climate change and land use change affect ecosystems and biodiversity by testing innovative monitoring techniques and developing spatially appropriate dynamic models to develop and implement regional adaptation & mitigation strategies and support decision making processes. The two tasks set out under TS1 are Task 1.1 Integrated monitoring of climate and environmental impacts: adaptation and mitigation strategies and Task 1.2. Conservation strategies and ecological modelling: recovering and improving sustainability in agri- food and forestry ecosystems and ecosystem services.

Results from these tasks, allow key stakeholders to develop optimal management strategies to guarantee sustainability and competitiveness in agri-food and forestry chain environments influenced by various types of impacts. Findings will be fundamental for governance and other decision making and planning processes in regional strategy. The SP will increase regional valorisation and competitiveness in agriculture and forestry production chains by reducing costs and risks and simultaneously contributing to improved ecosystem sustainability and provision of ecosystem services by reducing impacts.

Table 1. A summary of the thematic strands and tasks of the 2015 - 2020 Strategic Programme.

Thematic strands & Tasks description	
TS1 – Sustainability of Agri-food and Forestry Ecosystems in a changing environment	
Task 1.1 Integrated monitoring of climate and environmental impacts: adaptation and mitigation strategies	Development and implementation of new analytical techniques and integrated monitoring systems
	Database compilation
	Analysis, scaling, modelling tools testing indicators of environmental change
	Physiological adaptations and mitigations strategies
Task 1.2. Conservation strategies and ecological modelling: recovering and improving sustainability in agri- food and forestry ecosystems and ecosystem services	Ecological Modelling
	Ecosystem services
	Conservation and recovery strategies
TS2 – Technology & innovation in Agri-food and Forestry chains for a more competitive bioeconomy	
Task 2.1 - Innovative technologies and processes	Physiological and management tools
	New technological applications to agriculture and forestry
Task 2.2 - Bio-based products and waste research	Waste research and treatment
	Transformation and structural characterization of new products with bio-based value
	Biological activities
Task 2.3 -Towards valorisation of agro-food co-products	Toxicity and pharmacokinetic evaluation and modulation
	Metabolomic approaches
	Protocol Development: new procedures for clinical and toxicological evaluation and animal care

TS2 - Technology & innovation in Agri-food and Forestry chains for a more competitive bioeconomy - is based on a sound knowledge of regional, national and international trends on agro-food industry stakeholder profiles and regional agri-food, forestry and socioeconomic characteristics TS2 implements a sequential model to strengthen sector competitiveness, using innovation to improve the range of products on offer. TS2 is based on a sequential model comprising three tasks, namely Task 2.1 - Innovative technologies and processes, Task 2.2 - Bio-based products and waste research and Task 2.3 -Towards valorisation of agro-food co-products.

The TS2 sequential model focuses on R&D innovative technologies and processes to valorise products and optimise processes in the recycling, reuse & recovery of raw materials in agri-food and forestry chains. TS2 also provides positive feedback into TS1 by reducing impacts from these sectors on the natural environment and natural resources.

Based on these two tasks CITAB continues to (i) promote an ever higher research profile based on international benchmarking criteria, (ii) carry out ground-breaking national and international research and (iii) contribute to effective governance of natural resources.

2.4 Funding

Table 2. A summary of sources and amounts of CITAB funding in the period 2013-2015.

	2013	2014	2015	Subtotal
FCT Pluriannual	96.606,26€	110.051,00€	200.000,00€	406.657,26€
FCT Incentivo	12.019,00€	16.162,00€	---	28.181,00€
FCT Projects	1.218.184,53€	440.267,94€	86.151,27€	1.744.603,74€
Other (National)	1.658.526,76€	2.641.877,84€	937.924,18€	5.238.328,78€
Other (International)	285.078,25€	374.114,75€	322.049,13€	981.242,13€
Industry (National)	364.418,32€	145.915,58€	202.814,00€	713.147,89€
Industry (International)	0,00€	400,00€	0,00€	400,00€
Total	3.634.833,11€	3.728.789,12€	1.748.938,57€	9.112.560,79€

2.5 Main achievements

2.5.1 Thematic Strand 1 Main Achievements

In 2015, the main achievements of TS1 were related to the dataset production, climate variability and change assessment, the role of climate in agriculture, aquatic and forestry systems.

- During 2015 several datasets were collected, compiled, treated (error identification and correction) and exploratory analysis of climate, agro-forestry and environmental datasets were undertaken. Data records were also tested for their reliability and homogeneity.

- Research on climate variability, irregularity and extremes was further developed. Besides the compilation and treatment of new instrumental datasets from a wide range of sources (e.g. weather stations, climate models and remote sensing), additional information was retrieved from different proxies, documentary sources and early instrumental records. Tree rings were used as a biological archive to study past climate conditions in Portugal, particularly some native Portuguese species (*Quercus robur*, *pyrenaica* and *suber* L.). Several publications and scientific communications in the area of dendroclimatology and paleoclimatology were produced. 400-year reconstructed time series of air temperature and precipitation in Portugal were also produced and validated using different methodologies and datasets, from dendrochronology and geothermal flux measurements to regional palaeoclimatic simulations and historical records. Studies of past Portuguese climates were carried out using historical information and documentary sources, such as floods in Portuguese rivers over the last two centuries. CITAB researchers collaborated with other national and international institutions. The mechanisms underlying the occurrence of temperature extremes on the Iberian Peninsula, such as heat waves and cold spells, were also studied in close collaboration with a team from the ETH Zurich, an internationally leading institution in climate research which also lead to publications in peer-reviewed journals.

- Given the strong sensitivity of regionally-relevant crops (e.g. grapevines, olive, chestnut and berry trees) to atmospheric conditions, climate change can threaten their future sustainability. Crop models were applied either for short-term prediction of crop parameters (yields, quality and phenology) or for long-term assessment of climate change impacts. The STICS model was already calibrated and validated for Portuguese

grapevine varieties, under the typical Portuguese growth conditions. Several publications and communications were also produced in this line of research, including a review paper on this topic. The model outputs have been used as a predictive tool for grapevine production in Portugal, acting as a key decision support system for some CITAB's stakeholders, mainly some wineries in the Douro Valley. CITAB/UTAD researchers are also seeking for suitable short-term adaptation measures, as the first protection strategy against climate change.

- We managed to overcome the limitations of single-level approaches to assess the diversity of human stressors in the aquatic ecosystems (acting at different scales) by producing the integrative MELIS index. The MELIS index integrates biological indicators, with biochemical and histopathological biomarkers and functional indicators, representing the different levels of biological organization. MELIS includes distinct aquatic communities, namely fish and invertebrates, and it were established base line values at different pollution gradients, and identified potential variations due to climate and environmental impacts (physical and chemical habitats). Main achievements were based on the selection and further integration of disturbance indicators. A more intensive work was developed related to toxicity mechanisms (e.g. signalling pathways and gene networks implicated in toxic and adaptive responses) in aquatic animals, associated to emerging compounds where there is little or no information on toxic effects. Namely, effects on embryos development and alterations on sexual differentiation and reproductive fitness were assessed. The research produced important results concerning the quantification of ecological integrity in aquatic ecosystems based on the integration of indicators (molecular, biochemical, cellular, physiological, population and community level), including indicators of ecosystem function (decomposition), and producing a reliable system to be used in water assessment and sensitive to a wide range of impacts.

- Impacts of climate change and human pressure on aquatic biota of Beça River (northern Portugal) were assessed by a check on relevant water quality and river flow variables against predefined ecological requisites. The freshwater pearl mussel *Margaritifera margaritifera* was investigated. This endangered species is protected by EU regulations, but the approach applies to any aquatic species worldwide providing that the corresponding ecological requisites are stipulated. This species is threatened by projected reductions in precipitation and increasing human-related threats such as dam construction and wildfires Actions integrated other components of the aquatic system,

particularly the improvement and validation of environmental flows, control of exotic species (e.g. the bivalve *Corbicula fluminea*) and protection of endangered fish species, especially in situations of low connectivity (for the 1st time it was test the effect of flow management on the reproductive success of native fish species in regulated rivers.

- Different techniques were applied and tested in actions related to the restoration of the ecological functions of impacted systems and the rehabilitation of degraded environments, particularly under climate change scenarios, particularly in aquatic ecosystems under extreme hydrological events (droughts and floods), leading to soil loss and nutrient leaching. In this field the research test new soil engineering techniques designed for bank protection in order to decrease fluvial erosion and to allow habitat restoration (namely by applying bioengineering procedures), allowing the recovery of riparian galleries and the mitigation of fluvial erosion.

- Active fire information provided by TERRA and AQUA instruments on-board sun-synchronous polar MODIS platform was used to describe fire activity in the Western Mediterranean and to identify and characterize the synoptic patterns of several meteorological fields associated with the occurrence of extreme fire activity episodes (EEs). The spatial distribution of the fire pixels during the period of 2003 – 2012 leads to the identification of two most affected sub-regions, namely the Northern and Western parts of Iberian Peninsula (NWIP) and Northern Africa (NAFR). The temporal distribution of the fire pixels in these two sub-regions reveals: (i) high and non-concurrent inter- and intra-annual variability with maximum values during the summer of 2003 and 2005 in NWIP and 2007 and 2012 in NAFR; and, (ii) high intra-annual variability dominated by a prominent annual cycle with a main peak centred in August in both sub-regions and a less pronounced secondary peak in March only evident in NWIP region. The 34 EEs identified were grouped according to the location, period of occurrence and spatial configuration of the associated synoptic patterns into 3 clusters (NWIP-summer, NWIP-winter and NAFR-summer). Results from the composite analysis reveals similar fire weather conditions (statistical significant positive anomalies of air temperature and negative anomalies of air relative humidity) but associated to different circulation patterns at lower and mid-levels of the Atmosphere associated to the occurrence of EEs in each cluster of the Western Mediterranean region.

2.5.2 TS1 Future research

Future research aims to develop innovative techniques for monitoring agro-forestry and environmental systems to bring important added-value for several socioeconomic sectors covering a wide range of shareholders. Through multidisciplinary approaches, we aim to bring new perspectives together for better assessment of the likely impacts of a changing climate and environment on our target systems. This will enable the development of suitable, timely and cost-effective adaptation and mitigation measures. The main goals will be succinctly described in the following lines:

- The initiated dataset collection, compilation and treatment, as well as the exploratory analysis of climate, agro-forestry and environmental datasets will be continued and reinforced within this task. Furthermore, the reliability and homogeneity testing of data records will proceed.
- Due to the strong socioeconomic implications on agro-forestry and environmental systems, as well as on the corresponding socioeconomic sectors, the research on climate variability, irregularity and, namely, climate and weather extremes will continue to be an important focus area. Further studies on the physical mechanisms underlying the occurrence of precipitation extremes, droughts and floods will be carried out. The identification of weather types and regimes, and their connections to atmospheric conditions will also be pursued. A better understanding of these large-scale mechanisms is of foremost relevance to modelling and forecasting of extreme events. Climate change projections for Portugal will also be produced using new datasets, GHG emission scenarios and model experiments.
- Studies on viticulture, oliviculture and other economically relevant crops (chestnut-tree, almond-tree, cherry-tree and berries) will also proceed. These studies will include: the understanding of the responses of the crops to climate, climate change, environmental stresses, water and heat stresses and extreme weather events. The use of crop models for short-term and long-term prediction of climate change impacts will be continued, now applying model ensembles and new model-parameterization combinations. Furthermore, crop models will continue to be validated and tested to deal with main biotic and abiotic stresses. Regarding the chestnut sector, the research will also give emphasis to threats fight, such as the chestnut gall wasp (*Dryocosmus kuriphilus*), chestnut blight disease, and ink disease. The outcomes from these studies will deliver general guidelines to stakeholders.

- Development of indicator systems has seen an enormous increase in demand for integrative tools, over the last two decades, especially in systems with high connectivity such as lotic systems. Different items must be integrated to provide a “realistic” picture of the systems complexity under assessment since aquatic bio-assessment is a trade-off between the legislative requirements, best scientific knowledge and socio-political emphasis. We will further develop more Integrative techniques for indicator development in line with the Water Framework Directive and CIS-ECOSTAT proposals and suggestions. Building on the previous steps of MELIS index development, research will focus on the development of practical second generation bio-assessment tools to integrate ecotoxicology, biodiversity and ecosystem functioning and establish the relation of these indicators with the assessment of ecosystem stability, resilience and services provisioning and to bridge the systemic gap between ecological and chemical status. Therefore, we may reinforce the links between good ecological status, biodiversity and ecosystem services, and we may have great potential for examining the interaction between ecosystems and human well-being.

- Concerning effects of aquatic contaminants, including emerging compounds, it is intended to continue the performance of laboratory tests using model aquatic species to identify potential effect and/or exposure biomarkers. New identified biomarkers will be applied and tested on biomonitoring programs. This will also include tests at different water temperature, as biological responses to contaminants and their action can be temperature dependent.

- Application of Natural Water Retention Measures (NWRM). These measures aim to safeguard and enhance the water storage potential of landscape, soil, and aquifers, by restoring ecosystems, natural features and characteristics of water courses and using natural processes. They support Green Infrastructure by contributing to integrated goals dealing with nature and biodiversity conservation and restoration, landscaping, etc. They are adaptation measures that use nature to regulate the flow and transport of water so as to smooth peaks and moderate extreme events (floods, droughts, desertification and salinization). They are also better environmental option for flood risk management in Mediterranean streams subject to an intense variety of hydrological conditions. In fact, they reduce vulnerability of water resources to Climate Change and other anthropogenic pressures. They can also improve water quality. They are relevant both in rural and urban areas. In streams running in agricultural catchments we want to define buffer strips and shelter belts and to adopt soil conservation

practices (crop rotation, intercropping, conservation tillage...), together with correct afforestation and conversions for water quality improvements, appropriate design of river channels, etc.

