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)

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In This Issue:

KENYA BEGINS FIELD TRIALS OF GM MAIZE

After several years of research, Kenya has finally started field trials of genetically modified maize. The Kenya Agricultural Research Institute (KARI) and the International Maize and Wheat Improvement Center (CIMMYT) began planting the maize modified to resist stem borers, which cause 20 per cent crop loss to farmers every year.

"We are pleased to announce the field trials of the GM maize after five years of laboratory research, as part of an innovative approach to help local farmers minimize the devastating effects of stem borers," said KARI Director Romano Kiome.

Speaking during the farm planting at KARI Kiboko Center, about 20 km south east of Nairobi, Dr. Stephen Muga, a CIMMYT plant breeder, said that if the trials are successful, the eventual introduction of GM maize would help increase farmers' income and contribute to less dependence on maize imports.

Kenya produced 2,142,000 tons of maize last year, imported 241,800 tons at a cost of 4.6 billion shillings ($60 million), and lost 400,000 tons to stock borer, according to government official figures.

News provided by Daniel Otunge (dotunge@absfafrica.org) of the Kenya Biotechnology Centre and the African Biotechnology Stakeholders Forum.

NO AGREEMENT AT MONTREAL BIOSAFETY CONFERENCE

Despite aiming to finalize international trade rules for genetically modified commodities in Montreal, the 118 countries and the European Union, who are members to the Cartagena Protocol on Biosafety, ended their second meeting without agreeing on the shipping documentation requirements for bulk shipments of living modified organisms (LMOs) or GMOs intended for food, feed, and for processing.

According to the Protocol, a decision was supposed to have been made on the detailed requirements for such documentation within two years of the entry into force of the Protocol. Discussions will continue at the third meeting of the Parties, scheduled to take place in Curitiba, Brazil, in March 2006.

In the meantime, Parties will follow a Protocol guideline that requires member governments to take measures to ensure that documentation accompanying GMOs intended for direct use as food, or feed, or for processing, clearly identifies that the shipment "may contain living modified organisms (LMOs) that are intended for use as food, or feed, or for processing and states that they are not intended for intentional introduction into the environment."

Download a copy of the press release at http://www.biodiv.org/doc/press/2005/pr-2005-06-03-bs-en.pdf or find out more about the Montreal meeting at http://www.biodiv.org/default.shtml.

PERFORMANCE OF BT COTTON VARIETIES COMPARED

In Comparing the Performance of Official and Unofficial Genetically Modified Cotton in India, Stephen Morse and colleagues at the University of Reading, United Kingdom analyze yield and cost data from the planting of India's officially approved Bt cotton hybrids, MECH 12 and MECH 162; unofficial hybrids referred to as F1 and F2; and a number of different non-Bt varieties. Their work appears online in the latest issue of AgBioForum.

Using survey data, obtained during December 2003 and January 2004, from 622 farmers in Gujarat State; as well as data on 306 plots planted to official hybrids, 169 to unofficial, and 151 to non-Bt ones; researchers found that a) official Bt varieties significantly outperform unofficial varieties in terms of gross margin, b) official Bt varieties produced the highest yields, from 20-37% greater than unofficial varieties, c) inorganic fertilizer costs are highest for MECH 162 seeds, d) irrigation costs are lowest for MECH 12 seeds, and e) bollworm spray use and cost is lowest for the official MECH 162 variety.

For more information, read the article at http://www.agbioforum.org/v8n1/v8n1a01-morse.htm

NEW OUTLOOK GOOD FOR PLANTS AS FUEL

Two recent studies in the journal Science report that plant-derived hydrocarbons may one day be used to fuel cars, replacing fossil fuels which cause air pollution.

Work on using plants for fuel has hitherto focused on burning them, then converting the heat to electricity – a method unsuitable for long-haul trips, since electric cars have to be recharged constantly. Since then, scientists have focused on converting plant material into fuel that vehicles can use directly. In the newest study, researchers have found a way to harness the power of plant carbohydrates, which make up about 75% of a plant's dried weight.

In one study, scientists used a platinum catalyst to facilitate the reaction between plant carbohydrates and hydrogen gas, producing short carbon chains. In the next step, they used a magnesium based catalyst, this time to link the products from the first step together, to produce the longer carbon chains required for fuel. With more pressurized hydrogen and another platinum catalyst, scientists succeeded in delivering a finished fuel similar to conventional diesel.

