

South Asia Biosafety Program

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**2nd Annual South Asia Biosafety Conference
September 15-16, 2014
Colombo, Sri Lanka**

Featuring Plenary Sessions on:

- Perspectives on the Regulation of Genetically Engineered Organisms in South Asia
- Research and Development of Genetically Modified Organisms in South Asia
 - Biosafety and Regulation of Genetically Engineered Insects
 - Tools for Science Communicators
- Agricultural Biotechnology and Adaptation to Climate Change
- Regional Harmonization of Risk Assessment Approaches in Agricultural Biotechnology

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BANGLADESH

Training Held on Agricultural Policies of Bangladesh

DR. MIAN SAYEED HASSAN, DIRECTOR, TECHNOLOGY TRANSFER & MONITORING UNIT, BANGLADESH AGRICULTURAL RESEARCH COUNCIL, FARMGATE, DHAKA

The Bangladesh Agricultural Research Council (BARC) is an autonomous organization under the Ministry of Agriculture, Government of the People's Republic of Bangladesh, which is the apex body of National Agricultural Research System (NARS). The mission of BARC is to strengthen and mobilize research capabilities of the institutes of NARS, including universities, private sector organizations and other stakeholders in partnership for the development of agriculture and technology.

As part of their regular activities, a 3-day training programme entitled "Training on Knowledge and Awareness Building on Agricultural Policies of Bangladesh" was organized by BARC on June, 23-25, 2014 at the BARC Training Building in Dhaka. Forty participants attended the training course. Participants were from organizations such as the Department of Agricultural Extension, the Bangladesh Agricultural Development Corporation, the Seed Certification Agency, the Bangladesh Agricultural Research Institute, the Bangladesh Rice Research Institute, the Bangladesh Institute of Nuclear Agriculture, the Bangladesh Sugarcane Research Institute, the Bangladesh Jute Research Institute, the Cotton Development Board, the Soil Resources and Development Institute, the Bangladesh Sericulture Research and

Training Institute, the Bangladesh Academy of Rural Development, the Ministry of Agriculture and BARC.

In the concluding session, participants expressed their views on the training programme and they shared that this was a very well organized training opportunity focused on agricultural research and development. The selection of the topics and speakers were very appropriate. Participants thanked the BARC authority and requested that this type training be continued on a larger scale.



Key Messages from the Workshop on Environmental Risk Assessment

DR. SYED NURUL ALAM, HEAD, ENTOMOLOGY DIVISION, BANGLADESH AGRICULTURAL RESEARCH INSTITUTE, JOYDEBPUR, GAZIPUR



A training workshop on the environmental risk assessment (ERA) of non-target organism testing of transgenic crops was conducted June 23 -27, 2014 in Ames, Iowa, USA. The workshop was organized by the Center for Environmental Risk Assessment (CERA), in cooperation with the Agricultural Research Service, United States Department of Agriculture, and DuPont Pioneer. The purpose of the workshop was to provide regulatory scientists and environmental risk assessors with an experimental learning opportunity in laboratory and field testing of the effects of GM crops and specific insecticidal toxins on non-target organisms (NTOs).

The participants of the training workshops came from diverse backgrounds. The participants were selected from Africa, including Ghana, Malawi and Uganda as well as scientists from Asia, including Bangladesh, China, India and Pakistan. All the participants are directly involved in either environmental risk assessment or regulatory service of GM crops in their countries, and their respective countries have either released a GM crop or are very close to releasing it. So, the topic of the training workshop was appropriate for all participants.

Scientists involved in studying the regulation of GM crops have long felt that hands-on training is necessary to complement and reinforce conceptual understanding of the environmental risk to NTOs and this workshop provided an opportunity to do that.

Practical experience was gathered by the workshop participants while working the GM and non-GM corn fields by setting pitfall traps for ground dwelling and mobile arthropods as well as sticky traps for flying insects. Large numbers of arthropods were captured by both the traps within two days. Those captured arthropods were brought back to the laboratory for identification. I found it interesting that we have found more arthropods species in the GM field than in the non-GM field. This made the participants fully realize how specific *Bt* toxins are to their targeted insects only and gave firm confidence that GM crops are not harmful on NTOs.

The lectures were very informative and topics ranged from the conduction of bioassays to field techniques, suitable test organisms, tiered testing of NTOs, problem formulation for ERA and resistance management of GM crops. A group of devoted and professional scientists with vast expertise on worldwide NTO testing of GM Crops from both the public and private sectors were engaged as the speakers of the workshop.



There were lively discussions and interactions among the speakers and the participants in the lecture sessions. Most of the participants have working experience on GM crops at their respective countries under different regulatory bodies. So, this workshop gave a great opportunity to solve different issues concerning NTOs. Some real field problems related to NTO testing of GM crops, namely, plot size, design for NTO testing, etc. were also discussed in the sessions. The topics on resistance management of GM crops were very interesting.

