CROP BIOTECH UPDATE

A weekly summary of world developments in agri-biotech for developing countries, produced by the Global Knowledge Center on Crop Biotechnology, International Service for the Acquisition of Agri-biotech Applications
SEAsiaCenter (ISAAA), and AgBiotechNet

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MEXICO APPROVES GM LAW

Mexican legislators approved a new law to regulate genetically modified (GM) crops. The law was approved by a vote of 319 to 105, with 17 abstentions.

While oppositionists claimed that the new law would endanger corn diversity in Mexico, supporters said however, that GM crops would now be regulated and undergo evaluation of any possible risks to human health and the environment.

See the full story in http://story.news.yahoo.com/news?tmpl=s tory&cid=570&ncid=753&e=8&u=/nm/20041215/sc_nm/food_mexico_law_dc

MALAYSIA TO USE BIOTECH TO SPEED UP AGRIC DEVELOPMENT

Johor, Malaysia will develop biotechnology as part of its plans to diversify the state economy. Menteri Besar Datuk Abdul Ghani Othman said while manufacturing and services would continue to be the mainstay of the economy, the new thrust would be agriculture, with the focus on biotechnology. An initial project will be the opening of 1,215 hectares of new agriculture land in Sisik near Kota Tinggi where a RM 1 million tissue-culture laboratory will be set up.

Othman added that work will be done with local universities to encourage research and development on herbal farming to extract derivatives for use in health products. He noted that Johor is keen to develop its own range of products from local traditional herbs.

News about biotechnology in Malaysia are available from the Malaysian Biotechnology Information Centre at http://www.bic.org.my/BICalert/1204/p1.html.

FAO DOCUMENT ON PUBLIC PARTICIPATION IN GM DECISIONS

The importance of public participation in decision-making has been increasingly recognized by policy makers. Specifically, the public can be involved in various aspects of the decision-making process with regards genetically modified organisms (GMOs). These can be in national policy dialogues, developing a regulatory framework for GMOs, approval of individual GM products, and post-release monitoring.

Three recently adopted international instruments are of special relevance to public participation in decision-making about GMOs. These are the Aarhus Convention (i.e. the United Nations Economic Commission for Europe (UNECE) Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters; the Cartagena Protocol on Biosafety to the Convention on Biological Diversity; and the Codex principles on risk analysis.

These are some points in a background document released by the Food and Agriculture Organization in preparation for an e-mail conference entitled "Public participation in decision-making regarding genetically modified organisms (GMOs) in developing countries: How to effectively involve rural people".

The e-mail conference runs from 17 January to 13 February 2005 and is hosted by the FAO Biotechnology Forum. To join the Forum (and also register for the conference), send an e-mail to mailserv@mailserv.fao.org leaving the subject blank and entering only the following text on two separate lines: subscribe BIOTECH-L subscribe biotech-room4.

A copy of the document is available at:http://www.fao.org/biotech/C12doc.htm

ASIAN VEGETABLE BECOMES INDICATOR OF SOIL ARSENIC LEVELS

In Distribution of Arsenic in Kangkong (Ipomoea reptans), Mizanur Rahman and Preeda Parkpian of the Asian Institute of Technology in Thailand used the local leafy vegetable to assess how easily plants could accumulate arsenic from the soil, and how the application of phosphorous-based fertilizers could influence uptake of the toxic element. Their findings are published in the latest issue of Science Asia.

Using a pot experiment on kangkong in Khulna, Bangladesh, a country which constantly faces the problem of high levels of arsenic in its food chain, researchers found that applying arsenic to the soil significantly increased its accumulation in plants, with the highest levels found in the root; and that phosphorous-based fertilizers, also widely used in developing countries, could enhance arsenic accumulation.

Kangkong is an important vegetable in Asia, and is an excellent source of vitamin A, vitamin C, calcium, iron, potassium, and phosphorus. However, with the danger of long time consumption of arsenic contaminated food and water,

consumers are also in danger of suffering from kidney, liver, lung, and bladder damage.

Download the complete article at http://scienceasia.tiac.or.th/PDF/vol30/v30_255_259.pdf

DNA REPAIR MAY LEAD TO EVOLUTION, NEW TRANSGENIC TECHNIQUES

The little mustard Arabidopsis and the tobacco plant are both dicots, but the latter's genome is over twenty times larger, even as Arabidopsis' is more complex. What, then, spells the difference and complexity? Holger Puchta of the University of Karlsruhe, Germany attempts to answer the question in the latest issue of The Journal of Experimental Botany.

