

## **CROPBIOTECH UPDATE**

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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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**NEWS**

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**ASIA**

### **CHINA TO PUSH BIOTECH CROP STUDIES**

China is prepared to work toward finding wider applications of agricultural biotechnology in the next five years, since the sector's growth is important to the country's overall development. According to Qi Chengyuan, director of the High and New Technology Department under the National Development and Reform Committee, the country has already drafted its biotech development strategy for 2006-2010. Within the strategy are efforts to develop biotech seeds for major crops and to increase investment in biosafety monitoring, and the establishment of a new biosafety committee.

Zhu Zhen, leading promoter of genetically modified (GM) rice technology in China, believes the strategy will help increase the number of biotech applications in agriculture. "The better regulation of the GM plants is a good thing," Zhu says, "With more biosafety and environmental scientists joining the review team for GM crops, the team will have more direct experience on the safety and efficiency of GM technology."

According to the China Bio-Industrial Report, released by the China National Center of Biotechnology Development (CNCBD), the Ministry of Agriculture has approved as of mid-2003 585 GM plant experiments, including 154 environmental releases and 48 pre-production trials. The Chinese Government approved commercialization of GM cotton, tomato, pepper, and a species of morning glory in the late 1990's.

Read the complete article at [http://www.chinadaily.com.cn/english/doc/2006-02/14/content\\_519769.htm](http://www.chinadaily.com.cn/english/doc/2006-02/14/content_519769.htm). For more information, write to the China Agricultural Biotechnology Information Center (CABIC) at [cabic@cncbd.org.cn](mailto:cabic@cncbd.org.cn).

### **U.S., PHILIPPINES SHARE SAME BIOTECH CHALLENGES, ARTICLE REPORTS**

The United States faces many of the same biotechnology challenges as the Philippines, says Yali Friedman, Ph.D, chief Knowledge Officer at Washington, DC-based innovation-based economic development firm New Economy Strategies. His article, "Developing Biotechnology in The Philippines - Filipinos Share the Same Challenges as Many Americans," appeared in a recent issue of the Manila Bulletin, a daily newspaper in the Philippines.

The challenges to developing biotechnology, Friedman says, include weak R&D infrastructure, a lack of start-up financing and support, and little government support – a situation common to both the United States and the Philippines. In order to develop biotechnology in the country, Friedman suggests that the Philippines must “focus on its unique combination of assets and gaps. An economic development plant must be carefully structured to consider the specific strengths, weaknesses, and opportunities present in the Philippines.”

Read the complete article at

<http://www.mb.com.ph/issues/2006/02/08/TECH2006020855842.html>. For more information, send an e-mail to the Philippine Biotechnology Information Center at [bic@agri.searca.org](mailto:bic@agri.searca.org) or visit their website at <http://www.bic.searca.org/>.

## **VALUE-ADDED FOODGRAINS PROJECT SLATED FOR INDIA**

Thirteen premier research institutions in India have joined hands to ensure value added food-grains are developed to combat malnutrition nationwide. Partnering the institutions is HarvestPlus, an international bio-fortification program. The initiative is led by the International Rice Research Institute (IRRI) and the International Food Policy Research Institute (IFPRI).

“Iron and zinc deficiency are very serious public health problems in India,” said M.K. Bhan, Secretary of Biotechnology, at a three-day conference of national and international experts held in the M.S. Swaminathan Research Foundation, “Even if our socio-economic conditions were to improve, iron deficiencies will remain for years to come.”

The project is expected to change the quality of life for millions who are now experiencing “hidden hunger.” India is believed to have the world's largest conglomeration of malnourished people, with half the country's children reported to be underweight.

In related news, India's government is now considering a crop diversification program intended to change current rice and wheat cultivation practices. The plan is to adopt shorter-duration varieties of rice and wheat, and mix vegetables and pulses in the year-round cultivation of both crops. The program will be introduced initially to Punjab and Haryana this year.

