

FEATURES

BIOTECHNOLOGY

Pre-requisites for Promotion of Research in Bangladesh

by Ahmad S Islam

For extra allocation of funds to biotechnology departments of universities, conditions may be laid down that after five years or so a part of the expenses of running the lab should be generated out of contracts with the industry or patenting some of its own research findings.

THE handful of scientists engaged in biotechnological and genetical engineering research find it extremely difficult to carry on their work due to the following difficulties:

Some of the reagents such as enzymes, necessary to carry out routine as well as research projects, are so delicate that in the first place, they need to be air-transported in ice or dry ice; and secondly, they need to reach the designated laboratories within 48 hours or so; otherwise they would lose their potency and as such can no longer be used in the laboratory experiments.

It will therefore be necessary for Bangladesh to relax customs rules and regulations with reference to such perishable chemicals exempting such items from routine customs checks with arrangement for their immediate delivery to designated laboratories within minimum possible time.

The other alternative, which we should aim, say within the next five years, is to float a company where expertise is already available to manufacture the important enzymes such as exonucleases, exonucleases, ligase, Taq polymerase and kits for molecular biology work. It may be mentioned here that for 100 units of Taq polymerase, the enzyme for gene amplification (PCR reaction), the foreign companies charge about \$50 which roughly means \$5 (taka 240) per experiment involving 5-10 PCR reactions. This is in addition to other reagents.

Professor Zeba Seraj and Professor Haseem Khan doing research in molecular biology in the department of biochemistry, Dhaka University produce their own Taq polymerase, the most important enzyme for gene amplification. These senior staff members may be encouraged to open up small com-

panies for large scale production of enzymes. On one hand, it will cut down the cost of the above reagents considerably; on the other, the delivery of such reagents will be speedier if such companies are established. According to Dr. Rashid, a Bangladeshi scientist working in the USA, one can produce and purify about 10,000 units of the enzyme (worth about \$5000) a week, in an ordinary microbiology laboratory in Bangladesh. In other words, a teaching or research laboratory can produce its requirement for the whole year in one week and save an enormous amount of money which they would have to otherwise spend to import this reagent from the multinationals do business with developing countries.

As regards making of other enzymes in one's own laboratory, some overseas Bangladeshi scientists are ready to help their counterparts. One such scientist is Dr. Shaikh Mizanur Rahman now working in the College of Veterinary Medicine, University of Georgia. He has a WEB site: HYPERLINK <http://www.TechBangla.org>. Requests from Bangladeshi scientists desiring to prepare their own enzymes may be posted there or alternatively he may be personally contacted through his email: HYPERLINK mail to: srahman@calc.vet.uga.edu.

These are stop gap arrangements; but these little steps would convince the outside world that Bangladeshi scientists are trying very hard to march along with the rest of the world and some of them may like to come forward to either launch a collaborative project or finance specific projects of individual scientists. I am saying this based on my personal knowledge. Now Bangladesh is a member of the International

Centre of Genetic Engineering and Biotechnology (ICGEB) and the latter has recognized the Botany Department, DU as one of its Affiliated Centres. Obviously, if tissue culture centres at various universities, research institutes prepare suitable projects and seek help of ICGEB, there is no reason why their assistance would not be forthcoming. Then some among the 50 member countries of ICGEB will respond positively if their help is sought in matters of mutual interest.

Allocation of more funds to run biotechnology laboratories: budget allocation for different departments of a university, or research organizations, is the most difficult task because each department wants an equal share. Awareness needs to be created among policy- and decision-makers who allocate funds and among fellow colleagues of existing science departments that in some emerging fields of science such as biotechnology, special funds are needed to get them going smoothly. When more allocation is given to the department of biotechnology, scientists of other departments instead of grumbling should gladly accept that fact. Suffice it to say that construction of laboratories won't be of much benefit to the country unless adequate funds for running molecular biology laboratories are placed at the disposal of workers carrying out both routine and research work in biotechnology.

However, for extra allocation of funds to biotechnology departments, conditions may be laid down that after five

years or so a part of the expenses of running the lab should be generated out of contracts with the industry or patenting some of its own research findings

Access to Internet should be made easy and less expensive: To do research in the fast expanding field of biotechnology, it is incumbent upon the researcher to search for the latest information in the area of his research. In Bangladesh, surfing the Internet is very expensive, time consuming and more often than not the search ends without success. The result is that researchers are discouraged to retrieve and find information from Internet. On the other hand, in developed countries it is so easy to access search engines that even high school students go for it with breath-taking information.

