CONFERENCE REPORT

10th International Symposium on the Biosafety of Genetically Modified Organisms (GMOs)

The 10th international symposium in a series on the biosafety of GMOs was held on 16th–21st November, 2008 in Wellington, New Zealand. It was organized by the International Society for Biosafety Research (ISBR) and its running title: "Biosafety Research of GMOs: Past Achievements and Future Challenges" was, no doubt, attractive not only to academicians but also to regulators, policy makers, and representatives of industry and non-governmental organizations (NGOs). Thus, despite the distance and the fact that many other related events on the biosafety of GMOs were taking place in 2008, about 250 participants joined the symposium. The Symposium Committee headed by Sally McCammon (USA) and a Programme Committee under the guidance of Jeremy Sweet (UK), supported by numerous specialists from New Zealand (e.g. Tony Conner, Linda Newstrom-Lloyd, Christina Vieglais, Libby Harrison) and Australia (Paul Keese) did a good job in preparing a comprehensive programme based on the careful selection not only of relevant problem-oriented sessions and workshops, but also of chairmen and speakers. Due to the limited time available the programme was divided into nine sessions (Biosafety: Experience and Results; Introgression, Invasion and Fitness: Developing Models for the Risk Assessment of GM Plants; Biotic and Abiotic Stress Resistance; GM Animals; Soil Ecosystems; Common OECD/ISBR session on Risk Assessment: State of the Art in Different Countries; Biocontainment Methods; Post Market Environmental Monitoring, and Conference Conclusions), five workshops (Confinement Measures for Field Experiments; The Future of ISBR; Relevant Science for Regulators; Novel Approaches to Environmental Risk Assesssment, and Risk Communication) and eight poster sessions. There were only a few overlapping parts of the programme so that participants were able to take part in most of the events.

The presentations were introduced by M. Newell-McGloughlin (University of California, Davis, USA) who gave an overview lecture devoted to the Risk Assessment (RA) challenges of new biotech products. While the first generation of commercialized GMOs were crops focusing largely on input agronomic traits, upcoming generations could be grouped into four broad areas: continuing improvement of agronomic traits (yield, abiotic and biotic stress), crop plants as biomass stocks for biofuels and biosynthesis, value added output traits (improved nutrition and food functionality) and modified animals that may parallel plants at some level of application (disease resistance, yield, food quality, molecular pharming, etc.). At present, different regulatory approaches are used in different countries all over the world (e.g. in USA "product-based" evaluations vs. the "technology-based" criteria used in Europe) and this causes some difficulties in RA, GMOs release into the environment, risk management (RM), transboundary movement and international trade. As to the seven years of Australian (AU) and New Zealand (NZ) regulatory experience with the use of the "Risk Assessment Framework for Licence Applications" (a key document for regulators, evaluation staff, applicants, stakeholders, domestic and international biodies and the Australian public), it will soon be necessary to make revisions of the GMO legislation based on operational experience, advances in RA methodology and worldwide gains in scientific knowledge (E. Flynn, Office of the Gene Technology Regulator, AU). Regulatory constraints could hamper or block the commercialization not only of the main, but also of minor transgenic crops, like that of the genetically modified (GM) carnations referred to in the presentation of S. Chandler (Florigene, AU), and the entry of GMO to the market in small countries

could be prohibitively expensive. Problems in bringing the regulations more in line with scientific knowledge were discussed in a workshop chaired by Sally McCammon. During another workshop chaired by T. Conner current approaches to RA were considered in relation to the necessity of adopting new or different methods. New generations of GM crops will be safer to the environment (with barriers to reduce the gene transfer, e.g. using chloroplast transformation, male sterility, segmented transgene(s), blocks against recombination, etc.) with new characteristics (modified composition of sugars, oil, vitamins, pharma factories) but due to gene stacking and novel traits introduced, more complex RA will be necessary.

A lot of attention was paid to the possible impact of GMOs on soil environment and non-target organisms – topics which have made a very uneasy study for many years due to extensive discussions, controversy and speculation. Thanks to the introduction of novel approaches, in particular the use of highly-sensitive methods, (e.g. ELISA, methods of molecular biology based on PCR, Western blot and others like flow cytometry), the detection of extremely low levels of toxins and other compounds has been enabled both in soil and organisms as well as comparisons of the presence and abundance of various microbial species. G. Stotzky (New York University, USA) and other authors were especially interested in the persistance in soil and possible effects of Bt-toxins expressed in transgenic plants on soil microbiota. Although some differences between the characteristics of modified and natural Bt-toxin exist (e.g. in binding to clay particles, persistance in soil), and between Bt plants and their non-modified analogues (lignin content, slower decomposition of post harvest Bt-plants residues), it has been shown, importantly, that the current GM plants have no significant impact on the soil environment. Surprisingly, differences among the effects of different conventional (non-GM) cultivars on soil microflora were more pronounced than those found between GM and non GM varieties. Generally, numerous studies performed both under laboratory and field conditions have discovered no negative impacts of Bt-crop cultivation on populations of various arthropodes especially predators (except for a non-significant effect on some Hymenoptera in some studies),. J. Romeis *et al.* (Agroscope Reckenholz, CH) in comparing the effect of Cry1Ab and Cry3Bb1 proteins on adult lacewings again found no influence on any life-table parameter in both feeding assays, stability and bioactivity of Cry proteins. Possible non-target effects of other crop protection strategies "beyond Bt" against pests such as the use of transgenes coding for aprotinin or avidin were also tested, but until now on a limited number of non-target species only (O'Callaghan, Agresearch, NZ). No significant differences in non-target above-ground invertebrates were found during the 2.5 year comparisons of GM and control pine trees cultivation (Ch. Walter, Scion, NZ). Meta-analysis of the data obtained for example by field studies performed often at different locations and with different aims could be a powerful tool in this respect (M. Marvier, Santa Clara Univ., USA). There are already findings available on the impact of long term GM crop cultivation, e.g of the insect resistant Bt-cotton. Its use has contributed to on-farm biodiversity enhancement and to a spectacular reduction in pesticide use (G. Fitt, CSIRO, AU).

Besides the above mentioned aspects of GM crop cultivation, the possible impact of GMOs in relation to their fitness, and invasiveness should not be neglected. These topics were discussed in sessions chaired by R. Hails (Centre for Ecology and Hydrology, UK) and Bao-Rong Lu (Ministry of Education, China). On this occasion also the results of a specialized workshop on fitness and invasiveness held during the previous week in Christchurch, NZ were presented. On Thursday, a forum was held in public by a panel of scientists, on risk communication, which is an important part of RA. A related workshop chaired by K. Sinemus (Genius GmbH, DE) explored how information on the biosafety of GMOs can be communicated to a wider audience and decision makers.

Abstracts of all symposium contributions will soon be accessible on the ISBR web site (http://www.isbr.info/symposia/). The symposium programme was finalized by a summary of the conclusions of all sessions and workshops and by the invitation by an Argentinian delegate to attend the next 11th ISBGMO symposium to be held on 15–20 November 2009 in Buenos Aires, Argentina.

The 10th ISBR symposium in Wellington was hosted in the beautiful National Museum of New Zealand – Te Papa Tongarewa and great attention was paid to its success by local organizers and numerous sponsors including the research organizations, biotec companies and NZ ministries. The

social and venue programme included the Maori invitation "Powhiri", and tours of Wellington city and surrounding wilderness enabled the visitors to become familiar with some of the traditional Maori culture, the city and the wonderful nature of New Zealand.

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