Read the complete stories at <http://ricenews.irri.cgiar.org/>, <http://www.newkerala.com/news2.php?action=fullnews&id=10133>, and <http://www.thehindubusinessline.com/2006/02/18/stories/2006021802231200.htm>. For more information, contact Bhagirath Choudhary of the ISAAA South Asia Office at [b.choudhary@cgiar.org](mailto:b.choudhary@cgiar.org).

## **AUSTRALIA**

### **SUCCESS FACTORS FOR AGRICULTURE IN AUSTRALIA**

The Agriculture and Food Policy Reference Group has released a report on “Creating our future: Agriculture and food policy for the next generation” which it submitted to the Australian Minister for Agriculture, Fisheries and Forestry. It identified principal issues and challenges that the country should consider if the agriculture and food sector is to be successful over the next 10 to 15 years.

Among the report’s recommendations include a stronger emphasis on innovation in production and marketing, sound macroeconomic and microeconomic policies, reduction in regulatory burden, more timely and accurate communication of relevant information, and partnership between businesses and governments.

The report also devoted a section on biotechnology. It highlighted the need for the Australian government to:

- \* Give higher priority to communicating the benefits of current and emerging agrifood biotechnology.
- \* Publicize the strength of the regulatory regime for the safety of research and the resulting products.
- \* Work with agriculture and food businesses to facilitate the rapid uptake of agrifood biotechnologies.
- \* Lift moratoriums on the commercial use of GM crops immediately.

The full report is available online at

[http://www.agfoodgroup.gov.au/next\\_generation.html](http://www.agfoodgroup.gov.au/next_generation.html)

## **AFRICA**

### **CIMMYT DEVELOPS HERBICIDE RESISTANT MAIZE HYBRIDS**

The International Maize and Wheat Improvement Center (CIMMYT), in collaboration with public and private partners, has developed and tested 26 Imidazolinone-resistant (IR) 3-Way maize hybrids, across 18 sites in several sub-Saharan African countries. These hybrids are available to National Agricultural Research Systems (NARS) and seed companies in eastern and southern Africa companies for inclusion into trials to decide on variety registration, release, and eventual commercialization in various sub-Saharan African countries.

Imidazolinone-resistance (IR) is a natural form of herbicide resistance originally discovered in mutation-derived populations. Imidazolinone herbicides possess high biological potency at low application rates, and thus are an attractive alternative for weed control. The seed of IR-hybrids coated with Imidazolinone offers an effective protection against Striga, a flowering parasitic plant with devastating effects on crop production in sub-Saharan Africa. In trials, IR-hybrids show a 50% increase in yield and provide close to 100% Striga control. Without Imidazolinone seed treatment, the same hybrids can be commercialized in non-Striga affected areas.

For more information write to Ms. Ebby Irungu ([e.irungu@cgiar.org](mailto:e.irungu@cgiar.org)) or visit: <http://www.africancrops.net/striga/CIMMYT-IR-Maize-Hybrids.pdf>

## **EAST AFRICA COUNTRIES MEET ON BIOTECH**

The Eastern African Dialogue on Policy-Making and Biotechnology, Trade, and Sustainable Development was held on February 14-17 in Jinja, Uganda. It brought together a wide range of stakeholders from the Eastern Africa Region, including members of government and intergovernmental organizations, civil society groups, academia, industry, and the media. Together, they deliberated on the formulation of coherent, informed, and inclusive policies on trade, biotechnology, and sustainable development at the national, regional, and multilateral levels.

“Most African agriculture remains of a subsistence nature and most farmers grow non-cash crops. Introduction of agro-biotech suggests a shift to cash crops and industrialized agriculture. This, combined with reforms of agricultural policy and economic models, could also soon lead to export-led use of soils and farming,” Ricardo Meléndez-Ortiz, ICTSD executive director, said in his opening speech, “That is not an insignificant socio-cultural transformation and it would involve significant numbers of peoples and fields.”

