

## **SEB Prague 2010 Programme and Abstract Amendments**

In this handout you will find amendments to the programme, additional posters, amendments to the abstracts and additional abstracts.

Please see below a list of changes that have been made to the scientific sessions:

- The **Evolutionary and Ecological Physiology** session will now run on the morning of the 3<sup>rd</sup> of July, in addition to the whole day on the 2<sup>nd</sup> of July.
- The **Plant cell cycle and its interaction with plant hormones session** will now run on the morning of the 3<sup>rd</sup> of July, in addition to the whole day on the 1<sup>st</sup> of July and the whole day on the 2<sup>nd</sup> of July.
- The **Scaling of metabolic rate with body size in organisms: its causes and ecological relevance** session has been reduced to the afternoon of the 3<sup>rd</sup> of July, as opposed to the whole day on the 3<sup>rd</sup> of July.
- The **Young Scientists in Plant Biology** session will only take place on the 2<sup>nd</sup> of July, as opposed to running on both the 2<sup>nd</sup> and 3<sup>rd</sup> of July.
- The YSAS session will be chaired by Peter Lumsden.

Late poster abstracts can be seen below:

### **Late.1 (Plant Responses to Belowground stresses)**

#### **Cadmium Tolerance Mechanism in *Wedelia trilobata* (L.) Hitchc. (Asteraceae) plants**

Marisol Castrillo (Departamento de Biología de Organismos), Beatriz Pernía (Postgrado Cs. Biológicas), Maritza Calabokis (Departamento de Biología Celular), Karen Noris (Departamento de Biología Celular), José Bubis (Departamento de Biología Celular)

Cadmium is a widespread nonessential toxic heavy metal released into the biosphere mostly by modern industry. The aim of the present work is to evaluate the responses of different Cd concentrations (5, 25 and 50 µM) exposure in *W. trilobata* plants kept in hydroponic nutritive solution for 96 h, to diagnose the potential use of this plant specie in phytoremediation. Cd content in tissues increased proportionally with concentration; the accumulation was 1306, 193 y 52 mgKg<sup>-1</sup> in roots, stems and leaves respectively. The bioconcentration factor was higher than 1 in all organs at any [Cd], which is an indication that *W. trilobata* is Cd accumulator plant. Root dry biomass was reduced 40.3%. at 50 µM Cd. Increase in GSH, cistein and phytochelatins content (PCs) at 50 µM

was observed, six different PCs types were detected. Lipid peroxidation increased at 0.5, 5 y 25 µM, but not at 50 µM. The PCs increase at 50 µM is related to the sequestration mechanism which reduced the toxic Cd effect on lipid membranes. These results indicate that *W. trilobata* is a Cd accumulator and tolerant specie throughout the PCs mechanism sequestration, allowing Cd phytoextraction in Cd contaminated soil.

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Poster Session 17:00 – 19:00 Friday 2nd July 2010

### **Late.2 (Plant temperature response networks)**

#### **Chilling tolerance conferred by the constitutive expression of a fungal glucose gene in transgenic tobacco**

Chin Ho Lin (Department of Life Sciences, National Chung Hsing University), Subbiyan Maruthasalam (Department of Life Sciences, National Chung Hsing University), Yi Lun Liu (Department of Life Sciences, National Chung Hsing University), Ching Mei Sun (Department of Life Sciences, National Chung Hsing University), Pei Ying Chen (Department of Life Sciences, National Chung

Hsing University), Chih Wen Yu (Department of Molecular Biotechnology, Da Yeh University), Pei Fang Lee (Department of Biotechnology, Fooyin University)

The endogenous H<sub>2</sub>O<sub>2</sub> content of tobacco (*Nicotiana tabacum* L. cv. SR1) plants was enhanced in this study by transformed the constitutively expressing a glucose oxidase (GO; EC 1.1.3.4) gene of *Aspergillus niger* and the cold tolerance level of transgenic plants was evaluated. Molecular and biochemical analyses of the transgenic plants have clearly proved the stable integration and expression of GO gene in the transgenic (up to T<sub>2</sub> generation) tobacco lines. Elevated levels of H<sub>2</sub>O<sub>2</sub> in the GO-transformed transgenic plants indicated the functional expression of GO transgene in tobacco. Three homozygous lines were selected for the cold tolerant studies. The electrolyte conductivity was found to be significantly lower in GO expressing tobacco plants when exposed to chilling temperatures for 12 h than the control plants; in particular, chilling tolerance was more prominent at -1°C. Furthermore, most transgenic lines resumed regular growth within a week after returning to normal culture conditions after -1°C-12 h cold stress. However, the control plants showed a series of chilling injuries such as necrosis of shoot tip, shoots and leaves, finally leads to death. Antioxidant assays showed elevated levels of total antioxidant content, CAT and APX activity in the transgenic tobacco plants. Based on the results, we predict that the transgenic expression of GO might be used to improve cold tolerance potential of higher plants and also to study the underlying mechanisms of H<sub>2</sub>O<sub>2</sub>-mediated stress tolerance in higher plants.

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Poster Session 17:00 – 19:00 Thursday 1st July 2010

### **Late.3 (Young Scientists in Plant Biology)**

#### **Interaction of the snf1-like AKIN10 kinase with the transcription factor PTL: a link into cell growth and development**

Martin O'Brien (Monash University, Australia), DR Smyth

We are characterizing the role of the PETAL LOSS (PTL) trihelix transcription factor and its role in perianth development in *Arabidopsis thaliana*. There is evidence that the PTL protein is involved in growth suppression between emerging sepals, leading to their separation and allowing sufficient space for petals to emerge internal to the inter-sepal zone. To identify proteins that interact with PTL, we conducted a yeast two-hybrid screen where the snf1-related protein kinase AKIN10 was isolated. AKIN10 and PTL interaction was proved in vitro by pull-down assays and through the use of bimolecular fluorescence complementation (BiFC), we were also able to show this interactions in planta. We also shown that the non-kinase domain of AKIN10 is sufficient to bind PTL through its N-terminus where PTL contains a serine/threonine rich region that could be subject to phosphorylation. In this

regard, in vitro phosphorylation assays by AKIN10 were not conclusive. Promoter analysis of AKIN10 has been undertaken by fusions to GUS, and PTL expression is included in the AKIN10 transcription domain. We are presently trying to understand the biological relevance of this interaction considering that AKIN10 was shown to sense energy deprivation and target a range of transcription factors involved in metabolism.

