SOUTH ASIA
BIOSAFETY PROGRAM

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NEWSLETTER

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www.cera-gmc.org

SABP

The South Asia Biosafety Program (SABP) is an international developmental program initiated with support from the United States Agency for International Development (USAID). The program is implemented in India and Bangladesh and aims to work with national governmental agencies 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.

SABP is working with its in-country partners to:

- Identify and respond to technical training needs for food, feed and environmental safety assessment.
- Develop a sustainable network of trained, authoritative local experts to communicate both the benefits and the concerns associated with new agricultural biotechnologies to farmers and other stakeholder groups.
- Raise the profile of biotechnology and biosafety on the policy agenda within India and Bangladesh and address policy issues within the overall context of economic development, international trade, environmental safety and sustainability.

NEW WEB RESOURCE ABOUT REGULATION AND SAFETY OF GENETICALLY MODIFIED CROPS

The Center for Environmental Risk Assessment (CERA), ILSI Research Foundation, announced the launch of its new website, **www.cera-gmc.org**, on April 19, 2010. This new web resource is an important tool that will assist CERA in achieving its purpose, which is to develop and apply sound science to the environmental risk assessment of agricultural biotechnologies so their contributions to the sustainable production of food, fuel and fiber may be safely realized. More information about CERA, including its Advisory Council of eminent scientists, and CERA personnel can be found on the **Welcome Page** and under **About Us**.

CERA Welcome Page

The cornerstone of CERA's website is the GM Crop Database. This database is recognized internationally as the most comprehensive resource of accurate, factual, safety-related information about regulatory evaluations and approvals of genetically modified (GM) plants. Previously hosted by AGBIOS, the **GM Crop Database** is used extensively by regulatory agencies, the academic and product developer communities, and members of the value chain. It is the referral database of choice for the Biosafety Clearing House, GMO Compass, and hundreds of other websites. The GM Crop Database has been cited as a source of information in over 800 peer reviewed papers and has been referenced in an array of popular press articles. It was profiled in Science magazine and has received international recognition as a valuable biotechnology resource (*e.g.*, Genetic Engineering News Top 100 Biotechnology Web Sites).

CERA GM Crop Database pages

Users can access the **GM Crop Database** from the menu on the **Welcome Page** of www.cera-gmc.org. The database can be searched by selecting choices from one or more of the following drop-down boxes: Event Name; Crop Plant; Trait; Inserted Gene; Type of Approval; and Country. If a query is broad (*i.e.*, it is not event-specific) a list of records for all of the GM crop events that are consistent with the search criteria will be returned. The user can scroll through these records and then click on a specific Event Name to access the **Database Product Description** for that event. If a user constructs a narrow search (*e.g.*, when a specific event name is selected from the Event Name drop down box) the **Database Product Description** for just that event will be returned.

Each **Database Product Description** is formatted the same way. The top of the record includes the OECD Unique Identifier for that event as well as other commonly used event name synonyms. There is a summary box that includes general information about the event such as the species and common name of the host plant, the introduced trait(s), proposed use and the product developer (typically the authorized party). This is followed by a table of regulatory approvals that includes the type and year of approval. Information about the approving country's regulatory decision for that event, regulations and related contact information can be accessed by clicking on the country name. This is followed by a detailed description of the GM event and related food safety and environmental risk assessment information obtained from public domain sources such as regulatory dossiers and decision documents. At the bottom of each **Database**

(continued on page 2 - see CERA)