Participants urged governments to formulate public policy objectives related to biotechnology, make sure biotechnology enhances public policy objectives, ensure public participation and awareness of the technology, guarantee policy coherence in biotechnology, contribute financial resources and funding for biotechnology, and strengthen technical assistance and capacity building.

The dialogue was organized by The International Center for Trade and Sustainable Development (ICTSD) and the African Technology Policy Studies Network (ATPS), and co-hosted by the African Union (AU) and the New Partnership for Africa's Development (NEPAD).

Summary report is provided by ATPS, at <http://www.atpsnet.org>. Find out more at <http://www.ictsd.org/dlogue/2006-02-14/2006-02-14-prog.htm> or contact Margaret Karembu of the ISAAA AfriCenter at [m.karembu@isaaa.org](mailto:m.karembu@isaaa.org).

## **THE AMERICAS**

### **PUBLIC FUNDS FOR SEQUENCING PROJECTS OF MAJOR POTATO PEST**

The genus *Phytophthora* comprises some of the most important crop pathogens causing the late blight disease of potato and tomato, responsible for huge global losses in crop production. *P. infestans*, the pathogen responsible for the Irish potato famine, is the single greatest pathogenic threat to global food security, as potatoes are the staple food in many countries and the most important non-cereal crop in the world. Damages due to *P. infestans* infection are estimated to exceed US\$ 5 billion a year worldwide.

The National Science Foundation (NSF), the U.S. Department of Agriculture's Cooperative Research, Education and Extension Service, and the U.S. Department of Energy's (DOE) Community Sequencing Program are funding two US\$6.7 million projects to sequence the genomes of two *Phytophthora* species. Collaborators in these projects include Ohio State University, the Massachusetts Institute of Technology (MIT), Cornell University, the University of California-Riverside, and North Carolina State University.

These genome initiatives are set to obtain information on the *Phytophthora* 20,000 genes to identify those responsible for infection, so that strategies for disease control can be developed. The information will also be essential to discover which genes confer resistance to *Phytophthora* in crop plants. "When dealing with plant diseases, the most important step is to know your enemy, and obtaining the genome sequence of these pathogens is key to learning more about them" said Sophien Kamoun, assistant professor in Ohio State University. These projects will particularly benefit resource-poor farmers in developing countries. "The reality is that you can't grow potatoes without spraying for late blight," added Kamoun. "It's a manageable disease, but an expensive one. However, in many parts of the world, farmers don't have the means to apply chemicals; there, this disease could cause food shortages and hunger."

For more information, visit <http://www.oardc.ohio-state.edu/story.php?id=3530>.

## **BORLAUG HONORED WITH DANFORTH CENTER AWARD**

Nobel Laureate Dr. Norman E. Borlaug, often referred to as the “Father of the Green Revolution” in agriculture, has received the Danforth Award for Plant Science in recognition of his life-long commitment to increasing global agricultural production through plant science. The groundbreaking work by his research team and colleagues from around the world reversed the chronic food shortages suffered by India and Pakistan in the 1960s, and led to his 1970 Nobel Peace Prize.

Dr. Borlaug recently received the National Medal of Science, and was honored by the Government of India with the Padma Vibhushan – India’s second highest national award. “Norman Borlaug has brought more benefit to more people than anyone in my lifetime and shown how science can serve humanity. He is a hero and the role model for us at the Donald Danforth Plant Science Center,” said Danforth Center Chairman, Dr. William H. Danforth. “That one man can have such a profound impact on the world is nothing short of overwhelming. It is a pleasure to once again host Dr. Borlaug at the Danforth Center, and a true honor to recognize his incredibly important lifetime of achievement.”

Read the complete article at

<http://www.danforthcenter.org/newsmedia/NewsDetail.asp?nid=114>.