- In Portugal, one of the trends that characterizes wildfires activity has been the appearance of events that reached extreme behaviours and grow to previously unheard sizes. Although these fires present a very low frequency of occurrence, they are an important challenge, mainly when they affect wildland urban interface. In this sense, the purpose is to identify and characterize the weather/climate and other drivers of large fires in Portugal to develop efficient prevention and preparedness strategies and measures to contain wildfire risk, to decrease impacts and damages and to enhance resilience to extreme fire events. Another objective of the fire research for 2016 is to increase the knowledge about the role of human and biophysical drivers on the fire incidence in Portugal.

2.5.3 TS2 Main Achievements

Main achievements during 2015 focused on TS2 primary objectives to develop novel and innovative technologies in order to valorise the endogenous products and optimise processes in the recycling and recovery of raw materials from agri-food and forestry chains. We also worked to reduce the negative impacts from these materials on the natural environment and natural resources.

- New vivarium spaces were inaugurated in the new laboratory building and animals were moved into new spaces for experiments. Rooms were prepared and organized prior to inauguration. Biosafety rules and basic standard operative procedures were developed over 2015 for implementation in the facility. The facility licensing process was resumed, since a provisional license was issued by DGAV in December 2015.

- Grape stems that were characterized in Task 2.2 were tested in the development of new grape stems-based liqueurs, with valuable sensory properties and phytochemical composition. The nutritional and functional composition of fresh cowpea pods was evaluated to obtain information on new potential applications of this underexploited material. New compounds were derived from phenolics in citrus peels with interesting technological applications as antioxidants and edulcorants.

- Contacts were initiated with colleagues from other institutions via meetings and presentations at seminars (CITAB-UMinho, CNC.IBILI, UBI and CEDOC). Project proposals were submitted under the North 2020 and PAC programs.
- Curcumin used in photodynamic therapy increases production of reactive oxygen species and DNA damage and decreases DNA damage repair, leading to increased loss of viability of *Candida albicans*.
- Assessment of bioactivities of propolis mixtures from different origins showed synergistic effects.
- Since new resources of phytochemicals with biological activity are being claimed to substitute used drugs and synthetic protective compounds, during the reporting period it was assessed the composition in nutrients (crude protein, total fats, ash, amino acids, and minerals) and non-nutrients (total phenolics, ortho-diphenols, flavonoids, and tannins) of the following vegetal matrices: (1) By-products: Grape stems, olives' pomace, citrus' peel, almond hull, and almond peel; (2) Edible fruits and vegetables: Blueberry, almonds, chesnut, chickpea, cowpea, wheat, apples, olives, cowpea pods, bean flours, and olive oil.
- Apart from the evaluation of the basic chemical composition and phytochemical content of the above referred plant materials, the hydroalcoholic extracts obtained, were evaluated on their biological activity mainly regarding antioxidant power.
- These determinations allowed to establish the possible correlation between composition and bioactivity, resorting to chemometric models (multivariate analysis).
- Furthermore, infrared spectra have been registered for these matrices in order to produce predictive models, resorting to multivariate statistical methods, allowing the evaluation of these matrices solely by the acquisition of its infrared spectrum. This new approach constitutes a complementary tool to classical methods for the assessment of the nutritional and non-nutritional contents of the assessed matrices, which also allows the evaluation of the correlation between distinct species or clones.
- Characterization of the role of dietary phytochemicals on the regulation of blood lipoproteins and cholesterol metabolism and on the promotion of healthy ageing through induction of oxidative stress defense mechanisms.
- Impact of legumes of the Mediterranean diet on the prevention of colorectal cancer. Role of phytochemicals on improvement of DNA repair capacity.

- Use of paper industry by-products as source of pharmacologically active compounds.

2.5.4 TS2 Future research

- We will continue to establish more collaborations with other research groups, internally and externally to UTAD, in order to establish multi-disciplinary and more competitive teams for future funding application. We will carry out the first animal studies with extracts obtained by the phytochemicals group. Bio security and basic standard operative procedures will be concluded for the animal facility activities, the DGAV licensing process with DGAV will be finalised and external projects will commence. Service and consultancy will continue to support long term economic feasibility.

- The phytochemicals group will continue to evaluate the impact of diverse freezing times, at different temperatures, on the nutritional and phytochemical composition of cowpea pods in order to establish the optimal combination for the development of ready-to-eat products and the extension of the previously developed work regarding the production of a grape stems-based liqueurs for stems of distinct native and non-native varieties.

- The integration of different spatiotemporal modelling concepts to improve ecosystem management, bioconversion of lignocellulose for application in industry, understanding the principal factors affecting the emergence of large fires and improving prescribed fire techniques in ecosystem management, improve the application of management techniques in endemic forests, application of statistical techniques to model life cycles of endangered species and colour change as a recent application and testing emerging techniques such as ecological infrastructures for enhancing the water storage potential and water quality of watersheds.

- The future integration of the Agent Based Models (ABM) principles in our proposed modelling frameworks will result in promising future outcomes, allowing a better understating of ecosystems functioning, which will make the methodology more instructive and credible to decision-makers and environmental managers. In fact, the combination of whole-system processes such as resilience, resistance, persistence, regulation, density dependence, and individual properties are crucial to capture multi-factor influences under relevant scenarios, which can be widely applicable to support biodiversity conservation measures.

- The team is still interested in developing bioconversion of lignocellulose in products of added value. Another subjects are related with to develop the integrated models based on Michaelis–Menten equation in the presence of presence of two inhibitors when one of them is a reaction product and also develop models that can discriminate sequential models (random and ordered).
- Human and natural systems are still severely affected by frequent and destructive natural hazards (wildfires, floods, etc.) causing high environmental, human and socio-economic costs every year. Therefore, further research in environmental sciences using new and adapted methodologies is of high scientific value and, on this respect, the main objective for 2016 is to develop, test and use different methods for the space-time mapping, analysis and modelling of environmental data with focus on natural hazards.
- Wildland fires are an integral component of many ecosystems. The environmental and societal impacts of the fires depend on several fire behaviour attributes which, in turn, are determined by the fire environment. On this respect, the objective is to identify and characterize the drivers of burn severity variation in large fires as well as to understand and model the fire behaviour and systematize its prediction on a global scale, towards more sustainable prescribed burning practices in Europe.
- Provide statistical models that could be useful for research in microbiology and microorganism studies. Namely to study *F. Huffmanella* sp. (Nematoda: Trichosomoididae) from *Microchirus azevia* captured off Portuguese coast. Concerning ecological studies it is intended to provide more accurate Mark Release Capture models for insects population: and disseminate results of adult demography, spatial distribution and movements of *Phengarisalcon* (Lepidoptera: Lycaenidae) populations in Portugal.
- Continuing to develop scientific research centered within the timber construction area, specifically analyzing and modeling floor structures. This means, not only to center the research in the same area as the doctoral thesis, but also to cover other related areas as is the structural rehabilitation and the use of bio-based products to obtain new structural solutions, among others.
- Analysis of the antigenotoxic properties of Ginkgo biloba and Dittrichia viscosa extracts and investigation of the mechanisms of protection. Investigation of a natural biodegradable antifungal plant extract to be used in biological farming.

- Development of propolis-based products for different applications.
- Isolation of individual bioactive phytochemicals present in the presently assessed matrices (edible and by-products).
- Evaluation of the isolated compounds on their biological activity in vitro, through cellular models.
- Extension of the present set of matrices under study to new interesting products and species, as well as newly identified agro-industrial by-products.
- Characterization of vegetable foods and medicinal and aromatic plant phytochemical composition and biological properties aiming at innovative nutritional and pharmacological applications for the management of age related diseases (such as Diabetes type 2, Non-Alcoholic Fatty Liver Disease, Colorectal Cancer as well as Cardiovascular and Neurodegenerative diseases).

2.6 Outreach activities

CITAB researchers organised and took part in almost 50 outreach activities over the year. Activities were highly varied, ranging from talks or Skype conferences given at schools, talks and communications at trade or public fairs and festivals, visits to schools and training of volunteers. Talks or events, such as IrriGOlive and INNOFood seminars, were organised with stakeholder needs in mind. The 10th Iberian and 7th Iberoamerican Conference on Environmental Contamination and Toxicology with the theme Environmental Sustainability: insights to the future was partly organised by CITAB and held at UTAD between the 14th and 17th of July 2015. A summary of outreach activities, listed in chronological order, is given below:

1. CIENCIA P'RA QUE TE QUERO - Pole CITAB-UMINHO – For children 6 to 10 years|21 February to 20 June (last Saturday of every month)
2. LAB DAY - Pole CITAB-UMINHO – for high School students|16 February
3. Tertulia FNACiência – “E o Douro aqui tão perto - Investigação e ciência em viticultura” |19 February
4. Seminar “A Floresta e a Atualidade. Ameaças Bióticas ao Setor Florestal” |12 - 13 March
5. Exhibition “Bichos Nós, Um Outro Olhar” |10 March - 31 July
6. Exhibition Photo Vitis|13 March - 10 April
7. International Tree day | UTAD | CM VILA REAL | RI 13 | 350 primary school children CITAB|19 March
8. Presentation of the Ciencia Viva Centre | Agrupamento de Escolas de Amarante|19 March
9. Seminar “Sustentabilidade da Viticultura de Encosta: algumas ferramentas para a sua gestão”- ADVID|20 e 26 March
10. Skype conference with students from Escola de Santa Maria Feira, about the theme “Desflorestação e Alterações Climáticas” |25 March

11. Seminar CM Vila Real "Hora do Planeta" - João Santos | 28 March
12. "Café Ciência" in the Portuguese Parliament | 09 - April
13. National Festival on Biotechnology - Pavilhão do Conhecimento – Ciência Viva | 10 - 11 April
14. Training "Monitorização da Qualidade Ecológica dos Cursos de Água" | 11 - 12 April
15. Skype conference with students from Escola Secundária de Resende, about the theme "Desflorestação e alterações climáticas" - ClimaEduMedia | 13 April
16. Conference on Obesity (by José Maria Tallon) | 23 April
17. Open conference, by Núria Pascual Seva, from València Polytechnic University | 28 April
18. Skype conferences with students, about the theme "Agriculture, viticulture and climate change"- ClimaEduMedia | 16, 22 April - 20 May
19. Open conference with Joanna Chudzian, Faculty of Economy and Science University of Warsaw | 13 May
20. AgroBioPlant - "Da uva ao vinho: da fisiologia, à bioquímica e biotecnologia" Festa Ciência UMinho | 14 May
21. Skype conference: climate change, fire and forests in the Gerês National Park - ClimaEduMedia | 27 May
22. Ciência Acontece! "Alimentos, Nutrientes & Calorias". | 29 May
23. Conference "IrriGOlive" – for olive oil producers | 5 June
24. Seminar "Novos desafios da cereja" - Festa da cereja de Alfandega da Fé | 07 June
25. Workshop: final evaluation of the Innofood project | 22 June
26. Pole CITAB UMinho - Pedeu Ciência | 09 July
27. The 10th Iberian and 7th Iberoamerican Conference on Environmental Contamination and Toxicology | 14th – 17th July
28. XIV Trade Fair - Aguiar da Beira | 23-26 July
29. XXIII MEETING OF THE EUROPEAN CONFEDERATION OF MEDITERRANEAN MYCOLOGY-CEMM | 8-13 November 2015
30. CIENCIA P'RA QUE TE QUERO - Pole CITAB-UMINHO - Microbios Amigos ou Inimigos - Eis a questão | 17 October
31. Seminar "Impacto das alterações climáticas na vinha e no vinho" | 23 October
32. "Uma Tarde com o Freixo" | 31 October
33. CIENCIA P'RA QUE TE QUERO - Pole CITAB UMINHO - Micróbios: De Fugir a Sete Pés! | 21 November
34. Science and Technology Week Ana Sofia Faria - Escola Barcelos | 23 November
35. Science and Technology Week Ana Barros Gastronomia Molecular (Colegio São José)
36. Science and Technology Week Ana Sofia Santos - cavalos são nossos amigos | 23 - 27 November
37. Science and Technology Week Ana Lúcia Pinto Sintra – "Cisgénese versus transgénese: soluções para problemas velhos da viticultura" | 25 November
38. Science and Technology Week Isaura Castro "Videiras vivas Perspetiva da Genética Molecular e Biotecnologia" | 25 November

39. Science and Technology Week Marchia das Neves Paiva Cardoso “És amante da natureza e das atividades ao ar livre? Vem conhecer alguns perigos inimagináveis: As espiroquetas” |25 November
40. “Guia de Azeites 2015” |09 December
41. ClimaEduMedia: Report and Interviews | Clima Edu Media | Prof. Henrique Trindade, Domingos Lopes, João Santos |11 December.

