



SOUTH ASIA
BIOSAFETY PROGRAM

NEWSLETTER

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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 the local governments to facilitate implementation of transparent, efficient and responsive regulatory frameworks that ensure the safety of new foods and feeds, and protect the environment.

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 address policy issues within the overall context of economic development, international trade, environmental safety and sustainability.

GOING BACK TO NATURE FOR SUSTAINABLE PEST MANAGEMENT

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Provision of food has always been a challenge facing mankind. A major cornerstone in this challenge is the competition from insect pests. While some pest-associated losses occur when the crops are standing in the farms or greenhouses, others are caused during storage in grain elevators, storage bins and granaries. In the last 50 years, many countries, including India, have enjoyed the benefits of modern agricultural technology that increase the productivity of vegetables, crops, fruits, fodder and forest products. Their remunerative cultivation necessitated the use of high crop yielding, short duration varieties, fertilizers, improved irrigation systems and effective pest management.

Application of chemical pesticides minimized the threat from pest manifestations by rapidly controlling them, albeit with very little consideration of (i) quality (nutritional content) of the crop; (ii) quality of agro residues (fodder); (iii) distribution of microflora in the soil; and (iv) eco-system impact. However, indiscriminate use of pesticides over a long period has not only proved to be harmful to soil microflora, animals and human life, but has also contributed to a number of adverse effects, viz. development of resistance by the insects, weeds and pests; resurgence and outbreak of new pests; toxicity to non-target organisms, including those that are beneficial; presence of non-permissible levels of pesticide residues on seeds, vegetables, fruits, fodder and in milk; and alteration in the dynamics of pest populations. Cumulatively these have harmed soil fertility, the environment and the sustainability of ecosystems. Integrated Pest Management (IPM), which is defined and implemented in many ways, has a place in planning, developing and adopting eco friendly

technologies. Aimed at controlling pests on a sustainable basis, IPM envisages modification of pesticide usage patterns so as to minimize the negative impact of chemical pesticides. Lately, it has been recognized that plant-derived secondary metabolites can be incorporated into products suitable for IPM based on their selectivity and few, if any, side effects on non-target organisms or the environment.

There are an estimated 400,000 to 500,000 different plant species that have an excellent track record for providing novel commercial products. Due to their inherent biodiversity in origin and structure, they can provide target-specific, high volume and low margin products for pest management. Within each generation of chemical insecticide developed so far, there are examples of products that were derived from natural plant compounds. The plant secondary metabolites,

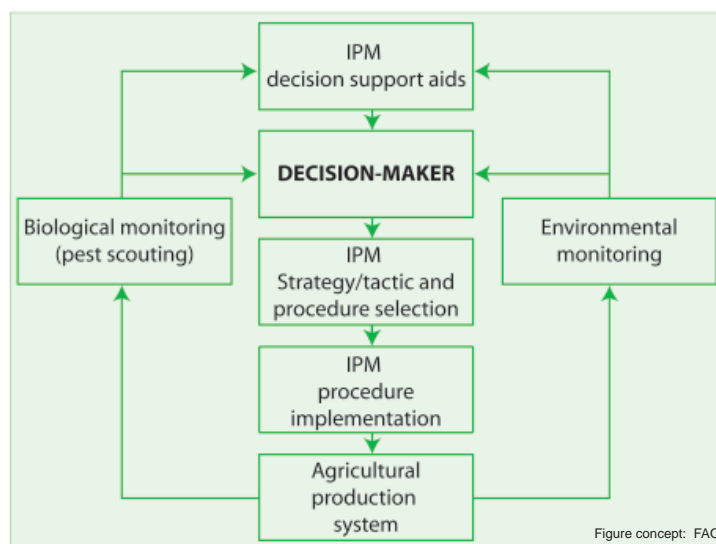


Figure concept: FAO

Outline of an IPM system.

