

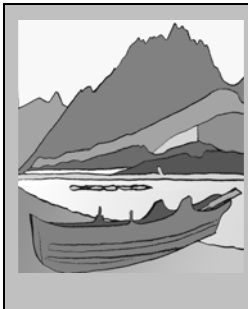


European Plant Science Organisation
3rd EPSO Conference
“Plant Dynamics: from Molecules to Ecosystems”
Thermal Hotel Visegrád, Visegrád, Hungary
28 May – 1 June 2006
<http://www.epsoweb.org/catalog/conf2006.htm>



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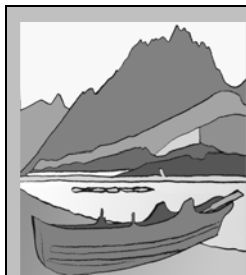
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Final Program

Sunday	28 May 2006	
From 13:00	Registration	
15:00 – 15:30	Opening Chair: Karin Metzloff , Gent, BE & Denes Dudits , Szeged, HU	Speakers: Karin Metzloff and Denes Dudits (10 min) Executive Director of the European Plant Science Organisation Director General of the Biological Research Center, Hungarian Academy of Sciences Welcome from EPSO E. Szilveszter Vizi , HU (10 min) President of the Hungarian Academy of Sciences Miklós Boda , HU (10 min) President of the National Office for Research and Technology
15:30 – 17:00	Plant Science in Europe – Science Policy I Chair: Mike Bevan , Norwich, UK	Speakers: Marc Zabeau , Gent, BE (45 + 10 min) S 003 Plant science in Europe – and the contribution of EPSO Manuel Hallen , European Commission (30 + 5 min) S 002 Head of Unit Strategy and Policy Directorate E: Biotechnology, agriculture and food Plant biotechnology opportunities and perspectives for a European knowledge based bio-economy
17:00 – 17:30	Break	
17:30 – 19:30	Plant Science in Europe – Science Policy II Chair: Mike Bevan , Norwich, UK	Speakers: Pierre de Wit , Wageningen, NL (30 + 5 min) S004 White paper from the EPSO Workshop “Environmental Plant Biology” Rainer Fischer , Aachen, DE (30 + 5 min) S005 White paper from the EPSO Workshop “Molecular Farming” Chris Sommerville , Stanford, USA (45 + 5 min) S006 The future of biofuels
20:00 – 23:00	Welcome Reception	
Monday	29 May 2006	
8:30 – 10:30	The dynamic genome I: Genome evolution/comparative genomics Chair: Dani Zamir , Jerusalem, IL Co-Chair: György Botond Kiss , HU	Speakers: Dani Zamir , Jerusalem, IL (30 + 5 min) S 007 A systems approach to complex phenotypes György Botond Kiss , Gödöllő, HU (25 + 5 min) S 008 Genomics and its use to study plant-pathogen interactions in <i>Medicago</i>

