

ABSTRACT BOOK

SEB VIRTUAL CONFERENCE 2021

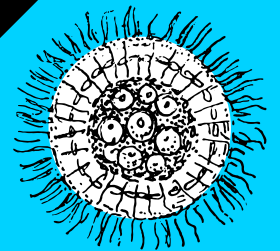
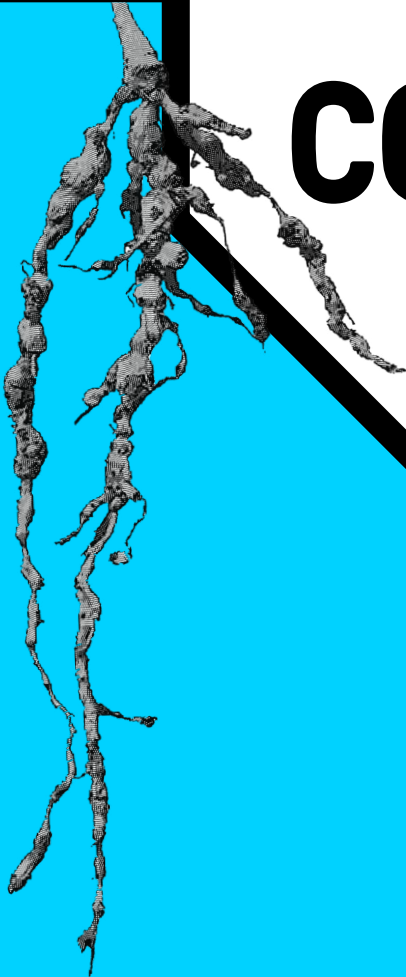
29 JUNE - 8 JULY 2021

SEBIOLOGY.ORG

#SEBCONFERENCE



SEB 2021 ANNUAL CONFERENCE



DELEGATE INFORMATION

VIRTUAL VENUE

Aventri Webinar platform.

Please note all times are displayed in British Summer Time (BST).

CERTIFICATES OF ATTENDANCE

A certificate of attendance will be sent by the SEB team to attendees who have presented a poster or delivered a talk.

CONFERENCE APP

This year's conference app will allow you to create your own bespoke schedule, network with other attendees and watch and stream talks (to name but a few of its functions!).

The App is available on the app store and on the SEB website – <https://www.sebiology.org/events/event/seb-conference-2021/seb-app>

The Conference app is available on the app store and google play

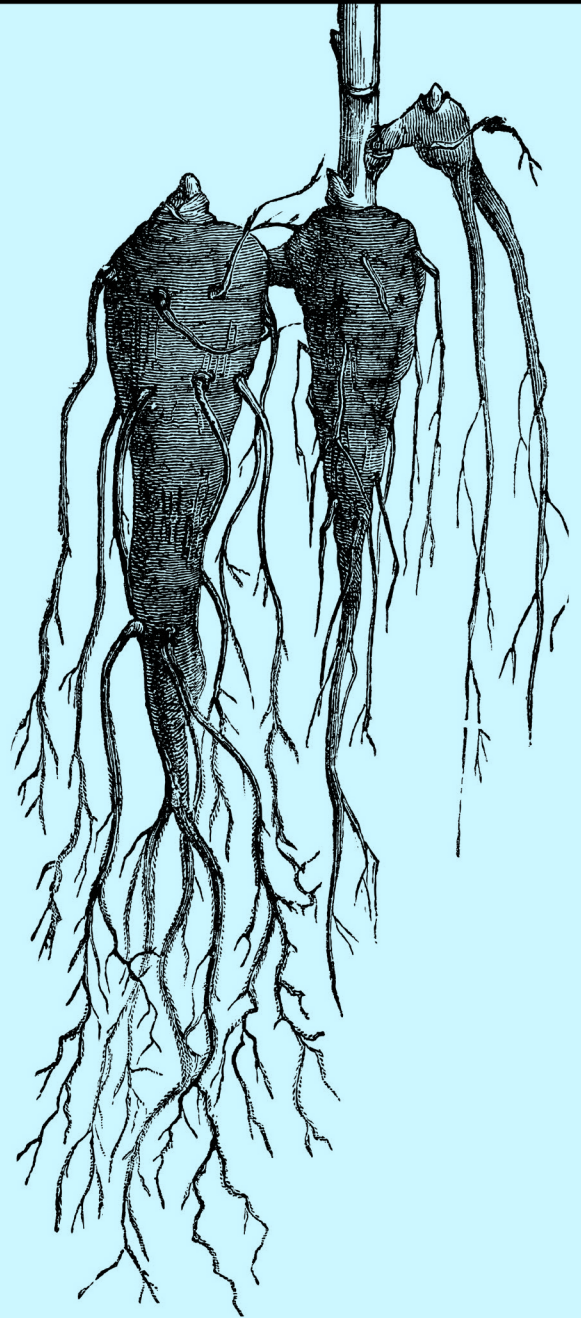
You will need to log into the App to create your personalised agenda and should have received these by email.

