UNIVERSITÀ DELLA CALABRIA
Dipartimento di Biologia, Ecologia e Scienze della Terra

Società Botanica Italiana

Riunione Annuale dei Gruppi di Lavoro SBI

"BIOLOGIA CELLULARE E MOLECOLARE" & "BIOTECNOLOGIE E DIFFERENZIAMENTO"

Il Borgo della Marinella - Amantea (CS), 14-16 Giugno 2016

Società Botanica Italiana

Riunione Annuale Gruppi di Lavoro

"Biologia Cellulare e Molecolare"
&
"Biotecnologie e Differenziamento"

14-16 Giugno 2016

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Dipartimento di Biologia Ecologia e Scienze della Terra (DiBEST)
Università della Calabria

17.50 - 18.10 **Upon high-light stress *Selaginella martensii* accumulates thylakoid megacomplexes formed by photosystem I and light-harvesting complex II**
Ferroni L., Suorsa M., Aro E., Baldisserotto C., Pancaldi S.

18.10 - 18.20 **Analysis of leaf metabolic pathways in seagrasses living in high and normal CO_2 environments: a proteomics view**
Piro A, Serra I.A., Bernardo L., Lucini L, Silva J, Samarra I.O., Costa M.M., Santos R., Mazzuca S.

18.20 - 18.40 **Ultrastructural features, chromium content and methylation pattern in two strains of *Scenedesmus acutus* M. (Chlorophyceae) with different chromium sensitivity**
Ferrari M., Torelli A., Cozza D., Veltri A., Marieschi M., Cozza R.

18.40 - 18.50 **Presentation of text book: "Interazioni piante-ambiente"**
Editor L. Sanità di Toppi

18.50 - 19.00 **Commemoration of Prof.ssa Franca Scaramuzzi**

20.00 **Dinner**

JUNE 15th 2016

Invited Lecture

Chair: Lucia Colombo

9.00 - 10.00 **Tête-à-tête between plant cells: Cell-to-cell communication from fertilization to developmental plasticity**
G. Grossman, Ruprecht-Karls-Universität, Heidelberg, Germany

Development and Differentiation

Chair: Flavia Guzzo

10.00 - 10.20 **Ethylene and auxin interaction in the control of adventitious rooting *in planta* in *Arabidopsis thaliana.***
Veloccia A., Fattorini L., Della Rovere F., Sofo A., D'Angeli S., Falasca G., Altamura M.M.

10.20 - 10.40 **A transcriptomic approach to explore fruit formation and maturation in *Arabidopsis thaliana* fruit**
Rotasperti L., Mizzotti C., Masiero S.

10.40 - 11.00 **3-di(benzo[*d*]oxazol-5-yl)urea acts as either adventitious rooting adjuvant or xylogenesis enhancer in carob and pine microcuttings depending on the presence/absence of exogenous indole-3-butyric acid**
Ricci A., Rolli E., Brunoni F., Dramis L., Sacco E., Fattorini L., Ruffoni B., Diaz-Sala C., Altamura M.M.

Ethylene and auxin interaction in the control of adventitious rooting *in planta* in *Arabidopsis thaliana*