like the terpenoids, flavonoids, phenolics, amines, alkaloids, etc., apparently have no role in fundamental physiological or biochemical processes of the plant, but may be involved in protecting the plant against diseases, pests, herbivores and environmental stress. These plant secondary metabolites may serve as repellents, antifeedents, phagostimulants or toxins for the insect pests. Literature indicates that plant species of the families Meliaceae and Rutaceae have promising insecticidal activity, contributed mainly by limonoids similar to azadirachtin. Of late, small molecular weight circular proteins, cyclotides, isolated from members of the families Rubiaceae and Violaceae have shown promising insecticidal and antimetabolic properties. The worldwide trend to minimize the use of toxic substances on crops has led to several studies focusing on alternate post harvest technologies for crop preservation during storage. Our own studies with *Callosobruchus chinensis* (pulse beetle), the major post harvest pest of grain legumes, uses triterpenoids isolated from *Annona squamosa* seeds and flavonoids from *Calotropis procera* and *Acorus calamus* and has shown encouraging results. A common feature of many of these compounds is that they have a chronic rather than an acute toxicity on

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CALENDAR OF EVENTS

Event	Organization	Date	Place
INDIA			
Regional Workshops on Management and Monitoring of Field Trials of Genetically Modified Crops	Ministry of Environment & Forests, (MoEF), Department of Biotechnology (DBT), Biotech Consortium India Limited (BCIL) and Central Institute of Cotton Research (CICR)	March 28, 2008	Nagpur
Regional Workshops on Management and Monitoring of Field Trials of Genetically Modified Crops	MoEF, DBT, BCIL and Environment Protection Training and Research Institute (EPTRI)	March 29, 2008	Hyderabad
Indo-US workshop under Agriculture Knowledge Initiative on harnessing the benefits of biotechnology in agriculture	Indian Council of Agricultural Research	March 27-29, 2008	NASC Complex, New Delhi
International Seminar on Preclinical Toxicology	International Institute of Biotechnology and Toxicology (IIBAT)	April 11-12, 2008	Chennai
BANGLADESH			
Plant Tissue Culture and Biotechnology Conference	Bangladesh Association for Plant Tissue Culture and Biotechnology	April 11 - 13, 2008	Botany Department, Dhaka University

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insects and their effects are less dramatic than those of synthetic insecticides. In spite of this progress and in light of the differences in geo-climatic zones and biodiversity, the plant kingdom still remains an untapped vast reservoir of new molecules endowed with good biopesticidal potential.

Since plants secreting allelochemicals are anticipated to serve as natural bioreactors, they will not harm soil, water and air. This will leave the micro and macro environment unaffected and should control insects without the development of resistance in insect pests. On the other hand, popularization of the application of biopesticides is mired by a number of technical and logistical difficulties. Raw material availability appears to be a rate-limiting step. Secondly, their extraction, processing, purification, stabilization and formulation must be optimized to be appealing for commercialization. Active ingredients of the extracts may not always be the same; there may be intermediary metabolites, as a function of maturity, season and geo-climatic conditions. This results in incompleteness of the structure of side chains and active groups, which leads to variable bioefficacy.

Where the tangible and intangible costs of chemical pesticides are exorbitant, the insecticidal crystal proteins (ICPs) from *Bacillus thuringiensis* and azadirachtin from *Azadirachta indica*, which have acquired worldwide acceptability as eco-friendly biopesticides, should serve as role models for further research in this direction.

BANGLADESH NBF AND COMPLIANCE MANAGEMENT WORKSHOPS

Two workshops, jointly organized by Bangladesh Agricultural Research Council (BARC) and the South Asia Biosafety Program (SABP), were given at BARC last month.