## ***THE GLOBAL ARENA***

### **FAO LAUNCHES WEBSITE TO HELP FORESTERS WITH INVASIVE SPECIES**

The Food and Agriculture Organization of the United Nations (FAO) has created a new online database with comprehensive information on invasive species as a tool to help foresters deal with a growing problem. Invasive species are plants, animals, or other organisms introduced from foreign ecosystems that often have a negative impact on the natural communities they assault, and are responsible for important economical and environmental damages. The total cost of losses in agriculture and forestry in six countries was estimated at US\$314 billion per year, according to a survey reported in the journal of Agriculture, Ecosystems, and Environment. The threat of invasive species is dramatically growing with recent increases in global trade and travel.

“Comprehensive information on invasive species related to forestry did not exist before. This is the first time that a portal has been created that focuses on invasive species related to forestry,” said Gillian Allard, an FAO expert on forest protection and health. “We hope this web site and database will help raise

awareness among foresters on the need to address the problem from beginning to the end – from preventive measures to management.”

For more information visit:

<http://www.fao.org/newsroom/en/news/2006/1000233/index.html>

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**RESEARCH**  
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### **PAPAYA RIPENING GENES IDENTIFIED**

Papaya is an important fruit for the tropics, where it is used in both the food and cosmetics industries. As a result, studies are on the way on the the papaya's genome, in order to identify candidate genes that may be used to improve the nutritional quality of papaya through marker-assisted breeding or genetic engineering. Luke C. Devitt and colleagues of the Queensland Agricultural Biotechnology Center contribute their findings as they report the “Discovery of genes associated with fruit ripening in *Carica papaya* using expressed sequence tags.” Their work appears in a recent issue of Plant Science.

To identify genes involved in papaya fruit ripening, researchers generated a total of 1171 expressed sequence tags (ESTs) from clones of two independent fruit cDNA libraries derived from yellow and red-fleshed fruit varieties. ESTs are short DNA fragments of expressed genes. They have been used extensively and effectively in a number of fruit species as a tool for rapid gene discovery.

Researchers found that the most abundant gene sequences isolated were those coding for the enzymes chitinase, which breaks down chitin; 1-aminocyclopropane-1-carboxylic acid (ACC) oxidase, which controls the release of ethylene in plants; catalase, which breaks down harmful hydrogen peroxide into hydrogen and water; and methionine synthase, which processes amino acids. Researchers also found putative genes contributing to fruit softening, among them cell wall hydrolases, cell membrane hydrolases, and ethylene synthesis and regulation sequences. By comparing ESTs with gene sequences in other plant species, researchers identified expressed papaya genes which could play a role in fruit aroma and color.

Subscribers to Plant Science can read the complete article at <http://dx.doi.org/10.1016/j.plantsci.2005.09.003>.

## ARABIDOPSIS MADE SALT TOLERANT

High soil salinity can severely limit agricultural productivity and lower crop quality. As saline soils are a growing problem in many countries, developing plants that can tolerate salinity is a key priority. One approach for engineering salt tolerance is reported in the latest issue of *Plant Science* by Eun-Ji Koh and colleagues in the article “Expression of yeast cadmium factor 1 (YCF1) confers salt tolerance to *Arabidopsis thaliana*.”

Previous studies have shown that yeast cadmium factor 1 (YCF1), when introduced to *Arabidopsis*, allows the plant to grow in the presence of heavy metals. In this paper, researchers show that *Arabidopsis* lines expressing YCF1 are also salt tolerant. According to the authors, this enhanced salt tolerance is due to the movement of salt ions from the cytosol to vacuoles, allowing the cell to maintain osmotic balance.

Subscribers to *Plant Science* can read the complete article at <http://dx.doi.org/10.1016/j.plantsci.2005.10.007>.