		<p>Michele Morgante, Udine, IT (25 + 5 min) S 009 Genome evolution, junk DNA and functional variation</p> <p>Giovanna Frugis, Rome, IT (15 + 5 min) S 010 Post-genomics of forage legumes: an Italian initiative to set up genetic tools to improve forage quality and eco-compatibility</p>
10:30	Coffee Break	
11:00 – 13:00	<p>The dynamic genome II: Non-coding RNAs Chair: Detlef Weigel, Tübingen, DE Co-Chair: József Burgyán, HU</p>	<p>Speakers:</p> <p>Detlef Weigel, Tübingen, DE (30 + 5 min) S 011 Plant microRNAs: insights from whole-genome analyses</p> <p>Pamela Green, Newark, USA (25 + 5 min) S 012 Elucidating the small RNA component of the transcriptome</p> <p>David Baulcombe, Norwich, UK (25 + 5 min) S 013 RNA silencing in defense and development</p> <p>John Brown, Dundee, UK (15 + 5 min) S 014 Non-coding RNAs from the Arabidopsis nucleolus</p>
13:00	Lunch	
15:00 – 17:00	<p>The dynamic genome III: Chromatin remodelling / epigenetic control Chair: Caroline Dean, Norwich, UK Co-Chair: Gábor Horváth V., HU</p>	<p>Speakers:</p> <p>Caroline Dean, Norwich, UK (30 + 5 min) S 015 Linking RNA processing, RNAi and chromatin in <i>FLC</i> regulation</p> <p>Milos Tanurdzic, Cold Spring Harbor, USA (25 + 5 min) Chromatin remodeling, DNA methylation and RNAi S 016</p> <p>Ueli Grossniklaus, Zürich, CH (25 + 5 min) S 017 Epigenetic control of seed development in <i>Arabidopsis</i></p> <p>Ingo Schubert, Gatersleben, DE (15 + 5 min) S 018 Persistent and dynamic features of chromosome/chromatin arrangement in higher plants</p>
17:00	Coffee Break	
17:30 – 19:30	<p>Science and Society: Industrial applications of plant science Chair: Karin Metzloff, Gent, BE Co-Chair: László Erdei, HU</p>	<p>Speakers:</p> <p>Karin Metzloff, Gent, BE (5 min) Introduction</p> <p>Ralf-Michael Schmidt, BASF, Ludwigshafen, DE (15 min) From plant research to products: a view of the chemical industry S 019</p> <p>Marc Cornelissen, BioScience Research, Bayer CropScience NV, Gent, BE (15 min) S 020 Science for a better life – Plants for the bio-based economy</p> <p>Ove Nilsson, Swe Tree Technologies, Umea, SE (15 min) Forest Biotechnology – from basic research to industrial applications S 021</p> <p>Ying Wang, Novartis Pharma, Basel, CH (15 min) S 022 Opportunities and challenges for plant sciences in modern drug R&D</p> <p>Vincent Pétiard, Nestlé, Tours, FR (15 min) S 023 Potential impacts of Plant Sciences and genomics on Food Industry</p> <p>Discussion (40 min)</p>

19:30 – 20:30	Poster Session I with snacks and drinks Chair: Kirsi-Marja Oksman-Caldentey, Espoo, FI	19:30 – 20:00 Even poster numbers will be attended 20:00 – 20:30 Uneven poster numbers will be attended
21:00 - 22:30	Industry session on Co-existence Chair: Pál Venetianer, HU Co-Chair: Ervin Balázs, HU	Speakers: Pál Venetianer, HU (5 min) Introduction Simon Barber, EuropaBio, BE (25 + 5 min) S 024 Politics and Policies around Plant Biotechnology in the EU Guy Poppy, Southampton, UK (25 + 5 min) S 025 Risk Assessment of GM crops - A scientific and public relations challenge Andrew Cockburn, Newcastle, UK (25 + 5 min) S 026 An overview of the EU safety assessment process of Foods from GM crops
Tuesday 30 May 2006		
8:30 – 10:30	The dynamic plant - growth and development I: Cell division, cell growth and organ development Chair: Phil Benfey, Durham, USA Co-Chair: Attila Fehér, HU	Speakers: Phil Benfey, Durham, USA (30 + 5 min) S 027 A systems biology approach to understanding root development Herman Höfte, Versailles, FR (25 + 5 min) S 028 Coordination between cell wall synthesis and cell elongation during organ formation Christian Hardtke, Lausanne, CH (25 + 5 min) S 029 Isolating unknown modifiers of known pathways in root development by exploiting natural genetic variation Hilde Nelissen, Gent, BE (15 + 5 min) S 030 Elongator in plants: a novel view on organ growth
10:30	Coffee Break	
11:00 – 17:00	Excursion	
17:30 – 19:30	The dynamic plant - growth and development II: Transitions in plant development Chair: Cris Kuhlemeier, Bern, CH Co-Chair: Ferenc Nagy, HU	Speakers: Cris Kuhlemeier, Bern, CH (30 + 5 min) S 031 A plausible model of phyllotaxis Marja Timmermans, New York, USA (25 + 5 min) S 032 <i>Organ polarity is specified through the opposing activity of two small regulatory RNAs</i> Jan Traas, Versailles, FR (25 + 5 min) S 033 Modelling cell growth and differentiation at the shoot apical meristem Friedrich Kragler, Vienna, AT (15 + 5 min) S 034 Identification of a Transport Regulator of the Stem Cell Identity Homoeodomain Protein KNOTTED1/STM
19:30	Supper	
20:30 – 22:30	Responding to the dynamic environment I: Light and abiotic stresses Chair: Peter Quail, Albany, USA Co-Chair: Imre Vass, HU	Speakers: Peter Quail, Albany, USA (30 + 5 min) S 035 Phytochrome Photosensory Signaling and Transcriptional Networks Xing-Wang Deng, New Haven, USA (25 + 5 min) S 036 The COP protein complexes define a regulatory switch for control of development in <i>Arabidopsis</i>