3 Productivity metrics

3.1 – Publications in peer reviewed journals

A total of 157 JCR articles were published within the thematic strands of **Sustainability of Agri-food and Forestry Ecosystems in a changing environment** and **Technology & innovation in Agri-food and Forestry chains for a more competitive bioeconomy** in 2015

1. Albuquerque, C. Morinha, F., Magalhães, J., Requicha, J., Dias, I., Guedes-Pingo, H., Bastos, E., Viegas, C. 2015. Variants in the interleukin-1 alpha and beta genes, and the risk for periodontal disease in dogs. *Journal of Genetics* 94: 651-659. 10.1007/s12041-015-0576-z.
2. Alves-Pimenta, S., Ginja, M.M., Colaço, J., Fernandes, A.M., Melo-Pinto, P., Colaço, B., 2015. Curvature Radius Measurements from the Ulnar Trochlear Notch in Large Dogs. *The Anatomical Record* 298: 1748-1753. 10.1002/ar.23194.
3. Amraoui, M., Pereira, M.G., DaCamara, C.C., Calado, T.J., 2015. Atmospheric conditions associated with extreme fire activity in the Western Mediterranean region. *Science of the Total Environment* 524: 32-39. 10.1016/j.scitotenv.2015.04.032.
4. Anderson, W.R., Cruz, M.G., Fernandes, P.M., McCaw, L., Vega, J.A., Bradstock, R.A., Fogarty, L., Gould, J., McCarthy, G., Marsden-Smedley, J.B., Matthews, S., Mattingley, G., Pearce, H.G., van Wilgen, B.W., 2015. A generic, empirical-based model for predicting rate of fire spread in shrublands. *International Journal of Wildland Fire* 24: 443-460. 10.1071/wf14130.
5. Andrade, C., Belo-Pereira, M., 2015. Assessment of droughts in the Iberian Peninsula using the WASP-Index. *Atmospheric Science Letters* 16: 208-218. 10.1002/asl2.542.
6. Andreani, T., Figueiro, J.F., Jose, S., Santini, A., Silva, A.M., Souto, E.B., 2015. Hydrophilic Polymers for Modified-Release Nanoparticles: A Review of Mathematical Modelling for Pharmacokinetic Analysis. *Current Pharmaceutical Design* 21: 3090-3096, WOS:000357937500005.
7. Andreani, T., Kiill, C.P., de Souza, A.L.R., Figueiro, J.F., Doktorovova, S., Garcia, M.L., Gramiao, M.P.D., Silva, A.M., Souto, E.B., 2015. Effect of cryoprotectants on the reconstitution of silica nanoparticles produced by sol-gel technology. *Journal of Thermal Analysis and Calorimetry* 120: 1001-1007. 10.1007/s10973-014-4275-4.
8. Andreani, T., Miziara, L., Lorenzon, E.N., de Souza, A.L.R., Kiill, C.P., Figueiro, J.F., Garcia, M.L., Gremiao, P.D., Silva, A.M., Souto, E.B., 2015. Effect of mucoadhesive polymers on the in vitro performance of insulin-loaded silica nanoparticles: Interactions

- with mucin and biomembrane models. *European Journal of Pharmaceutics and Biopharmaceutics* 93: 118-126. 10.1016/j.ejpb.2015.03.027.
9. Andreani, T., Silva, A.M., Souto, E.B., 2015. Silica-based matrices: State of the art and new perspectives for therapeutic drug delivery. *Biotechnology and Applied Biochemistry* 62: 754-764. 10.1002/bab.1322.
 10. Angelo Rodrigues, M., Dimande, P., Pereira, E.L., Ferreira, I.Q., Freitas, S., Correia, C.M., Moutinho-Pereira, J., Arrobas, M., 2015. Early-maturing annual legumes: an option for cover cropping in rainfed olive orchards. *Nutrient Cycling in Agroecosystems* 103: 153-166. 10.1007/s10705-015-9730-5.
 11. Aragão, F.R., Moreira, M.H., Gabriel, R.E., Abrantes, C.G., 2015. Should menopausal characteristics be considered during cardiorespiratory exercise prescription in postmenopausal women? *Climacteric* 18: 278-283. 10.3109/13697137.2014.938042.
 12. Ayadi, I., Monteiro, S.M., Regaya, I., Coimbra, A., Fernandes, F., Oliveira, M.M., Peixoto, F., Mnif, W., 2015. Biochemical and histological changes in the liver and gills of Nile tilapia *Oreochromis niloticus* exposed to Red 195 dye. *RSC Advances* 5: 87168-87178. 10.1039/C5RA13127H.
 13. Azevedo, M.-M., Pinheiro, C., Dias, A.C.P., Pinto-Ribeiro, F., Baltazar, F., 2015. Impact of an Educational Hands-on Project on the Antimicrobial, Antitumor and Anti-Inflammatory Properties of Plants on Portuguese Students' Awareness, Knowledge, and Competences. *International Journal of Environmental Research and Public Health* 12: 2437-2453. 10.3390/ijerph120302437.
 14. Bacchetta, L., Rovira, M., Tronci, C., Aramini, M., Drogoudi, P., Silva, A.P., Solar, A., Avanzato, D., Botta, R., Valentini, N., Boccacci, P., 2015. A multidisciplinary approach to enhance the conservation and use of hazelnut *Corylus avellana* L. genetic resources (vol 62, pg 649, 2015). *Genetic Resources and Crop Evolution* 62: 807-808. 10.1007/s10722-015-0258-y.
 15. Barros, A., Gironés-Vilaplana, A., Texeira, A., Baenas, N., Domínguez-Perles, R., 2015. Grape stems as a source of bioactive compounds: application towards added-value commodities and significance for human health. *Phytochemistry Reviews* 14: 921-931. 10.1007/s11101-015-9421-5.
 16. Barros, P. Vale-Gonçalves H. M., Paupério J., Cabral J. A. & Rosa G., 2015. Confirmation of European snow vole *Chionomys nivalis* (Mammalia: Rodentia: Cricetidae) occurrence in Portugal. *Italian Journal of Zoology* (2015) 1-7.
 17. Botequim, B., Zubizarreta-Gerendiain, A., Garcia-Gonzalo, J., Silva, A., Marques, S., Fernandes, P.M., Pereira, J.M., Tomé, M., 2015. A model of shrub biomass accumulation as a tool to support management of Portuguese forests. *iForest - Biogeosciences and Forestry* 8: 114-125. 10.3832/ifer0931-008.
 18. Carmello, J.C., Pavarina, A.C., Oliveira, R., Johansson, B., 2015. Genotoxic effect of photodynamic therapy mediated by curcumin on *Candida albicans*. *FEMS Yeast Res* 15 (4) fov018. 15.10.1093/femsyr/fov018.
 19. Carneiro, M., Colaço, B., Brandão, R., Azorín, B., Nicolas, O., Colaço, J., Pires, M.J., Agustí, S., Casas-Díaz, E., Lavin, S., Oliveira, P.A., 2015. Assessment of the exposure to heavy metals in Griffon vultures (*Gyps fulvus*) from the Iberian Peninsula. *Ecotoxicology and Environmental Safety* 113: 295-301. <http://dx.doi.org/10.1016/j.ecoenv.2014.12.016>.

20. Carvalho, A., Graça, C., Carocha, V., Pêra, S., Lousada, J.L., Lima-Brito, J., Paiva, J.A.P., 2015. An improved total RNA isolation from secondary tissues of woody species for coding and non-coding gene expression analyses. *Wood Science and Technology* 49: 647-658. 10.1007/s00226-015-0709-9.
21. Carvalho, A.C., Gomes, A.C., Pereira-Wilson, C., Lima, C.F., 2015. Redox-dependent induction of antioxidant defenses by phenolic diterpenes confers stress tolerance in normal human skin fibroblasts: Insights on replicative senescence. *Free Radical Biology and Medicine* 83: 262-272. 10.1016/j.freeradbiomed.2015.02.022.
22. Carvalho, M.I., Pires, I., Dias, M., Prada, J., Gregorio, H., Lobo, L., Queiroga, F., 2015. Intratumoral CD3+T-Lymphocytes Immunoexpression and Its Association with c-Kit, Angiogenesis, and Overall Survival in Malignant Canine Mammary Tumors. *Analytical Cellular Pathology* ID 920409, 8. 10.1155/2015/920409.
23. Carvalho, M.I., Pires, I., Prada, J., Ferreira, A.F., Queiroga, F.L., 2015. Positive Interplay Between CD3(+) T-lymphocytes and Concurrent COX-2/EGFR Expression in Canine Malignant Mammary Tumors. *Anticancer Research* 35: 2915-2920, WOS:000354267200056.
24. Coimbra, A.M., Peixoto, M.J., Coelho, I., Lacerda, R., Carvalho, A.P., Gesto, M., Lyssimachou, A., Lima, D., Soares, J., Andre, A., Capitao, A., Castro, L.F., Santos, M.M., 2015. Chronic effects of clofibric acid in zebrafish (*Danio rerio*): a multigenerational study. *Aquat Toxicol* 160: 76-86. 10.1016/j.aquatox.2015.01.013.
25. Conde, A., Regalado, A., Rodrigues, D., Costa, J.M., Blumwald, E., Chaves, M.M., Geros, H., 2015. Polyols in grape berry: transport and metabolic adjustments as a physiological strategy for water-deficit stress tolerance in grapevine. *J Exp Bot* 66: 889-906. 10.1093/jxb/eru446.
26. Costa, C., Pereira, S., Lima, L., Peixoto, A., Fernandes, E., Neves, D., Neves, M., Gaiteiro, C., Tavares, A., Gil da Costa, R.M., Cruz, R., Amaro, T., Oliveira, P.A., Ferreira, J.A., Santos, L.L., 2015. Abnormal Protein Glycosylation and Activated PI3K/Akt/mTOR Pathway: Role in Bladder Cancer Prognosis and Targeted Therapeutics. *Plos One* 10(11), e0141253. 10.10.1371/journal.pone.0141253.
27. Costa, R., Fraga, H., Malheiro, A.C., Santos, J.A., 2015. Application of crop modelling to portuguese viticulture: implementation and added-values for strategic planning. *Ciência e Técnica Vitivinícola* 30: 29-42. 10.1051/ctv/20153001029.
28. Dávila, J., Morinha, F., Blanco, G., 2015. Eleven new polymorphic microsatellite markers for the Red-billed chough (*Pyrrhocorax pyrrhocorax*). *Conservation Genetics Resources* 7: 81-83. 10.1007/s12686-014-0293-6.
29. de Morais, A.B., Pereira, A.B., de Moura, M.F.S.F., Silva, F.G.A., Dourado, N., 2015. Bilinear approximations to the mixed-mode I-II delamination cohesive law using an inverse method. *Composite Structures* 122: 361-366. 10.1016/j.compstruct.2014.11.058.
30. de Moura, M.F.S.F., Fernandes, R., Silva, F.G.A., Dourado, N., 2015. Mode II fracture characterization of a hybrid cork/carbon-epoxy laminate. *Composites Part B-Engineering* 76: 44-51. 10.1016/j.compositesb.2015.02.010.
31. de Sousa, A.L., Calçadas Dias Gabriel, R.E., Faria, A.M., Aragao, F.R., Rodrigues Moreira, M.H., 2015. Behaviour of temporal parameters of the ground reactive forces for the

- walking of postmenopausal women. Acta of Bioengineering and Biomechanics 17: 119-127. 10.5277/abb-00122-2014-03.
32. de Sousa-Pereira, P., Cova, M., Abrantes, J., Ferreira, R., Trindade, F., Barros, A., Gomes, P., Colaco, B., Amado, F., Esteves, P.J., Vitorino, R., 2015. Cross-species comparison of mammalian saliva using an LC-MALDI based proteomic approach. Proteomics 15: 1598-1607. 10.1002/pmic.201400083.
 33. Dias, C., Dominguez-Perles, R., Aires, A., Teixeira, A., Rosa, E., Barros, A., Saavedra, M.J., 2015. Phytochemistry and activity against digestive pathogens of grape (*Vitis vinifera* L.) stem's (poly)phenolic extracts. Lwt-Food Science and Technology 61: 25-32. 10.1016/j.lwt.2014.11.033.
 34. Donno, D., Cerutti, A.K., Prgomet, I., Mellano, M.G., Beccaro, G.L., 2015. Foodomics for mulberry fruit (*Morus* spp.): Analytical fingerprint as antioxidants' and health properties' determination tool. Food Research International 69: 179-188. 10.1016/j.foodres.2014.12.020.
 35. Dourado, N., de Moura, M.F.S.F., Morel, S., Morais, J., 2015. Wood fracture characterization under mode I loading using the three-point-bending test. Experimental investigation of *Picea abies* L. International Journal of Fracture 194: 1-9. 10.1007/s10704-015-0029-y.
 36. Dourado, N., de Moura, M.F.S.F., Xavier, J., Pereira, F.A.M., 2015. A New Procedure for Mode I Fracture Characterization of Cement-Based Materials. Strain 51: 483-491. 10.1111/str.12165.
 37. Dunck, B., Lima-Fernandes, E., Cassio, F., Cunha, A., Rodrigues, L., Pascoal, C., 2015. Responses of primary production, leaf litter decomposition and associated communities to stream eutrophication. Environmental Pollution 202: 32-40. 10.1016/j.envpol.2015.03.014.
 38. Fangueiro, D., Pereira, J., Bichana, A., Surgy, S., Cabral, F., Coutinho, J., 2015. Effects of cattle-slurry treatment by acidification and separation on nitrogen dynamics and global warming potential after surface application to an acidic soil. J Environ Manage 162: 1-8. 10.1016/j.jenvman.2015.07.032.
 39. Fangueiro, D., Surgy, S., Fraga, I., Cabral, F., Coutinho, J., 2015. Band application of treated cattle slurry as an alternative to slurry injection: Implications for gaseous emissions, soil quality, and plant growth. Agriculture Ecosystems & Environment 211: 102-111. 10.1016/j.agee.2015.06.003.
 40. Fangueiro, J.F., Silva, A.M., Garcia, M.L., Souto, E.B., 2015. Current nanotechnology approaches for the treatment and management of diabetic retinopathy. European Journal of Pharmaceutics and Biopharmaceutics 95: 307-322. 10.1016/j.ejpb.2014.12.023.
 41. Faria, A.S., Paiva-Cardoso, M.d.N., Nunes, M., Carreira, T., Vale-Goncalves, H.M., Veloso, O., Coelho, C., Cabral, J.A., Vieira-Pinto, M., Vieira, M.L., 2015. First Detection of *Borrelia burgdorferi* sensu lato DNA in Serum of the Wild Boar (*Sus scrofa*) in Northern Portugal by Nested-PCR. Ecohealth 12: 183-187. 10.1007/s10393-014-0973-4.
 42. Faustino-Rocha, A.I., Ferreira, R., Oliveira, P.A., Gama, A., Ginja, M., 2015. N-Methyl-N-nitrosourea as a mammary carcinogenic agent. Tumor Biology 36: 9095-9117. 10.1007/s13277-015-3973-2.

