



European Plant Science Organisation

4<sup>th</sup> EPSO Conference

“Plants for Life”

Toulon (Côte d’Azur), France

22 – 26 June 2008

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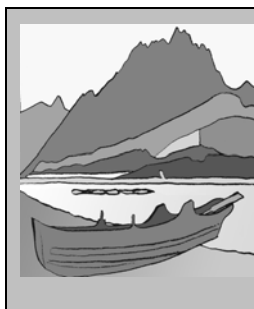


## Appendix to the conference abstract book

The appendix includes only the final conference programme and information for the conference abstract book received after 28 May 2008.

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## Final conference programme

Sunday		22 June 2008	
From 13:00	Registration		
15:00 – 16:30	<b>Opening and Keynote</b> <b>Chair: Karin Metzloff</b> , Brussels, BE <b>&amp; H�el�ene Lucas</b> , Versailles, FR	<b>Speakers:</b>  <b>Karin Metzloff and H�el�ene Lucas</b> (10 min) Executive Director of European Plant Science Organisation Head of Genetics and Plant Breeding Division, INRA and Local Conference Organiser Welcome from EPSO  <b>Fran�ois Houllier</b> , FR (10 min) Scientific Director for Plant and Plant Products, INRA  <b>Andr� Le Bivic</b> , FR (10 min) Deputy Scientific Director, Department of Life Sciences, CNRS  <b>Richard B. Flavell</b> , USA (60 min) <b>S 001</b> Chief Scientific Officer of Ceres, Inc. - The Energy Crop Company What do we need to improve crops faster and cheaper?	
16:30 – 17:00	Break		
17:00 – 19:00	<b>Plant Science in Europe –            Science Policy</b> <b>Chair: Wilhelm Gruissem</b> , Z�urich, CH <b>&amp; Karin Metzloff</b> , Brussels, BE	<b>Speakers:</b>  <b>Timothy Hall</b> , EU (25 + 5 min) <b>S 002</b> Acting Director of Directorate Food, Agriculture, Fisheries and Biotechnology, DG Research The knowledge-based bio-economy from a “plant” perspective  <b>Babis Savakis</b> , GR (25 + 5 min) <b>S 003</b> Senior Advisor to the President of the ERC The European Research Council: A benchmark for frontier research funding in Europe  <b>Wilhelm Gruissem</b> , CH (25 + 5 min) <b>S 004</b> President of European Plant Science Organisation (EPSO) Plant science in Europe – Breaking new ground  <b>Mike Gale</b> , UK (25 + 5 min) <b>S 005</b> Member of the CGIAR Science Council Grain for food – the plant breeding challenge	
19:30 – 22:30	Welcome Reception		
Monday		23 June 2008	
8:30 – 10:30	<b>Understanding, preserving and using            plant diversity I: Genome structure and            evolution</b> <b>Chair: Catherine Feuillet</b> , Clermont- Ferrand , FR	<b>Speakers:</b>  <b>Catherine Feuillet</b> , Clermont-Ferrand , FR (30 + 5 min) A glimpse into the impossible: physical mapping of the giant hexaploid wheat genome using a chromosome based approach <b>S 006</b>  <b>Graham Moore</b> , Norwich, UK (25 + 5 min) It's not size but coordination that matters <b>S 007</b>	