Christian Fankhauser, Lausanne, CH (25 + 5 min) **S 037**
Early nuclear and cytoplasmic events in phytochrome signaling

Roman Ulm, Freiburg, DE (15 + 5 min) **S 038**
Regulation of UVB-induced photomorphogenesis in
Arabidopsis

Wednesday 31 May 2006	
8:30 – 10:00	Dynamic populations I: Ecophysiology: natural habitats / crops Chair: Stefan Jansson, Umea, SE Co-Chair: Zoltán Tuba, HU
	Speakers: Stefan Jansson , Umea, SE (25 + 5 min) S 039 Real world genomics Bruce Osborne , Dublin, IE (25 + 5 min) S 040 Looking at acclimation in a new light Marcel Dicke , Wageningen, NL (25 + 5 min) S 041 Ecogenomics of plant-attacker interactions: from gene to ecology
10:00	Coffee Break
10:30 – 12:00	Responding to the dynamic environment III: Protein Dynamics Chair: Richard Vierstra, Madison, USA Co-Chair: Csaba Koncz, HU
	Speakers: Richard Vierstra , Madison, USA (25 + 5 min) S 042 Diverse roles of ubiquitin and ubiquitin-like proteins in plant biology Hanjo Hellmann , Berlin, DE (25 + 5 min) S 043 Description of complex assembly and impact on plant development of the <i>Arabidopsis</i> E3 subunit CUL4 Rudy Maor , Norwich, UK (25 + 5 min) S 044 Proteomic analysis of protein ubiquitination in <i>Arabidopsis thaliana</i>
12:00 – 13:00	Poster Session II Chair: Wilhelm Gruissem, Zürich, CH
	12:00 – 12:30 Even poster numbers will be attended 12:30 – 13:00 Uneven poster numbers will be attended
13:00	Lunch
15:00 – 17:00	Responding to the dynamic environment IV: Plant-microbe interactions Chair: Paul Schulze-Lefert, Cologne, DE Co-Chair: Ádám Kondorosi, HU
	Speakers: Paul Schulze-Lefert , Cologne, DE (30 + 5 min) S 045 The molecular basis of non-host resistance to invasive fungi Olivier Voinnet , Strasbourg, FR (25 + 5 min) S 046 RNA silencing in plant-pathogen interactions Xinnian Dong , Durham, USA (25 + 5 min) S 047 Induction of disease resistance in plants Satoko Yoshida , Munich, DE (15 + 5 min) S 048 Seven In Absentia Homologues of <i>Lotus japonicus</i> Interact with Symbiosis-Receptor Kinase (SYMRK)
17:00	Coffee Break
17:30 – 19:30	Responding to the dynamic environment II: Hormones Chair: Salomé Prat, Madrid, ES Co-Chair: Zsófia Bánfalvi, HU
	Speakers: Salomé Prat , Madrid, ES (30 + 5 min) S 049 DELLA repressor inhibition of plant cell growth Stefan Kepinski , Umea/York, SE/UK (25 + 5 min) S 050 Auxin perception and response mediated by the ubiquitin-ligase SCF ^{TIR1} Tatsuo Kakimoto , Osaka, JP (25 + 5 min) S 051 Biosynthesis and signal transduction of cytokinins

