

# EPSO-Conference 2002

## Panel Discussion

### **Biotechnology and its acceptance Poster 5.1 – 5.4**

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## EPSO-Conference 2002 - Poster 5.1

Session	Biotechnology and its acceptance
Title	The debate about plant biotechnology as Science Assessment. Perspectives on a sustainable design of innovation
Author(s)	Stefan Böschen, Universität Augsburg Germany  Authors Email   Stefan.Boeschen@phil.Uni-Augsburg.de
<p>Abstract:</p> <p>Sustainable Development seeks to combine the interests of three different perspectives, the social, the economic and the ecological one. While the necessity for a sustainable development can be taken for granted, the concrete strategies are less consensual as they are elements of complex conflict constellations. In the course of these conflicts problems of knowledge and values become more and more important. The debate of plant biotechnology is such a case there much more ignorance than knowledge is observable and the normative perspectives are very different. With regard to this situation new strategies are necessary to cope with such problems of ignorance and normative ambivalence. A sustainable design of innovation has to find answers to this challenges and has to discuss the social dimensions of knowledge and ignorance. My thesis is, that Science Assessment could be such a strategy. In contrast to the programme of Technology Assessment, Science Assessment do not take its focal point not only on knowledge about the negative side-effects of innovations but also on the social- and democracy-specific problems of ignorance and the possibilities to challenge this in the institutional field of science. Consequently there are not only problems of knowledge but also of legitimacy. But there are many institutional problems to install such a wide approach reflecting the negative side-effects of innovation and ignorance. But there are some experience offered by the dynamics of risk-debates. My second thesis is, that the debate about the negative side-effects of genetic engineering, especially plant biotechnology, is a very good example of such a dynamic and could be interpreted as the first Science Assessment at all. But there are chances to optimise such processes. First, Science Assessment has to organise procedures to combine knowledge-resources of different actors. Second, such Science Assessment procedures are a form of building up legitimacy for the knowledge produced. In this way the different normative perspectives could be confronted and a consent about the normative dissent could be elaborated.</p> <p>To put in a nutshell: The sustainable quality of plant biotechnology is under discussion. There will be no "one-way-solution" but the possibility to initiate new processes of institutional learning. With respect to this challenge, the paper discusses the historical insights and also strategies to initiate processes of designing sustainable innovation in the conflict between science, policy, economy and the public.</p>	

## EPSO-Conference 2002 - Poster 5.2

Session	Biotechnology and its Acceptance
Title	Geoinformational systems as tools in monitoring, decision-making and promotion of biotechnology
Author(s)	Z.Klestova, A.Makarenko, E.Samorodov  Institute of Veterinary Medicine Donetskaya Str. 30 03151, Kiev  Author e-mail: makalex@mmsa.ntu-kpi.kiev.ua; makalex@i.com.ua
<p>Abstract:</p> <p>One of the very important components of biotechnology development is spreading of information. Practice shows that one of recent tool for this is GIS –computer geoinformational systems. The main advantage of the GIS is the possibility of presentation of various informations on a unique cartographic basis. GIS is a convenient tool for information collection, storage, analysis, modelling, forecasting and presentation of the results. This enables qualitatively new assessment of the presented data (for example): Water consumption per capita in a certain region of Ukraine; Age composition of the Ukrainian population; Livestock and poultry number in Ukraine; Caesium- 137 contamination in Ukraine and Europe.</p> <p>More intriguing is another aspect of GIS on biotechnological industry as large social systems. That is we can say about increasing influences of GIS on the social processes, decision making, informational and PR technologies, education and management. All this problems are interesting and important for West Europe countries in recent transition period. But it is especially important for East Europe countries (in particular for Ukraine). Remark that GIS now are in using only in some official organizations.. In result it is leak of necessary information for population on many key problems. This follows the unstable and emotional opinion on many problems, including biotechnology. Thus we can propose the list of possible project on biotechnology:</p> <ol style="list-style-type: none"> <li>1. General investigations of plant biotechnology as the part of sustainable development process.</li> <li>2. Creation of electronic atlas of genotoxical, ecological and another factors on biotechnology complex (for each region).</li> <li>3. Creation of information and analytical means for the monitoring of biotechnology production and consumption .</li> <li>4. Enhancing of informational possibilities in forming of public opinion on prospects and challenge of biotechnology.</li> </ol> <p>Moreover GIS is very useful for development of sustainable development ideas and human decision-making in large socio- economical systems, described in [1, 2].</p> <ol style="list-style-type: none"> <li>1. Klestova Z., Makarenko A. (1999) Enviromental challenges, biotechnology problems and their informational- analitical aspects. Report at EPBN Int. Conf 'PHYTOPLANT', Roma, October, 1999</li> <li>2. Makarenko A. (2002) Anticipating in modeling of large social systems - neuronets with internal structure and multivaluedness. Int.J.Comput.Anticipation Systems, 2002. Vol.11. 16 p. (in print)</li> </ol>	