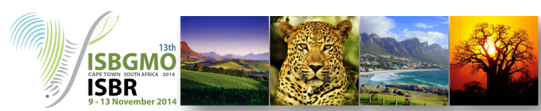
In addition to the lectures, labs and field works, participants reviewed a variety of proprietary studies submitted as part of regulatory dossiers and were asked to identify key information related to the risk assessment as well as to assess the quality of the studies, identifying strengths and weaknesses. This was both a useful and a successful activity as evidenced by the participants' post exercise presentations.

One of the most important lessons for the regulators attending the workshop was the concept of problem formulation in the context of ERA and non-target organism assessments, which was elegantly explained by Dr. Andrew Roberts. The key messages on problem formulation are summarized here:

1. What are we trying to protect in the environment and why are we trying to protect it?
2. Do we have enough information on the likely impacts of GM crops on NTOs?
3. If not, what sorts of experiments will be most informative in obtaining the information we need, keeping in mind the limitations of NTO studies?

The participants also visited the DuPont Pioneer laboratories in Ames where we learned about their research on drought tolerant hybrid corn, including the use of DNA markers to ensure the best characteristics in corn; their use of robotics to examine their transgenic events, which may run into thousands of plants/day; and the automated transgenic greenhouse.

Lastly the workshop venue at Ames is a beautiful little university town. I would like to acknowledge the cooperation of Stephanie Carter of CERA, whose organizational skills ensured the smooth functioning of the workshop.



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Update on Biosafety in Pakistan

GHULAM MUHAMMAD ALI, CHIEF SCIENTIST, NATIONAL INSTITUTE FOR GENOMICS AND ADVANCED BIOTECHNOLOGY, NARC, ISLAMABAD

Like other countries, Pakistan took a bold step towards adoption of modern biotechnology and started to establish biotechnology centers across the country. Realizing the significance of biosafety regulation, Pakistan became a party to the Cartagena Protocol on Biosafety. In response to this, and other domestic and international obligations, the Government of Pakistan promulgated a biosafety regulatory system through the National Assembly. This system has been in operation since 2005 and has achieved some success in regulating the introduction of GE plants in Pakistan, particularly genetic manipulation work in the laboratories and in allowing field trials under confined conditions. Biosafety Guidelines clarify the roles played by the three authorities responsible for the regulation of biotechnology: the Institutional Biosafety Committees, the Technical Advisory Committee, and the National Biosafety Committee.

The role of biotechnology as an engine of growth and socio-economic development in Pakistan has been recognized in all key policy documents of the Government of Pakistan. Despite low investment in research and development for the national agriculture sector, research and development for agricultural biotechnology received a fairly good share of this limited resource. However the insufficient and inordinate funding in the public sector is a major bottleneck. Being a developing country, Pakistan is facing multi-faceted challenges related to food security, energy crisis, and rapid urbanization in the wake of an increasing population and the global phenomenon of climate change. By 2050, the population will grow to 355 million and already per capita land and water availability has reduced to 0.4 ha and 1000m³ compared to 0.7 ha and 7400m³ in 1947.

The importance of the vast potential of agricultural biotechnology was formally recognized in the early 1980s. Biotechnology research has been carried out at many of the research centers in Pakistan. Presently, there are 34 government institutes and universities working broadly in agricultural biotechnology, however modern biotechnology research including the development of genetically engineered plants is restricted to only a few of the major centers, like the National Institute for Biotechnology and Genetic Engineering, the Center of Excellence of Molecular Biology and the National Institute for Genomics &



Advanced Biotechnology. These institutes are involved in the genetic manipulations of cotton, potato, tomato, wheat, groundnut, maize, canola, sugarcane, etc. The major genes and traits that are under investigation are Cry1Ac and Cry2Ac for insect resistance; EPSPS for herbicide tolerance; waxy, AVPI, AtNHX1, LfNHX1, NAC6, and DREB1A genes for drought tolerance and many other genes for biotic stress tolerance. Besides folate for iron uptake and chitinase for fungal resistance, various others developmental control genes are being manipulated. All the transgenic plants developed at these institutes are under glasshouse testing. So far, cotton is the only crop that has been approved for field testing and commercialization.

In developing countries like Pakistan, lack of appropriate, cost effective and hands-on trainings remains a major constraint in risk assessment analysis of GE plants. To overcome this deficiency, training workshops are being organized. The training workshop organized by the Center for Environmental Risk Assessment (CERA) holds great promise to impart hands-on training to biosafety workers of underdeveloped countries. The real benefit comes when techniques learnt from these trainings are disseminated at local biotechnology institutes in Pakistan.

In order to create awareness about biosafety risk assessment analysis with public and private stakeholders, further trainings at Pakistani Biotechnology Institutes like NIGAB are essential. NIGAB has the capacity to offer meetings, workshops, seminars and training to biosafety workers not only across Pakistan but also to other developing countries, particularly, South Asian countries.

INDIA

Transfer of Oil Palm Tissue Culture Technology to Indian Companies

DR. S. K. SHUKLA, ASSISTANT GENERAL MANAGER, AND S. M. MASHFUQUILLA, SENIOR PROJECT EXECUTIVE, BIOTECH CONSORTIUM INDIA LIMITED, NEW DEHLI

Palm oil is one of the most important vegetable oils worldwide. Edible palm oil is derived from the mesocarp (reddish pulp) of the fruit of the oil palm. Commercial plantation of oil palms yields 5-6 tons of vegetable oil and 0.5 tons of kernel oil per hectare.