		Sabrina Sabatini , Rome, IT (15 + 5 min) S 052 Growth control of the <i>Arabidopsis</i> root meristem by Cytokinin
20:00	Conference Dinner	Prices for the three best posters will be awarded
Thursday 01 June 2006		
8:30 – 10:00	Dynamic populations II: Biodiversity Chair: Sandy Knapp , London, UK Co-Chair: Ilona Peszlen , HU/USA	Speakers: Sandy Knapp , London, UK (25 + 5 min) S 053 Biodiversity conservation – whose job is it, how can we do it and is it even possible? Rob DeSalle , New York, USA (25 + 5 min) S 054 High throughput analytical tools for CboL and AToL Hanna Tuomisto , Turku, FI (25 + 5 min) S 055 Biodiversity at different scales: what do we really know about the diversity of tropical rain forests?
10:00	Coffee Break	
10:30 – 12:00	Dynamic populations III: Population dynamics, ecology Chair: Magnus Nordborg , Los Angeles, USA Co-Chair: Ilona Meszaros , HU	Speakers: Magnus Nordborg , Los Angeles, USA (25 + 5 min) S 056 Genome-wide scans for adaptively important polymorphisms in <i>Arabidopsis thaliana</i> Joy Bergelson , Chicago, USA (25 + 5 min) S 057 Interactions between <i>A. thaliana</i> and its bacterial pathogens Christian Lexer , Kew, AT/UK (25 + 5 min) S 058 (Post-) genomic studies of species barriers: a plant perspective
12:00 – 12:30	Closing	Karin Metzloff and Denes Dudits Executive Director of the European Plant Science Organisation Director General of the Biological Research Center, Hungarian Academy of Sciences
12:30	Departure	

We would like to thank our committee and secretariat members for organizing this conference:

Members of the organising committee: **Michael Bevan, Paolo Costantino, Denes Dudits (coordinator), Wilhelm Grissem, Hélène Lucas, Karin Metzloff, Kirsi-Marja Oksman-Caldentey, Mark Stitt, Erkki Truve, Pierre de Wit, Marc Zabeau.**

Conference secretariat: Katrien Molders and Judit Szabad



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Speakers Abstracts

Session: Plant Science in Europe – Science Policy

When EPSO was created in 2000 public perception of plant science and agriculture in general was at an all time low, and political support for plant and agricultural research was dwindling rapidly. This resulted in severe cuts in research funding in particular at the European level. Consequently, EPSO's first priority in these troubled times was to reverse the tide by convincing policy makers of the broad socio-economic impact of plant science. Although we still face strong opposition, in particular from "dogmatic" NGO's, the concerted efforts of EPSO have born fruit.

Our first success was the "reintroduction" of plant research in FP6 through an amendment of the European Parliament. Although the funding of plant research projects was substantially lower than in the preceding Framework Programmes, over 35 plant science projects received a total of 175 Mi € in FP6.

A second major achievement was the creation of the ERA-NET for plant genomics -ERA-PG, which is the first ERA-NET to organize the funding transnational collaborative research with an initial budget of 31 Mi €. ERA-PG represents a cornerstone for funding plant science in Europe complementary to the Framework Programmes, and for coordinating plant science policy making between the national funding agencies.

Our third achievement was the Technology Platform "Plants for the Future" created jointly by EPSO and EuropaBio. The European Technology Platforms are intended to advise European and national research policy makers on short and long term research strategies in relevant technology areas. The Vision Paper "Plants for the Future" published in 2004, describes the long term contributions of plant genomics and biotechnology to Europe's Knowledge-based Bioeconomy. This vision was subsequently translated into a draft "Strategic Research Agenda" outlining the short and long term plant research objectives required to meet the socio-economic challenges outlined in the Vision Paper. Broad stakeholder consultations were organized in the different European member states to broadly disseminate and communicate the research agenda. The critical comments received from these member state consultations are now being incorporated into the final Strategic Research Agenda that will be published in early 2007. An important step in the implementation of the Strategic Research Agenda is the recently launched a survey of "future plant research activities in Europe". Based on this survey, the Technology Platform will formulate its recommendations for future research priorities for the first calls of FP7 and for ERA-PG. This survey constitutes a bottom-up input of plant scientists in European research policy making.

Although the outlook for plant science in Europe has improved considerably, EPSO faces the enormous future challenge of convincing policy makers, and society at large, that plant science is nothing less than a top priority in developing a sustainable world economy, impacting the current global challenges of rising CO₂ levels, climate change, depletion of fossil reserves, rapidly falling water tables and human wellness and health.

Time is running out rapidly, and hence even more concerted action will be necessary!

Marc Zabeau

Chairman European Plant Science

Organisation

Technologiepark 927

B-9052 Gent

marc.zabeau@skynet.be

Plant science in the EU – developing and implementing science and regulatory policy.

OR “Does your mother know what you are doing?”