## ARTICLE REVIEWS AGROBACTERIUM-LIKE SPECIES

*Agrobacterium*-mediated genetic transformation is the most widely used technology to express recombinant proteins (those coded from genetically modified DNA) in host plants. *Agrobacterium* is routinely used in two main types of applications: in the generation of transgenic plants that require the stable integration of the foreign DNA sequences into the host genome, and in the transient production of recombinant proteins following infection. Transient expression does not require the stable integration of the transgene, however it also results in lower levels of protein expression as not all the cells of the plant host become infected. In three decades of *Agrobacterium* research, numerous protocols have been designed, and the associated patent issues that can sometimes have negative effects on research.

Sang-Min Chung and colleagues from the State University of New York review recent advances in transformation technologies using alternative hosts for stable transformations, and improved viral vectors for transient expression. The review article “*Agrobacterium* is not alone: gene transfer to plants by viruses and other bacteria,” is published in the latest issue of *Trends in Plant Science*.

The authors review recent advances in improving three non-*Agrobacterium* species – *Rhizobium* sp. NGR234, *Sinorhizobium meliloti* and *Mesorhizobium loti* for the generation of stable transgenic plants. These species may interact better with certain plant host species and thus avoid plant defense mechanisms that limit transformation efficiencies. In addition, they provide an open-source

alternative to patent claims. The authors also report on the development of viral vectors with enhanced infectivity for improved transient expression protocols.

Read the complete article at

[http://www.sciencedirect.com/science?\\_ob=MIimg&\\_imagekey=B6TD1-4HK04VJ-2-3&\\_cdi=5185&\\_user=677719&\\_orig=browse&\\_coverDate=01%2F31%2F2006&\\_sk=999889998&\\_view=c&\\_wchp=dGLbVlb-zSkzV&\\_md5=deeb62540e2cdf6a8caa40f8cdfba07&\\_ie=/sdarticle.pdf](http://www.sciencedirect.com/science?_ob=MIimg&_imagekey=B6TD1-4HK04VJ-2-3&_cdi=5185&_user=677719&_orig=browse&_coverDate=01%2F31%2F2006&_sk=999889998&_view=c&_wchp=dGLbVlb-zSkzV&_md5=deeb62540e2cdf6a8caa40f8cdfba07&_ie=/sdarticle.pdf) in the journal's complimentary issue.

## **EFFECTS OF FERTILIZERS ON TOMATO ANTIOXIDANTS EXPLORED**

Tomatoes are an important source of antioxidants, and eating them has been linked with reduced risk of prostate and various other forms of cancer. The levels of antioxidants in tomato fruit, however, can be affected by the cultivar, growing conditions, seasons, harvesting stage, and ripening on and off the vine.

R.K. Toora of Lincoln University, Canterbury, New Zealand and colleagues look at the "Influence of different types of fertilizers on the major antioxidant components of tomatoes" in a recent issue of the Journal of Food Composition and Analysis. Researchers measured the effects of different mineral nutrient solutions, chicken manure, and grass-clover mulch on tomato antioxidant levels and acidity when the fertilizers were applied on greenhouse-grown tomatoes.

The authors found that: 1) there was no significant difference in yield, dry matter content, or soluble solids of tomatoes grown with different forms of fertilizers; 2) the mean content of lycopene, a potent carotenoid antioxidant, was 40% lower in tomatoes grown with high chloride levels and grass-clover mulch compared with other treatments; and 3) the mean antioxidant activity of the ammonium treated plants was 14% lower compared with other treatments.

Read the complete article at <http://dx.doi.org/10.1016/j.jfca.2005.03.003>.

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**ANNOUNCEMENTS**  
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## **WORKSHOP ON BIOTECH, ISLAM TO BE HELD IN CAIRO**

A workshop entitled "The Development of Agricultural Biotechnology in Islamic Countries: Sharing the Experience on Issues and Challenges" will be held in

Cairo, Egypt on the 6-8 March. The event is organized by the Biotechnology Information Centers (BICs) of Egypt, Malaysia, Indonesia, Bangladesh and Pakistan. The BICs are the national nodes of a global biotech knowledge network coordinated by the International Service for the Acquisition of Agri-biotech Applications (ISAAA). Both the BICs and ISAAA are non-profit organizations.