The same problem was encountered with email service in Bangladesh only 3-4 years back but now everywhere whether developed or developing countries, communication via email has become a routine and fast. The same kind of fast Internet service needs to be urgently developed in Bangladesh. If necessary, companies like "Yahoo" be invited to establish their network office in Bangladesh giving news of technological advancement, new product information in general and biotechnology in particular covering countries in Asia, Africa and Latin America, and availability of expert service. The assistance of ICGEB, FAO, UNDP and UNESCO, the British Council may be sought for this purpose.

ICGEB may help to promote biotechnology in Bangladesh: Mention has already been made that the Board of Governors of ICGEB in its last September meeting voted to elect Dr. Ahmed A. Azad to the Council of Scientific Advisers (CSA). Originally a Bangladeshi, he now lives in Australia and is the Chief Research Scientist, CSIRO, Division of Molecular Science, Australia. CSA is a 13-member body and guides the policies of ICGEB. [The world's topmost scientists including Nobel Laureates are the Council Members]. Both Government of Bangladesh and individual institutes and for that matter any individual scientist(s) may approach Dr. Ahmed A. Azad for any advice for setting up biotechnological facilities, the kind of projects to be launched particularly in the field of pharmaceuticals, kind of personnel needed to man those laboratories, expenses involved to run such labs, international agencies to be contacted for funds for research.

Introduction of biosafety rules and regulations in Muslim countries: To introduce a transgenic plant material, fish, animal, bacterium or for that, the matter any other organism in a country, one of the preconditions is that said country must have a set of biosafety rules. It is mandatory for the multinational companies to confirm whether adequately covered biosafety rules exist in the country which requests for import of genetically modified (GM) material. So in the absence of biosafety rules Bangladesh won't be able to import GM material even if she wants to utilize it for improvement of

her crop, forest, animal or fish production.

The Ministry of S&T has completed the draft on biosafety rules. It is under review of concerned departments. In other words, biosafety rules are yet to take final shape and to be approved by the Parliament. If necessary, Bangladesh may receive help from ICGEB and also from the Royal Society, UK. The latter has just brought out a comprehensive report and any individual or any country may have a free copy of it by sending an email to HYPERLINK <mailto:angela.halpin@royalsoc.ac.uk>. Guidelines are also available with Food and Drug Administration in their WEB page HYPERLINK <http://vm.cfsan.fda.gov/~dms/opa-armg.html>.

FAO's service for a short term consultant may also be available, if we need one, to finalize the draft on biosafety rules.

Database facilities are most essential for scientific progress in Bangladesh: Almost all the International Organizations, particularly those run by UNO have their own database to retrieve whatever information they need in the fields they control and require for making plans, preparing projects and executing them. Bangladesh urgently requires to establish such a database and to establish links with UNO organizations, Third World Academy of Sciences and Science Academies of developing world. We need data banks desperately to list biotechnologists who belong to Bangladesh but work elsewhere for want of opportunities in their home countries. There is a general impres-

sion that expatriate biotechnologists do not want to return to their home countries. This is not true for all scientists working abroad. Some of them, I personally know, would love to return to Bangladesh, if they could find labs with basic facilities in the field of molecular biology and to start their career there working on country-oriented problems. I also know some young Bangladeshi scientists who returned home with higher degree(s) in molecular biology; their earnest intention was to serve the institutes from where they were sent overseas for higher studies. After struggling for a year or two to settle and do the work in the field of molecular biology, they found no option but to quit the mother institution; and seek employment in an appropriate overseas laboratory where they were welcomed. The molecular biology laboratory at the Bangladesh Rice Research Institute was closed for more than a year because all trained scientists left for overseas for lack of opportunities both in terms of laboratory facilities and pay.

Let me conclude with an open letter borrowed from MONSANTO Home Page. This open letter is supported by 50 leaders from 32 countries. The signatories include former Presidents and Prime Ministers, current and former Cabinet Ministers, former heads of major international organizations, Presidents and Deans of universities, and prominent scientists and academicians. The views expressed in are not necessarily mine although they represent the world food situation vis-a-vis the ever increasing world population which is at present around six billions with arable cultivable land shrinking concomitant with urbanization.