- 43.** Fernandes, A.M., Franco, C., Mendes-Ferreira, A., Mendes-Faia, A., da Costa, P.L., Melo-Pinto, P., 2015. Brix, pH and anthocyanin content determination in whole Port wine grape berries by hyperspectral imaging and neural networks. *Computers and Electronics in Agriculture* 115: 88-96. 10.1016/j.compag.2015.05.013.
- 44.** Fernandes, A.M., Melo-Pinto, P., Millan, B., Tardaguila, J., Diago, M.P., 2015. Automatic discrimination of grapevine (*Vitis vinifera* L.) clones using leaf hyperspectral imaging and partial least squares. *Journal of Agricultural Science* 153: 455-465. 10.1017/S0021859614000252.
- 45.** Fernandes, P.M., Fernandes, M.M., Loureiro, C., 2015. Post-fire live residuals of maritime pine plantations in Portugal: Structure, burn severity, and fire recurrence. *Forest Ecology and Management* 347: 170-179. 10.1016/j.foreco.2015.03.023.
- 46.** Fernández-Cabo, J.L., Majano-Majano, A., Crocetti, R., Xavier, J., Widmann, R., Arce-Blanco, M., 2015. Assessment of wire-frame analysis models of a historical planked timber arch. *Proceedings of the ICE - Structures and Buildings* 168: 680-694. 10.1680/stbu.14.00049.
- 47.** Ferreira, D., Freixo, C., Cabral, J.A., Santos, R., Santos, M., 2015. Do habitat characteristics determine mortality risk for bats at wind farms? Modelling susceptible species activity patterns and anticipating possible mortality events. *Ecological Informatics* 28: 7-18. 10.1016/j.ecoinf.2015.04.001.
- 48.** Ferreira, L., Almeida-Aguiar, C., Parpot, P., Fonseca, A.M., Neves, I.C., 2015. Preparation and assessment of antimicrobial properties of bimetallic materials based on NaY zeolite. *RSC Advances* 5: 37188-37195. 10.1039/c5ra04960a.
- 49.** Ferreira, L.M.M., C., R., Santos, A.S., Mayes, R.W., Rodrigues, M.A.M., Osoro, K., 2015. Application of long-chain alcohols as diet- composition markers in sheep fed on grass–white clover and heather–gorse plant species. *Grass and Forage Science* (2015) 70 (1), 30-43.
- 50.** Ferreira, R., Oliveira, P., Martins, T., Magalhaes, S., Trindade, F., Pires, M.J., Colaco, B., Barros, A., Santos, L., Amado, F., Vitorino, R., 2015. Comparative proteomic analyses of urine from rat urothelial carcinoma chemically induced by exposure to N-butyl-N-(4-hydroxybutyl)-nitrosamine. *Molecular Biosystems* 11: 1594-1602. 10.1039/c4mb00606b.
- 51.** Ferreira, V., Castro, I., Rocha, J., Crespi, A.L., Pinto-Carnide, O., Amich, F., Almeida, R., Carnide, V., 2015. Chloroplast and nuclear DNA studies in Iberian Peninsula endemic *Silene scabriflora* subspecies using cpSSR and ISSR markers: Genetic diversity and phylogenetic relationships. *Biochemical Systematics and Ecology* 61: 312-318. 10.1016/j.bse.2015.06.029.
- 52.** Figueiredo, N., Carranca, C., Goufo, P., Pereira, J., Trindade, H., Coutinho, J., 2015. Impact of agricultural practices, elevated temperature and atmospheric carbon dioxide concentration on nitrogen and pH dynamics in soil and floodwater during the seasonal rice growth in Portugal. *Soil & Tillage Research* 145: 198-207. 10.1016/j.still.2014.09.017.
- 53.** Fraga, H., Costa, R., Moutinho-Pereira, J., Correia, C.M., Dinis, L.T., Goncalves, I., Silvestre, J., Eiras-Dias, J., Malheiro, A.C., Santos, J.A., 2015. Modeling Phenology, Water Status, and Yield Components of Three Portuguese Grapevines Using the STICS Crop

- Model. *American Journal of Enology and Viticulture* 66: 482-491. 10.5344/ajev.2015.15031.
54. Fragoso, M., Marques, D., Santos, J.A., Alcoforado, M.J., Amorim, I., Garcia, J.C., Silva, L., Nunes, M.d.F., 2015. Climatic extremes in Portugal in the 1780s based on documentary and instrumental records. *Climate Research* 66: 141-159. 10.3354/cr01337.
 55. Froufe, E., Varandas, S., Teixeira, A., Sousa, R., Filipova, L., Petrusek, A., Edsman, L., Lopes-Lima, M., 2015. First results on the genetic diversity of the invasive signal crayfish *Pacifastacus leniusculus* (Dana, 1852) in Europe using novel microsatellite loci. *Journal of Applied Genetics* 56: 375-380. 10.1007/s13353-015-0272-y.
 56. Garcia-Santos, S., Monteiro, S., Malakpour-Kolbadinezhad, S., Fontainhas-Fernandes, A., Wilson, J., 2015. Effects of Cd injection on osmoregulation and stress indicators in freshwater Nile tilapia. *Comparative Biochemistry and Physiology C-Toxicology & Pharmacology* 167: 81-89. 10.1016/j.cbpc.2014.09.002.
 57. Ghiassi, B., Xavier, J., Oliveira, D.V., Kwiecien, A., Lourenço, P.B., Zajac, B., 2015. Evaluation of the bond performance in FRP–brick components re-bonded after initial delamination. *Composite Structures* 123: 271-281. 10.1016/j.compstruct.2014.12.047.
 58. Gil da Costa, R.M., Oliveira, P.A., Vasconcelos-Nobrega, C., Arantes-Rodrigues, R., Pinto-Leite, R., Colaco, A.A., de la Cruz, L.F., Lopes, C., 2015. Altered expression of CKs 14/20 is an early event in a rat model of multistep bladder carcinogenesis. *International Journal of Experimental Pathology* 96: 319-325. 10.1111/iep.12145.
 59. Gondim Pitanga, F.J., Seara Pitanga, C.P., Calcada Dias Gabriel, R.E., Beck, C.C., Rodrigues Moreira, M.H., 2015. Anthropometry to identify high visceral fat area in postmenopausal women. *Nutricion Hospitalaria* 32: 2535-2539. 10.3305/nh.2015.32.6.9813.
 60. Gonzalez, D., Cabral, J.A., Torres, L., Santos, M., 2015. A cohort-based modelling approach for managing olive moth *Prays oleae* (Bernard, 1788) populations in olive orchards. *Ecological Modelling* 296: 46-56. 10.1016/j.ecolmodel.2014.10.012.
 61. Gonzalez-Fernandez, M.L., Perez-Castrillo, S., Ordas-Fernandez, P., Lopez-Gonzalez, M.E., Colaco, B., Villar-Suarez, V., 2015. Study on viability and chondrogenic differentiation of cryopreserved adipose tissue-derived mesenchymal stromal cells for future use in regenerative medicine. *Cryobiology* 71: 256-263. 10.1016/j.cryobiol.2015.07.007.
 62. Goufo, P., Ferreira, L.M.M., Trindade, H., Rosa, E.A.S., 2015. Distribution of antioxidant compounds in the grain of the Mediterranean rice variety 'Ariete'. *Cyta-Journal of Food* 13: 140-150. 10.1080/19476337.2014.923941.
 63. Gouvinhas, I., de Almeida, J.M., Carvalho, T., Machado, N., Barros, A.I., 2015. Discrimination and characterisation of extra virgin olive oils from three cultivars in different maturation stages using Fourier transform infrared spectroscopy in tandem with chemometrics. *Food Chem* 174: 226-232. 10.1016/j.foodchem.2014.11.037.
 64. Gouvinhas, I., Machado, N., Carvalho, T., de Almeida, J.M.M.M., Barros, A.I.R.N.A., 2015. Short wavelength Raman spectroscopy applied to the discrimination and characterization of three cultivars of extra virgin olive oils in different maturation stages. *Talanta* 132: 829-835. 10.1016/j.talanta.2014.10.042.

65. Gouvinhas, I., Machado, N., Cunha, M., Pereira, M., Matos, C., Gomes, S., Lopes, J., Martins-Lopes, P., Barros, A.I.R.N.A., 2015. Trace Element Content of Monovarietal and Commercial Portuguese Olive Oils. *J Oleo Sci* 64: 1083-1093. 10.5650/jos.ess15101.
66. Guiomar, N., Godinho, S., Fernandes, P.M., Machado, R., Neves, N., Fernandes, J.P., 2015. Wildfire patterns and landscape changes in Mediterranean oak woodlands. *Science of The Total Environment* 536: 338-352. 10.1016/j.scitotenv.2015.07.087.
67. Karanam, V., Marslin, G., Krishnamoorthy, B., Chellan, V., Siram, K., Natarajan, T., Bhaskar, B., Franklin, G., 2015. Poly (epsilon-caprolactone) nanoparticles of carboplatin: Preparation, characterization and in vitro cytotoxicity evaluation in U-87 MG cell lines. *Colloids and Surfaces B-Biointerfaces* 130: 48-52. 10.1016/j.colsurfb.2015.04.005.
68. Karaouzas, I., Zogaris, S., Lopes-Lima, M., Froufe, E., Varandas, S., Teixeira, A., Sousa, R., 2015. First record of the freshwater jellyfish *Craspedacusta sowerbii* Lankester, 1880 in Greece suggests distinct European invasion events. *Limnology* 16: 171-177. 10.1007/s10201-015-0452-9.
69. Khang, G., Lee, S.K., Kim, H.N., Silva-Correia, J., Gomes, M.E., Viegas, C.A., Dias, I.R., Oliveira, J.M., Reis, R.L., 2015. Biological evaluation of intervertebral disc cells in different formulations of gellan gum-based hydrogels. *J Tissue Eng Regen Med* 9: 265-275. 10.1002/term.1625.
70. Khouaja, W., Oliveira, R., Raies, A., Dias, A.C.P., 2015. Antifungal activity of the essential oils from *Cupressus arizonica* var. *arizonica* and var. *glabra*. *Industrial Crops and Products* 77: 614-623. 10.1016/j.indcrop.2015.08.026.
71. Kucuk, O., Bilgili, E., Fernandes, P.M., 2015. Fuel modelling and potential fire behavior in Turkey. *Sumarski List* 11-12: 553-560.
72. Laranjeira C., S.F., L.F., Borges, A., Cristelo, N., 2015. k-e Flow Modeling of Osmosis. *Tecnología y Ciencias del Agua*, VI (5), 5-16.
73. Leal, S., Campelo, F., Luz, A.L., Carneiro, M.F., Santos, J.A., 2015. Potential of oak tree-ring chronologies from Southern Portugal for climate reconstructions. *Dendrochronologia* 35: 4-13. 10.1016/j.dendro.2015.05.003.
74. Lima, C.F., Costa, M., Proenca, M.F., Pereira-Wilson, C., 2015. Novel structurally similar chromene derivatives with opposing effects on p53 and apoptosis mechanisms in colorectal HCT116 cancer cells. *European Journal of Pharmaceutical Sciences* 72: 34-45. 10.1016/j.ejps.2015.02.019.
75. Lopez Lopez, C., Celaya, R., Santos, A.S., Rodrigues, M.A.M., Osoro, K., Ferreira, L.M.M., 2015. Application of long-chain alcohols as faecal markers to estimate diet composition of horses and cattle fed with herbaceous and woody species. *animal* 9: 1786-1794. 10.1017/s1751731115001196.
76. Luzio, A., Coimbra, A.M., Benito, C., Fontainhas-Fernandes, A.A., Matos, M., 2015. Screening and Identification of Potential Sex-Associated Sequences in *Danio rerio*. *Molecular Reproduction and Development* 82: 756-764. 10.1002/mrd.22508.
77. Luzio, A., Monteiro, S.M., Garcia-Santos, S., Rocha, E., Fontainhas-Fernandes, A.A., Coimbra, A.M., 2015. Zebrafish sex differentiation and gonad development after exposure to 17 alpha-ethinylestradiol, fadrozole and their binary mixture: A stereological study. *Aquat Toxicol* 166: 83-95. 10.1016/j.aquatox.2015.07.015.

