

South Asia Biosafety Program

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7TH ANNUAL SOUTH ASIA BIOSAFETY CONFERENCE

September 14 – 16, 2019 | The Westin, Dhaka, Bangladesh

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SOUTH ASIA BIOSAFETY PROGRAM



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Annual Plant Tissue Culture & Biotechnology Conference 2019 at Dhaka University

Mohammad Umer Sharif Shohan, Dhaka University



From left: Prof. Dr. Md. Akhtaruzzaman, Honourable Vice Chancellor, Dhaka University (DU), delivering the speech; Dr. Md. Amzad Hossain, Director General, Bangladesh Sugarcrop Research Institute; Prof. Dr. Md. Imdadul Hoque, Dean, Faculty of Biological Sciences, DU; Prof. Dr. Rakha Hari Sarker, President, Bangladesh Association for Plant Tissue Culture & Biotechnology (BAPTC&B); Prof. Dr. Mihir Lal Shaha, General Secretary, BAPTC&B.

The day-long Annual Plant Tissue Culture & Biotechnology Conference 2018, organized by the Bangladesh Association for Plant Tissue Culture & Biotechnology (BAPTC&B), was held at the Department of Botany, Dhaka University (DU) on 31 August 2019. Prof. Dr. Md. Akhtaruzzaman, Honourable Vice Chancellor, DU, presided over the programme as Chief Guest. Dr. Md. Amzad Hossain, Director General, Bangladesh Sugarcrop Research Institute (BSRI) and Professor Dr. Md. Imdadul Hoque, Dean, Faculty of Biological Sciences, DU, were present as Special Guests. Prof. Dr. Rakha Hari Sarker, President of BAPTC&B welcomed the congregation of scientists and gave a brief introduction of the activities of BAPTC&B. Honourable Vice Chancellor, Prof. Dr. Md. Akhtaruzzaman, in his speech, focused on the vital role of agriculture in the development of Bangladesh, addressed researchers, and advocated for work on the development of the agricultural sector of the country. Dr. Md. Amzad Hossain explained the history and prospects of biotechnological research in Bangladesh. Prof. Dr. Md. Imdadul Hoque, in his speech, upheld the leadership of

The conference provided a unique opportunity to hear from scientists from leading institutes across the country.

BAPTC&B in developing biotechnology and biosafety in Bangladesh. The inaugural session ended with a Vote of Thanks by Prof. Dr. Mihir Lal Shaha, General Secretary, BAPTC&B.

During the scientific session, biotechnological research and development activities going on in various research and academic institutes were presented. Participating organizations included: BSRI, Bangladesh Agricultural Research Institute, Bangladesh Rice Research Institute, Bangladesh Council of Scientific and Industrial Research, Bangladesh Forest Research Institute, University of Dhaka, and Shahjalal University of Science and Technology. The conference provided a unique opportunity to hear from scientists from leading institutes across the country. Their ideas and research contributions will provide an impetus to agricultural development in Bangladesh. This conference was attended by academics, scientists, researchers, scholars, and students from all over Bangladesh.

Development of Genetically Modified Transgenic Mosquitoes in Sri Lanka

Prof. R. S. Dassanayake, University of Colombo
H. P. B. K. D. Ramyasoma, University of Colombo and University of Kelaniya
Prof. Y. I. N. Silva Gunawardene, University of Kelaniya

Mosquito-borne diseases achieved greater attention over the last few decades as mosquitoes are involved in spreading diseases such as malaria, dengue (DEN), yellow fever, chikungunya, etc. DEN causes epidemics in more than 100 tropical and sub-tropical countries and over 2.5 billion people (over 40% of the world's population) are now at risk of infection by dengue virus (DENV). Also, in recent years, DEN has become the number one vector-borne disease in Sri Lanka, and the country experienced the worst ever DEN outbreaks in 2009, 2010, and 2013, showing that DEN is a major health issue in Sri Lanka. Despite these, there is no effective medicine or vaccine available to DEN, and mosquito vector control is the only promising option to control DEN. In recent years, studies were focused on the

The development of a transgenic mosquito based vector control strategy will have national importance because it will be able to control dengue virus transmission and mosquito population more effectively.

possibility of using alternative disease transmission control strategies based on genetically modified transgenic mosquito (TM). Therefore, we undertook research work to develop a DENV transmission resistant TM based on RNA interference (RNAi) of DENV as an additional useful tool in integrated DENV transmission control employed in Sri Lanka.