"We would like you to know how we feel about the benefits of biotechnology. Across the farms of Europe and the United

States, crops grow plentifully, providing an over-abundance of food. But in other parts of the world, food shortages still confront the population every day. Finding new ways to meet our global need for food, while maintaining ecological balance, might be the greatest challenge we face in the next century.

"We all share the same planet — and the same needs. In agriculture, many of our needs have an ally in biotechnology and the promising advances it offers for our future. Biotechnology is the science of changing the genetic makeup of seeds that grow our food to add new benefits. Healthier, more abundant yields. Reduced reliance on pesticides and fossil fuels. A cleaner environment. As we stand on the edge of a new millennium, we dream of a tomorrow without hunger. To achieve that dream, we must overcome many hurdles, including poverty, distribution, water supply, soil erosion and crop disease. Biotechnology alone cannot address all of these hurdles, but it is an important tool in our hands today. We know advances in biotechnology must be tested and safe, but they should not be unduly delayed.

"In the next century, we need food that is more plentiful and more affordable than it is today. With more productivity needed from less tillable land, we need new ways to yield more from what is left. To strengthen our economies, we need to grow our own food as independently as we can. Agricultural biotechnology can help play a major role in realizing the hope we all share. This science can help make a dramatic difference in millions of lives. Securing food for our future is the beginning of a better life for us all. Let the harvest begin."

The author is President, Bangladesh Association for Plant Tissue Culture.

'Mutant' Food Not Just a First-World Concern

Johanna Son writes from Manila

"GENETICALLY altered food" sounds alien to many in a developing country like the Philippines, but local activists say these products are already finding their way to Filipino dining tables.

This is because the Philippines is a heavy importer of common products of food ingredients like soybean and corn, which often come from industrialised countries that make them with genetically altered products, says a study by the Manila-based South-east Regional Institute for Community Education (SEARICE).

In short, genetically modified organisms (GMOs), altered often to make agricultural crops resistant to herbicides and viruses, are no longer just first-world products of concern only in developed country markets, it says.

Likewise, their health risks are no longer the preoccupation only of wealthy consumers, SEARICE argues.

"We have every reason to worry that GMOs are already in Philippine soil and in all probability, in our tables," said the SEARICE study, released last week. "We have to realise that the impact of genetic engineering has gone beyond theoretical and has become a reality, a frightening one."

The SEARICE study found little formal statistical data on GMOs in the Philippines. But it reached its conclusions on the entry of GMOs of products using GMOs by extrapolating data from the size of areas planted to genetically altered crops in exporting countries like the

United States, Argentina and Australia.

"The Philippines is a gross importer of soybeans, corn, maize, cotton and to a more limited extent tobacco and potato — agricultural crops that are principally targeted for genetic engineering," the SEARICE report noted.

It says "a sizable percentage of these crops come from countries that have allowed the commercial cultivation of GMOs — countries that are major trading partners of the Philippines".

Going by data that 30 per cent of total soybean acreage in the US is planted to transgenic soybean, SEARICE deduced that some 20 per cent of soybeans imported from the US in 1997 were likely to have genetically engineered.

Soybean is said to be present in 60 per cent of processed foods eaten everyday. Locally, it is manufactured into soybean milk, infant formula, tofu and soy sauce. The US is the world's largest soybean exporter.

SEARICE estimated that 10,000 out of some 105,000 metric tonnes of corn that the Philippines imported from the US — including corn flour, milled corn and corn seeds for planting — could have been transgenic corn made resistant to insects.

The proportion of transgenic corn that the country gets from the US is expected to triple in 1998, with growth in land area

in the US planted to transgenic corn. Imported corn is used in making snack food, cooking oil and animal feed.

Apart from the dearth of clear data on imports of products with limited awareness about GMOs and the issues surrounding them among the government, companies and consumers.

The Philippines also does not have policy or regulations on the commercial production and marketing of GMOs and genetically altered food.

Local importers of agricultural products were reluctant to respond to a SEARICE questionnaire asking whether they were aware of genetic engineering in food crops, or whether they were sure their imports did not have transgenic components.

Of 20 chief executive officers of local firms importing cotton, tobacco, corn and potato, only eight responded. Four said they were aware the crops they were involved with were being genetically engineered in some exporting countries. Of these, three said they do not import transgenic products.

What the Philippines has are policy guidelines on local research into genetic engineering, but SEARICE says this is not the likeliest source of GMOs' entry, but from imports.