## EPSO-Conference 2002 - Poster 5.3

Session	Biotechnology and its Acceptance
Title	Challenging field test application for GM-wheat with improved bunt resistance in Switzerland.
Author(s)	Christof Sautter, Thomas Schlaich, Nicole Malgras  Institute of Plant Sciences Fed. Inst. Technol. (ETH) Zurich Universitaetstr. 2 Ch-8092 Zurich Switzerland  Author-email: <a href="mailto:Christof.Sautter@ipw.biol.ethz.ch">Christof.Sautter@ipw.biol.ethz.ch</a>
<p><b>Abstract</b></p> <p>Seed transmitted diseases such as smuts and bunts can be a major problem in wheat production (i) for developing countries, where small scale farmers have to use part of their own harvest for seed material, (ii) as well as for organic farming which is reluctant to use 'chemical' fungicides or (iii) for extensive wheat cultures such as in the South of U.S.A., where a Karnal bunt epidemic infection caused severe losses in 2001. In an exclusively Swiss National Foundation-funded project, we developed Swiss wheat lines, which contain a viral gene, which improves the endogenous resistance against stinking smut in wheat by more than 30% (Clausen et al. 2000). This system has the potential to be effective also against loose smut and Karnal bunt. Its effectiveness is limited to fungi of the order Ustilaginales, which contains exclusively pathogens. Side effects have not been detectable up to now. Our proposed field test is the safest ever suggested, but nevertheless meanwhile delayed by more than three years, due to political reasons and exhaustive evaluation by the authorities. In a first decision the authorities did not permit the experiment (Weiss 2001). We will report about the (i) bio-safety measures anticipated, (ii) the bio-safety experiments done so far and their results, (iv) our experience with the public, and (v) our impression about the official perception of the public acceptance.</p> <p>References: Clausen M, Kräuter R, Schachermayr G, Potrykus I, Sautter C: (2000) Antifungal activity of a virally encoded protein in transgenic wheat. <i>Nature-Biotechnology</i> 18, 446-449. Weiss G (2001) Government Shoots Down GM Plant Trials. <i>Science</i> 294, 2067-2069.</p>	

## EPSO-Conference 2002 - Poster 5.4

Session	Biotechnology and its Acceptance
Title	Bringing research closer to society – communication management on plant biology research
Author(s)	Kristina Sinemus, Elisabeth Schulte Genius Biotechnologie GmbH Robert-Bosch-Str. 7 D-64293 Darmstadt, Germany Author email: <a href="mailto:eschulte@genius-biotech.de">eschulte@genius-biotech.de</a>
<p><b>Abstract</b></p> <p>Success of innovative technologies and products - such as plants with novel traits for food quality and health improvement - depends on the agreement of the society. Those developments are taking effects far beyond the horizon of research. New technological developments will be perceived and influenced by the public as well. Since the technology is in place and scientific knowledge is increasing daily, the ultimate choice lies with the consumer.</p> <p>In order to improve public awareness and understanding of new developments in plant research intensifying knowledge transfer from science to the broader public is crucial. By making complex issues comprehensible and transparent to the public more science based discussions about benefits and impacts of new developments by modern biotechnology could be expected. But - information flow within and to the outside of scientific projects, e.g to end users such as public, breeder, commerce, politicians and consumers should be accompanied by a professional communication management.</p> <p>Building networks between different groups are helpful measures to improve information flow. Workshops, personal contacts to scientists, reports about projects and persons initiate the dialog between science and society.</p> <p>An internet-based information and dialog platform could be another helpful tool. This platform will be supported by special information portals presenting pictured and journalistically prepared background information dossiers. Overviews to selected topics (e.g metabolic processes, new crop compounds, food safety aspects) and stories around crops and traits should make curious about new approaches in plant breeding. Special information and working materials designed for use in school should transfer the new approaches into school lessons.</p> <p>Relevant references: Genius provides marketing, communication and scientific consulting services within the field of biotechnology, agriculture and food safety to customers from industry, authorities and non-profit organizations <a href="http://www.genius-biotech.de">www.genius-biotech.de</a></p>	