		<p><b>Joachim Messing</b>, Piscataway, USA (25 + 5 min) Evolution of grasses by comparative genomics <b>S 008</b></p> <p><b>Anne-Françoise Adam-Blondon</b>, Evry, FR (15 + 5 min) The grapevine genome sequence suggest hexaploidization in major angiosperm phyla <b>S 009</b></p>
10:30	Coffee Break	
11:00 – 13:00	<p><b>Understanding, preserving and using plant diversity II: Plant adaptation, domestication and conservation</b> Chair: Stephen Hopper, Kew, UK</p>	<p><b>Speakers:</b></p> <p><b>Stephen Hopper</b>, Kew, UK (30 + 5 min) <b>S 010</b> Rethinking agriculture and urban green space management: plant adaptation, domestication and conservation</p> <p><b>Simon Hiscock</b>, Bristol, UK (25 + 5min) <b>S 011</b> Hybrid speciation in flowering plants</p> <p><b>Thomas Städler</b>, Zürich, CH (25 + 5min) <b>S 012</b> Assessing demographic history in a population-genetic framework: A multilocus case study in wild tomatoes</p> <p><b>Benjamin Kilian</b>, Gatersleben, DE (15 + 5 min) <b>S 013</b> A dispersed-specific model of plant domestication</p>
13:00 – 15:00	Lunch	
13:45 – 14.45	<b>SEB Careers Workshop</b>	
15:00 – 17:00	<p><b>Understanding, preserving and using plant diversity III: Climate change and challenges for the next decades</b> Chair: Ulrich Schurr, Jülich, DE</p>	<p><b>Making the most of your research position</b></p> <p><b>Speakers:</b></p> <p><b>Ulrich Schurr</b>, Jülich, DE (30+5 min) <b>S 014</b> Dynamics of plants in a changing environment – novel insights into growth, transport and exchange processes through non-invasive phenotyping</p> <p><b>Andrew D. Friend</b>, Cambridge, UK (25 + 5 min) <b>S 015</b> Impacts of global environmental changes on the distribution of plant production to 2100</p> <p><b>Bruce Osborne</b>, Dublin, IE (25 + 5 min) <b>S 016</b> Using comparative assessments of net ecosystem exchange and carbon sequestration to identify mitigation options for managed ecosystems</p> <p><b>Shravani Basu</b>, Nottingham, UK (15 + 5 min) <b>S 017</b> Promoting indigenous crops as a tool for tackling climate change and food insecurity in semi-arid Africa</p>
17:00	Coffee Break	
17:30 – 19:30	<p><b>Science and Society: The challenges for tomorrow's agriculture</b> Chair: Robert Watson, London, UK</p>	<p><b>Speakers:</b></p> <p><b>Robert Watson</b>, London, UK (20 min) <b>S 018</b> Is multifunctionality the future of agriculture or simply a trade issue?</p> <p><b>Tim Lang</b>, London, UK (15 min) <b>S 019</b> A food system which ticks all the policy boxes: Can it be done? What would it look like? Is anyone pushing for it?</p> <p><b>Matin Qaim</b>, Göttingen, DE (15 min) <b>S 020</b> Economic consequences of Golden Rice</p> <p><b>Joachim Schiemann</b>, Braunschweig, DE (10 min) <b>S 021</b> Regulation and risk assessment of transgenic plants at European level</p> <p><b>Discussion</b> (60 min)</p>
19:30 – 20:30	Dinner	

20:30 – 22:30	<b>Poster Session I</b> with drinks Chair: Dénes Dudits, Szeged, HU	20:30 – 20:50 Opening and short presentations of <b>P 032</b> , <b>P 042</b> and <b>P 057</b> 20:50 – 21:40 Even poster numbers will be attended 21:40 – 22:30 Uneven poster numbers will be attended
<b>Tuesday 24 June 2008</b>		
8:30 – 10:30	<b>Improving plant product quantity and quality I: Developmental biology</b> Chair: <b>Ottoline Leyser</b> , York, UK	<b>Speakers:</b>  <b>Ottoline Leyser</b> , York, UK (30 + 5 min) <b>S 022</b> Regulation of shoot branching  <b>Enrico Coen</b> , Norwich, UK (25 + 5 min) <b>S 023</b> Modelling genes, growth and form in plants  <b>Björn Sundberg</b> , Umeå, SE (25 + 5 min) <b>S 024</b> Wood development – what do plant hormones do?  <b>Raffaele Dello Iorio</b> , Rome, IT (15 + 5 min) <b>S 025</b> Cytokinins control root meristem activities and root growth by antagonizing auxin action
10:30	Coffee Break	
11:00 – 17:00	Excursion	
17:30 – 19:30	<b>Preserving our future by reducing the inputs in agriculture I: Reducing fertilisers</b> Chair: <b>Mark Stitt</b> , Golm, DE	<b>Speakers:</b>  <b>Mark Stitt</b> , Golm, DE (30 + 5 min) <b>S 026</b> Genomics analysis of responses to nutrients  <b>Javier Paz-Ares</b> , Madrid, ES (25 + 5 min) <b>S 027</b> Phosphate starvation signalling in plants  <b>Nicolaus von Wirén</b> , Hohenheim, DE (25 + 5 min) <b>S 028</b> Nitrogen uptake and signaling networks  <b>Heike Schneider, Jülich, DE</b> (15 + 5 min) <b>S 029</b> A new approach for imaging nutrient distributions in plant tissue using time of flight secondary ion mass spectrometry and scanning electron microscopy
19:30 – 20:30	Dinner	
20:30 – 22:30	<b>Poster Session II</b> with drinks Chair: <b>Kirsi-Marja Oksman-Caldentey</b> , Espoo, FI	20:30 – 20:50 Opening and short presentations of <b>P 064</b> , <b>P 095</b> and <b>P 121</b> 20:50 – 21:40 Even poster numbers will be attended 21:40 – 22:30 Uneven poster numbers will be attended
<b>Wednesday 25 June 2008</b>		
8:30 – 10:30	<b>Preserving our future by reducing the inputs in agriculture II: Reducing pesticides</b> Chair: <b>Jonathan Jones</b> , Norwich, UK	<b>Speakers:</b>  <b>Jonathan Jones</b> , Norwich, UK (30 + 5 min) <b>S 030</b> Monitoring and manipulating information flow at the host/pathogen interface  <b>Sophien Kamoun</b> , Norwich, UK (25 + 5 min) <b>S 031</b> Filamentous pathogen effectors  <b>Frank Takken</b> , Amsterdam, NL (25 + 5 min) <b>S 032</b> Resistance proteins: scouts of the plant innate immune system  <b>Montserrat Solé</b> , Barcelona, ES (15 + 5 min) <b>S 033</b> A family of bacterial effectors promote disease by interfering with plant MAP-kinases
10:30	Coffee Break	
11:00 – 13:00	<b>Preserving our future by reducing the inputs in agriculture III: Reducing water input</b> Chair: <b>Peter Langridge</b> , Glen Osmond, AUS	<b>Speakers:</b>  <b>Peter Langridge</b> , Glen Osmond, AUS (30 + 5 min) <b>S 034</b> Genetic and genomic approaches to deal with subsoil constraints to yield