CALENDAR OF EVENTS

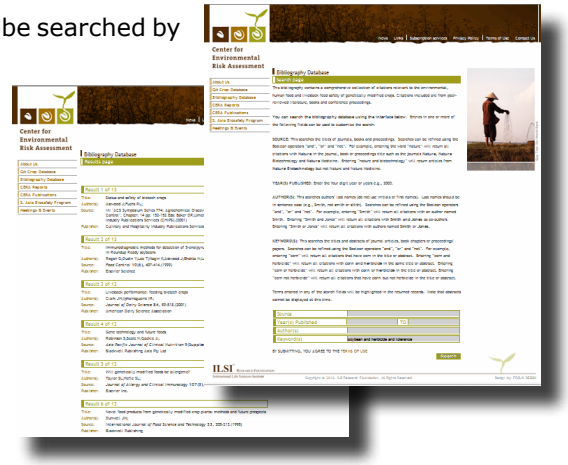
Event	Organized by	Date and Venue	Website
INDIA			
Bangalore India Bio 2010	Department of Information Technology and Biotechnology, Government of Karnataka	June 2 – 4, 2010 Bangalore	http://www.bangalorebio.in/BIO2010/index.php
A practical training course: "Techniques in Plant Tissue Culture, Genetic Engineering and Molecular Biology"	CCS Haryana Agricultural University	June 17 – July 28, 2010 Hisar	http://hau.ernet.in/
A practical training course: "Genomics, Transformation and Molecular Marker Tools for Crop Improvement"	CCS Haryana Agricultural University	June 17 – July 7, 2010 Hisar	http://hau.ernet.in/
A practical training course: "Theory and Practices in Agricultural Biotechnology"	CCS Haryana Agricultural University	June 17 – June 23, 2010 Hisar	http://hau.ernet.in/
TERI-ITEC Courses 2010-11: Applications of Biotechnology and its Regulation	The Energy and Resources Institute (TERI)	August 2 - 22, 2010 Gurgaon	http://www.teriin.org/index.php?option=com_events&task=details&sid=307
BIO JOHOR 2010: The Second International Biotechnology and Biodiversity Conference	Johore Biotechnology and Biodiversity Corporation (J-Biotech)	July 6 - 8, 2010 Johor, Malaysia	http://www.biojohor.my/biojohor.html
ABIC 2010: Bridging Biology and Business	Agricultural Biotechnology International Conference	September 12 - 15, 2010 Saskatoon, Canada	http://www.abic.ca/abic2010/
IBS 2010: 14th International Biotechnology Symposium and Exhibition	Alma Mater Studiorum – University of Bologna, ADRIA CONGREX and Elsevier	September 14 - 18, 2010 Rimini, Italy	http://www.ibs2010.org/index.asp
An Introduction to the Risk Analysis of Current Genetically Modified Organisms (GMOs) and their Products, and to Possible Issues Raised by Novel GMOs in the Future	Biosafety Unit, International Centre for Genetic Engineering and Biotechnology (ICGEB)	September 27 – October 1, 2010 Trieste, Italy	http://www.icgeb.org/meetings-and-courses.html
11th International Symposium on the Biosafety of Genetically Modified Organisms (ISBGMO)	International Society for Biosafety Research	November 15 - 20, 2010 Buenos, Argentina	http://www.isbgmo.info/
BIT's 4th Annual World Congress of GENE-2010: Gene Technology, Environment and Economic Growth	BIT Life Sciences, Inc.	December 1 - 4, 2010 Sanshui, Foshan, China	http://www.bitlifesciences.com/wcg2010/fullprogram.asp

CERA - *continued from page 1*

Product Description are links to further information and references, most of which are provided as PDFs. The top right of the **Database Product Description** record also includes other information that may be of interest to the database user such as biology documents for the crop species, product summaries published by the developer, detection methods, and selected figures from product dossiers or decision documents.

The information provided in the **GM Crop Database** is referenced extensively by organizations around the world. In order to maintain the currency and accuracy of database entries, CERA includes only verified information. For example, regulatory approval information is only included in the **GM Crop Database** if it has been confirmed by national regulatory authorities (either directly or through postings on regulatory websites) or if proofs of approvals are provided to CERA from product developers. Information about approvals that is speculative or anecdotal is not included.

Another useful resource on CERA's website is the **Bibliography Database**. This database contains a comprehensive collection of citations relevant to the environmental, human food and livestock feed safety of genetically modified crops. Citations included are from peer-reviewed literature, books and conference proceedings. The **Bibliography Database** can be searched by typing entries in one or more of the following fields: Source; Year(s) Published; Author(s); and Keyword(s). The Keyword field searches the titles and abstracts of journal articles, book chapters or proceedings' papers. Instructions for composing searches are provided above the search interface including how searches can be customized using the Boolean operators "and", "or" and "not". Terms entered in any of the search fields will be highlighted in the returned records. The exception to this is if a search term is found in an abstract as abstracts are not displayed with the returned records. CERA plans to add abstracts



CERA Bibliography Database pages

(continued on page 3 - see CERA)

CERA - *continued from page 2*

(and full papers) to search results pending approval from copyright holders.

Both the **GM Crop Database** and **Bibliography Database** are continuously being updated. Users can subscribe to keep up to date with one or both of these databases by using the **Subscription Services** function, which is found on the top menu of the welcome page. Subscribers are notified at the start of each month of changes to the databases and are provided links to new or revised records.

CERA's website also keeps readers up to date on **Reports** and **Publications** that come out of research and other program activities that CERA leads or is involved in. For example, in August 2009 CERA partnered with ILSI branches in Brasil and Argentina to host environmental risk assessment workshops for regulators, risk assessors and scientists from public and private sector organizations. The workshop agendas, presentations and reports are available for review and download under CERA **Reports**.