While the scale of entry of GMOs is far behind those of richer countries, experts say it is not too early to prepare pol-

icy to deal with transgenic crops — especially with the lack of global rule on the research, commercialisation, and trade in such products.

For starters, SEARICE suggests the Philippines declare a moratorium on the entry of GMOs until international rules are clarified.

The spread of GMOs has already become controversial not only in the US but in Europe and Japan. Europe, which had earlier denied entry to imported soybeans from the US, recently passed a directive requiring the labelling of GMOs. Under consumer pressure, Japan is discussing labelling rules.

While crops are genetically altered supposedly to improve yields or make them resistant, experts warn the transfer and of genes across species is bound to have harmful effects on health. Some of these effects range from allergies to hypersensitivity, and genetic engineering has been linked by some to the revival of drug-resistant diseases.

The health risks are not something Filipinos should toy around with, says Romeo Quijano, pharmacology professor at the University of the Philippines College of Medicine.

"Genetically engineered foods are hazardous commodities," he said. "Genetically engineered food products have not undergone sufficient toxicological evaluation and there are studies indicating that there are significant health risks involved in genetic engineering technology."

— IPS/APB

Animal Rescue on the Ho Chi Minh Trail

by Elizabeth Kemp

When poor Vietnamese villagers who barely achieve subsistence levels came upon a rare sao la trapped in a ravine, they chose to release the animal rather than kill and eat it. It is a sign of hope in a country recovering from the ravages of war.

NGUYEN Van Tri Tin, or Mr Sao La, as he is affectionately called by his colleagues, guided us through "forgotten" villages in the Truong Son mountain range, which separates Vietnam from Laos. Here, not far from the ancient imperial capital of Hue, live some of the world's rarest animals. We were in search of the sao la (*Pseudoryx nghetinhensis*), a primitive bovid that captured world attention when it was found at the Vu Quang Nature Reserve in 1992, and the giant muntjac, a species of deer discovered in the same reserve in 1994.

Although the skulls and horns of the animals are found in many village houses of Thua Thien Hue province, sightings of these rare species are hardly ever reported. This part of the country, in the A Luoi valley in Western Vietnam, was badly damaged during the US-Vietnam conflict. This 60 kilometre stretch of largely riverine valley — along the Ho Chi Minh trail used by Viet Cong fighters from North Vietnam to infiltrate the US-backed South — is not far from Hamburger Hill, one of the most heavily bombed

battlefields of the war. The valley lost some 100,000 hectares of forest when it was sprayed with the deadly defoliant Agent Orange to prevent Viet Cong troops from using it.

I first visited A Luoi in 1987 to document the environmental effects of the war. My return visit more than a decade later was to see how the people and their forests were faring. The recovery of the region has been slow and the majority of people still live at a low subsistence level. They hunt, fish, collect wild plants, and farm to survive.

Tin and the foresters in A Luoi have been working with the villagers for about two years. In 1996 they started to exhibit drawings of the sao la and other rare species in schools, community centres, and the market place, asking villagers to help them find and protect the rare animals — and to stop hunting them. The villagers, who are the original scientists of the area with their own systems of traditional knowledge, told us about the ecology and biology of the animals, and offered to help.

This, it was that in late May thus year, three young boys, the eldest just 16, reported finding a live sao la on a hunting expedition with their dogs. Mr Sao La" rushed off with them to find the animal trapped in a ravine accessible only along a slippery ridge inside a deep evergreen forest. Within hours, a team of scientists, led by the Ta Oi youth who had found the animal, joined forces to record on film for the first time a sao la in the wild — and to release the pregnant female back into the forest.

The Forestry Department turned the video tape over to its national television station, and the whole of Vietnam watched the rescue operation on their TV screens, spellbound by the event. They knew it was a huge sacrifice for the impoverished people of A Luoi to free an animal they would normally have killed and eaten.

Five months ago some villagers had brought an injured live male sao la to the district but it had died within two hours. This time the local residents and conservationists were taking no chances.

"I wish everyone would

think as these people and set the sao la or other animals like this free. I wish they would protect the forest where it lives," said Hoang Ngoc Khanh, Chief of the Thua Thien Hue Forestry Control Department. "And I wish the people had enough food and better conditions so they would not have to hunt it for survival."