The commercial planting material of oil palm is a hybrid and is currently propagated through seedlings. These seedlings are raised in a nursery before field plantation. The hybrid production of oil palm planting materials is tedious due to various difficulties associated with hybridization technology and no other vegetative method is available for propagation. Therefore, production of oil palm planting material through tissue culture is one of the options for mass propagation.

The Directorate of Oil Palm Research, an institute established by the Indian Council of Agricultural Research, Department of Agricultural Research and Education (DARE), Ministry of Agriculture, Government of India, has developed the technology for culturing tissue of oil palms in the lab, covering callus induction, somatic embryo formation, shooting, rooting, plantlet development etc. Agrinnovate India Limited, DARE, Government of India has been assigned responsibility

for commercialization of this technology and has partnered with the Biotech Consortium India Limited to make that happen.

The present technology developed for in vitro propagation of oil palms (*Elaeis guineensis* Jacq.) is reproducible under controlled culture conditions. Tissue culture protocol has been developed through callus mediated somatic embryo regeneration using combinations of plant growth hormones. The callusing of explants takes 3 to 6 months. The embryogenic calli are obtained during sub-culturing every 3 months, which are then being germinated on suitable culture media. Germination of these somatic embryos takes place under controlled conditions including light intensity, temperature and humidity.

The technology has been transferred to four tissue culture companies in India, namely Bejo Sheetal Bioscience Foundation, Jalna, Vijaya Phyto Farms Pvt Ltd, Secunderabad, Sristi Agro Biotech Pvt Ltd, Howrah and Sheel Biotech Limited, Manesar.

The Oil Palm Area Expansion Program is already underway in India, with a target of approximately 60,000 hectares to be used with this technology.

CALENDAR OF EVENTS

EVENT	ORGANIZED BY	DATE	WEBSITE
INDIA			
Advanced Course on Novel Approaches in Pest and Pesticide Management in Agro-Ecosystem	CCS Haryana Agricultural University	August 19 - September 8, 2014 Hisar, Haryana	http://www.hau.ernet.in/ento1529.pdf
Workshop on Effective Management of Intellectual Property Rights in Biotechnology by Universities and Research Institutes in the NER	Department of Biotechnology, Ministry Of Science And Technology And Biotech Consortium India Limited	August 27-28, 2014 Aizawl	http://www.bcil.nic.in/
Training Program on Analytical Techniques in Nutrition, Food Safety and Biosafety	The Asia-Pacific Association of Agricultural Research Institutions (APAARI) and the International Crops Research Institute for the Semi-Arid-Tropics (ICRISAT)	September 1-14, 2014 Telangana, Andhra Pradesh	http://www.apaari.org/events/food-safety-training.html
National Conference on Biotechnology for Sustainable Agriculture	Jawaharlal Nehru Krishi Vishwavidyalaya	September 8-9, 2014 Jabalpur	http://www.jnkvv.nic.in/seminar.html
National Conference on Pulses: Challenges and Opportunities under Changing Climate Scenario	Jawaharlal Nehru Krishi Vishwa Vidyalaya, the Indian Society of Pulses Research and Development, the Indian Institute of Pulses Research, and the Indian Council of Agricultural Research	September 29 – October 1, 2014 Jabalpur	http://www.iipr.res.in/pdf/ncp_10july2014.pdf
National Conference of Plant Physiology (NCPP-2014) On "Frontiers of Plant Physiology Research: Food Security and Environmental Challenges"	Department of Plant Physiology Orissa University of Agriculture and Technology Bhubaneswar and the Indian Society for Plant Physiology	November 23-25, 2014 Bhubaneswar, Orissa	http://www.ouat.ac.in/download/NCPP%202014.pdf
INTERNATIONAL			
4th Johor Biotechnology Conference and Exhibition (BIO JOHOR 2014)	Johor Biotechnology and Biodiversity Corporation and the Malaysian Biotechnology Corporation	August 26-27, 2014 Johor, Malaysia	http://www.biojohor.my
South Asia Biosafety Conference	South Asia Biosafety Program	September 15-16, 2014 Colombo, Sri Lanka	http://sabc.biotech.co.in/
13th International Symposium on the Biosafety of Genetically Modified Organisms (ISBGM013)	International Society for Biosafety Research (ISBR)	November 9-13, 2014 Cape Town, South Africa	http://isbr.info/ISBGM013



SOUTH ASIA
BIOSAFETY PROGRAM

The South Asia Biosafety Program (SABP) is an international developmental program implemented in India, Bangladesh and Pakistan with support from the United States Agency for International Development. SABP aims to work with national governmental agencies and other public sector partners to facilitate the implementation of transparent, efficient and responsive regulatory frameworks for products of modern biotechnology that meet national goals as regards the safety of novel foods and feeds, and environmental protection.



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