The workshop has been scheduled to bring together scientists, policy makers, and religious authorities to discuss the developments of agricultural biotechnology in selected Islamic countries. A good understanding of agricultural biotechnology among policy makers and religious authorities will enable them to impart knowledge to the public and to formulate fatwa rulings in accordance to the teachings of Islam. This is important so that Islamic countries can embrace and benefit from biotechnology, and at the same time adhere to their faith.

For more information email: [knowledge.center@isaaa.org](mailto:knowledge.center@isaaa.org)

## **PREST SCHOLARSHIP FOR AFRICAN SCIENCE AND TECHNOLOGY PROFESSIONALS**

Manchester Business School, University of Manchester, welcomes applications for a 3 months PREST scholarship, funded by the Commonwealth Scholarship Commission. The scholarship is intended for mid-career professionals (not university academics) who are working in areas relating to science and technology policy and management who require some training in this area and an opportunity to network in the U.K. All expenses including travel and living costs are paid under the scholarship.

Applicants must have a minimum of 5 years working experience and be willing to learn and take back lessons to their home countries. This year, applications from countries that have not applied to PREST previously are particularly encouraged (especially Kenya, South Africa, Zambia, Botswana and Gambia). Deadline for application is April 2006.

For further information please contact Dr.Khaleel Malik at [khaleel.malik@manchester.ac.uk](mailto:khaleel.malik@manchester.ac.uk)

## **SWITZERLAND HOSTS BIOSQUARE 2006**

BioSquare 2006 will be held on March 8-10, 2006 in CIGG Geneva, Switzerland. The conference is supported by EuropaBio, and will feature a Partnering Program. This program provides the means and space for scheduling private, 30-minute one-on-one meetings between biotech and pharmaceutical executives, investors as well as leading academic research institutions. For more information, visit the conference website at <http://www.ebdgroup.com/biosquare/registration.htm>.

## **WHEAT WORKSHOP BY CIMMYT SLATED**

The International Maize and Wheat Improvement Centre (CIMMYT) will hold a workshop on increasing wheat yields this March 20-24, 2006 in Obregon, Mexico. The workshop will be aimed at improving wheat yield potential in high production zones, with emphasis on developing countries. Topics covered will include the latest technologies in breeding, genetics, physiology, and crop management that can be applied to maximize wheat genetic yield and its expression. Other presentations will focus on how technologies can raise and stabilize farm yields to improve food security and livelihoods. Wheat scientists from over the world, including representatives from the largest and highest yielding production zones, will attend the workshop. For more information, contact M. Reynolds [m.reynolds@cgiar.org](mailto:m.reynolds@cgiar.org), or visit <http://www.cimmyt.org/english/wps/events/2006/intlInceasYield.htm>.

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**DOCUMENT REMINDER**  
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## **POCKET K'S UPDATED**

The latest editions of the following Pocket Ks are now available for download from the ISAAA website: #1: Q&A About Genetically Modified Crops; #3: Are Food Derived from GM Crops Safe?; #4: GM Crops and the Environment; #6: Bt Insect Resistant Technology; #11: Contribution of GM Technology to the Livestock Sector; and #16: Global Status of Commercialized Biotech/GM Crops in 2005.

Pocket Ks are Pockets of Knowledge, packages of information on crop biotechnology products and related issues. They are produced by the Global Knowledge Center on Crop Biotechnology (KC) of the International Service for

the Acquisition of Agri-biotech Applications (ISAAA). Twenty other topics are available at <http://www.isaaa.org/kc/Publications/pocketk.htm>.

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While we are still developing this site, feel free to e-mail ([knowledge.center@isaaa.org](mailto:knowledge.center@isaaa.org)) us for your views and comments on any crop biotechnology product and related issues.

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