In achieving this objective, we established an Arthropod Containment Level-2 (ACL2) safety facility with microinjection system and biosafety protocols for the ACL2 facility to minimize further risks and environmental release of the TM (Figure 3). A TM line was engineered to have a gene construct containing the RNAi effector molecule that processed into small interfering RNA (siRNA) sequences inside the TM upon consuming blood to recognize DENV

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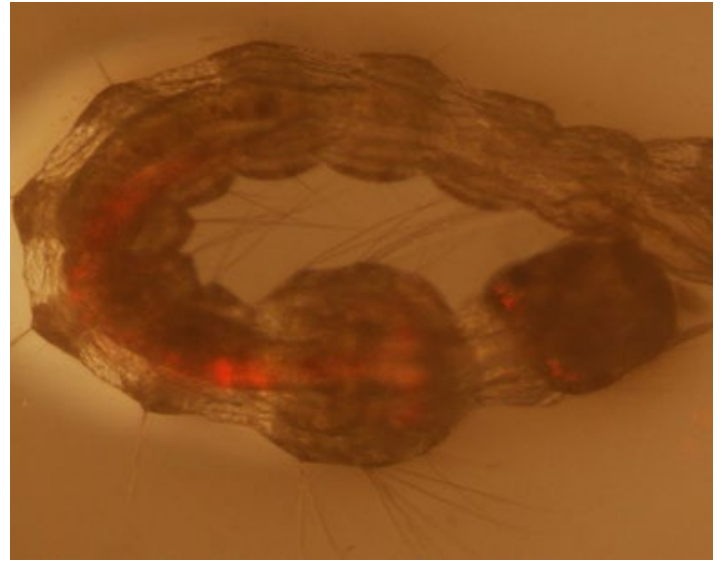
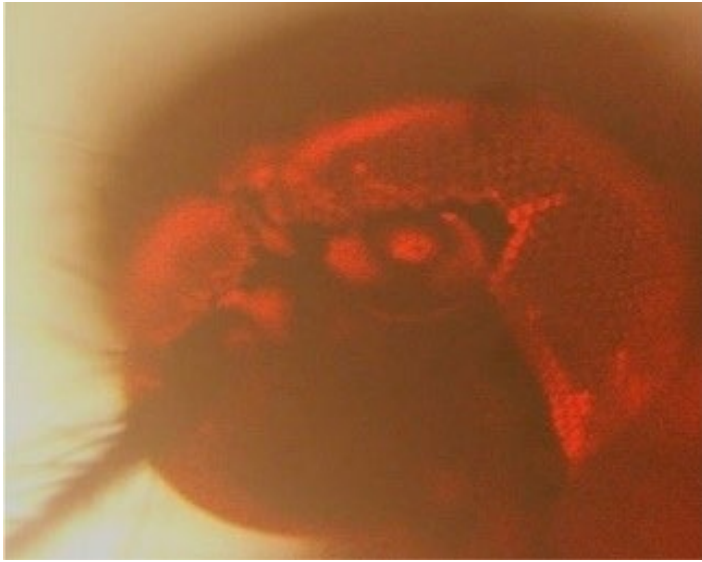


Figure 1: DsRed fluorescence protein expression in ommatidium units of *Aedes aegypti* adult mosquito eyes. *A. aegypti* is the principal mosquito vector of dengue viruses.

Figure 2: DsRed fluorescence protein expression in L1 larvae of TM.