Whether or not Khanh's dream will come true remains to be seen. Killing of the rare species, although forbidden, is extremely difficult to regulate, especially after years of subsistence hunting. But the release rather than the death of the female sao la, soon to bear a calf, signals hope. The children of the Truong son range took the future of the sao la into their hands, and this is where its survival lies. More than twenty years after the end of the Vietnam war, return to the Ho Chi Minh Trail revealed that although recovery was slow, there was some promise.

— WWF Features

The writer is WWF's Species Policy Information Officer based in Gland, Switzerland.

Of a Filmstar, Some Tribals and 'Wild' Passion

IN villages near the historic town of Jodhpur in India's desert land, Salman Khan will never be forgiven. Ever since he and four fellow movie stars from Mumbai allegedly hunted down three protected deer near Jodhpur, the heartthrob of millions is considered a devil by the Bishnoi community.

"We can never forgive anyone who kills our animals," said Swarup Bishnoi, a young farmer about three kilometres from the area where Khan had reportedly gone on a killing spree over several nights in September-October while shooting for a Hindi movie.

The Bishnois are a mild-mannered Hindu community spread over northwestern India for whom conserving nature has been a passion since they were founded some 500 years ago. The sect follows 29 cardinal principles, one of which is a pledge not to kill any living being. Even trees are cut only when they dry up. Other commandments include a ban on liquor and other intoxicants, the day with a bath. The Bishnois are strict vegetarians. The commitment to nature began long before green activism became a fashion in the West. The sprawling wooded areas near

Jodhpur, which is Bishnoi country, are home to hundreds of black buck, one of the most beautiful of antelopes which has spirals horns and is exclusive to India, as well as chinkara, or the Indian gazelle. Both are highly endangered species and protected by law. The region also abounds in spotted deer and the giant neelgai. These animals move freely in and around Bishnoi villages, knowing they face no danger.

The Bishnois, who are mainly agriculturists, can go hungry but will ensure that the deer — or for that matter any animal or bird in their area — do not go without food and water.

"For a hunter, a deer or Black Buck is the most prized animal," said Poonam Chand Bishnoi, a former Speaker of the Rajasthan Assembly and a community leader. "They are harmless easy prey. In our area, animals and birds live in peace. We feed the peacocks although they cause damage to our fields. That is our commitment. The Chipko save-the-tree movement — which involves nature lovers clutching at trees to prevent them from being cut — originated at a Bishnoi village near Jodhpur in 1730 when hundreds of Bishnoi men and women clasped trees which a local king

wanted chopped. In the process, 294 men and 69 women were either killed or got hacked. The community has not forgotten the sacrifice. Even now, every year at least one Bishnoi gets killed while fighting hunters in the region. In October 1996, Nihal Chand Bishnoi was shot dead by poachers when he tried to protect a deer. Nihal's father, Hanuman Singh Bishnoi, speaks about it proudly even today.

To such passionate lovers of nature, Salman Khan's actions were a monumental crime. The fact that he got away with a brief stint in police lock-up and is most unlikely to be jailed for killing the deer has only added to their sense of frustration. "We can lay our lives to protect the animals and birds," says Poonam Chand Bishnoi, now a Congress party member of the Rajasthan Assembly. "If hunters are caught in our area they are given punishment they will always remember. I think Salman Khan was lucky he did not fall into our hands. He may have never been able to act again." Even the police admit it is best not to trifle with Bishnois over wildlife. Since the Salman Khan episode, the Bishnois have become hostile to visits of even Western tourists to their vil-

lages. The anger is directed more against local guides who Bishnois feel also guide hunters at night. Some tourist cars were recently stoned at Bishnoi villages and forced to return to Jodhpur. "It is our religion not to kill any living being," explained Arjun Ram, 76, a resident of Buda Bishnoyan, a vast Bishnoi village of 6,000 people only 30 kilometres from Jodhpur. "We live with the environment. We are disappointed Salman Khan got away lightly despite killing innocent deer. What had the animals done to him?"

The community, he said, wanted more jobs with the forest department and guns to protect the remaining deer in this desert region. "The government is not serious about stopping hunting of wildlife," he said. "If it was, the deer population would not have been reduced to living in just Bishnoi areas of Rajasthan." Explained Sona Ram Bishnoi: "The Bishnois are simple rural people trying to keep the purity of village life intact." The trouble, others in the community say, is they seem to be the only ones determined to preserve nature.

— India Abroad News Service

Garfield



by Jim Davis

James Bond