		<b>Jian-Kang Zhu</b> , Riverside, USA (25 + 5 min) <b>S 035</b> Small RNAs and epigenetic regulation in abiotic stress resistance
		<b>François Tardieu</b> , Montpellier, FR (25 + 5 min) <b>S 036</b> An integrated approach of tolerance to water deficit involving precise phenotyping and modelling
		<b>Laszlo Szabados</b> , Szeged, HU (15 + 5 min) <b>S 037</b> Controlled cDNA overexpression system to isolate novel stress genes in <i>Arabidopsis</i> .
13:00 – 15:00	Lunch	
13:45 – 14:45	<b>SEB Careers Workshop</b>	<b>Identifying and selling your skills</b>
15:00 – 17:00	<b>Improving plant product quantity and quality II: Improving yield</b> Chair: <b>Lothar Willmitzer</b> , Golm, DE	<b>Speakers:</b>  <b>Lothar Willmitzer</b> , Golm, DE (30 + 5 min) <b>S 038</b> Metabolic composition and biomass <b>Ian Bancroft</b> , Norwich, UK (25 + 5 min) <b>S 039</b> The identification of molecular markers for yield components <b>Wim Van Camp</b> , Gent, BE (25 + 5 min) <b>S 040</b> Yield increase by transgenic approaches <b>Teresa Penfield</b> , York, UK (15 + 5 min) <b>S 041</b> Increasing Artemisinin Yield in <i>Artemisia annua L.</i>
17:00	Coffee Break	
17:30 – 19:30	<b>Improving plant product quantity and quality III: Food and feed</b> Chair: <b>Kaisa Poutanen</b> , Espoo, FI	<b>Speakers:</b> <b>Kaisa Poutanen</b> , Espoo, FI (30 + 5 min) <b>S 042</b> How to optimally exploit grains for food? <b>Roberto Ranieri</b> , Parma, IT (25 + 5 min) <b>S 043</b> Food product innovation taking advantage of plant selection <b>Søren K. Rasmussen</b> , Frederiksberg, DK (25 + 5 min) Presentation of the white paper of the EPSO workshop on “The European Feed Value Chain” held in Copenhagen from 26 to 27 June 2007. <b>S 044</b> <b>Wessel van Leeuwen</b> , Wageningen, NL (15 + 5 min) An <i>Arabidopsis</i> genetical genomics approach to improve phytonutrient quality in <i>Brassica</i> vegetable crops <b>S 045</b>
20:00	Conference Dinner	Prices for the three best posters will be awarded
<b>Thursday</b>	<b>26 June 2008</b>	
8:30 – 10:00	<b>New Products I: Plant based biofuels: how to improve them?</b> Chair: <b>Birgitte K. Ahring</b> , Lyngby, DK	<b>Speakers:</b> <b>Birgitte K. Ahring</b> , Lyngby, DK (30 + 5 min) <b>S 048</b> Second generation bioethanol production from lignocellulosic material <b>Jay D. Keasling</b> , Berkeley, USA (25 + 5 min) <b>S 047</b> Engineering microbial metabolism for production of advanced biofuels <b>Hélène Zub</b> , Peronne, FR (15 + 5 min) <b>S 049</b> Effect of early plant development and genotypic variation in frost tolerance for 3 species of <i>Miscanthus</i>
10:00	Coffee Break	
10:30 – 12:30	<b>New Products II: Biomaterials, biopharmaceuticals and other new products</b> Chair: <b>Yuri Gleba</b> , Halle, DE	<b>Speakers:</b> <b>Yuri Gleba</b> , Halle, DE (30 + 5 min) <b>S 050</b> New materials from new plants

