News from Asia and Pacific

Patenting life forms in Singapore

The patentability of life forms, and specifically plants and animals, has remained contentious issues in several jurisdictions. The Patents Act of Singapore contains no restrictions to the patentability of plants and animals or other biotechnological inventions such as DNA, living tissues etc. This proviso, however, has not been tested in a court of law nor has it been clarified at the level of examination.

Until now, patentees have to rely on UK patent practice as a guideline. The Singapore Patent Office has been granting patents for inventions involving genotypically or phenotypically modified living organisms such as genetically modified bacteria, plants and non-human organisms. Patenting plants and/or animals usually raise ethical and distributive justice concerns. Most international treaties and national patent laws have incorporated provisions to address such concerns. For instance, section 16(2) of the Singapore Patents Act states that "An invention of a method of treatment of the human or animal body by surgery or therapy or of diagnosis practiced on the human or animal body shall not be taken to be capable of industrial application". Thus the Registrar may refuse a patent for an invention, the use of which would be contrary to public morality. Thus, while patentees may file patents claiming plants and/or animals in Singapore, grant of such patents is at the discretion of the Registrar who will weigh the relevant ethical and other considerations. Patenting plants does not raise as many ethical concerns as patenting animals does. The issues here mainly concern traditional knowledge, the gene pool etc. The Singapore Patents Act does not contain an express provision to preserve and maintain the traditional knowledge of local and indigenous communities or to provide developing countries with access to technologies in a just and equitable manner.

A recent understanding reached between the United States and Singapore on Free Trade saw commitments from both sides to strengthen their respective Intellectual Property regime for bio-inventions. Specifically,

Singapore is expected to accede to the UPOV convention (for the protection of new plants varieties) to provide a system of better protection of plant varieties. Singapore also reiterated its commitment to its current regime of allowing patents on all bio-inventions so long as they do not contradict order public or morality. Thus, patentees seeking protection for inventions directed to plants and/or animals in Singapore have a conducive intellectual property regime to support them.

The Supreme Court of Canada rejected the patentability of the Harvard Oncomouse in Canada, ruling that Canada's Patent Act did not allow patents for higher life forms and it was up to the legislature to provide a proper legislative basis for such patents. Article 27.3(b) of the TRIPS (Trade-Related Aspects of Intellectual Property Rights) Agreement provides members with an option to exclude plants and animals from patentability. At the same time, however, members are expected to provide for the protection of plant varieties either through patents or through an effective *sui generis* system or through any combination thereof. For example, the UPOV convention (The Convention for the Protection of New Varieties of Plants) provides plant breeders with limited monopoly rights to commercialize new plant varieties. *Source:* www.checkbiotech.org 30 Jan 2003.

Thailand uses GM Technology to Develop Ornamental Plants

The development of the GM technology in Thailand has been in progress. Researchers have now developed techniques to use the genetically engineering method to develop orchids of different colours. Since 1995, the budget of 60 million baht has been aside for the biotechnology researches. The agency incharge for the purpose of BIOTEC has been monitoring the projects related to the development of coloured orchids. Thailand is also planning to tap this technology to upgrade the variety of herbs. The development of the GM technology in Thailand would focus on supplementary food, as people were now more health-conscious. Plant Genetic Engineering says that the global GM technology had been moving forward, particularly in China, where 50 GM plants had been developed. However, GMOs is not likely to be widely used in the developing countries,

as the distinctive characteristics GM plants are mostly created for the upper market such as health products, ornamental plants with unique colours like orchids. *Source:* www.chechbiotech.org 30 Jan 2003.

China may buy more US soy on Brazil GMO concerns

China may have to buy more U.S. soybeans for the first quarter as Brazil is facing difficulty in clearing the country's rules on genetically modified (GM) crops. An Agriculture Ministry had issued certificates to allow soy imports from Argentina, but it had not done so for similar purchases from Brazil, the world's second biggest soy producer after the United States. In Brazil farmers are officially not allowed to grow transgenic soy but are known to do so. The Agriculture Ministry of China and the state-owned China National Grain & Oils Information Centre had rejected quarantine certificates from Brazil and that Brazil had not provided any new solution.

