

# South Asia Biosafety Program

NEWSLETTER FOR PRIVATE CIRCULATION ONLY – NOT FOR SALE



**Current Status of Golden Rice Research in Bangladesh**

PAGE 2

**Capacity Building of African Candidates on Commercial Plant Tissue Culture in India**

PAGE 3

**Comprehensive Review of Environmental Safety of Bt Plants Published**

PAGE 4

**Workshop on Genetic Biocontrol for Invasive Species**

PAGE 5

## BANGLADESH

### Institutional Biosafety Officer (IBO) Workshop: Building a Network of Biosafety Practitioners in Bangladesh

Aparna Islam and Andrew Roberts, South Asia Biosafety Program

On February 14, 2019, the South Asia Biosafety Program (SABP) organized a workshop in Dhaka, Bangladesh for members of Institutional Biosafety Committees, as well as researchers and government officials from National Agricultural Research Organizations and universities. The purpose of the workshop was to review the role of Institutional Biosafety Officers (IBOs) in facilitating compliance with Bangladesh's biosafety regulatory framework and to solicit feedback from stakeholders on how SABP might best work with IBOs in the future to strengthen their capacity and ensure that this critical component of the Bangladesh biosafety framework is functioning as needed to facilitate the safe development of agricultural biotechnologies.

Currently, many public research institutions, individually or in collaboration with foreign research partners, have been developing genetically engineered (GE) crops in Bangladesh. One of the successful examples of collaborative research is Bt brinjal, which got approved by the government of Bangladesh on October 30, 2013 for "limited cultivation" in the field. Since 2014, this trait has been cultivated commercially for human consumption, making Bangladesh a pioneer

**A space in which IBOs can learn from and support each other through collective learning, collaboration, and networking is needed.**

in the arena of GE food crop commercialization. Many other crops are now ready to be assessed or already in the pipeline for performance evaluation. To support such activities, the government of Bangladesh has developed several documents, such as the *Standard Operation Protocols (SOPs) for Confined Field Trial*, the *Data Recording Formats for CFT*, and the *Manual for Confined Field Trial*, etc. For IBOs to effectively perform their duties, it is crucial for them to understand and act in accordance with these guiding documents. Additionally, a space in which IBOs can learn from and support each other through collective learning, collaboration, and networking is needed.

The workshop consisted of a series of lectures and discussions. Following a short introduction to the South Asia Biosafety Program by Dr. Aparna Islam, Dr. Andrew Roberts reviewed the history and origin of IBOs as a component of global programs in biosafety and as described in the *Biosafety Guidelines of Bangladesh*. Dr. Vibha Ahuja, Biotech Consortium India Ltd., then shared the results of an ongoing collaboration between the Indian Council for Agricultural Research (ICAR) and SABP to provide training to IBOs at 10 ICAR research institutions that are active in conducting research and development for agricultural

*Continued on page 2*



Participants and trainers at the Institutional Biosafety Officer Workshop, Dhaka, Bangladesh (February 2019)





Participants at the IBO Workshop.



Dr. Vibha Ahuja, Dr. Aparna Islam, and Dr. Andrew Roberts at the IBO Workshop.



Dr. Vibha Ahuja delivering a presentation at the IBO Workshop

biotechnology. This presentation laid out the types of training activities and resource development that has occurred in India, with the intention of helping participants better understand the potential mechanisms through which SABP might contribute to building the capacity of IBOs



Dr. Andrew Roberts speaking with participants at the IBO Workshop.

in Bangladesh. Dr. Roberts then returned to provide a short overview of how SABP might begin working on a similar program in Bangladesh, after which he facilitated a discussion with participants on what kind of interventions would be most useful.

## BANGLADESH

### Current Status of Golden Rice Research in Bangladesh

Md. Abdul Kader, Bangladesh Rice Research Institute

GR2E BRRI dhan29 Golden Rice was developed and selected at the International Rice Research Institute (IRRI) from a cross between GR2E Kaybonnet Golden Rice and Bangladesh Rice Research Institute's (BRRI) dhan29. The GR2E event was produced by *Agrobacterium*-mediated transformation of Kaybonnet rice using plasmid pSYN12424 containing the phytoene synthase gene from maize (*Zmpsy1*) and the carotene desaturase gene (*crtI*) from a ubiquitous bacterium, which together complete the  $\beta$ -carotene biosynthetic pathway in the rice endosperm. The BC<sub>5</sub>F<sub>5</sub> progenies of GR2E were imported into Bangladesh for further study.