In "The repair of double-strand breaks in plants: mechanisms and consequences for genome evolution," Puchta looks at various proposed techniques for DNA repair in plants, especially for damage caused by double-strand breaks (DSBs). DSB repair is important for the survival of all organisms, as it has to be performed before genomes can be replicated; and, considering that it entails removing or replacing entire stretches of DNA, it may be the key to understanding why some plants have more DNA than others, or why some genes are missing or duplicated.

Generally, DSB's can be repaired by either homologous recombination (HR), where sequences are linked in regions that are nearly identical in sequence to each other; or non-homologous end joining (NHEJ); also known as illegitimate recombination, where DNA sequence information does not play a major role in the rejoining of the two double strands.

Since sequence substitution or removal are involved, induced DSB's and DSB repair may also one day be used in the controlled induction of genomic changes in plants, Puchta says.

For a more detailed discussion of DSB repair, download the review at http://jxb.oupjournals.org/cgi/reprint/56/409/1.

THIS CHRISTMAS, THE TREE'S THE GIFT

Phenolics are a class of plant compounds that have found many a therapeutic use, and now, scientists have found them in the Scotch Pine, widely used for Christmas trees. This time, the phenolics found can be developed into food supplements or drugs for treating arthritis and pain. The findings are scheduled to appear in the Dec. 29, 2004 print issue of the Journal of Agricultural and Food Chemistry.

Researchers studied several different preparations of pine bark extract taken from the Scotch pine (Pinus sylvestris) and identified up to 28 compounds through nuclear magnetic resonance and mass spectrometry. Some of the fractions obtained already had previously studied biological activity, including ferulic acid, vanillin, and matairesinol.

They then tested the extracts against mouse macrophages, which produce nitric oxide and prostaglandin E2. Both compounds are turned out in excess amounts

during disease or injury, and are linked to arthritis, circulatory problems, and pain. Treating the cells with highly purified bark extract resulted in lower nitric oxide production by 63%, and prostaglandin production by 77%.

Research has shown that pine bark, long used as folk medicine to treat coughs and wounds, also has the potential to relieve high blood pressure, asthma, heart disease, and skin cancer. Researchers caution, however, that the extract used in the study has not yet been tested in animals or humans.

Download the article, "Phenolic Extractives from the Bark of Pinus sylvestris L. and Their Effects on Inflammatory Mediators Nitric Oxide and Prostaglandin E2," at http://pubs.acs.org/journals/jafcau/index.html.

EU INITIATIVE SUPPORTS OLIVE RESEARCH

The European Union (EU) has recently organized TDC-OLIVE – a Technology Dissemination Center devoted to research on olive oil, as well as modernization and increasing the competitiveness of small and medium size enterprises working in the sector. The initiative, EU hopes, will promote olive oil and table olive consumption in non-Mediterranean European countries.

About 77% of the 2.2 million tons of olives produced annually are sourced from Europe. Spain, Italy, and Greece are the largest producers, followed by Portugal and France. TDC-OLIVE hopes to improve the industry through training programs of olive mills´ and table olives producers´ technical competence and competitiveness.

Recent research has shown that extra virgin olive oil, and the Mediterranean diet of tomatoes and fish, appear to combat heart disease. Olive oil production, however, negatively impacts the environment due to the large amounts of water required for field upkeep, and the non-disposable, non-recyclable residues from the purification process.

For further information about TDC-OLIVE, please visit: http://www.tdcolive.net. Read the news article at http://dbs.cordis.lu/fep-cgi/srchidadb?ACTION=D&SESSION=48052004-12-15&DOC=9&TBL=EN_NEWS&RCN=EN_RCN_ID:23062&CALLER=EN_NEWS

MONSANTO INTRODUCES TRIPLE TRAIT TECH

Monsanto Company will make available the first triple trait offering, YieldGard Plus with Roundup Ready Corn 2 technology, for 2005 season planting in the United States. The new product will offer corn growers in-seed protection against harmful corn insects and the flexibility of herbicide tolerance in one seed.