However, China has issued some temporary certificates on imports of Argentina soybeans after December 20, but for no certificates on Brazilian beans, as the Brazilian side cannot provide necessary documents. Some Chinese buyers may have already switched to U.S. soybeans, booking three to four cargoes during the past two weeks, traders said. Traders have estimated that China, the world's top importer of soybeans, had already booked some 4.5 million tonnes from the new South American crop for shipment between April and June last year alone. *Source:* www.checkbiotech.org, 08 Jan 2003.

China Developing GM eggplants

Professor Wenbin Li and graduate students of the Institute of Genetics and Development Biology, Chinese Academy of Sciences are attempting to develop male sterile and disease-resistant varieties of eggplants using genetic engineering. In China, most breeding is done conventionally, which requires a great deal of time and effort. Genetic engineering would, therefore, simplify the process. The team is using one of the most popular vegetables in China, the eggplant, as a research model. By placing cellulotoxic genes-ribonuclease barnase under the control of

an anther-specific promoter, TA29, the pollen can be destroyed, thus leading to male sterility. Another study being undertaken by the group is on improving the disease resistance of eggplants by increasing the production of the rabbit defesin gene. This gene has demonstrated greater activation against a broad spectrum of fungi and bacterial diseases. *Source:* Asian Seed Vol. 9 No. 6, Dec 2002.

India Plans for GM-pulses and Potato

After commercial cultivation of transgenic cotton and field evaluation for mustard, India is now all set to release genetically modified (GM) pigeon-pea and chick-pea pulses, for which work is going on in its labs. India favours introduction of transgenic varieties in all crops and emphasis now is to release GM-pulses for commercial growth at the earliest to curb imports and tackle insect menace. Priority is being given to pulses in the GM-crops' project, as the country is deficient in the commodity and facing the menace of a dangerous borer insect, *Haliverpa Armgera.*

However, it forms part of a larger project in which GM-varieties are being developed for rice, potato, brinjal, tomato, sorghum, and cauliflower amongst others. India's share in world production of pigeon pea and chickpea is 90 per cent and 73 per cent respectively making it imperative that the cultivation of these commodities is perfected even if it means tinkering with genes. Being the world's largest producer of these crops, India faces the borer menace like nobody else and efforts are on to make the GM-varieties Armgera-resistant. ICAR being the apex body on agri-research related issues is developing these varieties based on the principle, "GM-crops should be inferior in none (parameters) and superior in at least one" to the conventional types.

Genetically modified potatoes will play a key part in an ambitious 15-year plan to combat malnutrition among India's poorest children. Anti-poverty campaigners have greeted the "potato" with cautious support. The three-pronged attack on childhood mortality would aim to provide children with

clean water, better food and vaccines. Zero child mortality in underprivileged children would be the goal, according to the Indian Institute of Science in Bangalore. The protein-rich GM potatoes are in the final stages of testing, prior to being submitted for approval. Addition of the *AmA1* gene to potatoes, with the result that they make a third more protein than usual, including substantial amounts of the essential amino acids lysine and methionine. *AmA1* is a gene from the amaranth plant. The idea is that the potatoes will form part of a midday meal to redress deficiencies in children's diets. A lack of lysine, for example, can affect brain development. *Source:* Business Standard, Press Trust of India, January 14, 2003; www.newscientist.com, 02 January 03.

India ratifies Biosafety Protocol

India has ratified the first ever-international Biosafety Protocol for ensuring safety in transfering, handling and use of Genetically Modified Organisms. The Biosafety Protocol, ratified last month, seeks to minimise the risks to environment and human health during the transfer and use of GMOs. India's ratification of the Cartegena Protocol of Biosafety comes amidst the growing worldwide interest in the GMOs. India thus, joins the group of another 42 countries, which have ratified the protocol. Recognising the potential of biotechnology to offer solutions in pollution control, the Indian Government has accorded priority to programmes in environmental biotechnology. The use of biotechnology for environmental protection was in biomedication (the biological clean up of effluents), reduction and stabilisation of recalcitrant pollutants and detection and prevention of pollution. *Source:* PTI, February 5, 2003.