Angela Veloccia[1]*, Laura Fattorini[1]*, Federica Della Rovere[1], Adriano Sofo[2], Simone D'Angeli[1], Giuseppina Falasca[1], Maria Maddalena Altamura[1]
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Adventitious roots (ARs) are roots arising from non-pericycle tissues in roots in primary structure, and from tissues of the aerial organs and of the roots in secondary structure. The ARs are necessary for survival in numerous plants, for vegetative propagation *in planta* and *in vitro,* and for breeding programs. In *Arabidopsis thaliana,* ARs originate from the pericycle of the hypocotyl of the seedling, exhibit the same developmental stages of lateral roots (LRs), and their formation is favoured by seedling growth under continuous darkness. Indole-3-acetic acid (IAA) is the natural auxin controlling AR-formation *in planta.* However, recent studies have demonstrated also the importance of the natural auxin-precursor indole-3-butyric acid (IBA), because IBA-derived IAA is a part of the auxin necessary for many processes related to seedling development. Moreover, when applied exogenously, IBA exhibits a greater ability to promote ARs compared with IAA, possibly because its higher stability. Ethylene could be another hormone involved in the AR-process, because it influences many features of auxin-dependent plant growth by altering auxin signaling, synthesis and/or transport. However, there are still many questions concerning its role in AR-formation. Moreover, it is still unknown whether ethylene affects AR-formation and LR-formation in the same way, being both post-embryonic organs. In *A. thaliana*, recent studies show an inhibitory effect of 1-aminocyclopropane-1-carboxylic acid (ACC), i.e., the direct ethylene precursor, on LR-formation, even if low concentrations stimulate the process. Our objective was to investigate the effect of ethylene on AR-formation in the model plant *A. thaliana*, by the use of ACC, and the possible interaction of ethylene with the two main natural auxins, i.e., the active form IAA, and its natural precursor IBA. To the aim, numerous mutants and transgenic lines were exposed to different treatments, and mRNA *in situ* hybridizations, and hormone quantifications, were carried out. The optimal IBA concentration (10μM) for enhancing AR-formation by the seedlings was preliminarily established, and the ACC concentration with a physiological effect on AR-process in the wt detected. It was found that the concentration of ACC (0.1μM) caused an inhibition of AR-formation in the seedlings. Treatments with/without ACC and/or IBA, at the selected concentrations, were carried out to investigate the AR-response, firstly in the wt, and then in ethylene insensitive mutants, mutants of auxin biosynthesis, reception and transport, and mutants blocked at the level of IBA-to-IAA conversion and cellular efflux. It was observed that ethylene acts with an opposite effect on endogenous IAA and exogenous IBA. In fact, the application of ACC alone reduced AR-formation, whereas the combination of ACC and IBA enhanced it. In accordance, ACC alone inhibited IAA biosynthesis and favoured IBA-to-IAA conversion. Moreover, ACC affected ethylene signalling, but did not affect either IAA reception by TIR1 and AFB2, or transport by AUX1, LAX3 and PIN1. The evaluation of hormonal concentrations and the detection of IAA cellular localization by a *DR5::GUS* line sustained these results.
Altogether, the research demonstrates that a crosstalk between ethylene and IAA exists in the control of AR-formation and involves ethylene signalling and IBA-to-IAA conversion.

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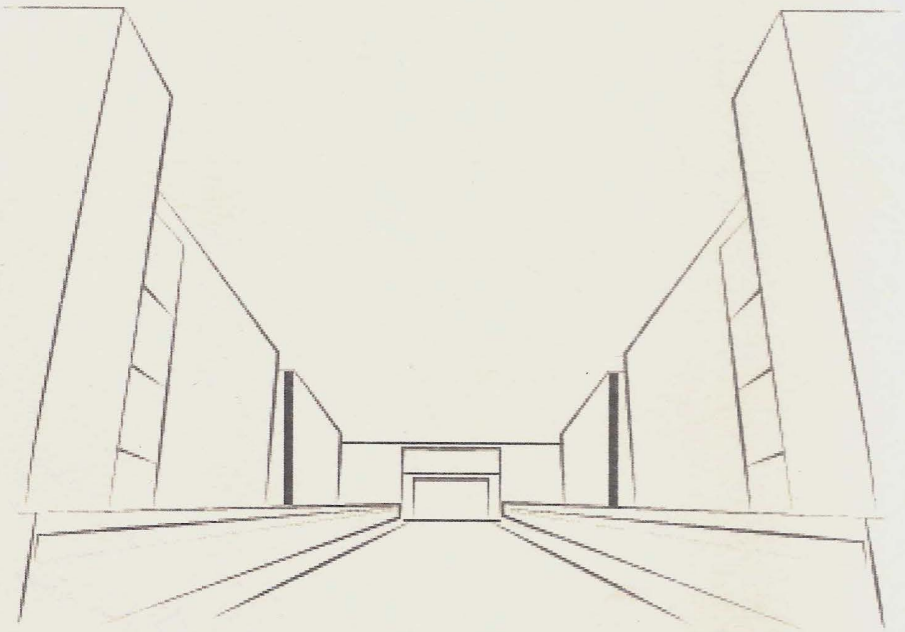

Ponte Pietro Bucci

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