- 78.** Machado, M., Machado, N., Gouvinhas, I., Cunha, M., de Almeida, J.M.M.M., Barros, A.I.R.N.A., 2015. Quantification of Chemical Characteristics of Olive Fruit and Oil of cv Cobran double dagger osa in Two Ripening Stages Using MIR Spectroscopy and Chemometrics. *Food Analytical Methods* 8: 1490-1498. 10.1007/s12161-014-0017-2.
- 79.** Marslin, G., Revina, A.M., Khandelwal, V.K.M., Balakumar, K., Prakash, J., Franklin, G., Sheeba, C.J., 2015. Delivery as nanoparticles reduces imatinib mesylate-induced cardiotoxicity and improves anticancer activity. *International Journal of Nanomedicine* 10: 3163-3170. 10.2147/ijn.s75962.
- 80.** Marslin, G., Revina, A.M., Khandelwal, V.K.M., Balakumar, K., Sheeba, C.J., Franklin, G., 2015. PEGylated ofloxacin nanoparticles render strong antibacterial activity against many clinically important human pathogens. *Colloids and Surfaces B-Biointerfaces* 132: 62-70. 10.1016/j.colsurfb.2015.04.050.
- 81.** Marslin, G., Selvakesavan, R.K., Franklin, G., Sarmento, B., Dias, A.C.P., 2015. Antimicrobial activity of cream incorporated with silver nanoparticles biosynthesized from *Withania somnifera*. *International Journal of Nanomedicine* 10: 5955-5963. 10.2147/ijn.s81271.
- 82.** Martins, M., Cunha, A., Oliveira, I., Morgado, L., 2015. Usability test of 3Dconnexion 3D mice versus keyboard+mouse in Second Life undertaken by people with motor disabilities due to medullary lesions. *Universal Access in the Information Society* 14: 5-16. 10.1007/s10209-013-0329-9.
- 83.** Martins, V., Teixeira, A., Geros, H., 2015. Changes in the volatile composition of wine from grapes treated with Bordeaux mixture: a laboratory-scale study. *Australian Journal of Grape and Wine Research* 21: 425-429. 10.1111/ajgw.12150.
- 84.** Mata, D., Amaral, M., Fernandes, A.J., Colaco, B., Gama, A., Paiva, M.C., Gomes, P.S., Silva, R.F., Fernandes, M.H., 2015. Diels-Alder functionalized carbon nanotubes for bone tissue engineering: in vitro/in vivo biocompatibility and biodegradability. *Nanoscale* 7: 9238-9251. 10.1039/c5nr01829c.
- 85.** Matias, J., Correia, A., Mestre, P., Serodio, C., Couto, P., Teixeira, C., Melo-Pinto, P., 2015. Adaptive Penalty and Barrier function based on Fuzzy Logic. *Expert Systems with Applications* 42: 6777-6783. 10.1016/j.eswa.2015.04.070.
- 86.** Mesquita, J.R., Sousa, S.I., Vala, H., Nascimento, M.S., 2015. The epidemiology of blood-contaminated needlestick injuries among veterinarians in Portugal. *J Agromedicine* 20: 160-166. 10.1080/1059924X.2015.1010061.
- 87.** Modesto Gonzalez Pereira, M.J., Sanches Fernandes, L.F., Barros Macario, E.M., Gaspar, S.M., Pinto, J.G., 2015. Climate Change Impacts in the Design of Drainage Systems: Case Study of Portugal. *Journal of Irrigation and Drainage Engineering* 141. 10.1061/(asce)ir.1943-4774.0000788.
- 88.** Monteiro, S.R.S., Dias, A.M.P.G., Lopes, S.M.R., 2014. Bi-dimensional numerical modeling of timber–concrete slab-type structures. *Materials and Structures* 48: 3391-3406. 10.1617/s11527-014-0407-3.
- 89.** Monteiro-Cardoso, V.F., Castro, M., Oliveira, M.M., Moreira, P.I., Peixoto, F., Videira, R.A., 2015. Age-Dependent Biochemical Dysfunction in Skeletal Muscle of Triple-Transgenic Mouse Model of Alzheimer's Disease. *Current Alzheimer Research* 12: 100-115, WOS:000350572200002.

- 90.** Monteiro-Cardoso, V.F., Oliveira, M.M., Melo, T., Domingues, M.R.M., Moreira, P.I., Ferreira, E., Peixoto, F., Videira, R.A., 2015. Cardiolipin Profile Changes are Associated to the Early Synaptic Mitochondrial Dysfunction in Alzheimer's Disease. *Journal of Alzheimers Disease* 43: 1375-1392. 10.3233/jad-141002.
- 91.** Morinha, F., Cabral, J.A., Martins, S., Cruz, E., Alvura, N., Nunes, P., Direitinho, J., Magalhães, P., Bastos, E., 2015. (R)evolution in the molecular sexing of ratite birds: identification and analysis of new candidate sex-linked markers. *Avian Biology Research* 8: 145-159. 10.3184/175815515x14380769320720.
- 92.** Noronha, H., Conde, C., Delrot, S., Geros, H., 2015. Identification and functional characterization of grapevine transporters that mediate glucose-6-phosphate uptake into plastids. *Planta* 242: 909-920. 10.1007/s00425-015-2329-x.
- 93.** Nunes, L., Gower, S.T., Peckham, S.D., Magalhaes, M., Lopes, D., Rego, F.C., 2015. Estimation of productivity in pine and oak forests in northern Portugal using Biome-BGC. *Forestry* 88: 200-212. 10.1093/forestry/cpu044.
- 94.** Orellana-Jaimes, N., Ginja, M.M., San Roman-Llorens, F., Garcia-Gomez, M., Orden, M.A., Altonaga, J.R., Gonzalo-Orden, J.M., 2015. Magnetic resonance imaging: findings of osteochondrosis like-lesions in glenoid fossa and proximal humeral metaphyses in a dog: a case report. *Veterinari Medicina* 60: 387-390, WOS:000360366900007.
- 95.** Pacheco, A.P., Claro, J., Fernandes, P.M., de Neufville, R., Oliveira, T.M., Borges, J.G., Rodrigues, J.C., 2015. Cohesive fire management within an uncertain environment: A review of risk handling and decision support systems. *Forest Ecology and Management* 347: 1-17. 10.1016/j.foreco.2015.02.033.
- 96.** Pacheco, F.A., Pires, L.M., Santos, R.M., Sanches Fernandes, L.F., 2015. Factor weighting in DRASTIC modeling. *Sci Total Environ* 505: 474-486. 10.1016/j.scitotenv.2014.09.092.
- 97.** Pacheco, F.A., Santos, R.M., Sanches Fernandes, L.F., Pereira, M.G., Cortes, R.M., 2015. Controls and forecasts of nitrate yields in forested watersheds: A view over mainland Portugal. *Sci Total Environ* 537: 421-440. 10.1016/j.scitotenv.2015.07.127.
- 98.** Padrao, A.I., Moreira-Goncalves, D., Oliveira, P.A., Teixeira, C., Faustino-Rocha, A.I., Helguero, L., Vitorino, R., Santos, L.L., Arnado, F., Duarte, J.A., Ferreira, R., 2015. Endurance training prevents TWEAK but not myostatin-mediated cardiac remodelling in cancer cachexia. *Archives of Biochemistry and Biophysics* 567: 13-21. 10.1016/j.abb.2014.12.026.
- 99.** Paiva, I., da Costa, R.M.G., Ribeiro, J., Sousa, H., Bastos, M., Rocha, A.F.C., Oliveira, P.A., Medeiros, R., 2015. A Role for MicroRNA-155 Expression in Microenvironment Associated to HPV-Induced Carcinogenesis in K14-HPV16 Transgenic Mice. *Plos One* 10 (1), e011686810. 10.1371/journal.pone.0116868.
- 100.** Paiva, I., da Costa, R.M.G., Ribeiro, J., Sousa, H., Bastos, M.M.S.M., Faustino-Rocha, A., Lopes, C., Oliveira, P.A., Medeiros, R., 2015. MicroRNA-21 expression and susceptibility to HPV-induced carcinogenesis - role of microenvironment in K14-HPV16 mice model. *Life Sciences* 128: 8-14. 10.1016/j.lfs.2015.02.020.
- 101.** Paula, A.B., Dias, M.I., Ferreira, M.M., Carrilho, T., Marto, C.M., Casalta, J., Cabrita, A.S., Carrilho, E., 2015. Effects on gastric mucosa induced by dental bleaching--an experimental study with 6% hydrogen peroxide in rats. *J Appl Oral Sci* 23: 497-507. 10.1590/1678-775720150235.

- 102.** Pereira, J., Coutinho, J., Fangueiro, D., Trindade, H., 2015. Nitric oxide and nitrous oxide emissions from cattle-slurry and mineral fertiliser treated with nitrification inhibitor to an agricultural soil: A laboratory approach. *Spanish Journal of Agricultural Research* 13: e0305. 10.5424/sjar/2015134-7622.
- 103.** Pereira, J., Trindade, H., 2015. Impact of the intensity of milk production on ammonia and greenhouse gas emissions in Portuguese cattle farms. *Spanish Journal of Agricultural Research* 13. 10.5424/sjar/2015134-8176.
- 104.** Pereira, M.G., Caramelo, L., Orozco, C.V., Costa, R., Tonini, M., 2015. Space-time clustering analysis performance of an aggregated dataset: The case of wildfires in Portugal. *Environmental Modelling & Software* 72: 239-249. 10.1016/j.envsoft.2015.05.016.
- 105.** Pereira, P., Pedrosa, S.S., Correia, A., Lima, C.F., Olmedo, M.P., Gonzalez-Fernandez, A., Vilanova, M., Gama, F.M., 2015. Biocompatibility of a self-assembled glycol chitosan nanogel. *Toxicol In Vitro* 29: 638-646. 10.1016/j.tiv.2014.11.004.
- 106.** Pinheiro, L.A., Torres, L.M., Raimundo, J., Santos, S.A.P., 2015. Effects of pollen, sugars and honeydew on lifespan and nutrient levels of *Episyrphus balteatus*. *Biocontrol* 60: 47-57. 10.1007/s10526-014-9621-8.
- 107.** Portela, E., Ferreira-Cardoso, J., Louzada, J., Gomes-Laranjo, J., 2015. Assessment of Boron Application in Chestnuts: Nut Yield and Quality. *Journal of Plant Nutrition* 38: 973-987. 10.1080/01904167.2014.963116.
- 108.** Price, O.F., Pausas, J.G., Govender, N., Flannigan, M., Fernandes, P.M., Brooks, M.L., Bird, R.B., 2015. Global patterns in fire leverage: the response of annual area burnt to previous fire. *International Journal of Wildland Fire* 24: 297-306. 10.1071/wf14034.
- 109.** Queiroga, F.L., Perez-Alenza, D., Gonzalez-Gil, A., Silvan, G., Pena, L., Illera, J.C., 2015. Serum and Tissue Steroid Hormone Levels in Canine Mammary Tumours: Clinical and Prognostic Implications. *Reproduction in Domestic Animals* 50: 858-865. 10.1111/rda.12597.
- 110.** Raposo, T.P., Beirao, B.C.B., Pang, L.Y., Queiroga, F.L., Argyle, D.J., 2015. Inflammation and cancer: Till death tears them apart. *Veterinary Journal* 205: 161-174. 10.1016/j.tvjl.2015.04.015.
- 111.** Raposo, T.P., Pires, I., Carvalho, M.I., Prada, J., Argyle, D.J., Queiroga, F.L., 2015. Tumour-associated macrophages are associated with vascular endothelial growth factor expression in canine mammary tumours. *Veterinary and Comparative Oncology* 13: 464-474. 10.1111/vco.12067.
- 112.** Ribeiro, M., Nunes, F.M., Guedes, S., Domingues, P., Silva, A.M., Carrillo, J.M., Rodriguez-Quijano, M., Branlard, G., Igrejas, G., 2015. Efficient chemo-enzymatic gluten detoxification: reducing toxic epitopes for celiac patients improving functional properties. *Scientific Reports* 5, 18041. 10.1038/srep18041.
- 113.** Ribeiro, P.O., Antunes, L.M., Nunes, C.S., Silva, H.B., Cunha, R.A., Tome, A.R., 2015. The Effects of Different Concentrations of the alpha2-Adrenoceptor Agonist Medetomidine on Basal Excitatory Synaptic Transmission and Synaptic Plasticity in Hippocampal Slices of Adult Mice. *Anesth Analg* 120: 1130-1137. 10.1213/ANE.0000000000000636.
- 114.** Rocha, J., Hughes, S.J., Almeida, P., Garcia-Cabral, I., Amich, F., Crespi, A.L., 2015. Contemporary and future distribution patterns of fluvial vegetation under different

- climate change scenarios and implications for integrated water resource management. *Ecological Research* 30: 989-1003. 10.1007/s11284-015-1300-4.
- 115.** Rodriguez, E., da Conceicao Santos, M., Azevedo, R., Correia, C., Moutinho-Pereira, J., Ferreira de Oliveira, J.M., Dias, M.C., 2015. Photosynthesis light-independent reactions are sensitive biomarkers to monitor lead phytotoxicity in a Pb-tolerant *Pisum sativum* cultivar. *Environ Sci Pollut Res Int* 22: 574-585. 10.1007/s11356-014-3375-9.
- 116.** Rossa, C.G., Davim, D.A., Viegas, D.X., 2015. Behaviour of slope and wind backing fires. *International Journal of Wildland Fire* 24: 1085-1097. 10.1071/wf14215.
- 117.** Rossa, C.G., Fernandes, P.M., Pinto, A., 2015. Measuring foliar moisture content with a moisture analyzer. *Canadian Journal of Forest Research* 45: 776-781. 10.1139/cjfr-2014-0545.
- 118.** Sa, C., Oliveira, A.R., Machado, C., Azevedo, M., Pereira-Wilson, C., 2015. Effects on Liver Lipid Metabolism of the Naturally Occurring Dietary Flavone Luteolin-7-glucoside. *Evidence-Based Complementary and Alternative Medicine*. Article ID 647832, 9 pages. 10.1155/2015/647832.
- 119.** Saavedra, M.J., Aires, A., Dias, C., Almeida, J.A., De Vasconcelos, M.C.B.M., Santos, P., Rosa, E.A., 2015. Evaluation of the potential of squash pumpkin by-products (seeds and shell) as sources of antioxidant and bioactive compounds. *Journal of Food Science and Technology-Mysore* 52: 1008-1015. 10.1007/s13197-013-1089-5.
- 120.** Sanches Fernandes, L.F., Terencio, D.P., Pacheco, F.A., 2015. Rainwater harvesting systems for low demanding applications. *Sci Total Environ* 529: 91-100. 10.1016/j.scitotenv.2015.05.061.
- 121.** Santos, C., Felix, L., Neves, M., Coimbra, A., Valentim, A.M., Antunes, L., Goncalves, C., Carmo, A., Pinto, M.L., 2015. Refinement Techniques in Zebrafish Anaesthesia - Results from a Pilot Study. *Microsc Microanal* 21 Suppl 5: 93-94. 10.1017/S1431927615014270.
- 122.** Santos, D., Falcão, A., Luzio, A., Fontainhas-Fernandes, A., Monteiro, S., 2015. Neuroendocrine and Eosinophilic Granule Cells in the Gills of *Tilapia, Oreochromis niloticus*: Effects of Waterborne Copper Exposure. *Archives of Environmental Contamination and Toxicology* 69: 566-576. 10.1007/s00244-015-0170-7.
- 123.** Santos, J.A., Carneiro, M.F., Alcoforado, M.J., Leal, S., Luz, A.L., Camuffo, D., Zorita, E., 2015. Calibration and multi-source consistency analysis of reconstructed precipitation series in Portugal since the early 17th century. *Holocene* 25: 663-676. 10.1177/0959683614566250.
- 124.** Santos, J.A., Carneiro, M.F., Correia, A., Alcoforado, M.J., Zorita, E., Gomez-Navarro, J.J., 2015. New insights into the reconstructed temperature in Portugal over the last 400 years. *Climate of the Past* 11: 825-834. 10.5194/cp-11-825-2015.
- 125.** Santos, J.A., Pfahl, S., Pinto, J.G., Wernli, H., 2015. Mechanisms underlying temperature extremes in Iberia: a Lagrangian perspective. *Tellus Series a-Dynamic Meteorology and Oceanography* 67, 26032. 10.3402/tellusa.v67.26032.
- 126.** Santos, J.A., Rochinha, C., Liberato, M.L.R., Reyers, M., Pinto, J.G., 2015. Projected changes in wind energy potentials over Iberia. *Renewable Energy* 75: 68-80. 10.1016/j.renene.2014.09.026.