Session: Science and Society: Industrial applications of plant science

Simon Barber
 EuropaBio
 6 Avenue de l'Armée
 1040 Brussels
 Belgium
s.barber@europabio.org

As a “lapsed” plant scientist working for the European Biotechnology Industry Association, EuropaBio, and specifically for those companies that are plant breeding “innovators and integrators”, my job is to communicate to EU policy makers the industry’s views on a number plant science research and development issues. Firstly, it is important to understand the rather complex structure within Europe that determines what plant science is funded and by whom, and what plant products may be marketed to farmers – after all, one major objective as plant scientists is, I believe, to develop plant varieties that provide desirable harvested end product, but that can be grown with some confidence by our farmers.

It is also important to know who the players are in these policy decisions – and there are many. There is a triumvirate of policy makers that develop and implement law in the EU. We have the Commission (politically appointed) made up of various Directorates that draws up EU law and that is responsible for seeing that it is properly implemented by the Member States. We have the European Parliament made up of 732 MEPs from across the EU that is a key player in the “co-decision” process of law making. And, we have the Council made up of the 25 member States – usually represented by relevant ministers on Committees (e.g., Agriculture, Environment, etc) that is responsible for developing law, and also for implementing it.

You, the plant scientific community, play key roles in all of this. Firstly in moving plant science forward – the innovation activity of basic research that through further research and development results in end product offered to the marketplace, but also in safety considerations, especially in the case of highly regulated recombinant DNA technologies, and with respect to varietal development, taxonomy, ecology, toxicity, nutrition, allergenicity, etc. The European Food Safety Authority made up of independent European scientists is a key EU institution with the responsibility of providing EU decision makers with the best advice around safety issues.

In seven years working with policy makers in Brussels I have learnt much. I would hesitantly say that the “80/20” rule generally applies to much of what goes on – 20% science and 80% politics is, I perceive, often the recipe for making decisions. I have also learnt that many involved in making decisions have never had the opportunity to find out about the history of agriculture, the origin of our crop plants, the sexual habits of our crop plants, the effect of our choice of crops and cropping practices on the evolution and changes in our agro-environments – all of which means that it is difficult for them to easily make “reasoned” science based decisions around agriculture and around change (that is of course the norm). This is especially true when our citizens at large, themselves with the same limited information, are justifiably worried about food and environmental safety. Where there is an information vacuum, those with specific agendas will step in, as has been the case with the use of rDNA technologies.

So my question “Does your mother know what you are doing?” is a serious one. I urge you collectively to be ambassadors for plant science, and to do this we must learn to be communicators and to take time to communicate to our mothers, our families, friends, the community at large and to our policy makers.



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Poster Abstracts

Session: Science and Society: Industrial applications of plant science.

Plant cell cultures constitute a promise for the production of a high number of phytochemicals, although the majority of bioprocesses that have been developed so far have not proved sufficiently competitive for their commercial development. An overview indicates that most of the research carried out during the last 10 years is of the empirical type. For this reason, although suitable strategies and technology are still being developed, there is a need for a rational approach to the molecular and cellular basis of metabolic pathways and their regulation in order to stimulate future advances.

The empirical investigations are based on the optimization of the culture system, exclusively considering input factors such as the selection of cellular lines, type and parameters of culture, bioreactor design and elicitor addition, and output factors such as cellular growth, the uptake system of nutrients, production and yield.

Our research group of Plant Biotechnology and Phytochemical Production has a long tradition in the production of plant bioactive compounds by means of plant cell cultures. We have developed cell and hairy root cultures with an increased capacity to biosynthesize several secondary metabolites such as taxol, ginsenosides, and tropane alkaloids both in shake flasks and scaled up to bioreactors. In this context, we have worked with plant cell cultures of *Taxus* spp, *Ruscus aculeatus* and *Centella asiatica*, in some cases obtaining high yields of secondary compounds, mainly at bioreactor level. The main problems that these kind of cultures present are the sometimes low product yield and the instability of cell lines. It is well known that undifferentiated cell cultures contain the appropriate genes for the biosynthesis of secondary compounds, but sometimes these genes are not expressed. In these cases the need for biochemical and, consequently, morphological differentiation has been recognized as fundamental for the biosynthesis of secondary metabolites. Many recent studies have shown that transformed root cultures, known as hairy roots, offer better possibilities for producing secondary metabolites synthesised in the plant roots than any other plant organ culture. Our research has allowed us to establish hairy root cultures of *Duboisia*, *Datura metel*, and *Scopolia japonica*, which produce tropane alkaloids (hyoscyamine and scopolamine) and *Panax ginseng*, which is able to produce high levels of ginsenosides. Using metabolic engineering techniques, we have recently over-expressed some genes involved in the tropane alkaloid biosynthesis. In the hairy root cultures established, the yield of these compounds was dramatically increased.