TALKS

All talks will be available two months after the conference on the webinar platform .

SOCIAL MEDIA

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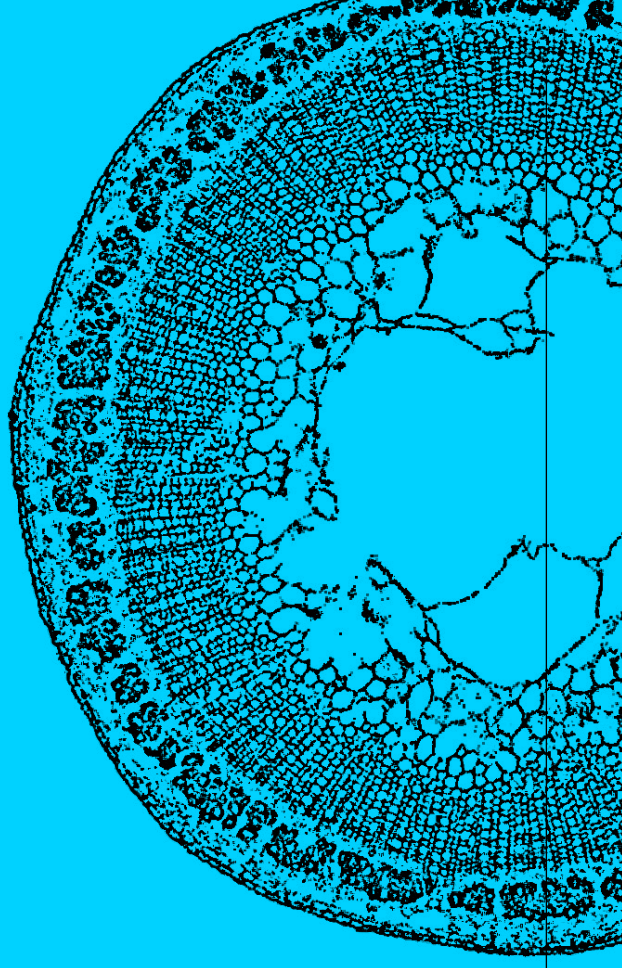


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SCIENCE ACROSS BOUNDARIES ABSTRACTS (ANIMAL, CELL AND PLANT BIOLOGY)



are required for chloroplast promoter recognition and transcription initiation. The circadian clock drives rhythmic expression of SIGMA FACTOR5 (SIG5), and SIG5 transcripts also respond to light and low temperature. This regulation of SIG5 results in the rhythmic transcription of the blue light responsive promoter (BLRP) of *psbD*, which encodes the D2 protein of photosystem II. We are exploring the role of SIG5 in photosynthetic adaptation to low temperatures within the context of circadian regulation. This is providing interesting insights into the processes by which SIG5 optimizes plant performance under low temperature conditions.

PC1.9 FOLIAR APPLICATION OF MAGNESIUM AND POTASSIUM AFFECTS THE EXPRESSION OF GENES RELATED TO CELL WALL MODIFICATIONS DURING SWEET CHERRY DEVELOPMENT

📅 Tuesday 6 July 2021 POSTER SESSION

👤 Marlene Santos (Department of Genetics and Biotechnology (DGB) University of Trás-os-Montes e Alto Douro Vila Real, Portugal), Marcos Gutiérrez-Cortines (Institute of Plant Biotechnology Polytechnic University of Cartagena, Spain), João R. Sousa (Department of Biology and environment (DEBA) University of Trás-os-Montes e Alto Douro Vila Real, Portugal), Fernando Raimundo (Department of Biology and environment (DEBA) University of Trás-os-Montes e Alto Douro Vila Real, Portugal), Berta Gonçalves (Department of Biology and environment (DEBA) University of Trás-os-Montes e Alto Douro Vila Real, Portugal), Manuela Matos (Department of Genetics and Biotechnology (DGB) University of Trás-os-Montes e Alto Douro Vila Real, Portugal)

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Sweet cherries are seasonal fruits and are considered one of the most popular spring-summer fruits in temperate regions of Europe. Important quality characteristics such as taste, colour, sweetness, sourness or firmness can influence consumer preference which, generally, prefer fruits with good appearance, size, firmness and flavor. Despite the high commercial value of the cherry, the cracking is a factor that devalues the price of the fruit, leading to high losses at economical level. Therefore, it's important to find solutions to this problem in order to improve fruit quality, by reducing the commercial losses. So, the Cv. Burlat of *Prunus avium* L. from an orchard located in Resende region (Portugal) was selected for this study and different nutrients were applied at foliar level, namely magnesium and potassium at high and low doses as mitigation strategy of sweet cherry cracking. In order to understand how the applied compounds influence sweet cherry cracking at molecular level, fruits were collected at different maturation stages from all treatments, total RNA was extracted from fruit exocarp and then the cDNA synthesis was performed. The expression patterns of genes related to cell wall modifications and cuticular membrane deposition during fruit development was analysed by quantitative real-time PCR (RT-qPCR) and a housekeeping gene was used as control. The analysis of the expression of genes potentially involved in cherry cracking, showed differences among treatments and maturation phases while the housekeeping gene maintained their expression.