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Poster Session 17:00 – 19:00 Friday 2nd July 2010

### **Late.4 (Plant responses to below ground stresses)**

#### **Water transport in plant and soils: the role of the root-soil interface**

Yangmin X. Kim (Department of Soil Physics, Helmholtz Centre for Environmental Research), A Carminati (Department of Hydrogeology, Helmholtz Centre for Environmental Research), D Vetterlein (Department of Soil Physics, Helmholtz Centre for Environmental Research), E Steudle (Department of Plant Ecology, Bayreuth University), H-J Vogel (Department of Soil Physics, Helmholtz Centre for Environmental Research)

Water uptake by plants is influenced by soil water availability. In wet soils, plants have the high hydraulic resistance and therefore control the water uptake. As soils dry, the soil hydraulic resistance increases non-linearly and the soil becomes the limiting factor for water uptake. In the grey area between these two extremes, the interface between root and soil, the so called rhizosphere, may play an important role. This poster illustrates hypotheses and methods to investigate the hydraulic role of rhizosphere. Recent experimental observations using neutron radiography (Carminati et al 2010) showed that water content in rhizosphere was unexpectedly high compared to dry bulk soil, contradicting the conventional expectation. It was hypothesized that (i) high water content is due to mucilage produced by roots and having high water-holding capacity; and (ii) rhizosphere and mucilage facilitate plant water uptake in the transition regime where soil gets wet to dry. To access the hydraulic resistances of plant root and soil (either with or without mucilage in rhizosphere), a root pressure probe and a pressure chamber have been employed. The validity to use those techniques is under examination.

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Poster Session 17:00 – 19:00 Friday 2nd July 2010

### **Late.5 (General Biomechanics)**

#### **Zebrafish (*Danio rerio*) muscle mechanics**

Iain Young (University of Liverpool), Zoe Featherstone (University of Liverpool), Philip Whitfield (University of Liverpool), Mary Doherty (University of Liverpool)

Biomedical research depends heavily on the use of animal models. The high degree of conservation of cellular processes across vertebrates means that many disease processes can be modelled in non-mammalian species. The zebrafish (*Danio rerio*) is rapidly becoming accepted as a valuable vertebrate model. *Danio* have transparent embryos and larvae, their embryos can be easily manipulated, they have a short generation time and they are relatively easy to breed and maintain. Further, there are a vast number of physiologically pertinent mutants and the availability of genetic techniques and high quality genomic data make the zebrafish a highly useful model system. In the field of muscle research they have been used to investigate many molecular mechanisms in muscle development and remodelling as well as muscle pathologies. However, to date, very few studies have looked at the mechanical properties of the muscle – an obstacle in linking molecular and cellular properties and their mechanical consequences. In the light of the huge weight of developmental, molecular and genomic information available, this seems a wasted opportunity. We used isometric and work-loop experiments to measure the mechanical properties of small (<1mm diameter and up to 10mm long) preparations of axial muscle from the caudal or rostral regions of the fish and found force, work and power outputs similar to those published for other fish species. Thus, establishing a consistent and reliable muscle preparation from adult zebra fish and providing the possibility of integrative studies in this highly useful model species.

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Poster Session 17:00 – 19:00 Thursday 1st July 2010

## **Late.6 (General animal biology)**

### **Effects of environmental ammonia stress on hemolymph ammonia concentrations, branchial ammonia excretion rates and Rh protein mRNA expression levels in marine crabs.**

Dirk Weihrauch (University of Manitoba, MB, Canada), Michael Martin (University of Manitoba, MB, Canada), Mary M. Sourial (University of Ottawa, ON, Canada)

As observed in all marine invertebrates, the gill epithelium from marine crabs is highly permeable for ions including toxic ammonium ions. In this study we investigated the long term effects of high environmental ammonia (HEA) on hemolymph ammonia concentrations, branchial ammonia excretion rates and mRNA expression levels of the crustacean Rh-ammonia transporter in the stenohaline Dungeness crab *Cancer magister*. Under control conditions hemolymph ammonia concentrations were low (ca. 200µM) and the gills of the crab exhibited an impressive capacity to actively excrete ammonia against an at least 16-fold inwardly directed gradient. The mRNA expression levels of the crustacean Rh-ammonia transporter under control conditions were found to be high

in the gills in contrast to very low expression levels in all other tissues investigated including the antennal gland, hepatopancreas, gut and skeletal muscle. After exposure to 1mM environmental ammonia, hemolymph ammonia increased rapidly to ca. 500µM and the crabs were able to keep this level for about 4 days. During this time period branchial Rh-protein mRNA levels roughly doubled. After 7 days HEA however, hemolymph ammonia raised up to environmental levels (ca. 1 mM) and the capability of the gills to actively excrete ammonia vanished. After 14 days branchial Rh-protein mRNA levels decreased to 30 to 50% of control levels, whereas expression levels of the remaining internal tissues increased substantially. Interestingly, the mortality rate of exposed crabs was low and not different from the control group even after 3 weeks of ammonia stress.

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Poster Session 17:00 – 19:00 Thursday 1st July 2010