		<p><b>Inge Broer</b>, Rostock, DE (25 + 5 min) <b>S 051</b> Biomaterials, synthesis of the biopolymer cyanophycin in tobacco and potato</p> <p><b>Dirk Bosch</b>, Wageningen, NL (25 + 5 min) <b>S 052</b> Controlling of quality of biopharmaceuticals in plants</p> <p><b>Melanie Oey</b>, Potsdam, DE (15 + 5 min) <b>S 053</b> High efficient synthesis in chloroplasts of a protein antibiotic active against human pathogenic bacteria</p> <p><b>Karin Metzloff and H�el�ene Lucas</b> <i>Executive Director of European Plant Science Organisation Head of Genetics and Plant Breeding Division, INRA and Local Conference Organiser</i></p>
12:30 – 13:00	Closing	
13:00	Departure	

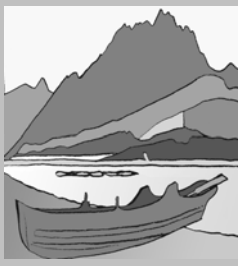
**We would like to thank our committees and secretariat members for organising this conference:**

**Members of the organising committee:** Wilhelm Gruissem, Jacek Hennig, Dirk Inz e, Jonathan Jones, H el ene Lucas (local coordinator), Karin Metzloff (EPSO coordinator), Kirsi-Marja Oksman-Caldentey, Pere Puigdomenech, Ulrich Schurr, Chiara Tonelli, Erkki Truve.

**Members of the local committee:** H el ene Barbier-Brygoo (CNRS), H el ene Lucas (INRA), Jean-Christophe Glaszmann (CIRAD).

**Conference secretariat:** Katrien Molders, AnnaKarin Hedin and Agnes Hubert





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## **Speakers abstracts**



### Session: Plant Science in Europe - Science Policy

Cereal production worldwide has almost trebled since the early 1960s when Borlaug and Beachell began the wheat and rice breeding programmes that underpinned the Green Revolution. Nevertheless production has not kept up with the world's population and the per capita share of the world's grain harvest available as food has been dropping since the mid-1980s. As always the pain is being felt first by the world's poor, the bulk of whom live in developing countries. Just to halt this decline will require a huge effort in both developed and developing countries by policy reform and increased investment in agricultural research.

The CGIAR Centers and their partner national programmes are already working on novel agronomies and new crop varieties. The former are needed to close 'yield gaps', the difference between achieved and potential levels of production, while improved germplasm is needed to meet the new challenges of the first half of the 21<sup>st</sup> century. Examples from CIMMYT and IRRI will demonstrate some of the innovation needed in a breeding programme today. However a successful outcome in which a world of 9.5 billion can be fed will require much more investment and much more involvement of public sector researchers in the problems of the South.

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## **Dynamics of plants in a changing environment – novel insights into growth, transport and exchange processes through non-invasive phenotyping**

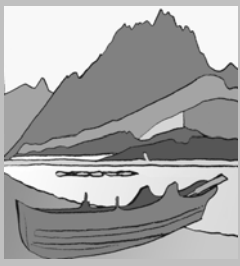
**Session: Understanding, preserving and using plant diversity III:  
Climate change and challenges for the next decades**

**Ulrich Schurr  
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Climate change will alter the environment of plants significantly. It is thus crucial to improve our knowledge on plant responses to abiotic and biotic factors influencing plant performance in changing environments. This talk will focus on the highly dynamic nature of plants and how this is linked to heterogeneous distribution of resources in atmosphere and soils. Plants grow, they transport water, nutrients and signals, and they exchange substances and energy with their environment. As plants are sessile, their structures and functions have evolved in this tight and dynamic interaction with their heterogeneous and perpetually fluctuating environments.