With the ultimate purpose of transforming the potential production of plant cell cultures into a commercial reality, the research of our group is currently focused on the study of the metabolic route leading to the biosynthesis of taxol, considering that different factors controlling or activating the production of this compound affect the metabolic profiles and genetic expression in *Taxus baccata* cellular cultures.

Rosa M. Cusidó*
Mercè Bonfill*
Elisabeth Moyano**
Miriam Onrrubia***
Oscar Expósito*
Susana Mangas*
Javier Palazón*
M. Teresa Piñol*

*Laboratori de Fisiologia Vegetal.
Facultat de Farmacia. Universitat de Barcelona.

** Departament de Ciències Experimentals i de Salut, Universitat Pompeu Fabra. Avd. Dr. Aiguader 80, 08003 Barcelona, Spain

***Plant Systems Biology, Vlaams Instituut voor Biotechnologie. Technologiepark 927, B-9052 Gent, Belgium

Rosa M. Cusidó
Departament de Fisiologia Vegetal
Facultat de Farmacia, Universitat de Barcelona, AVD/ Diagonal 643
E-08028 Barcelona, Spain
rcusido@ub.edu

Physiological responses of sessile oak and peduncular oak to supplemental UV-B radiation

Session: Responding to the dynamic environment I: Light and other abiotic stresses

Ilona Mészáros¹

Réka Láposi¹

Szilvia Veres¹

Éva Sárvári²

Viktor Oláh¹

Gyula Lakatos³

¹Department of Botany,
Debrecen University,
Debrecen, Hungary

²Department Plant Physiology,
Eötvös L. University, Budapest,
Hungary

³Department of Applied Ecology,
Debrecen University,
Debrecen Hungary

Ilona Mészáros

Department of Botany,
Debrecen University,
Debrecen, Hungary

immeszaros@tigris.unideb.hu

Decrease in stratospheric ozone level are predicted to result in an increase of UV-B radiation reaching the Earth surface within the next few decades. Although the effects might be the most dramatic in the Antarctic, there are also significant signs of increasing UVB radiation level in the temperate regions too which may have effects on the natural vegetation.

The aim of this work was to compare the physiological responses of seedlings of two native forest tree species (*Quercus petraea*, *Quercus robur*) in Hungary. Special focus was on the alteration of leaf photosynthetic pigment composition, photochemical activity and UV-B absorbing compounds. Three year seedlings of both species were exposed to enhanced UV-B radiation (40 % of the ambient level) supplied by UVB 313 tubes from bud-break until leaf senescence.

Under enhanced UV-B, increases of specific leaf mass (SLM) and reduction of leaf chlorophyll content were observed but the total carotenoid content remained high. Both oak species responded with an increase of VAZ pool to enhanced UVB. From morning till midday the accumulation of de-epoxi compounds of VAZ cycle became significant. However, the degree of deepoxidation as shown in form of DEEP index was smaller for *Quercus robur* than for *Quercus petraea*. UV-B supplementation decreased the conversion of violaxanthin into zeaxanthin and antheraxanthin. Beside the VAZ pool in leaves of both oak species a small portion of lutein took place in the light-induced lutein-epoxide cycle pool and contributed to the heat dissipation of excitation energy. Approximately 10 % of lutein pool appeared in form of lutein-5,6- di-epoxide in early morning which decreased by midday. Leaves of UV-B exposed seedlings showed larger sensitivity to the photoinhibition induced by high light than control seedlings. High values of potential photochemical efficiency (Fv/Fm) were maintained in both species during the vegetation season. On clear days loss of Fv/Fm from morning till midday which was larger under enhanced UV-B for both species suggesting that UV-B exposure enhanced the sensitivity of seedlings to photoinhibition. The lowering of Fv/Fm took place in good correlation with the decrease in concentration of violaxanthin and lutein-5,6- di-epoxide.