A contained trial with 170 introgression lines was conducted in Aus season during 2015. A selection of 30 lines was advanced to conduct a confined field trial (CFT) at BRRI, Gazipur, during Boro 2015-16 season. The eight best performing lines were advanced to CFTs at five locations during Boro 2016-17, and finally, a single line was selected and field tested at the same locations during Boro 2017-18. The final GR2E BRRI dhan29 selection was very similar to the parent variety in grain type, yield, and plant height, and had 24 percent amylose content in the milled rice.

#### *Substantial Equivalence of GR2E BRRI dhan29 Rice and the Non-Transgenic Parental Line:*

Grain yield and other phenotypic data were collected from CFTs at five locations during both 2017 and 2018 Boro rice growing seasons in Bangladesh. A total of 15 agronomic parameters were recorded. Of these, three parameters were significantly different between GR2E BRRI dhan29 and non-transgenic control BRRI dhan29. Across all locations and years, the GR2E entry was consistently about 1–2 days delayed in flowering and time to maturity in comparison to the BRRI dhan29 check,

**The combined analysis of the agronomic and phenotypic data [...] supports the conclusion that the genetic modification resulting in event GR2E did not have an unintended effect on plant growth habit and general morphology, vegetative vigour, or grain yield.**

and grain length and hundred-grain weight were also slightly less. The grain yield of GR2E was 13.3 percent higher than BRRI dhan29 in 2017, and approximately 3.8 percent lower than control BRRI dhan29 in 2018. However, in the combined analysis over seasons and locations yield differences were not statistically significant.

The combined analysis of the agronomic and phenotypic data generated over locations and growing seasons for GR2E rice and its non-transgenic control, supports the conclusion that the genetic modification resulting in event GR2E did not have an unintended effect on plant growth habit and general morphology, vegetative vigour, or grain yield. From the data and observations, there were no indications that GR2E rice exhibited any fitness advantage that would make it more invasive or persistent in the environment, or have altered susceptibility to pests or diseases, than conventional rice.

GR2E introgression line IR112060 GR2E:2-7-63-2-96 can be used for the purposes of breeding advancement as well as variety release in future based on its consistent performance across locations and seasons.

No sequence homology alerts for potential toxicity and allergenicity of the ZmPSY1 protein were recorded, and it has a history of consumption from maize. Testing of CRTI protein in male and female mice dosed at 100 mg/kg body weight did not result in mortality or other evidence of acute oral toxicity. Compositional data for GR2E including several components like fibre, polysaccharide, ash, crude fat, protein, minerals, amino acids, fatty acids, and vitamins revealed no significant differences in comparison with control rice except for the intended production of provitamin A carotenoids in the grain endosperm. An application for the environmental release and use in food and feed of GR2E Golden Rice is waiting for NCB approval.



## Capacity Building of African Candidates Through Creating Awareness and Training on Commercial Plant Tissue Culture in India

Shiv Kant Shukla, Biotech Consortium India Limited

Biotech Consortium India Limited (BCIL) has been organizing capacity building programs for African candidates under the aegis of the Ministry of External Affairs, Government of India and the guidance of the Department of Biotechnology, Government of India. BCIL, in the past, has organized eight such training modules, training 174 candidates from 24 different countries. Under this program, one of the approved training modules is about organizing awareness on benefits of tissue culture plants in comparison to conventional plants and training on a package of practices for cultivation of plants obtained through tissue culture. These candidates were provided exposure in leading commercial plant tissue culture units and research facilities situated in various cities in India, including Bangalore, Coimbatore, and Pune from January 28, 2019 to February 2, 2019. Candidates benefited from learning new techniques and expert interaction while visiting facilities producing different tissue cultured crops such as potato, cassava, banana, sugarcane, ornamental plants etc.