PC1.6 UNRAVELLING THE FUNCTION OF THE UNUSUAL ANTIOXIDANT ERGOTHIONEINE IN PHOTOSYNTHETIC ORGANISMS

📅 Tuesday 6 July 2021 POSTER SESSION

👤 Isobel S Cole (University of Exeter, United Kingdom), Glen L Wheeler (Marine Biological Association, United Kingdom), Katherine E Helliwell (University of Exeter, United Kingdom), Deborah Salmon (University of Exeter, United Kingdom), Nicholas Smirnoff (University of Exeter, United Kingdom)

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Photosynthetic eukaryotes produce a range of antioxidants to protect them from reactive oxygen species produced during photosynthesis. It has recently been discovered that some plants and algae accumulate ergothioneine, a thione/thiol compound derived from the amino acid histidine, but its role in these organisms is not currently understood. As a potential antioxidant, it could be important in the protection against environmental stresses. Ergothioneine is also effective at binding potentially toxic metals such as copper, nickel and cobalt, suggesting additional cytoprotective roles. However, there is currently little known about the occurrence, synthesis and physiological functions of ergothioneine in photosynthetic organisms. We will examine a diverse range of algal and plant lineages to determine their ability to accumulate ergothioneine. A combination of phylogenetic analysis, gene knockouts using CRISPR-Cas/amiRNA and expression of candidate genes will then be used to investigate the biosynthetic pathways in selected species and characterise the enzymes involved in ergothioneine synthesis. Biochemical and physiological characterisation of wild type and ergothioneine deficient mutants will be used to investigate the protective role of ergothioneine.

PC1.7 THE LONG-TERM EFFECT OF CARBOHYDRATE-COATED nCeO₂ TREATMENT ON SEED PROTEIN PROFILE IN TWO HERBACEOUS WEEDY ANNUALS

📅 Tuesday 6 July 2021 POSTER SESSION

👤 Ivana Lj. Milenković (Institute for Multidisciplinary Research University of Belgrade, Serbia), Aleksandra Lj. Mitrović (Institute for Multidisciplinary Research University of Belgrade, Serbia), Sla'ana Z. Spasić (Institute for Multidisciplinary Research University of Belgrade, Serbia), Ksenija Radotić (Institute for Multidisciplinary Research University of Belgrade, Serbia)

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Cerium oxide nanoparticles (nCeO₂) are attracting continuously growing attention due to their unique properties - their facile transition between Ce³⁺ and Ce⁴⁺ oxidation states. nCeO₂ found application in the industry, cosmetics, agriculture, electronics, etc. Their final accumulation in the environment creates new environmental stress factors for living organisms. To improve their solubility, nCeO₂ were coated with monosaccharide - glucose and microbial exopolysaccharides - levan and pullulan to obtain glucose-, levan-, and pullulan-coated nCeO₂ (G-CeO₂, L-CeO₂, and P-CeO₂). The potential long-term effect of nCeO₂ on vegetation was studied

in two herbaceous weedy annuals - *Sinapis alba* and *Chenopodium rubrum*. It was suggested earlier that the mechanism of maternal environmental effects, that persists for several generations, can act through relative seed protein composition representing an “archive” of environmental changes experienced by mother plants during their lives. Treatment with $n\text{CeO}_2$ of *Sinapis alba* and *Chenopodium rubrum* seeds during germination, on total protein content (TPC) and protein profile of seeds produced in two subsequent offspring generations grown in the greenhouse, were investigated. The TPC mainly showed no significant differences, both between treatments and between subsequent generations, in both species. SDS-PAGE electrophoresis showed the presence of 15 protein bands, molecular weight 10 - 140 kDa, in all seed samples of *Sinapis alba* or *Chenopodium rubrum*, respectively. We showed that $n\text{CeO}_2$ treatment during the very early development of mother plants (germination) has a long-term effect, visible in the difference in width and intensity of seed protein bands of seeds sampled in two subsequent offspring generations.