Agri Business Centre in Hyderabad

In a bid to enhance research activities in the agri-biotechnology area, the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Hyderabad, has proposed to set up an Agri Business Centre (ABC) in Hyderabad with an initial investment of Rs 3.4 crore. The proposed business

centre, the first of its kind in the country, will be encapsulated as part of the Technology Innovation Centre (TIC) developed by ICRISAT. Besides, the TIC will have an incubator to support the research activities of ABC. Both the centres will help in technology transfer partnering with the Biotech Park in Hyderabad and the Department of Science and Technology. The business centre, under the umbrella of TIC, will work on research products and have closer interactions between R&D institutions, the private sector and encourage innovation in market-driven research. The business centre will have 10,000 sqft of space inclusive of a laboratory and would also get a non-returnable grants-in-aid of Rs 2 crore from ICRISAT to fund its capital expenditure, while Rs 50 lakhs is extended by National Science & Technology Entrepreneurial Development Board (NSTEDB) and Technology Business Incubator of Department of Science and Technology towards the recurring expenditure. For the remaining finance the ABC is looking out from funding agencies. The technology focus areas of ABC would include bioinformatics, transgenics, genomics, diagnostics, tissue culture, water shed management and pesticides. *Source:* www. Financialexpress.com Dec 4, 2002.

Field trials for GM chickpea by 2004

The International Crops Research Institute for Semi-Arid Tropics (ICRISAT), here is hopeful of conducting field trials of genetically modified seed of chickpea by 2004. The institute is currently testing the transgenics in greenhouses. The institute is using biotechnology to address several pests of chickpea including *helicoverpa pod borer, botrytis gray mold, ascochyta blight, dry root rot,* drought and cold. Protocols for efficient transformation and regeneration of chickpea have been developed. The transgenics had been successfully produced for resistance to pod borer by using genes derived from the bacterium, Bacillus thuringiensis and soyabean trypsin inhibitor. The molecular characterisation and bioassays are currently going on. The first field trial of this product was anticipated by 2004. ICRISAT has also taken up a project, funded under the Indo-Swiss collaboration in biotechnology, for developing transgenic chickpea that would

be tolerant to drought and low temperature stresses by using genes with regulatory functions such as drought responsive elements and osmo – regulation. The global demand for chickpea, as per ICRISAT's estimates, will be around 11.1 million tonnes (mt) by 2010 as against 8.2 mt in 2001-02, an increase of 35 per cent. Approximately 85 per cent of the additional demand will come from India. A combination of yield and area expansion is the possible option in meeting the projected additional demand. At present, global productivity of chickpea at 0.8 tonnes per hectare is far below the potential of 5 tonnes per hectare.

Apart from chickpea, ICRISAT is the first institute to develop transgenic groundnut in the world. Its transgenic peanuts have reached the field trial stage and it was expected to conduct open field trial by this year-end. These groundnuts are engineered with the genes for resistance to Indian Peanut Clump Virus (IPCV), which is widespread in the country. Last year, the Department of Biotechnology had given permission to carry out field trials under controlled conditions. ICRISAT is also in the process of developing genetically modified pigeon pea, sorghum and pearl millet. The institute has found that some of its pearl millet genotypes with yellow endosperm were having beta-carotene levels comparable to those of "golden rice". *Source:* Hindu Business Line, Monday, Jan 20, 2003.