A total of 23 candidates from 7 different countries (namely Chad, Eswatini, Kenya, Nigeria, Tanzania, Tunisia, and Zambia) participated in this program. The training was comprised of in-depth lectures along with visits to production facilities and field visits to areas growing tissue culture raised plants. The inaugural program was held at the Department of Plant Pathology and Department of Genetics and Plant Breeding, University of Agricultural Sciences (UAS), Gandhi Krishi Vignan Kendra (GKVK), Bangalore, Karnataka on January 28, 2019, where Dr. Shiv Kant Shukla, Deputy General Manager (DGM), BCIL gave a talk titled Overview of Commercial Plant Tissue Culture. Dr. A. Mohan Rao, Professor, Department of Genetics & Plant Breeding, UAS, GKVK subsequently delivered a very informative lecture on Advantages of Tissue Culture Raised Tuber Crops w.r.t. Potato and Cassava. The candidates also visited laboratories within the department. Later in the

day, the candidates visited KF Biotech Pvt. Ltd. and learned about the process of commercial production of potato mini tubers at their facility. The candidates also visited the production laboratory, along with the hardening unit and aeroponic chamber producing potato mini-tubers.

On January 29, 2019, the candidates visited Tapioca and Castor Research Station (TCRS), Yethapur, Tamil Nadu. The candidates were given a lecture on Tissue Culture Cassava Production and Cultivation of Tapioca at the Tamil Nadu Agricultural University, Coimbatore and TCRS, Yethapur. Candidates were further briefed about disease and pest management of crops and visited cassava fields. On the third day of training, candidates visited SPIC-Agro Biotech Center, Coimbatore, Tamil Nadu, where they witnessed the production of tissue culture raised gerbera and other ornamental plants. Candidates visited the gerbera production facility and interacted with experts regarding tissue culture of gerbera. On the fourth day of the training program, the candidates visited high-tech laboratories for producing tissue

culture raised banana at Rise 'n' Shine Biotech Pvt. Ltd., Pune which included a tour of the demo house, hardening unit, and banana fields. Experts from the facility delivered a lecture on Advantages of Tissue Culture Raised Banana Plants, highlighting major aspects of banana tissue culture. Candidates interacted with the trained staff at the high-tech facility and were able to engage with the farmers during the field visit. The final day of the training programme involved a visit to Vasantdada Sugar Institute, Pune. Experts from the institute explained the advantage of tissue culture raised sugarcane to the candidates by way of a lecture and further talked about how tissue culture raised sugarcane plants would be virus free and have better yield. This was followed by a visit to the production unit and hardening facility, as well as to sugarcane fields.

*Continued on page 3*



Field visit during the training program.





Site visit during the training program.

The valedictory session was organized in the afternoon of February 1, 2019. The occasion was graced by the presence of Dr. Vidya S. Gupta, Council of Scientific and Industrial Research, Emeritus Scientist and Emeritus Professor, Biological Sciences, AcSIR, and the candidates were awarded certificates. A cultural tour was organized for the candidates in Mumbai on February 2, 2019, during which candidates visited the Gateway of India, Marine Drive, and a local market.

The candidates were motivated by the information delivered through presentations and found the training meaningful. The training



The awarding of a certificate during the training program.

was an eye opener to the wonderful potential of tissue culture and boosted their confidence towards the ideals and potential of tissue culture technology, especially in meeting the food security of the population of Africa. Continued efforts for the development of the tissue culture industry in Africa through organizing training programs and providing support for the development and management of their industry will strengthen foreign relations. Training organized by BCIL is expected to open new prospects for future partnerships and business ventures mutually benefitting the stakeholders in Africa and India.



Group photo of participants from the training program.

#### ANNOUNCEMENT

### Comprehensive Review of Environmental Safety of Bt Plants Published

Genetically engineered crops that are protected from major insect pests, by producing insecticidal proteins from *Bacillus thuringiensis*, have been grown on more than 1 billion acres over the last 20+ years. A major concern related to this technology is that the proteins could harm non-target organisms, in particular those that provide important ecosystem services such as biological control. In a comprehensive review just published in the journal *Biological Control*, authors from Switzerland and the USA summarized the existing literature from laboratory and field-based studies. Overall, the vast majority of studies demonstrates that the insecticidal proteins deployed today cause no unintended adverse effects to natural enemies. Furthermore, when Bt crops replace synthetic chemical insecticides for target pest control, this creates an environment supportive of the conservation of natural enemies. As part of an overall integrated pest management (IPM) strategy, Bt crops can contribute to more effective biological control of both target and secondary pests and lead to a reduction in insecticide use.