PC1.10 ORCHESTRATION OF TRANSCRIPTIONAL REPROGRAMMING UNDER OXYGEN DEFICIENCY BY ERFVII FACTORS REQUIRES THE MEDIATOR COMPLEX

Tuesday 6 July 2021 14:00

Romy Schmidt (Bielefeld University, Germany)

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Oxygen sensing in plants is facilitated by group VII ETHYLENE-RESPONSE FACTORS (ERFVII) which act as master regulators of transcriptional reprogramming under oxygen deficiency (hypoxia) as naturally occurring under flooding. Strikingly, while the regulation of ERFVII protein stabilization and translocation under hypoxia is well explored, the molecular mechanisms by which these key regulators activate downstream gene-regulatory networks to establish tolerance are not understood.

Here, we show that *Arabidopsis* ERFVII factors recruit the Mediator complex in order to convey stress signals to RNA polymerase II. This is achieved by interaction with a specific Mediator subunit. Interestingly, Mediator complex association with ERFVII-regulated target promoters only occurs during hypoxia, potentially to prevent precocious gene activation under aerobic conditions. Multiple ERFVII factors require the Mediator complex for full activity. However, we observed a clear differentiation in Mediator-dependent and -independent hypoxic core gene regulation, suggesting the existence of further, unknown coactivators to coordinate downstream transcriptional networks. Moreover, we demonstrate functional conservation of the MED-ERFVII module in the monocot *Oryza sativa*, opening the exciting possibility of improving crop hypoxia tolerance during flooding using the Mediator complex as novel breeding target.

PC1.11 NETWORK ANALYSIS OF ARABIDOPSIS MITOCHONDRIAL DYNAMICS REVEALS A TRADEOFF BETWEEN PHYSICAL DISTRIBUTION AND SOCIAL CONNECTIVITY

Tuesday 6 July 2021 14:35

Joanna M. Chustecki (University of Birmingham, United Kingdom), Daniel J. Gibbs (University of Birmingham, United Kingdom), George W. Bassel (University of Warwick, United Kingdom), Iain G. Johnston (University of Bergen, Norway)

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Mitochondria in plant cells exhibit highly dynamic collective behaviours, with individual organelles moving rapidly and interacting, forming a ‘discontinuous whole’. The guiding principles and underlying mechanisms of this intriguing behaviour are yet to be fully elucidated. In this talk, I will describe our work using single-cell confocal microscopy, physical modelling, and network science to understand this behaviour using the broad perspective of a dynamic intracellular social network. We combine experimental characterisation of mitochondrial dynamics with a range of image, network and statistical analyses in wild type *Arabidopsis thaliana* and the so-called *friendly* mutant with compromised mitochondrial dynamics. Alongside, we use individual-based modelling approaches to simulate the range of behaviours of the system, comparing theoretical and experimental data to identify a necessary trade-off between physical priorities (the even distribution of mitochondria through the cell) and “social” priorities (individuals localising to facilitate exchange of chemicals and information). This trade-off results in a tension between mitochondrial spacing and localisation, with heterogeneity in dynamics resulting as a consequence of imperfect resolutions to this trade-off. This talk will illustrate our use of experimental video data coupled to physical modelling, with our network-based approach helping to illuminate the driving principles underlying these rich and complex organelle dynamics.

PC1.12 NEXT GENERATION TRANSCRIPTIONAL ASSISTED GENOMIC RESOURCES PROVIDE MOLECULAR INSIGHT INTO LIGNAN BIOSYNTHESIS IN IPOMOEA CAIRICA

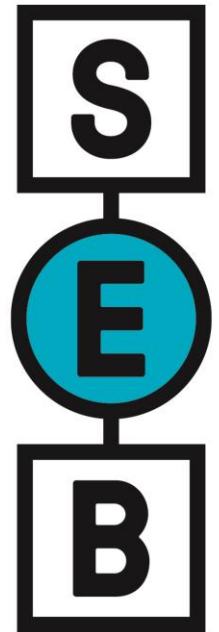
Tuesday 6 July 2021 14:55

Chibuikem I. N. Unamba (Imo State University Owerri, Nigeria), Romit Seth (CSIR-Institute of Himalayan Bioresource Technology Palampur (HP), India), Pradeep Singh (CSIR-Institute of Himalayan Bioresource Technology Palampur (HP), India), Rajni Parmar (CSIR-Institute of Himalayan Bioresource Technology Palampur (HP), India), Ikechukwu O Agbagwa (University of Port Harcourt Rivers State, Nigeria), Ram K Sharma (CSIR-Institute of Himalayan Bioresource Technology Palampur (HP), India)

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Ipomoea cairica L., is an evergreen, very fast growing, creeper and economically important plant belonging to the family Convolvulaceae.

CERTIFICATE OF ATTENDANCE



This is to certify that

Dr Ivana Lj. Milenković

*Attended and presented a poster titled
“The long-term effect of carbohydrate-coated
nCeO₂ treatment on seed protein profile in two
herbaceous weedy annuals”
at the SEB’s 2021 Annual Conference which took
place online from the 29 June - 8 July 2021.*



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Events Manager

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