The first workshop, on February 17, 2008 concerned the implementation of the Biosafety Guidelines of Bangladesh, which were gazetted by the Ministry of Environment and Forests on January 2, 2008 and the National Biosafety Framework (NBF), which is to be gazetted soon. It included two scientific

sessions one comprising presentations on the background of the UNEP/GEF-funded NBF and its features, a discussion on the Biosafety Guidelines and its usefulness, and the other focusing on the status of transgenic plant projects, which the Government of Bangladesh has given permission to import, including *Bt* brinjal, late blight resistant potato and Golden rice and the development of salt tolerant rice.

Presentations were made by representatives from the Ministry of Agriculture, Department of Environment, Department of Agricultural Extension, Bangladesh Agricultural Research Institute, Bangladesh Rice Research Institute and the coordinator of the NBF.

The second workshop, from February 18 through 20, directly addressed compliance management of confined field trials of transgenic plants. Instruction was provided by representatives from BARC, Dhaka University, Bangladesh Agricultural University and AGBIOS.

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Compliance management workshop participants during field visit to BARI.

SPOTLIGHT ON THE WORLDWIDE WEB

Over the next number of newsletters we will be spotlighting some important websites, created by the Department of Biotechnology (DBT) and the Ministry of Environment and Forests (MoEF), that provide information on genetically modified organisms.

This month we feature National Research Centre on Plant Biotechnology (<http://www.nrpcb.org/>). In the months ahead we will look at the websites of Department of Agriculture and Cooperation, Ministry of Agriculture, Government of India; and Biotech Consortium India Limited (BCIL). - Editor

National Research Centre on Plant Biotechnology

(<http://www.nrpcb.org/>)

The National Research Centre on Plant Biotechnology (NRCPB) was established in 1985 to undertake research, teach and train personnel in the areas of molecular biology and biotechnology. The Centre's focus is agricultural productivity and sustainability. Its mandate is:

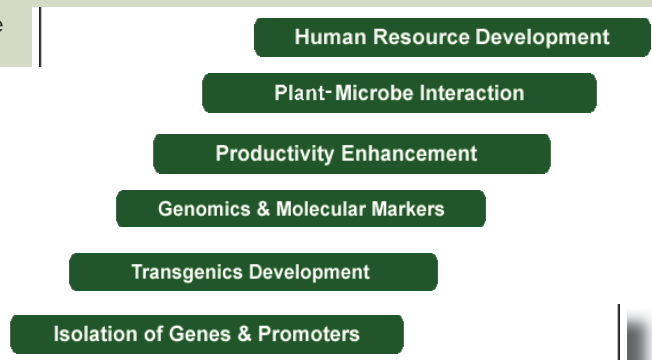
- To undertake plant molecular biology research for understanding molecular mechanisms underlying basic biological processes.
- To devise tools and techniques of biotechnology for crop improvement.
- To apply the knowledge of genomics for advancing agricultural production.
- To serve as a national lead centre for plant molecular biology and biotechnology research and to create trained manpower in the area of plant biotechnology.

The Centre provides post graduate teaching and training to students at M.Sc. and Ph.D. levels with the guidance of the Post Graduate School of Indian Agricultural Research Institute. Scientists of the National Agricultural Research System and State Agricultural Universities have been trained in the area of plant genetic engineering and molecular breeding under the auspices of the Teams of Excellence project sponsored by the Indian Council of Agricultural Research's National Agricultural Technology Project. The following types of long- and short-term training programs are offered:

- Summer training for students
- Project work training for students
- Short-term group training in the areas of gene cloning, plant transformation, DNA marker technology, genome sequencing, high throughput genotyping, gene expression profiling, microbial biotechnology, genome informatics
- Long-term training in specific areas of research
- Training of individuals from corporate sector and NGOs
- International training

The NRCPB website features sections on:

- human resources development;
- plant-microbe interaction;
- productivity enhancement;
- genomics and molecular markers;
- transgenics developments; and
- isolation of genes and promoters.



The National Research Centre on Plant Biotechnology was established in 1985 to undertake research, teaching and training personnel in the modern areas of Molecular Biology and Biotechnology. Since its inception, the Centre has grown and has acquired high degree of scientific competence and established excellent research facilities. The Centre is working towards achieving the national priorities of increased agricultural productivity and sustainability.