Non-invasive methods developed and applied in recent years have resulted in novel insights and concepts about the role of dynamic adaptations in plant performance. The talk will illustrate recent advances in non-invasive methods to analyze the dynamics of growth, transport, and exchange processes between plants and their environment. Digital image sequence analysis, optical mapping of leaf, root and canopy growth, of transport and growth dynamics by high-field and by portable NMR imaging, positron emission tomography and SPECT using short-lived isotopes to analyze transport of carbon and nutrients non-invasively and dynamically will be presented as new routes to get insights in the truly dynamic nature of plant-environment interaction and to study gene function in plants. These techniques provide the basis for detailed mechanistic understanding as well as high-throughput phenotyping to understand gene function and dynamic plant-environment interaction and to optimize plants for the challenges of the future.



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## **Poster abstracts**



## Expression of viral antigens (HIV-1/Gag, VACV/A27L) in plant cells: a comparison of plastid and nuclear transformation

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**Session: New products: Biomaterials, biopharmaceuticals and other new products**

To express recombinant biopharmaceuticals in plant cells, plastid transformation presents several potential advantages, including transgene and product containment, and high level of gene expression and protein accumulation. Nevertheless, parallel studies aiming to compare plastid and nuclear transformation for such a purpose are scanty. We are using plastid transformation to produce recombinant subunit vaccines against various viruses, including HIV-1, OrthoPoxViruses and HPV-16 (Lenzi et al. 2008, Transgenic Res., DOI 10.1007/s11248-008-9186-3). Herein, we report results of Hiv-1/Gag and VACV/A27L expression in transgenic and transplastomic tobacco (*cv.* Petit Havana) plants, produced, respectively, by *Agrobacterium*-mediated transformation of the nuclear genome and biolistic transformation of the plastome.

The Gag polyprotein precursor Pr55<sup>gag</sup> is processed by the viral protease into four distinct domains, that participate in the production of HIV-1 mature particles. They are highly immunogenic and well conserved across diverse HIV-1 subtypes. Preliminary transient expression experiments showed that the chloroplast is a useful site for the accumulation of the Gag polyprotein in plant cells. In that compartment, the Pr55<sup>gag</sup> precursor is processed similarly to infected human cells. However, stable nuclear transgenic plants, with the protein addressed into plastids by using a transit peptide, produced significantly less than transplastomic plants (0.01-0.1 vs. 7-8% TSP, respectively). In the latter, best results were obtained by translationally fusing the Pr55<sup>gag</sup> polyprotein to the N-terminus of the plastid photosynthetic RbcL protein. Preliminary results showed that the recombinant proteins self-assemble into hollow spheres similar to the particles produced by Gag expression in baculovirus and *E. coli* systems.

Orthopoxviruses (OPV) have recently received increased attention, due to the fear of bioterrorism and to the occurrence of zoonotic OPV outbreaks. A27L is specific to the intracellular mature virus (IMV) and is a good molecular candidate for the development of a vaccine against smallpox and related viruses. The integration of the A27L gene into the chloroplast genome resulted in the accumulation of up to 18% of total leaf protein. By contrast, when the gene was inserted in the nuclear genome and the protein addressed to the cytoplasm, it accumulated only between 0.01-0.04% TSP. The level of protein accumulation did not decline during leaf development in mature plants, suggesting that the protein is stable in transgenic tobacco chloroplasts. Preliminary results indicated that the chloroplast-made A27L protein is recognized by antiserum produced against zoonotic orthopoxviruses.

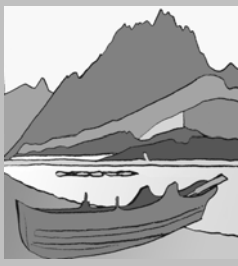
These results confirm that plastid transformation is a useful tool for viral antigen manufacturing in plant cells.

*Acknowledgements.* Research on HIV and VACV antigen production in our lab is carried out in collaboration with Dr. Franco Buonaguro's group at "Fond. G. Pascale" Cancer Institute, Naples, Italy, and with Dr. Maria Capobianchi's group at National Institute for Infectious Diseases "L. Spallanzani", Rome, Italy, respectively.

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