- 127.** Santos, M., Santos, J.A., Fragoso, M., 2015. Historical damaging flood records for 1871-2011 in Northern Portugal and underlying atmospheric forcings. *Journal of Hydrology* 530: 591-603. 10.1016/j.jhydrol.2015.10.011.
- 128.** Santos, R.M., Sanches Fernandes, L.F., Pereira, M.G., Cortes, R.M., Pacheco, F.A., 2015. A framework model for investigating the export of phosphorus to surface waters in forested watersheds: Implications to management. *Sci Total Environ* 536: 295-305. 10.1016/j.scitotenv.2015.07.058.
- 129.** Santos, R.M., Sanches Fernandes, L.F., Pereira, M.G., Cortes, R.M., Pacheco, F.A., 2015. Water resources planning for a river basin with recurrent wildfires. *Sci Total Environ* 526: 1-13. 10.1016/j.scitotenv.2015.04.058.
- 130.** Santos, R.M., Sanches Fernandes, L.F., Varandas, S.G., Pereira, M.G., Sousa, R., Teixeira, A., Lopes-Lima, M., Cortes, R.M., Pacheco, F.A., 2015. Impacts of climate change and land-use scenarios on *Margaritifera margaritifera*, an environmental indicator and endangered species. *Sci Total Environ* 511: 477-488. 10.1016/j.scitotenv.2014.12.090.
- 131.** Santos, T., Capelo, J.L., Santos, H.M., Oliveira, I., Marinho, C., Goncalves, A., Araujo, J.E., Poeta, P., Igrejas, G., 2015. Use of MALDI-TOF mass spectrometry fingerprinting to characterize *Enterococcus* spp. and *Escherichia coli* isolates. *J Proteomics* 127: 321-331. 10.1016/j.jprot.2015.02.017.
- 132.** Saraiva, C., Oliveira, I., Silva, J.A., Martins, C., Ventanas, J., Garcia, C., 2015. Implementation of multivariate techniques for the selection of volatile compounds as indicators of sensory quality of raw beef. *Journal of Food Science and Technology-Mysore* 52: 3887-3898. 10.1007/s13197-014-1447-y.
- 133.** Severino, P., Szymanski, M., Favaro, M., Azzoni, A.R., Chaud, M.V., Santana, M.H.A., Silva, A.M., Souto, E.B., 2015. Development and characterization of a cationic lipid nanocarrier as non-viral vector for gene therapy. *European Journal of Pharmaceutical Sciences* 66: 78-82. 10.1016/j.ejps.2014.09.021.
- 134.** Silva, F., de Moura, M., Dourado, N., Xavier, J., Pereira, F., Morais, J., Dias, M., Lourenco, P., Judas, F., 2015. Fracture Characterization of Human Cortical Bone Under Mode I Loading. *Journal of Biomechanical Engineering-Transactions of the Asme* 137 (12) 9pp. 10.1115/1.4031846.
- 135.** Silva-Carvalho, R., Baltazar, F., Almeida-Aguiar, C., 2015. Propolis: A Complex Natural Product with a Plethora of Biological Activities That Can Be Explored for Drug Development. *Evidence-Based Complementary and Alternative Medicine*. Article ID 206439, 29. 10.1155/2015/206439.
- 136.** Soares, J.P., Silva, A.I., Silva, A.M., Almeida, V., Matos, M., Gaivao, I., Mota, M.P., 2015. Effects of physical exercise training in DNA damage and repair activity in humans with different genetic polymorphisms of hOGG1 (Ser326Cys). *Cell Biochemistry and Function* 33: 519-524, CCC:000367919800002.
- 137.** Soares, J.P., Silva, A.M., Fonseca, S., Oliveira, M.M., Peixoto, F., Gaivao, I., Mota, M.P., 2015. How can age and lifestyle variables affect DNA damage, repair capacity and endogenous biomarkers of oxidative stress? *Experimental Gerontology* 62: 45-52. 10.1016/j.exger.2015.01.001.
- 138.** Sousa, C.P., Dias, I.R., Lopez-Pena, M., Camassa, J.A., Lourenco, P.J., Judas, F.M., Gomes, M.E., Reis, R.L., 2015. Bone turnover markers for early detection of fracture healing

- disturbances: A review of the scientific literature. *An Acad Bras Cienc* 87: 1049-1061. 10.1590/0001-3765201520150008.
- 139.** Sousa, P.M., Trigo, R.M., Pereira, M.G., Bedia, J., Gutierrez, J.M., 2015. Different approaches to model future burnt area in the Iberian Peninsula. *Agricultural and Forest Meteorology* 202: 11-25. 10.1016/j.agrformet.2014.11.018.
- 140.** Sousa, R., Amorim, A., Froufe, E., Varandas, S., Teixeira, A., Lopes-Lima, M., 2015. Conservation status of the freshwater pearl mussel *Margaritifera margaritifera* in Portugal. *Limnologia* 50: 4-10. 10.1016/j.limno.2014.07.004.
- 141.** Sousa, R.M.O.F., Rosa, J.S., Oliveira, L., Cunha, A., Fernandes-Ferreira, M., 2015. Activities of Apiaceae essential oils and volatile compounds on hatchability, development, reproduction and nutrition of *Pseudaletia unipuncta* (Lepidoptera: Noctuidae). *Industrial Crops and Products* 63: 226-237. 10.1016/j.indcrop.2014.09.052.
- 142.** Sousa, R.M.O.F., Rosa, J.S., Silva, C.A., Almeida, M.T.M., Teresa Novo, M., Cunha, A.C., Fernandes-Ferreira, M., 2015. Larvicidal, molluscicidal and nematicidal activities of essential oils and compounds from *Foeniculum vulgare*. *Journal of Pest Science* 88: 413-426. 10.1007/s10340-014-0628-9.
- 143.** Sousa, V.B., Louzada, J.L., Pereira, H., 2015. Earlywood vessel features in *Quercus faginea*: relationship between ring width and wood density at two sites in Portugal. *Iforest-Biogeosciences and Forestry* 8. 10.3832/ifor1346-008.
- 144.** Talhada D, T.-A.A., Faustino-Rocha AI, Teixeira-Guedes CI, Teixeira JH, Arantes-Rodrigues R, Vasconcelos-Nóbrega C, Gil da Costa R, Oliveira PA., 2015. Recommendations for urine and urinary bladder collection in chemical carcinogenesis assays with rodents. *Scandinavian Journal of Laboratory Animal Science* 41: 1-8.
- 145.** Trindade, F., Amado, F., Pinto da Costa, J., Ferreira, R., Maia, C., Henriques, I., Colaco, B., Vitorino, R., 2015. Salivary peptidomic as a tool to disclose new potential antimicrobial peptides. *J Proteomics* 115: 49-57. 10.1016/j.jprot.2014.12.004.
- 146.** Vale, A.P., Santos, J., Brito, N.V., Fernandes, D., Rosa, E., Oliveira, M.B.P.P., 2015. Evaluating the impact of sprouting conditions on the glucosinolate content of Brassica oleracea sprouts. *Phytochemistry* 115: 252-260. 10.1016/j.phytochem.2015.02.004.
- 147.** Vale, A.P., Santos, J., Brito, N.V., Peixoto, V., Carvalho, R., Rosa, E., Oliveira, M.B.P.P., 2015. Light influence in the nutritional composition of Brassica oleracea sprouts. *Food Chem* 178: 292-300. 10.1016/j.foodchem.2015.01.064.
- 148.** Vale-Goncalves, H.M., Cabral, J.A., Faria, M.C., Nunes-Pereira, M., Faria, A.S., Veloso, O., Vieira, M.L., Paiva-Cardoso, M.N., 2015. Prevalence of *Leptospira* antibodies in wild boars (*Sus scrofa*) from Northern Portugal: risk factor analysis. *Epidemiology and Infection* 143: 2126-2130. 10.1017/s0950268814003331.
- 149.** Valle Junior, R.F., Varandas, S.G.P., Pacheco, F.A.L., Pereira, V.R., Santos, C.F., Cortes, R.M.V., Sanches Fernandes, L.F., 2015. Impacts of land use conflicts on riverine ecosystems. *Land Use Policy* 43: 48-62. 10.1016/j.landusepol.2014.10.015.
- 150.** Valle Junior, R.F., Varandas, S.G.P., Sanches Fernandes, L.F., Pacheco, F.A.L., 2015. Multi Criteria Analysis for the monitoring of aquifer vulnerability: A scientific tool in environmental policy. *Environmental Science & Policy* 48: 250-264. 10.1016/j.envsci.2015.01.010.

151. Vanessa Ferreira, O.P.-C., Teresa Mota, Juna Pedro Martín, Jesús María Ortiz, Isaura Castro., 2015. Identification of minority grapevine cultivars from Vinhos Verdes Portuguese. *Vitis -Geilweilerhof* 54: 53–58.
152. Vazzana, M., Andreani, T., Fangueiro, J., Faggio, C., Silva, C., Santini, A., Garcia, M.L., Silva, A.M., Souto, E.B., 2015. Tramadol hydrochloride: Pharmacokinetics, pharmacodynamics, adverse side effects, co-administration of drugs and new drug delivery systems. *Biomedicine & Pharmacotherapy* 70: 234-238. 10.1016/j.biopha.2015.01.022.
153. Venancio, C., Felix, L., Almeida, V., Coutinho, J., Antunes, L., Peixoto, F., Summavielle, T., 2015. Acute Ketamine Impairs Mitochondrial Function and Promotes Superoxide Dismutase Activity in the Rat Brain. *Anesthesia and Analgesia* 120: 320-328. 10.1213/ane.0000000000000539.
154. Vilhena, H.C., Santos, R.R., Sargo, T.J., Lima, T.B., Dias, S.S., Pastorinho, M.R., Queiroga, F.L., Silvestre-Ferreira, A.C., 2015. Urine protein-to-creatinine concentration ratio in samples collected by means of cystocentesis versus manual compression in cats. *J Am Vet Med Assoc* 246: 862-867. 10.2460/javma.246.8.862.
155. Wynhoff, I., Bakker, R.B., Oteman, B., Arnaldo, P.S., van Langevelde, F., 2015. Phengaris (Maculinea) alcon butterflies deposit their eggs on tall plants with many large buds in the vicinity of Myrmica ants. *Insect Conservation and Diversity* 8: 177-188. 10.1111/icad.12100.
156. Xavier, J., Fernandes, J.R.A., Frazao, O., Morais, J.J.L., 2015. Measuring mode I cohesive law of wood bonded joints based on digital image correlation and fibre Bragg grating sensors. *Composite Structures* 121: 83-89. 10.1016/j.compstruct.2014.11.017.
157. Zhang, Y.L., Lima, C.F., Rodrigues, L.R., 2015. In vitro evaluation of bovine lactoferrin potential as an anticancer agent. *International Dairy Journal* 40: 6-15. 10.1016/j.idairyj.2014.08.016.

The respective quartile of papers published by the Centre in 2015 are listed in Table 3.

Table 3. A summary of all indicators of The Research Centre

<i>Quartile</i>	<i>Number of papers</i>
Q1	77
Q2	44
Q3	20
Q4	16
Total Geral	157

In addition to this 157 papers in JCR Journals, the Research Centre published several other type of manuscripts, including in international journals, ISI proceedings, and international and national conference meetings as abstracts, national journals, books and chapters in books (Table 4 and Figure 2).

