

Crop productivity, food security and environmental sustainability*

India faces challenges of crop productivity, food security and environmental sustainability. In the near future it may get worse if measures are not taken to address these issues. Growing population pressures hasten environmental degradation, ultimately posing a threat to natural resources. Nearly one billion people in the world are undernourished or suffer from chronic diseases due to food insecurity resulting from climate change, urban development and population growth. There is a relationship between hunger, poverty and agricultural productivity. The global population is expected to reach 9 billion in the next 50 years, doubling the food, feed and crop demand.

The introduction of modern and sustainable technologies into agricultural practice is essential for overcoming these issues. With the intention of addressing current issues in modern agriculture, the Society of Applied Biotechnology (SAB) organized a two-day national symposium, providing a platform for discussing potential solutions for various problems.

In his inaugural address, V. A. Parthasarathy (Indian Institute of Spices Research, Calicut) reviewed the revolutionary findings of E. C. Cocking (1960) – the isolation of protoplast, and of Guha

and Maheshwari (1964) who succeeded in producing haploid seedlings by anther culture. He spoke on: (i) the challenges to be faced to eliminate hunger, (ii) growing demand of food up to 38% by 2050 and (iii) scope of gamete biotechnology and protoplasm culture in the near future. George Thomas (Central Plantation Crops Research Institute, Kasaragod) in his keynote address highlighted aspects of food security, decline of resources, changing scientific and environmental scenarios. He viewed biotechnology as a powerful tool to increase the yield of the crops to meet the increasing demand for food. He emphasized that the Government of India has approved only *Bt* cotton till date and no other transgenic crop has been cleared so far. Hence, awareness has to be created among the public about transgenic food crops. He noted that organic farming and precision farming can also increase crop productivity.

Shiv Om Prasher (McGill University, Canada), who received the SAB Lifetime Achievement Award, spoke on 'Efficient, low-cost, low-maintenance best management practices for reducing agricultural pollution'. He focused on incorporation of novel, conceptual and innovative data analysis and processing techniques into problems of water resources management and water pollution. He highlighted the facts related to non-point source pollution from agricultural areas and some low-cost, low-maintenance methods of mitigating such pollution, particularly the role of con-

structed wetlands and floodplain filtration in reducing pollution. He reviewed current approaches to study new environmental concerns arising from increasing use in manure of veterinary pharmaceuticals such as antibiotics and male and female hormones, which are present in significant quantities, in farms in North America and parts of Europe.

Among the topics discussed in invited lectures were: (i) genomics of plant-pathogen interaction: a case study with jute *Macrophomina* host pathosystem, (ii) nutrient expert, a novel decision support tool for optimizing nutrient use and improving maize yields in India, (iii) application of proteomics to identify disease resistance gene in plants, (iv) food safety in hospitality industry, (v) prebiotics from lignocellulosic biomass, (vi) decalides – a new class of natural insecticides: implications for use in stored grain pest control and (vii) advances in aquatic animal health management.

Presentations by young scientists on applications of biotechnology in agriculture included topics like preservation of tender jackfruit using gamma radiation involving hurdle technology, *in vitro* regeneration of caryopses from distinct crosses in sugarcane, extraction and screening of antimicrobial peptides of plant origin, and endosulfan remediation using aquatic and terrestrial plant species.

K. V. Soumya (*Science Writing Intern*)
e-mail: soumyakori89@gmail.com

*A report on the Second National Symposium on 'Innovative approaches and modern technologies for crop productivity, food safety and environmental sustainability' held in Thrissur, during 19–20 November 2012. The symposium was organized by the Society of Applied Biotechnology.