New University at Japan for Biosciences

Although the government is aware that bio-related businesses are important for revitalizing the economy, this field has yet to be developed in Japan at the level seen in other countries. To improve the situation, a new university specializing in bioscience and biotechnology will open in April in Nagahama, Shiga Prefecture. The Nagahama Institute of Bioscience and Technology will not only train people in advanced knowledge and skills, but, also help them will to generate new bio-related businesses. In the rapidly evolving field of bioscience and biotechnology, Japan is far behind other industrialized nations in terms of having people with expertise who are also able to apply it to business. And the new university will help to improve the situation. Now there is the need to create a four-year university course specializing in bioscience and technology.

Biotechnology College, Kyoto, was set up about 10 years ago and is doing very well, with enrollment always reaching its full quota, and almost 100 percent of graduates finding jobs. Strong needs from businesses for young people with high expertise are felt as the field is developing very swiftly and is diversified. This idea gained support from the Shiga Prefectural Government and the Nagahama Municipal Government, both of which had been seeking ways to revive the local economy. The university will be located on a 4-hectare plot within the 12.5-hectare Bioscience Park, which was developed by the city of Nagahama. According to a report compiled in November by the national government's Biotechnology Strategy Council, Japan's bio-related market was worth 1.3 trillion yen in 2001, compared with 3 trillion yen in the United States and 2 trillion yen in Europe. Meanwhile, the number of Japanese with bachelor's degrees in biology and pharmacology was less than one-sixth that of Americans holding bachelor's degrees in biological science.

The council has also noted that the total government budget for bio-related fields stood at 44 million yen in fiscal 2002, compared with $27.3 billion (3.3 trillion yen) the U.S. National Institute of Health would allocate for fiscal year 2003. The council called for doubling the budget in five years, as the bio-industry market is expected to grow to 25 trillion yen in 2010 and result in more than 1 million jobs. Japan lags behind other industrialized countries in generating bio-related businesses because of the rampant sectionalism within universities and government ministries, as well as its failure to train business-minded bio-specialists. The existing universities are too big to be flexible in meeting the needs of the real business world. It is only in recent years that Japan has begun to see some venture businesses being launched by university professors. To promote interdisciplinary education, as bio-related research crosses over many fields, including science, agriculture, engineering and pharmacology, the university will have only one department of bioscience, covering five fields: genetic science, molecular science, environmental life science, cell life science and life information science. A graduate school will open in three years. The university will provide education and training with emphasis on research that can be applied in the real

business world. The study of "bio-informatics," which unites information and bioscience technologies, will also be offered. The university plans to promote cooperation with overseas universities, including Beijing University and Stanford University. Source: The Japan Times, January 1, 2003.

Australia approves limited GM Cotton release

The Australian Office of Gene Technology (OGTR) has approved three new applications for the conditional release of GMOs. The Commonwealth Scientific and Industrial Research (CSIRO) has been granted a licence for the intentional release of GM insecticidal (INGARD® and Bollgard II®) and insecticidal/herbicide tolerant (Bollgard II®/Roundup Ready®) cotton into the environment on a limited scale and under controlled conditions. CSIRO proposes to carry out a limited and controlled release at five sites, Katherine and Douglas Daly in the Northern Territory and at Kununurra in Western Australia, over a total area of 136.5 hectares. A second application by CSIRO for the intentional release of genetically modified (GM) insecticidal cotton into the environment, on a limited scale and under controlled conditions has also been approved by the OGTR. This limited and controlled release will take place on three sites, in the shire of Wyndham-East Kimberley, over a total area of 3 hectares. None of the cotton plants from the release, or their by-products, would be used for animal and human food. A third application has also been approved.

The OGTR has received an application from the Department of Agriculture, Western Australia (WA) for a licence for the intentional release of GM insecticidal (INGARD® and Bollgard II®) and insecticidal/herbicide tolerant (Bollgard II®/Roundup Ready®) cotton into the environment on a limited scale and under controlled conditions. The Department proposes to carry out a limited and controlled release at 30 sites, Kununurra and Broome in Western Australia, over a total area of up to 500 hectares. None of the cotton plants from any of these releases, or their by-products, will be used for human food. *Sources:* www.ipmworld.com.au/articles.php3?rc=186.