Table 4. Summary of all indicators of the Research Centre during 2015

Type of publication	Number
Abstracts Book	39
Books & Chapter in Books	9
Conference Proceedings	29
ISI Proceedings	18
National Journals	4
Other International Journals	16
SCI Index	157
Total	270

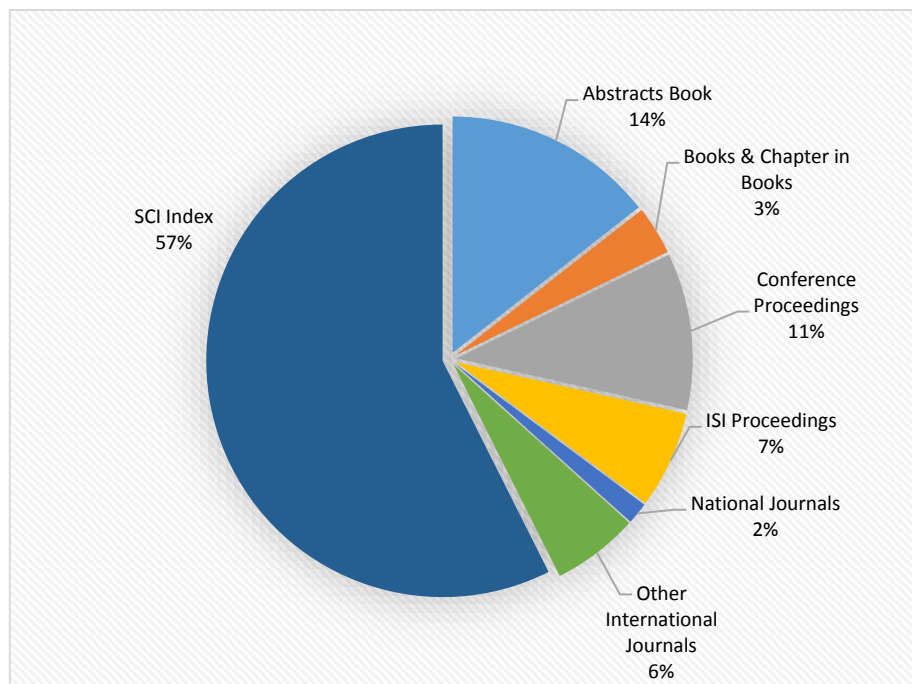


Figure 2. Percentage of each type of publication.

3.2 – International projects

CITAB researchers participated in 11 international projects over 2015:

	Project	Funding
1	"Eurolegume - Enhancing of legumes growing in Europe through sustainable cropping for protein supply for food and feed". Consortium coordinator: Eduardo Rosa. Starting date: January 2014, duration: 48 months (FP7-KBBE-2013-7 – GA 613781). http://www.eurolegume.eu/	€ 742.816,34
2	ReUseWaste - Recovery and Use of Nutrients, Energy and Organic Matter from Animal Waste. CITAB Coordinator: Henrique Trindade. Starting date: January 2012, duration: 48 months (FP7-PEOPLE-2011-ITN). http://www.reusewaste.eu/	€ 212.796,06
3	"IB Project - Production of new bioactive compounds by plants and bacteria using new and improved halogenases". CITAB coordinator: Alfredo Aires. Starting date: May 2014, duration: 36 months (Era-net CA EIB.13.008 NBCPBH)	€ 100.000,00
4	SmartAgriFor- Collaboration to develop a business plan for the Centre of Agriculture and Forestry. CITAB/UTAD Coodinator: Eduardo Rosa. Starting date: June 2015, duration: 12 months (H2020 - WIDESPREAD-2014-1 GA 664599). http://www.smartagrifor.eu/	€ 42.250,00
5	"InnoVine- Combining innovation in vineyard management and exploration of genetic diversity for a sustainable European viticulture". CITAB Coordinator: Hernâni Gerós. Starting date: January 2013, duration: 48 months (FP7-KBBE-2012-6). http://www.innovine.eu/home.html	N/A
6	"Copper uptake and detoxification in grapevine" Bilateral Cooperation Portugal-Tunisia. CITAB Coordinator: Hernâni Gerós. Starting date: January 2013, duration: 24 months	N/A
7	MedWildFireLab - Global Change Impacts on Wildland Fire Behaviour and Uses in Mediterranean Forest Ecosystems, towards a « wall less » Mediterranean Wildland Fire Laboratory. CITAB Coordinator: Paulo Fernandes. Starting Date: October 2014, duration 30 months (Era-net).	€ 10.000,00
8	Evolution and endemism in a morphologically cryptic group of aquatic insects (Ephemeroptera, Baetidae) on the islands of northeastern Macaronesia. CITAB Coordinator: Samantha Hughes. Starting Date: 2013, duration 24 months	€ 600,00
9	IMPACT - Developing an Integrated Model to Predict Abiotic habitat CondiTions and biota of rivers for application in climate change research and water management. CITAB Coordinator: Samantha Hughes. Starting Date: February 2013, duration 30 months.	N/A
10	European initiative on Natural Water Retention Measures (NWRM). CITAB Coordinator: Samantha Hughes. Starting Date: January 2014, duration 12 months.	N/A
11	MARCADUERO "MARCA DUERO DURADERO: Sostenibilidad, Calidad y Promoción". CITAB coordinator: Ronaldo Gabriel. Starting Date: June 2011, duration: 52 months (0363_MARCADUERO_2_E)	€ 106.980,00

3.3 – National projects

CITAB researchers participated in 32 national projects over 2015:

	Project	Funding
1	INNOFOOD - INNOVation in the FOOD sector through the valorization of food and agro-food by-products. CITAB coordinator: Ana Barros. Starting date: January 2014, duration: 18 months (NORTE-07-0124-FEDER-0000029)	€ 602.710,21
2	VITINOV – Innovation in Harvesting Systems for Steep Slope Viticulture. CITAB coordinator: Eduardo Rosa. Starting date: September 2014, duration: 36 months (PRODER 52306). Promotor: Symington Vinho SA	€ 107.695,92
3	ModelVitiDouro - Prediction model for grapevine development and production in the Douro Demarcated Region. CITAB coordinator: João Santos. Starting date: June 2014, duration: 36 months (PRODER 53774). Promotors: Adegas representativas da RDD: Mesão Frio (Baixo Corgo), Favaios (Cima Corgo) e Freixo de Espada à Cinta (Douro Superior).	€ 100.130,04
4	Mais Proteína. CITAB coordinator: Eduardo Rosa. Starting date: January 2014, duration: 36 months (PRODER 52506). Promotor: Frescura Sublime Lda	€ 140.373,00
5	Gold Cherry – Improving the quality of cherry production. CITAB coordinator: Berta Gonçalves. Starting date: April 2014, duration: 22 months. Promotor: Manuel Joaquim Ferrão Aires, Unipessoal (ProDer 53626).	€ 107.919,40
6	Integrated strategies for increasing the productivity of almond in Trás-os-Montes. CITAB coordinator: Ana Paula Silva. Starting date: January 2014, duration: 24 months. Promotor: Cooperativa Agrícola de Alfândega da Fé, CRL (ProDer 54609).	€ 56.449,97
7	RegCast - Fertigation in chestnut - an innovative approach to groves managing. CITAB coordinator: José Laranjo. Starting date: November 2013, duration: 36 months. Promotor: Geosil – Empreendimentos Agrosilvícolas S.A. (ProDer 47451).	€ 10.447,65
8	Ergofito - Evaluation of the impact of the use of Ergofito in chestnut. CITAB coordinator: José Laranjo. Starting date: May 2014, duration: 36 months. Promotor: AgroRioBom. (ProDer 52428).	129.265,37 €
9	NEucBark - New Valorization Strategies for Eucalyptus spp. Bark Extracts. CITAB coordinator: Cristóvão Lima. Starting date: June 2013, duration: 24 months (PTDC/AGR-FOR/3187/2012)	€ 33.659,00
10	Animal slurry management: sustainable practices at field scale. CITAB coordinator: Henrique Trindade. Starting date: January 2012, duration: 36 months (PTDC/AGR-PRO/119428/2010)	€ 45.000,00
11	WineBioCode - Desenvolvimento de biossensores para rastreabilidade do vinho na Região Demarcada do Douro. CITAB coordinator: Ana Barros. Starting date: March 2012, duration: 36 months (PTDC/AGR-ALI/117341/2010)	€ 17.749,20

12	Developing processes and technologies aiming the production of ink disease resistant chestnut rootstocks, compatible with national varieties certified with molecular markers. CITAB coordinator: José Laranjo. Starting date: January 2012, duration: 36 months. Promotor: Certifruiteiras.com Lda. (ProDer PA 45967)	€ 15.791,75
13	GreenVitis - Effects of soil management on productivity and sustainability of grape vineyards system. CITAB coordinator: Armindo Afonso Martins. Starting date: January 2012, duration: 39 months. Promotor: Quinta do Vallado Lda. (ProDer PA 43879)	€ 413.397,29
14	IrrigOlive - Deficit irrigation on olive, in the region of "Terra Quente Transmonta", to optimization water resources, productivity and olive oil quality. CITAB coordinator: Anabela Silva. Starting date: January 2012, duration: 39 months. Promotor: Aviaz Produção e Comercialização de Vinhos e Azeites, Lda - (ProDer).	€ 202.257,88
15	KlimHist - Reconstruction and model simulations of past climate in Portugal using documentary and early instrumental sources (17th-19h). CITAB coordinator: João Santos. Starting date: March 2012, duration: 36 months (PTDC/AAC-CLI/119078/2010)	€ 19.678,00
16	Introdução de telas antigranizo em macieira avaliação de efeitos colaterais e impacte económica. Mallus, Cagest, Instituto Politécnico de Bragança. CITAB coordinator: C. Correia. Starting date: 2015, duration: 36 months. Promotors: Mallus. (ProDer PA 54824)	€ 120.661,95
17	SambucusFRESH - Improving productivity and quality in the production of elderberry in fresh, chilled and frozen. CITAB coordinator: Eunice Bacelar. Starting date: June 2012, duration: 36 months. Promoter: Regiefrutas (QREN Co-promoção 23109)	€ 248.242,96
18	SerCast- Reinforce of chestnut productivity in Sernancelhe municipality. CITAB coordinator: José Laranjo. Starting date: May 2012, duration: 36 months (Protocol with Sernancelhe Municipality)	€ 44.609,00
19	WUSSIAAME - Water use, survival strategies and impact of agrochemicals on water resources in agricultural Mediterranean ecosystems. CITAB coordinator: Aureliano Malheiro. Starting date: February 2012, duration: 36 months (PTDC/AAC-AMB/100635/2008)	€ 51.574,00
20	SUSTAINSYS - Environmental Sustainable Agro-Forestry Systems. . CITAB Coordinator: Rui Cortes. Starting Date: January 2014, duration 18 months (NORTE-07-0124-FEDER-0000044)	€ 600.863,65
21	Biobase. Thematic Networks of Information and Dissemination CITAB Coordinator: António Crespi. Starting Date: March 2014, duration 24 months. Promotor: Corane (ProDer 52986)	€ 100.666,95
22	Chave In - Conceptualization, development and dissemination of an interactive system for identifying the Portuguese vascular flora, with emphasis in the North, based on an illustrated dichotomous key. CITAB Coordinator: António Crespi. Starting Date: March 2014, duration 36 months (ProDer 52751)	€ 32.190,82
23	Zebrafish (Danio rerio) anaesthesia and potential implications in research – reduction, replacement and refining. CITAB Coordinator: Sandra Mariza Monteiro. Starting Date: July 2013, duration 24 months (PTDC/CVT-WEL/4672/2012)	€ 159.965,00

24	Cryptococcus gattii environmental survey: Europe and Mediterranean area. CITAB Coordinator: Ana Sampaio. Starting Date: 2013, duration: 36 months (ISHAM Cryptococcus working group).	N/A
25	Economountain, Economy of biodiversity in the Vila Pouca de Aguiar mountains. CITAB Coordinator: Aurora Capapé. Starting Date: July 2012, duration: 36 months. (Fundo EDP Biodiversidade)	€ 50.000
26	IND_CHANGE - INDicator-based modelling tools to predict landscape CHANGE and to improve the application of social-ecological research in adaptive land management. CITAB Coordinator: João Cabral. Starting Date: July 2013. Duration: 36 months (PTDC/AAG-MAA/4539/2012)	€ 14.629,00
27	EcoVitis - Maximizing Eco-services into Douro Demarcated Region vineyards. CITAB Coordinator: Laura Torres. Starting Date: January 2011, duration: 40 months. Promotor: Real Companhia Velha (Proder 24043)	€ 495.122,00
28	Micoproject - Development of mycorrhizal inoculants and mycological management in marginal áreas. Promotor: Bioinvitro. 82 months. QREN/ADI 1589	€ 417.183,71
29	Promotion and valuation of native forest species. CITAB Coordinator: João Carvalho. Starting date: June 2013, duration: 36 months. (Associação Nacional Conservação Natureza – QUERCUS)	N/A
30	ENOEXEL – From vineyards to wine: targeting grape and wine excellency. CITAB coordinator: Pedro Melo Pinto. Starting Date: January 2014, duration: 18 months - NORTE-07-0124-FEDER-000032	€ 49.552,89
31	Fracture behaviour of cortical bone under mixed-mode I+II loading. CITAB coordinator: José Morais. Starting Date: April 2012, duration 36 months (PTDC/EME-PME/119093/2010)	€ 24.000,00
32	Hyper - Application of hyperspectral imaging and neural networks to viticulture. CITAB coordinator: Pedro Pinto. Starting Date: April 2012, duration: 39 months PTDC/EEA-AUT/121056/2010	€ 74.910,00

3.4 – Industry contract research

During 2015, 4 major contract research were held with private companies:

	Designation	Contractor	Total Value
1	Baixo Sabor hydroelectric dam (AHBS) - Integrated Environmental Monitoring Program (PIMA), (PRT-2015-00715) - PGM Birdlife, MC 9; PGM Otter, MC 6; PGM Pyrenean desman , MC 7; PGM Herpetofauna, MC 10; PGM Bats, MC 5. Starting Date: January 2015, duration 12 months	EDP – Gestão da Produção de Energia, S.A.	€ 175.414,00
2	Monitoring birds and bats of mortality in the Marco Alto Windfarm during the 3rd year of the operational phase. Starting Date: March 2014, duration 13 months	Parque Eólico de Gevancas, Lda	€ 12.000,00
3	Characterization of the reference ecological situation of Bestança Valley, with regard to fauna and flora. Starting Date: March 2015, duration 12 months	City Hall of Cinfães	€ 40.000,00
4	Clinical trial with animals. Starting Date: December 2014, duration 12 months	Merial Europe	€ 1.400,00