As a constitutive character of leaf chemistry and physiology both species accumulate UV-B absorbing compounds in relatively high concentration not only at sun light but at low light conditions too. The UV-B supplementation caused increases in the concentration of UV-B absorbing compounds (flavonoids) in leaves of *Quercus robur*, but it slightly affected these traits of leaves of *Q. petraea*.

The results of outdoor UV-B supplementation experiments suggest that acclimation of tree species to high intensity and daily fluctuations of visible light can serve the acclimation to the UV-B radiation. The oak species evolutionary developed effective protecting mechanisms and are able to defend their important tissues by accumulating UV-B absorbing compounds and to preserve the efficiency of photosynthetic apparatus through thermal dissipating processes and possibly by antioxidant compounds.

The effect of viral silencing suppressor proteins on siRNA and miRNA methylation

P 117

Session: The dynamic genome II: Non-coding RNAs

Small interfering RNAs (siRNAs) and microRNAs (miRNAs), act as guide RNAs to silence target gene expression in a sequence-specific manner. Small RNAs are processed from long double-stranded or foldback structured RNA molecules by Dicer-like proteins. In plants the biogenesis of small RNAs consist an additional step, they are methylated on the ribose of the 3' most nucleotide. The methylation may protect these RNA species from degradation.

We analysed the effect of two viral silencing suppressor proteins, p19 protein of *Carnation italian ringspot virus* and HC-Pro protein of *Tobacco etch virus* on methylation. Our results showed that this suppressors act differently on miRNA and siRNA pathways, interfering at different level. We observed that p19 protein binds methylated double stranded form of miRNAs and siRNAs, suggesting the p19 does not interfere with methylation. In contrast HC-Pro inhibits partially miRNA methylation and fully inhibits siRNA methylation. In immunoprecipitation experiments we observed that HcPro binds both methylated and non methylated forms of miRNAs, but all siRNA in HcPro complex are nonmethylated. Our results suggest that p19 act downstream to HEN1 but HcPro probably compete with the methylation or act upstream of that. This observations rise further questions. Where does the methylation take place? Are there two methyltransferases, one nuclear and one cytosolic acting independently?

Csorba Tibor
Lóza Rita
Lakatos Lóránt
Burgyán József

Csorba Tibor
Agricultural Biotechnology
Center, Institute of Plant Biology,
Gödöllő, Hungary
csorba@abc.hu



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Participants List

Atanas Atanassov
AgroBioInstitute
bul. Dragan Tsankov 8
1164 Sofia
Bulgaria
atanas_atanassov@abi.bg
Abstract: -

Tibor Csorba
Agricultural Biotechnology Center
Institute of Plant Biology
Gödöllő
Hungary
csorba@abc.hu
Abstract: P 117

Sigal Aviel
Protalix Biotherapeutics Ltd.
2 Snunit St.
20100 Carmiel
Israel
sigala@protalix.com
Abstract: -

Rainer Fischer
Fraunhofer IME
Forckenbeckstrasse 6
52074 Aachen
Germany
fischer@Ime.fraunhofer.de
Abstract: S 005

Bretislav Brzobohaty
Institute of Biophysics AS CR
Kralovopolska 135
CZ-61265 Brno
Czech Republic
brzoboha@ibp.cz
Abstract: -

Maria Greco
University of Calabria
Ponte Pietro Bucci
87036 Arcavacata di Rende
Italy
maryahdetroit@yahoo.it
Abstract: P 011

Marc Cornelissen
Bayer BioScience NV
Technologiepark 38
B-9052 Gent
Belgium
marc.cornelissen@bayercropscience.com
Abstract: S 020

Yves Hatzfeld
Cropdesign
Technologiepark 3
B-9052 Gent
Belgium
yves.hatzfeld@cropdesign.com
Abstract: -

Paolo Costantino
Università La Sapienza
Piazzale Aldo Moro 5
00185 Rome
Italy
paolo.costantino@uniroma1.it
Abstract: -

Iain Searle
The Sainsbury Laboratory
Norwich Research Park
Colney Lane
NR4 7UH Norwich, UK
iain.searle@mpiz-koeln.mpg.de
Abstract: -

Rosa Maria Cusido
University of Barcelona
Avda Diagonal 643
8028 Barcelona
Spain
rcusido@ub.edu
Abstract: P 115

Charles Spillane
University College Cork
LM2.10
Cork
Ireland
c.spillane@ucc.ie
Abstract: -