More information is available from Cornell University. The review article can be viewed at <https://doi.org/10.1016/j.biocontrol.2018.10.001>



The **International Society for Biosafety Research (ISBR)** will be hosting the **15<sup>th</sup> Annual ISBR Symposium** on April 1-4, 2019 in Tarragona, Spain. Previously known as ISBGMO, the symposium will build on the outcomes and successes of the symposia previously hosted in Germany, Canada, China, France, Korea, New Zealand, Argentina, USA, South Africa, and Mexico. It promises to be an outstanding and timely occasion for sharing and advancing understanding of contemporary applications of biotechnology to today's agriculture and food production problems.

**- FULL PROGRAM NOW AVAILABLE -  
REGISTER TODAY!**  
**[www.isbr2019.com](http://www.isbr2019.com)**

**ANNOUNCEMENT**

**Workshop on Genetic Biocontrol for Invasive Species**

*15<sup>th</sup> Annual ISBR Symposium Satellite Event | Tarragona, Spain, March 31, 2019 (9:00 am – 5:00 pm)*

Invasive species can pose a threat to the environment, agriculture, or human health. Most governmental approaches to control the spread of invasive species are focused on preventing new introductions. However, efforts to address the control of invasive species once they have become established have met with limited success. Genetic biocontrol of invasive species may offer a new opportunity to go beyond prevention and begin to reduce or eliminate invasive species through genetic strategies. Organized by the ILSI Research Foundation, this workshop will highlight different approaches to the control of invasive species that make use of transgenic and nontransgenic organisms designed for introduction into a target population in order to reduce or eliminate it. The presentations given on these various approaches will compare them with respect to efficacy, biosafety, practicality, cost, and time frame for implementation.

This workshop is sponsored by the OECD Co-operative Research Programme: *Biological Resource Management for Sustainable Agricultural Systems*, whose financial support made it possible for some of the invited speakers to participate in the workshop.

**Limited space available!**

**Register at: <http://ilsirf.org/event/isbr-invasivespecies/>**

**ANNOUNCEMENT**

**Crop Composition as a Component of Food and Feed Safety Assessment and  
Hands On with the ILSI Crop Composition Database**

*15<sup>th</sup> Annual ISBR Symposium Workshop | Tarragona, Spain, April 2, 2019 (2:00 pm – 5:30 pm)*

Crop composition is an essential component of the food safety assessment for GE crops that are intended to be used as food. However, it is important to understand the purpose of the data and its context in the safety assessment. Open to attendees of the 15<sup>th</sup> ISBR Symposium and organized by the ILSI Research Foundation, this workshop will provide an opportunity to briefly discuss the rationale for considering crop composition data, how that data is interpreted in the context of the safety assessment, and what the limitations are to compositional studies. The workshop will also introduce participants to a resource for assisting in the interpretation of compositional studies—the **ILSI Crop Composition Database**. Participants will see a demonstration of the database and its features, highlighting updates and additions to Version 7.0, the latest iteration of the database that was launched in January 2019. Then, participants will be provided with a series of exercises designed to help them understand the search reporting function of the ILSI Crop Composition Database, which they can walk through using their personal laptop during the workshop.

In order to ensure that organizers can provide assistance to participants while conducting the practical exercises, **the workshop is limited to 20 participants** and will be conducted twice (at 2:00 pm and 4:00 pm). More information about the workshop and how to register for the **15<sup>th</sup> Annual ISBR Symposium** is available at **<https://www.isbr2019.com/>**