## EPSO-Conference 2002 - Poster 6.2

Session	Interaction of Science with Small and Large Companies
Title	The RKS family of transmembrane receptor kinases
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<p>Abstract:</p> <p>The Receptor Kinases like SERK (RKS) family of transmembrane receptor kinases is represented by 15 different members in <i>Arabidopsis thaliana</i>. Together with a small related group of 3 Extracellular Like SERK (ELS) proteins they are involved in transmitting extracellular signals towards intracellular compartments. Specific features of the predicted RKS proteins consist of a signal sequence, an extracellular leucine zipper domain, a putative ligand binding domain containing only 5 leucine rich repeats (LRRs) surrounded by conserved cysteine residues and a single LRR motif at the intracellular C-terminus. This last domain is unique for the RKS family and is absent in all other classes of plant transmembrane receptor kinases. ELS proteins share all the conserved extracellular domains of RKS, but lack transmembrane and intracellular domains.</p> <p>We characterized the developmental function of all members of these receptors in <i>Arabidopsis thaliana</i> using transgenic plants overexpressing or co-suppression RKS and ELS genes.</p>	

## EPSO-Conference 2002 - Poster 6.4

Session	
Title	Regulation of tetrapyrrole biosynthesis: new insights from complete genome sequences
Author(s)	<p>Wim Vermaas, Dmitrii Vavilin, and Hong Xu</p> <p>Department of Plant Biology and Center for the Study of Early Events in Photosynthesis Arizona State University, Box 871601 Tempe, Arizona 85287-1601 USA</p> <p><a href="mailto:wim@asu.edu">wim@asu.edu</a></p>
Abstract:	<p>In photosynthetic organisms, biosynthesis of tetrapyrroles (chlorophyll, heme, phytychromobilin, and phycobilin) is strictly regulated as free chlorophyll (and its biosynthesis intermediates) is toxic in the light due to singlet oxygen generation. The mechanism of this regulation of tetrapyrrole biosynthesis remains largely unclear. The first complete genome sequence of a photosynthetic organism (the cyanobacterium <i>Synechocystis</i> sp. PCC 6803) showed that the predicted sequence of ferrochelatase (the enzyme catalyzing the first committed reaction on the heme biosynthesis pathway, just where the chlorophyll and heme pathways split) had a C-terminal extension that resembled part of a chlorophyll-binding antenna protein. This extension is missing in organisms that do not synthesize chlorophyll and in plant isozymes that are targeted to mitochondria rather than chloroplasts, suggesting a regulatory role of this extension in systems that make both heme and chlorophyll. In addition, the <i>Synechocystis</i> genome is expected to code for four small proteins that are similar to the C-terminal ferrochelatase extension with all putative chlorophyll-binding sites conserved. The small proteins have been named Small Cab-like Proteins (SCPs), Cab being the family of chlorophyll <i>a/b</i>-binding antenna proteins in plants. Some of the effects of genetic deletion of 1, 3, or 4 of these small proteins and/or C-terminal truncation of ferrochelatase are: (1) a decrease in the amount of chlorophyll and carotenoids in cells without a decrease in the antenna size of the photosystems (i.e., cells make less photosystems); (2) in strains that are unable to synthesize chlorophyll in darkness, accumulation kinetics of chlorophyll biosynthesis intermediates (such as protochlorophyllide) are altered; (3) the rate of chlorophyll biosynthesis is slowed down, and (4) the lifetime of chlorophyll in the cell is much reduced. On the basis of these and other observations, we propose that SCPs (1) bind carotenoids, (2) transiently and loosely bind chlorophyll, probably protecting free chlorophyll from degradation and serving as a chlorophyll reservoir for newly synthesized photosynthetic proteins, and (3) regulate at least two steps of the tetrapyrrole biosynthesis pathway as a function of the occupancy state of the chlorophyll binding sites on the SCPs.</p>

## EPSO-Conference 2002 - Poster 6.5

Session	
Title	Use of serology, SDS-PAGE, and RAPD analysis to evaluate susceptibility of Flax to powdery mildew.
Author(s)	M. T. M. Mansour, Maggie E. M. Hassan , H. A. Eisa , E.M Hussein and A. A. Aly Plant Pathology Research Institute Agric. Res. Center Giza, Egypt.  Maggie El-Sayed Mohamed Hassan
Abstract	<p>Three methods were used to evaluate the relationship between susceptibility of eight flax genotypes to powdery mildew. Both of the SDS-PAGE and RAPD analysis did not differentiate between susceptible and resistant genotypes, while the double diffusion (D.D.) test was able to differentiate between the two groups. Antigen of susceptible genotypes Giza 7, Giza 8, Cortland, linore, and C. I. 2008 gave positive relationship with antisera of <i>Oidium lini</i> the causal agent of powdery mildew, while antigen of resistant genotypes Dakota, Williston Brown, and Wilden did not give such a relationship.</p>