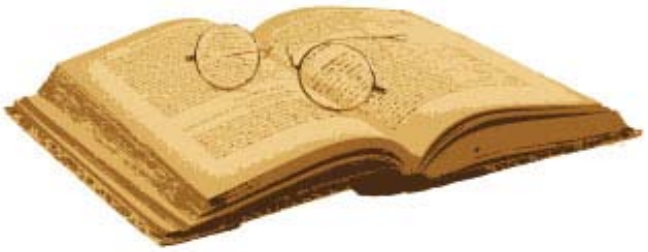
For more information about CERA or the website please e-mail info@cera-gmc.org.

DEVELOPMENT/MONITORING OF TRANSGENIC CROPS – ROLE OF SAUs

Dr. S.S. Gosal, Director, School of Agricultural Biotechnology, Punjab Agricultural University, Ludhiana, India

State Agricultural Universities have played a pivotal role in assuring food security in India. Development of new crop varieties of local field, vegetable, fruit, ornamental and forest plant species and the development of production, protection and post harvest handling technologies has been the major goal of SAUs. Agricultural Universities possess good expertise, infrastructure, laboratory facilities and experimental fields to conduct research in different disciplines like agronomy; soils; plant breeding and genetics; horticulture; entomology; plant pathology; food technology; agricultural meteorology; and biotechnology. Above all, the availability of abundant quantities of germplasm of different crops and strong networking with regional farmers make SAUs conduct demand-driven research more effectively. What is being perceived as a threat to Indian agriculture may turn out to be a boon if we succeed in developing agri-products more competitive for the domestic and international markets, especially by reducing the cost of production, value addition and by reducing pesticide residues in the food products.

(continued on page 4 - see SAUs)



The Reading List

. . . new and notable articles

MODELLING POLLEN-MEDIATED GENE FLOW IN RICE: RISK ASSESSMENT AND MANAGEMENT OF TRANSGENE ESCAPE

J. Rong , Z. Song , T.J. de Jong , X. Zhang, S. Sun,X. Xu, H. Xia, B. Liu and B.R. Lu

Fast development and commercialization of genetically modified plants have aroused concerns of transgene escape and its environmental consequences. A model that can effectively predict pollen-mediated gene flow (PMGF) is essential for assessing and managing risks from transgene escape. A pollen-trap method was used to measure the wind-borne pollen dispersal in cultivated rice and common wild rice, and effects of relative humidity, temperature and wind speed on pollen dispersal were estimated. A PMGF model was constructed based on the pollen dispersal pattern in rice, taking outcrossing rates of recipients and cross-compatibility between rice and its wild relatives into consideration. Published rice gene flow data were used to validate the model. Pollen density decreased in a simple exponential pattern with distances to the rice field. High relative humidity reduced pollen dispersal distances. Model simulation showed an increased PMGF frequency with the increase of pollen source size (the area of a rice field), but this effect levelled off with a large pollen-source size. Cross-compatibility is essential when modelling PMGF from rice to its wild relatives. The model fits the data well, including PMGF from rice to its wild relatives. Therefore, it can be used to predict PMGF in rice under diverse conditions (*e.g.*, different outcrossing rates and cross-compatibilities), facilitating the determination of isolation distances to minimize transgene escape. The PMGF model may be extended to other wind-pollinated plant species such as wheat and barley.

Plant Biotechnology Journal (2010) 8(4):452-64. Epub 2010 Feb 3.