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In view of the development and implementation of the NBF and the Biosafety Guidelines, and at the request of developers and regulators, the objective of the workshop was to provide hands-on training for the safe management of confined field trials of transgenic plants. Sessions included risk management, transportation of transgenic plants, trial site management, harvest and disposition, post-harvest management, documentation and record keeping.

The compliance workshop featured field visits to Lal Teer Seeds and BARI to see conventional brinjal in the field and *Bt* brinjal in contained facilities. It gave participants the opportunity to compare the monitoring and management practices needed for transgenic and non-transgenic plants.

Both workshops were attended by delegates from universities, government agencies and ministries, and the private sector with nearly 50 people participating in each workshop.



Guests and presenters at the Bangladesh NBF workshop. Shown, from left, Dr. Robert Potter, AGBIOS; Dr. Md. Abdur Razzaque, Executive Chairman, BARC; Mr. M. Abdul Aziz, ndc, Secretary, Ministry of Agriculture, Mr. Muhammad Reazuddin, Director (Technical), Department of Environment.

DBT LIKELY TO BE UPGRADED AS A MINISTRY

The Financial Express - March 17, 2008

The Government [of India] is planning to upgrade the Department of Biotechnology (DBT) to the status of a full-fledged ministry. At present DBT is under the Union Ministry of Science and Technology and is responsible for promoting researches for development of genetically modified (GM) crops and other biotechnological applications in agriculture and health sciences.

Speaking at the 22nd Foundation day of DBT on Monday, the Union Science and Technology minister, Kapil Sibal said: "DBT is 22 years old. As the 21st century would be the century of biotechnology with research and applications being carried out across the globe, the time is ripe that DBT be upgraded to the status of an independent ministry or a commission."

He said that DBT had an annual budget of Rs 9,000 crore as compared to Rs 450 crore budget for the Indian Council of Medical Research (ICMR). He said that biotechnology

had the potential for improving agricultural productivity and combating climate change. It can help in sustaining nine per cent growth rate in the economy and achieving four per cent growth rate in agriculture. Biotechnology had also given a lot of employment opportunities to women, he said.

Sibal informed the gathering that new institutions were being located in four technology clusters namely Agri-Food Technology at Mohali, Punjab; Health Science Biotechnology at Faridabad, Haryana; Animal Science and Biotechnology in Hyderabad; and Marine Science and Technology in Tamil Nadu.

He projected that by the end of 11th Plan the biotechnology sector in the country would be worth 10 billion. Reiterating the commitment of the Government to promote rapid growth in biotechnology he said 1000 positions of Ph.D. would be created in next five years.

Nine biotech scientists were honoured with the National Bioscience Awards for Career Development to recognize outstanding contributions of young scientists under 45 years of age in basic and applied research in the areas of biosciences and biotechnology including agricultural, biomedical and environmental sciences with potential for application/product and technology development. Ninety-eight students were given DBT biology scholarships.

HIGH FOOD PRICES PUSH CHINA TOWARDS GMO: SCIENTIST

Reuters News Services - February 27, 2008

BEIJING - Rising food prices and concerns over grains security have caused a shift in Chinese regulators' attitude towards genetically modified crops, a prominent Chinese researcher and GMO advocate said on Wednesday.

More than two-thirds of Chinese cotton fields are planted with biotech cotton, but the government has stalled on approving biotech rice to be grown commercially despite expectations it would get the go-ahead a few years ago.

Read the full article at: http://www.agbios.com/sabp_main.php?action=ShowNewsItem&id=9306

We welcome reader comments or suggestions. E-mail your letters to: nringma@agbios.com Mail your letters to: The Editor, SABP Newsletter, P.O. Box 475, Merrickville, Ontario, K0G 1N0 Canada

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