Access the article at http://www.nature.com/news/2005/050531/full/050531-6.html. Subscribers can also access the individual scientific journal articles at http://dx.doi.org/10.1126%2Fscience.1111166 and http://dx.doi.org/10.1126%2Fscience.1085597.

PLANTS IDENTIFIED BY DNA PROFILING IN STUDY

Dr. W. John Kress and colleagues of the Smithsonian Institution demonstrate the Use of DNA Barcodes to Identify Flowering Plants, a study detailing techniques on plant DNA profiling using methods commonly applied to animal samples.

Their work appears in the latest issue of the Proceedings of the National Academy of Sciences.

One method used in DNA profiling is PCR (or polymerase chain reaction) amplification of a short segment of DNA whose copy number, length, or sequence may be different from individual to individual. The cytochrome c oxidase 1 sequence is widely applicable to animal DNA profiling, but cannot be used for plants, since its rate of evolution is much slower.

In the study, researchers demonstrated that the trnH-psbA intergenic spacer, present in plastid DNA, is a potential target for plant DNA profiling, at least for flowering species. Using data from analysis of the plastid genomes of the deadly nightshade (*Atropa belladonna*) and *Nicotiana tabacum*, researchers developed specific primers for the spacer sequence, then tested them by conducting PCR on 99 species, from 80 genera, and 53 families of flowering plants. Results showed that use of the spacer could discriminate amongst the species, some of which were museum specimens around 20 years old.

To download the article, go to http://www.pnas.org/cgi/content/full/102/23/8369

REPORT EXPLORES COTTON INDUSTRY GROWTH IN INDIA

The United States Department of Agriculture has recently released its Electronic Outlook Report from the Economic Research Service. Growth Prospects for India's Cotton and Textile Industries is written by Maurice Landes and colleagues, and projects India's progress in the cotton industry by looking at data on, among other things, trade, export, and domestic consumption.

The report finds that demand for cotton and manmade fibers in India will likely strengthen in response to rising consumer demand in India, and increased exports of textiles and apparel following the removal of the Multifiber Arrangement quotas. The researchers likewise looked at Bt cotton, and saw its potential to improve cotton yields. India recently approved 12 new Bt cotton varieties for its cotton-producing states, in addition to the 19 already available for cultivation.

In 2002, India was the fifth-largest global exporter and second largest net exporter of textiles and clothing. Their area planted to cotton is larger than any other in the world, consisting of 25% of the global cotton area.

Download the study at http://www.ers.usda.gov

NEW METHOD DETECTS AGROBACTERIUM IN GM PLANTS

Vikrant Nain and colleagues, scientists from the Indian Agricultural Research Institute (IARI), performed Polymerase Chain Reaction Analysis of Transgenic Plants Contaminated by *Agrobacterium*. Their article appears in Plant Molecular Biology Reporter.

Agrobacterium-mediated transfer of genes is a popular method for producing transgenic plants, but the presence of *Agrobacterium* DNA can interfere with results obtained by polymerase chain reaction (PCR) analysis of putative transgenic lines. Detecting this contamination is difficult, since current methods are not sensitive enough, or may require radioactivity or large amounts of tissue and processing time.

The new method involves the use of restriction enzymes, which can cut the *Agrobacterium* vector at a site known to interfere with PCR analysis, while leaving the plant genomic DNA unaffected. Once this site is disrupted, it can no longer be amplified by PCR, and will therefore not interfere with PCR results. The method has been tested on, and proven effective with selecting transgenic tobacco lines transformed with the *Bacillus thuringiensis* vegetative insecticidal protein gene (vip3A).

Download the complete article at http://ginkgo.cisti.nrc.ca/ppv/RPViewDoc?_handler_=HandleInitialGet&journal=ispmb&volume=23&articleFile=r05-019.pdf

STUDY SHOWS CLIMATE CHANGE EFFECT ON PLANT SPECIES

The fate of plant species in Europe takes center stage in a study by Wilfried Thuiller, of the Centre National de la Recherche Scientifique-Unite´ Mixte de Recherche, in Montpellier, France, and colleagues. Their work, Climate Change Threats To Plant Diversity In Europe, is published in the Proceedings of the National Academy of Sciences.

Using climate data obtained from the Climatic Research Unit of the United Kingdom, researchers projected future climate scenarios, and consequently, distributions for 1,350 European plants in the late 21st century. They found that more than half of the species studied could be vulnerable to or threatened by extinction by the year 2080, with species loss and turnover found to depend strongly on the degrees of change in temperature and moisture.