4 List of CITAB Members in 2015

DIRECTOR

Eduardo Augusto dos Santos Rosa

VICE-DIRECTOR

Pedro José de Melo Teixeira Pinto

VICE-DIRECTOR

Rui Manuel Vítor Cortes

EXECUTIVE COMMITTEE

PRESIDENT

Samantha Jane Hughes

MEMBERS

Alfredo Augusto de Carvalho Aires

Alberto Carlos Pires Dias

Luis Filipe Sanches Fernandes

Mario Jorge Modesto Gonzalez Pereira

Pedro Miguel Mestre Alves da Silva

SUSTAINABLE AGRO-FOOD CHAINS

PRINCIPAL INVESTIGATOR

JOÃO CARLOS ANDRADE DOS SANTOS

RESEARCHERS IN THE GROUP (PH.D. ONLY)

Alfredo Augusto de Carvalho Aires	Eduardo Augusto dos Santos Rosa	Manuel Fernandes Ferreira
Amelia Maria Lopes Dias da Silva	Eunice Luis Vieira Areal Bacelar	Maria da Conceição Lopes Vieira dos Santos
Amin Karmali	Fernanda Maria Lopes-Ferreira	Maria Eugénia dos Santos Nunes
Ana Alvares Ribeiro Marques de Aguiar	Francisco Manuel Pereira Peixoto	Maria João Pires
Ana Isabel R. Novo Amorim de Barros	Helder José Chaves Fraga	Maria Solange Mendonça Leite
Ana Luisa Ferreira Pinto Moura da Cunha	Henrique Manuel da Fonseca Trindade	Mário Manuel de Miranda Furtado Campos Cunha
Ana Paula Calvão Moreira da Silva	Isaura Alberta Oliveira de Castro	Nélson Filipe Lopes Machado
Ana Sofia Santos	Ivo Vaz de Oliveira	Patricia do Céu Oliveira Ribeiro
Anabela Afonso Fernandes Silva	João Carlos Andrade dos Santos	Paula Alexandra Martins de Oliveira
Aureliano Natálio Coelho Malheiro	João Henrique J. O. Negrão	Paula Cristina Ribeiro Coutinho de Oliveira
Berta Maria de Carvalho Gonçalves	João Paulo Fonseca da Costa Moura	Piebiep Goufo
Bruno Jorge Antunes Colaço	Jorge Bernardo Lacerda de Queiroz	Raul Dominguez Perles
Carlos Alberto e Silva Venâncio	Jorge Ventura Ferreira Cardoso	Regina Arantes Rodrigues
Carlos Alberto Antunes Viegas	José Gomes Laranjo	Sónia Alexandra de Almeida Martins
Carlos Manuel Correia Changhe Zhang	José Luis da Silva Pereira	Susana Maria Gomes Caldas da Fonseca
Cristina Maria Mendes Andrade	José Manuel Moutinho Pereira	Tânia Sofia Cordeiro Martins
Dario Joaquim Simões Loureiro dos Santos	Lia-Tânia Rosa Dinis	Tatiana Andreani
Domingos Manuel Mendes Lopes	Luis Miguel Joaquim Marques Antunes	Valdemar Pedrosa Carnide
	Luís Miguel Soares Ribeiro Leite da Cunha	

OTHER RESEARCHERS IN THE GROUP (PH.D. ONLY)

Alfredo Dias	Helena Maria Vala Correia	Maria Isabel Pinho Pessoa
Ana Alexandra Ribeiro	Isabel Maria Cravo Aguiar	Amorim
Coutinho de Oliveira	Pinto Mina	Olinda da Conceição Pinto
Ana Cristina Bairrada	João Paulo Baptista	Carnide
Fortuna	Carneiro	Paulo Jorge Gouveia
Ana Lúcia Lopes Pinto e Sintra	João Ramalho Sousa Santos	Simões da Silva Oliveira Paulo Manuel Antunes
Ana Maria Araújo de Beja	John Griffith Jones	Mendes Gordo
Neves Nazaré Pereira	Luis Jesus Rivas Soriano	Ruth Maria de Oliveira
Ana Maria Marques Valentim	Manuel João Teles de Oliveira	Pereira Sandra Raquel de Sousa
Ana Sofia Rodrigues	Margarida Maria Correia	Monteiro
Domingos Xavier	Marques	Susana Maria Pinto de Carvalho
Filomeno Carlos Viegas	Maria do Rosário Alves	Teresa Maria dos Santos
Fernando de Pablo Davila	Ferreira dos Anjos	Pinto
Fernando Pedro Falcão	Maria Isabel Mendes	Vicente de Seixas e Sousa
Raimundo	Guerra Marques Cortez	
Fernando Ramos		

OTHER RESEARCHERS IN THE GROUP (NON PH.D. ONLY)

Ana Isabel Rocha Faustino	Cátia Sofia Pereira Braga	Maria Elisabete T.S.
Ana Sofia Lopes Mil- Homens	Pontos Célia Ferreira Rocha	Franco M.ª José Santos Pereira
Andreia Leonor Vieira	Cristiana Fernandes	Correia
Bento da Silva	Rodrigues	Marta Alexandra Nunes
Andreia Marilise Carneiro de Carvalho	Helena Maria Fernandes Ferreira	da Silva Nuno Miguel Franco Paula
Ângela Marina Oliveira	Hortense Alves Fernandes	Santos
Mucha	Hugo Alexandre de Oliveira e Silva	Sónia Patrícia Seabra Campos
António Costa Teixeira	Luis Filipe Pires Braz	Tiago Monteiro -
António J. M. Nogueira	Manyou Yu	Henriques
Beatriz J. F.R Oliveira		

AGROBIOPLANT RESEARCHERS

RESEARCHERS IN THE GROUP (PH.D. ONLY)

Alberto Carlos Pires Dias	Cristina Alexandra de Almeida Aguiar
Ana Cristina Gomes da Cunha	Cristóvão Fernando Macedo Lima
Artur Jorge da Silva Conde	Franklin Gregory
Cristina Maria da Silveira e Silva Pereira	Henrique Luís Silva de Noronha
Wilson	Hernâni Varanda Gerós

Olga Maria F. Pereira Coutinho
Rui Pedro Soares de Oliveira

Viviana Maria Martins Varajão

OTHER RESEARCHERS IN THE GROUP (PH.D. ONLY)

Isabel Maria Cravo Aguiar Pinto Mina

OTHER RESEARCHERS IN THE GROUP (NON PH.D. ONLY)

Cláudia Marta Libreiro Pinho

TRAINING

Ana Abraão	Manuela Andreia Gonçalves Carneiro
Ana Cristina Pontes Carvalho	Márcia Raquel Gomes de Carvalho
Ana Sofia Lopes Mil-Homens	Maria Adelaide Homem Perdigão Pito
André Daniel Mendes Lemos	Maria Elisabete T. da Silva Franco
André Miguel Pinho Moreira	Maria Margarida de Oliveira Mota
Andreia Marilise Carneiro de Carvalho	Marslin Gregory
António José Madeira Nogueira	Marta Abigail dos Santos Cardoso
Beatriz Justina F. Ramos de Oliveira	Marta Alexandra Nunes da Silva
Carla Sofia Calçada	Maxwell Y, Owusu-Twum
Carla Sofia Pereira Dias	Meriem Taghouti
Catarina Isabel Guedes Teixeira	Miguel Pedro Antunes de Oliveira
Cátia Inês Rodrigues dos Santos	Nikola Grcic
Cátia Sofia Pereira Braga Pontos	Nuno Miguel Franco Paula Santos
Cátia Vanessa Queijo Brito	Ricardo Costa
Célia Ferreira Rocha	Richard Maykel Gonçalves Breia
Chenyao Yang	Rose Marie Oliveira Ferreira de Sousa
Cláudia Coelho	Sandra Cristina Santos do Cabo
Dário Lúcio Ferreira de Jesus	Sara Bernardo
David Jerónimo Oppolzer	Sílvia Afonso
Ermelinda Isabel Martins da Silva	Sofia Correia
Irene Pereira Gouvinhas	Sónia Patrícia Seabra Campos
Iva Prgomet	Sweta Singh
Ivo Pavia	Tiago Monteiro - Henriques
Joana Fangueiro	Vanessa Cristina Monteiro Ferreira
Luis Filipe Pires Braz	Vânia Cristina Santos Sena Graça
Luis Filipe Ribeiro da Rocha	Weina Hou
Magda Semedo	

ECOINTEGRITY

PRINCIPAL INVESTIGATOR

PAULO ALEXANDRE MARTINS FERNANDES

RESEARCHERS IN THE GROUP (Ph.D. Only)

Ana Cristina Ramos Sampaio	Luís Filipe Sanches Fernandes
Ana Maria Monteiro Paiva Coimbra	Malik Amraoui
António Augusto Fontainhas Fernandes	Maria das Neves M. M. Paiva Cardoso
Antonio Luis Crespi	Maria de Fátima Magalhães Gonçalves
Estela Maria Bastos M. de Almeida	Mário Gabriel Santiago dos Santos
Felisbina Queiroga	Mário Jorge Modesto Gonzalez Pereira
Guilhermina Miguel da Silva Marques	Paula Maria Seixas de Oliveira Arnaldo
Hélder Filipe dos Santos Viana	Paulo Alexandre Martins Fernandes
João Alexandre F. A. Santos Cabral	Rui Manuel Furtado Bezerra
João Soares Carrola	Rui Manuel Vitor Cortes
José Albino Gomes Alves Dias	Samantha Jane Hughes
José Tadeu Marques Aranha	Sandra Mariza Veiga Monteiro
Laura Monteiro Torres	Simone da Graça Pinto Varandas
Liliana do Carmo S. F. A. Caramelo	

OTHER RESEARCHERS IN THE GROUP (Ph.D. Only)

Aurora Carmen Monzón Capapé	João Paulo Fidalgo Carvalho
Carla Maria Alves Q. Amaral Marinho	Leónia do Carmo Santos Nunes
Carmen Hernández Gómez	Luis Miguel Ferreira Pontes Martins
Edna Carla Janeiro Cabecinha da Câmara Sampaio	Maria Helena Rodrigues Moreira
Frederico Meireles Alves Rodrigues	Nuno Cláudio da Rocha Meses Pedro
	Sofia Gabriel Garcia Santos

OTHER RESEARCHERS IN THE GROUP (non Ph.D. Only)

Ana Sofia Andrade de Faria	Luís Pedro Mendes Freitas
Carlos Alberto R. Loureiro da Silva	Maria da Conceição C. Rodrigues
Cristina da Conceição Ribeiro Carlos	Maria Irene Fraga dos Santos
Diogo Carvalho	Marta Couto Ferreira
Hélia Marisa do Vale-Gonçalves	Paula Alexandra da Costa Sousa Botelho
Joaquim Barreira de Jesus	Pinto Rodrigues
Luís Filipe Roxo de Almeida	Regina Maria Bessa Santos
Luis Manuel Lourenço Félix	Rita Coelho Bastos

Sandra Liliana Cardoso da Costa

Tiago Nuno Dias e Neto

TRAINING

Ana Catarina Gonçalves Luzio

Anabela Cristina Marques da Nave Rodrigues

André Ribeiro da Fonseca

Carlos Gonçalves Rossa

Cátia Filipa Pinheiro dos Santos

Darinka Gonzalez

Francisco José Guedes Morinha

Joana Parente

Lav Sharma

Maria Inês de Almeida Páscoa

Marisa de Oliveira Lopes

Sandra Isabel Ribeiro Pereira

Teresa Raquel Duque Enes

Tiago Santos

Vitor Rodrigues Pereira

BIOSYSTEMS ENGINEERING

PRINCIPAL INVESTIGATOR

JOSÉ LUÍS PENETRA CERVEIRA LOUSADA

RESEARCHERS IN THE GROUP (Ph.D. Only)

Carlos Afonso de Moura Teixeira	José Manuel Cardoso Xavier
Carlos Manuel José Alves Serôdio	Maria Isabel Dias
Irene Cristina Salgueiro Oliveira	Mário Manuel Dinis Ginja
João Luís Pereira	Pedro Alexandre Mogadouro do Couto
José Joaquim Lopes Morais	Pedro José de Melo Teixeira Pinto
José Luís Penetra Cerveira Lousada	Ronaldo Eugénio Calçada Dias Gabriel

OTHER RESEARCHERS IN THE GROUP (Ph.D. Only)

Amadeu Duarte da Silva Borges
António Manuel Ribeiro de Sousa
Carlos Filipe C. Rompante da Cunha
Cristóvão Lucas dos Santos
Fábio André Magalhães Pereira
José Carlos Silva Cardoso
José Manuel Alves Ribeiro
Marco Paulo Duarte Naia
Maria Emília Calvão Moreira da Silva
Maria Eunice da Costa Salavessa
Norberto Jorge A. Parente Gonçalves
Nuno Manuel Lucas Vieira Lopes
Paulo Alexandre Cardoso Salgado
Pedro Manuel da Conceição Custodio
Pedro Miguel Mestre Alves da Silva
Valéria Reva

OTHER RESEARCHERS IN THE GROUP (non Ph.D. Only)

Alexandra Luísa Ribeiro Dias
Ana Paula Santana
David Neves Silva
Florabela Rocha Aragão
Hugo Daniel Pinto da Silva
João Manuel Cardoso Martins
João Paulo Coelho
Maria Sofia Rodrigues Alves Pimenta
Telmo Rui Dias Bento

TRAINING

Christophe Teixeira
Jorge Marcelo Quintas de Oliveira
Véronique Imperatriz Medeiros Gomes