The latest technology provides corn growers both above and below the ground protection against Western and Northern corn rootworm larvae and the European corn borer, and weed control. Monsanto adds that corn growers have benefited from the flexibility and convenience of Roundup Ready and YieldGard and will now get more profits from its latest product.

More on this new technology from http://www.monsanto.com/monsanto/layout/media/04/11-22-04.asp.

Document Reminder

IFPRI Releases Research Papers

Two research papers, conducted by the International Food Policy Research Institute (IFPRI) have been released online.

In “Managing Resources in Erratic Environments,” Nancy McCarthy and colleagues focus on research on resource management for three drought-prone countries of sub-Saharan Africa: Burkina Faso, Ethiopia, and Niger. They find that a) there is little evidence of dramatic misuse of land resources by herders, b) stock densities are lower precisely in areas with very high rainfall variability, and c) greater cooperative capacity significantly reduces grazing pressure on home resources.

Philip Pardey and colleagues assess varietal improvements on important crops in Brazil in “Assessing and Attributing the Benefits from Varietal Improvement Research in Brazil,” paying particular attention to genetic enhancement of upland rice, edible beans, and soybeans. According to the study, Brazil was estimated to receive $16 of benefit from every dollar invested in crop improvement. These benefits to Brazil came from either maintaining yields in the face of pressures that would otherwise cause them to fall, or improving the yield performance over time relative to base-year yields.

Download the papers at http://www.ifpri.org

CBTNEWS FEATURE: DR MS SWAMINATHAN

Dr. Monkombu Sambasivan Swaminathan, known as the architect of India’s “Green Revolution, was born on 7 August 1925 in Tamil Nadu, India. In 1952, he earned his PhD in genetics from Cambridge University, and then did further studies in Wisconsin, USA where he assisted in establishing an Inter-Regional Potato Introduction Station at Sturgeon Bay, Wisconsin. He developed methods of distant hybridization, leading to novel and economically valuable genetic combinations.

Dr. Swaminathan turned down a professorship and returned to India to fulfill his passion to make India self sufficient in food. He then joined the Indian Agricultural Research Institute (IARI) in New Delhi where he built up the wheat and rice germplasm collections, and helped collect over 7000 rice strains from the north-east region of India.

By 1966, Dr. Swaminathan was director of the IARI and spent his time in fields with farmers trying to help improve their productivity. In 1967, he and his team developed a high-yielding wheat variety. He brought into India seeds developed in Mexico by U.S. agricultural guru Norman Borlaug and, after cross-breeding them with India local species, created a wheat plant that yielded much more grain than traditional types. Scientists at the International Rice Research Institute (IRRI) accomplished the same miracle for rice. These were the breakthroughs of the Green Revolution. However, because of traditional practice in agriculture, there was tremendous hesitance for the adoption of the new seeds developed. To break the resistance of farmers reluctant to switch to unfamiliar seeds, Dr. Swaminathan set up thousands of small test plots all over the northern region of the India where he convinced farmers to plant new wheat

varieties. The first harvest with the new seeds was found to be three times greater than the previous year's.

Dr. Swaminathan also became the Director General of IRRI from 1982-1988, where he organized the International Rice Germplasm Centre (IRGC) with an international advisory board. He launched special expeditions to collect wild rices from “hot spot” locations. Dr. Swaminathan also played a critical role in the development of the draft on the Convention on Biological Diversity when he was the President of the International Union for Conservation of Nature and Natural Resources.

In July 1988, Dr. Swaminathan established The M.S. Swaminathan Research Foundation as a nonprofit organization with the goals of preserving regional ecosystems, developing innovative technology to help realize sustainable agriculture, and promoting the application of ecotechnology in agricultural communities.

Notable among the many awards he has won are the Ramon Magsaysay Award for community leadership in 1971, the Albert Einstein World Science Award in 1986, the first World Food Prize in 1987, Volvo Environment Prize in 1999, and the Franklin D. Roosevelt Four Freedoms Award in 2000. The Indian government conferred on him Padma Shri in 1967, Padma Bhushan in 1972 and the Padma Vibhushan in 1989.

Dr. Swaminathan also serves as one of the patrons of the International Service for the Acquisition of Agribiotech Applications (ISAAA).

http://www.time.com/time/asia/asia/magazine/1999/990823/swaminathan1.html and http://www.geneconserve.pro.br/bio_swaminathan.htm

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