ICE RECRYSTALLIZATION INHIBITION PROTEINS OF PERENNIAL RYEGRASS ENHANCE FREEZING TOLERANCE

C. Zhang, S.Z. Fei , R. Arora , D.J. Hannapel

Ice recrystallization inhibition (IRI) proteins are thought to play an important role in conferring freezing tolerance in plants. Two genes encoding IRI proteins, *LpIRI-a* and *LpIRI-b*, were isolated from a relatively cold-tolerant perennial ryegrass cv. Caddyshack. Amino acid alignments among the IRI proteins revealed the presence of conserved repetitive IRI-domain motifs (NxVxxG/NxVxG) in both proteins. Quantitative reverse transcriptase PCR (qRT-PCR) analysis indicated that *LpIRI-a* was up-regulated approximately 40-fold while *LpIRI-b* was up-regulated sevenfold after just 1 h of cold acclimation, and by 7 days of cold acclimation the transcripts had increased 8,000-fold for *LpIRI-a* and 1,000-fold for *LpIRI-b*. Overexpression of either *LpIRI-a* or *LpIRI-b* gene in *Arabidopsis* increased survival rates of the seedlings following a freezing test under both cold-acclimated and non-acclimated conditions. For example, without cold acclimation a -4 degrees C treatment reduced the wild type's survival rate to an average of 73%, but resulted in survival rates of 85-100% for four transgenic lines. With cold acclimation, a -12 degrees C treatment reduced the wild type's survival rate to an average of 38.7%, while it resulted in a survival rate of 51-78.5% for transgenic lines. After cold acclimation, transgenic *Arabidopsis* plants overexpressing either *LpIRI-a* or *LpIRI-b* gene exhibited a consistent reduction in freezing-induced ion leakage at -8, -9, and -10 degrees C. Furthermore, the induced expression of the LpIRI-a and LpIRI-b proteins in transgenic *E. coli* enhanced the freezing tolerance in host cells. Our results suggest that IRI proteins play an important role in freezing tolerance in plants.

Planta (2010) Apr 9. [Epub ahead of print]

SAUs - *continued from page 3*

Intensive crop cultivation in many zones has led to several problems like over exploitation of natural resources, groundwater depletion, deterioration of soil health, loss of biodiversity, and environmental pollution. At this stage, new gene technologies are needed to usher in a new green revolution. Keeping all this in view, most SAUs have now established separate departments/schools of biotechnology where they are developing good human resources and conducting research on different aspects of biotechnology. Plant genetic engineering has made very rapid and significant strides the world over. It has broadened the available gene pool for plant breeders. Following this approach, useful genes cloned from viruses, bacteria, fungi, insects, animals, unrelated plants, human beings and chemically synthesized genes can be rapidly introduced into crop plants and new designer crop varieties can be developed. Several agricultural universities possessing elite germplasm; better expertise in the area of plant transformation and allied disciplines; and good greenhouse, screen house and field facilities are currently undertaking research on the development of transgenic crops mainly to develop resistance against biotic/abiotic stresses and to improveme nutritional and keeping qualities. For instance, Punjab Agricultural University, Ludhiana; Tamil Nadu Agricultural University, Coimbatore; and UAS, Dharwad have strong DBT supported programmes on transgenic development in crops like rice, maize, sugarcane, citrus, banana and papaya. Punjab Agricultural University Ludhiana is focusing major attention on developing transgenic rice and maize possessing greater water use efficiency and resistance against yellow stem borer.

Field evaluation of Bt cotton

Particle gun mediated transformation

As well, several SAUs are running undergraduate and post-graduate teaching programmes and are also imparting practical training to students in the area of agricultural biotechnology including the development and contained evaluation of transgenics. In this regard, Punjab Agricultural University Ludhiana has established an independent School of Agricultural Biotechnology at the campus. This school has started three teaching programmes *viz*. B.Sc. Biotechnology (Hons.), M.Sc. Biotechnology and Ph.D. Biotechnology. The primary emphasis of the biotechnology education is to develop skilled human resources, which are urgently required by other universities, research institutes and private seed companies.

Further, SAUs are also playing a positive role in conducting confined field trials/biosafety research trials of transgenic varieties/hybrids developed by private agencies for their evaluation for trait expression, evaluation for agronomic performance, evaluation for biotic and abiotic stresses, realization of genetic potential of hybrids (spacing, number of rows and plants) and nutritional requirements of transgenic varieties/hybrids. In Punjab cotton is being grown across an area of about 6.5 Lakh hectares. Before the introduction of Bt cotton, Punjab alone used to spend about Rs.700 corers on pesticides for cotton. After the commercial release of Bt cotton during 2002, in the subsequent years, Punjab Agricultural University, after thorough evaluation of large number of Bt hybrids, has recommended seven Bt cotton hybrids developed by different seed companies for general cultivation in Punjab. Currently, more than 90 percent of the area is under Bt cotton. Yield has been increased up to 8 quintals/acre and pesticides have been reduced by almost 70 percent. The State is now heading for white gold revolution.

Because of good rapport and close interaction of SAUs with regional farmers they can play an important role in developing mechanisms for getting feedback from the farmers regarding the performance of GM crops in a particular long term environment assessments.

ONLINE INFORMATION
about the
SOUTH ASIA BIOSAFETY PROGRAM (SABP)
is now being hosted on
CERA's website.
Information about SABP, program activities and current and past copies of the newsletter are all accessible from CERA's wecome page at
www.cera-gmc.org

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