## CALENDAR OF EVENTS

EVENT	ORGANIZED BY	DATE	WEBSITE
<b>INDIA</b>			
Global R&D Summit 2019: International Collaboration in Research and Development for Sustainable Development	Federation of Indian Chambers of Commerce and Industry	February 21-22, 2019 Hyderabad	<a href="http://ficcirndsummit.com/">http://ficcirndsummit.com/</a>
XIV Agricultural Science Congress - Innovation for Agricultural Transformation	National Academy of Agricultural Sciences, Indian Council of Agricultural Research and Indian Agricultural Research Institute	February 20-23, 2019 New Delhi	<a href="http://14agricongress2019.in/index.php">http://14agricongress2019.in/index.php</a> & <a href="http://www.iari.res.in/files/Latest-News/14ASCFirstCircular_19042018.pdf">http://www.iari.res.in/files/Latest-News/14ASCFirstCircular_19042018.pdf</a>
Food and Nutritional Security Conclave and XIV Convention of the Indian Society of Agricultural Biochemists	Mahatma Phule Krishi Vidyapeeth and Indian Society of Agricultural Biochemists	February 25-27, 2019 Rahuri	<a href="http://mpkv.ac.in/">http://mpkv.ac.in/</a>
Gene Editing in Agriculture: Science, Policy, Story	Cornell-Sathguru Foundation for Development	February 25-28, 2019 Hyderabad	<a href="https://www.sathguru.com/gene-editing-in-agriculture/index.html">https://www.sathguru.com/gene-editing-in-agriculture/index.html</a>
National Conference on Innovative Agricultural Practices - Way Forward	ICAR- Indira Gandhi Krishi Vishwavidyalaya, Raipur	March 1-3, 2019 Raipur	<a href="http://igau.edu.in/pdf/event/Revised_event_iap2019.pdf">http://igau.edu.in/pdf/event/Revised_event_iap2019.pdf</a>
Workshop on Biotechnology Start-up Ecosystem in India	Biotech Consortium India Limited and Department of Biotechnology, Government of India	March 18, 2019 New Delhi	<a href="http://www.bcil.nic.in/">http://www.bcil.nic.in/</a>
India EMBO Symposium: Sensing and Signalling in Plant Stress Response	National Institute of Plant Genome Research	April 15-17, 2019 New Delhi	<a href="http://meetings.embo.org/event/19-plant-stress-response">http://meetings.embo.org/event/19-plant-stress-response</a>
National Conference on Identification, Convergence, Implementation & Extension of Science-Tech-Research for a Sustainable Planet	NAMO Society, New Delhi and Sardar Vallabhbhai Patel University of Agriculture and Technology, Meerut, U.P.	April 20-21, 2019 Meerut	<a href="http://www.svbpm Meerut.ac.in/notice/ICIESSP-2019.pdf">http://www.svbpm Meerut.ac.in/notice/ICIESSP-2019.pdf</a>
<b>INTERNATIONAL</b>			
15 <sup>th</sup> ISBR Symposium	International Society for Biosafety Research (ISBR)	April 1-4, 2019 Tarragona, Spain	<a href="http://www.isbr2019.com/">http://www.isbr2019.com/</a>
Workshop on Use of Genome Editing and Other New Breeding Technologies for Global Food Security	International Center for Genetic Engineering and Biotechnology and National Institute for Biotechnology and Genetic Engineering Faisalabad, Pakistan	April 8-10, 2019 Islamabad, Pakistan	<a href="https://www.icgeb.org/pakistan-genome-editing-2019.html">https://www.icgeb.org/pakistan-genome-editing-2019.html</a>



**SOUTH ASIA**  
BIOSAFETY PROGRAM

The South Asia Biosafety Program (SABP) is an international developmental program implemented in India and Bangladesh 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.



## CONTACT SABP

### BANGLADESH

Dr. Aparna Islam  
Country Manager  
South Asia Biosafety Program  
c/o CIMMYT  
House-10/B, Road-53, Gulshan-2  
Dhaka-1213, Bangladesh  
Email: [aparnaislam@southasiabiosafety.org](mailto:aparnaislam@southasiabiosafety.org)

### UNITED STATES

Ms. Layla Tarar  
Communications Manager  
ILSI Research Foundation  
740 Fifteenth Street NW, Suite 600  
Washington, D.C. 20005, USA  
Email: [ltarar@ilsirf.org](mailto:ltarar@ilsirf.org)  
Twitter: @ILSIRF

### INDIA

Dr. Vibha Ahuja  
Chief General Manager  
Biotech Consortium India Limited  
Anuvrat Bhawan, 5<sup>th</sup> Floor  
210, Deendayal Upadhyaya Marg  
New Delhi 110 002, India  
Email: [vibhaahuja.bcil@nic.in](mailto:vibhaahuja.bcil@nic.in)

To receive an electronic copy of this newsletter, send your name, institutional information, and e-mail address to: [vibhaahuja.bcil@nic.in](mailto:vibhaahuja.bcil@nic.in)