RNA (Figures 1 & 2). The siRNA, thus generated, was capable of reducing DENV in TM and blocking the transmission of DENV. Challenging tests based on DENV showed the RNAi effector gene is able to block the transmission of DENV serotypes 2 and 4. Currently, research is underway to design a new RNAi gene construct to block DENV serotypes 1 and 3 transmissions in TM. In addition to the strategy mentioned above, research work has been undertaken to engineer TM based on the Sterile Insect Technique (SIT) known as Release of Insect Dominant Lethal Gene and SIT TM based on CRISPR-associated sequence 9 (CRISPR/Cas9). The

development of a TM based vector control strategy will have national importance because it will be able to control DENV transmission and mosquito population more effectively than other vector control strategies in place, reducing DENV incidence amongst Sri Lankans. This research is not only involved in developing products to fight against DENV but also has advanced cutting-edge technologies that can be applied to control both mosquito-borne diseases and other pest insects, which will be of great importance to the Sri Lankan population of 20.95 million.



Figure 3: Arthropod Containment Level-2 facility at the Molecular Medicine Unit, University of Kelaniya.

EVENT	ORGANIZED BY	DATE	WEBSITE
BANGLADESH			
14 th Asia-Pacific Biosafety Conference: Biosafety & Biosecurity for Sustainable Development in Health and Agriculture	Asia Pacific Biosafety Association (A-PBA)	September 17-20, 2019 Dhaka	https://www.a-pba.org
4 th IPFS-ICBHA 2019-GNOBB Conference	Global Network of Bangladeshi Biotechnologists (GNOBB)	November 11-13, 2019 Dhaka	http://gnobb.org/conference/IPFS-ICBHA-2019
INDIA			
8 th Training Workshop on Regulatory Requirements for Product Commercialization and Dossier Development	Indian Council of Agricultural Research, South Asia Biosafety Program, ILSI Research Foundation, Institute for International Crop Improvement - Donald Danforth Plant Science Center, and Biotech Consortium India Limited	September 20, 2019 New Delhi	https://icar.org.in/
2 nd International Conference on Recent Advances in Agricultural, Environmental & Applied Sciences for Global Development	Agro Environmental Development Society (AEDS) and Dr. Y. S. Parmar University of Horticulture & Forestry	September 27-29, 2019 Nauni, Solan, Himachal Pradesh	http://www.yspuniversity.ac.in/trainings/Conference_Brochure_Solan.pdf
10 th National Seed Congress 2019	Indian Council of Agricultural Research-Indian Agricultural Research Institute	October 14-16, 2019 New Delhi	https://www.iari.res.in/files/Latest-News/NationalSeedCongress_31082019.pdf
5 th International Conference on Plant Genetics and Genomics: Germplasm to Genome Engineering	Select Biosciences India Pvt Ltd. (supported by National Academy of Agricultural Sciences)	October 17-18, 2019 New Delhi	http://www.selectbioindia.com
INTERNATIONAL			
Course: Basic Laboratory Training on GMO Analysis	International Center for Genetic Engineering and Biotechnology (ICGEB) and National Biotechnology Development Agency, Abuja, Nigeria	September 15-21, 2019 Abuja, Nigeria	https://www.icgeb.org/courses/course-basic-laboratory-training-on-gmo-analysis/
BIT's 10 th World Gene Convention	BIT Group Global Ltd.	September 20-22, 2019 Qingdao, China	http://www.bitcongress.com/wgc2019/default.asp



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-1212, Bangladesh
Email: aparnaislam@southasiabiosafety.org

UNITED STATES

Ms. Layla Tarar
Communications Manager
ILSI Research Foundation
740 Fifteenth Street NW, Suite 600
Washington, DC 20005, USA
Email: ltarar@ilsi.org
Twitter: @ILSIRF

INDIA

Dr. Vibha Ahuja
Chief General Manager
Biotech Consortium India Limited
Anuvrat Bhawan, 5th Floor
210, Deendayal Upadhyaya Marg
New Delhi 110 002, India
Email: vibhaahuja.bcil@nic.in

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