Researchers also expected the greatest changes in plant species populations in the transition between the Mediterranean and Euro-Siberian regions. The southern Mediterranean, in contrast, with its hot and dry summers, is home to

species tolerant to heat and drought, making the plant species hardier and better adapted to future climate conditions.

For more information, download the article at http://www.pnas.org/cgi/content/full/102/23/8245

CBTNEWS FEATURE: THE INTERNATIONAL WATER MANAGEMENT INSTITUTE (IWMI)

Also a member of the Consultative Group on International Agricultural Research, the International Water Management Institute (IWMI) is a scientific research organization focusing on the sustainable use of water and land resources in agriculture, and on the water needs of developing countries.

As with the rest of the CGIAR centers, IWMI works with its partners in the South to develop tools and methods to help these countries eradicate poverty through more effective management of their water and land resources. Its research projects span 21 countries in Asia and Africa, and work is coordinated through regional offices located in India, Pakistan, South Africa, Sri Lanka and Thailand.

The objectives of IWMI's work include identifying issues related to water management and food security, especially those which need to be addressed by governments and policymakers; developing, testing, and promoting management practices and tools that can be used by governments and institutions to manage water and land resources more effectively, and address water scarcity issues; clarifying the link between poverty and access to water; and helping developing countries build their research capacities to deal with water scarcity and related food security issues.

IWMI's research is organized around five themes: Integrated Water Resource Management for Agriculture; Sustainable Smallholder Land and Water Management; Sustainable Groundwater Management; Water Resource Institutions and Policies; and Water, Health and Environment.

The first theme is of special interest to those working in agricultural biotechnology, as it seeks to influence how investments in irrigation development are made; develop and disseminate research tools to enhance understanding of issues related to the management of irrigation water; and provide tools, processes, and knowledge to adapt and respond to new and changing needs and expectations. Under this theme, the IWMI studies water productivity in India and Pakistan, control of waterlogging and salinity in South Asia, and water saving practices in China, among many other projects.

Visit the institute at http://www.iwmi.cgiar.org

DOCUMENT REMINDER: BIO-ERA REPORT RELEASED FOR PURCHASE

Agbiotech 2005: Report on Regional Trends in GM Crop Adoption and Acceptance, completed by Bio Economic Research Associates, or bio-era, a research and advisory firm, has been released for purchase online.

The special report evaluates commercial, technical, and regulatory factors that characterize the business environment for genetically modified (GM) products for each of five regions: Asia-Pacific, Latin America, Africa, Europe and North America, and for key countries within Africa, Asia, and Latin America. Regions and key countries are evaluated with respect to the availability of GM crops to meet local requirements, government support for research and development in agricultural biotechnology, intellectual property regimes, consumer acceptance levels, GM crop approvals, and regulations restricting GM products.

The report is priced at US$ 250. To purchase it, or for more information, visit http://www.bio-era.net/research/add_research_21.html

ANNOUNCEMENTS

PROPOSALS SOUGHT ON RISK ASSESSMENT

As part of the GEF-World Bank Capacity Building Project for Implementation of the Cartagena Protocol, the Ministry of Environment and Forests, in partnership with the South Asia Biosafety Program, are seeking proposals for the project "Environmental Risk Assessment and Decision-Making Support for LMOs in India". This project is a review and comparative analysis of the regulations, guidelines and procedures, with particular attention to information/data requirements, used in India by regulatory authorities and/or their designates for the environmental risk assessment and approval of transgenic plants. This will include the extent to which, and how, socio-economic or other non-safety considerations related to LMOs are taken into account during the decision-making process surrounding field trials and/or commercial releases of transgenic crops. Respondents should have: regulatory expertise in, and preferably first-hand experience with, the approval process for transgenic crops in India, and experience in cost-benefit analysis (e.g. ex ante studies of technology/regulatory impacts on agriculture). For more information, please see the Call for Proposals found under Advertisements at http://envfor.nic.in/. Please note that the deadline for proposals has been extended to June 30, 2005.

TWO BIOTECH CONVENTIONS SET FOR LATE 2005

The Cordia Biotechnology Convention and BioPartnering Europe (BPE) will take place in London, United Kingdom, from the 9th -13th October 2005, through the support of EuropaBio. The events coincide with the United Kingdom taking on the presidency of the European Union (EU), and are targeted at the biotechnology industry.

For further information on the programme and how to participate, go to www.cordiaconvention.com, or download the brochure at http://www.europabio.org/events/cordia2005.pdf

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