

CROPBIOTECH 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 Week's Issue:

NEWS

Global

- Decision on GURTS Reaffirmed by COP-8
- Institute Develops Tomato Metabolite Database

Africa

- Imminent Threat of Stem Rust Pandemic in Wheat
- African Agriculture Experts Tackle Biofortification
- Little Fertilizer, Big Gains in Africa
- System Unites Crop Protection Data from Indian Ocean Islands

The Americas

- New National Genome Laboratory for Biodiversity Slated in Mexico
- Improved Quinoa to Help Andean Farmers
- Cuba to Develop Agri-Biotech, Scientist Says

Asia and the Pacific

- India approves 20 more Bt cotton hybrids
- Thai Agriculture Head Calls for Lift of GM Testing Ban
- Thai Farmers Urged to Plant Cane to Restore Livelihoods
- FAO Voices Concern about Decreasing Wild Banana Species
- Australia Government to Fund Biotech Studies

RESEARCH

- Study on Gene Flow from Transgenic Oilseed Rape
- Paper Looks at Plants, Spider Silk Research

ANNOUNCEMENTS

DOCUMENT REMINDERS

NEWS

GLOBAL

INSTITUTE DEVELOPS TOMATO METABOLITE DATABASE

Zhangjun Fei, a senior bioinformatics scientist of the Virginia Bioinformatics Institute, is spearheading the creation and development of the Tomato Metabolite Database. This database can be used to store information about tomato metabolites, as derived from microarray and metabolite profiling data. With such information, scientists all over the world can help in identifying tomato genes involved in metabolite production, which can directly impact tomato taste, flavor, and nutritional content.

This database, now online, is part of the Tomato Nutrient and Flavor Project funded by a \$2 million grant from the National Science Foundation (NSF). Visit the database at <http://tomet.vbi.vt.edu>. To read the complete article, go to <http://www.isb.vt.edu/news/2006/news06.May.htm>.

DECISION ON GURTS REAFFIRMED BY COP-8

Genetic use restriction technologies (GURTs) is a broad term referring to many forms of gene switching technology, all of which assure that a transgene is expressed only in specified conditions, such as high salinity and drought stress. This strategy can allow a plant to save energy, which it can spend on growth and seed production.

The use of GURTs has been debated in the Eight Meeting of the Parties to the Convention on Biological Diversity last March. According to meeting proceedings, the parties agreed to reaffirm the GURTs decision from the fifth meeting of the Parties, which has been in place since 2000. The decision recommends that parties do not approve products of GURTs for field testing and/or commercial use “until strictly controlled scientific assessments have been carried out in a transparent manner, and the conditions for their safe and beneficial use have been validated.”

At the end of the last meeting, Parties recommended, among others, that scientists “Continue to undertake further research...on the impacts of [GURTs], including their ecological, social, economic, and cultural impacts, particularly on indigenous and local communities.” Thus, no moratorium on research on GURTs has been called, despite claims to the contrary.

To read more about GURTS technology, download the ISAAA-KC Pocket K at <http://www.isaaa.org/kc/bin/pocketk/index.htm>. For more information, visit <http://www.biodiv.org>

AFRICA

IMMINENT THREAT OF STEM RUST PANDEMIC IN WHEAT

The International Food Policy Research Institute (IFPRI) reports that a highly virulent strain of the fungal pathogen responsible for stem rust disease in wheat, named Ug99, has emerged and has reduced grain yields by as much as 71% in experimental plots in Africa. International wheat experts led by Nobel Prize laureate Norman E. Borlaug briefed officials of the United States Agency for International Development (USAID) in Washington, D.C. about a possible stem rust pandemic in wheat, and suggested ways to contain it.

The International Maize and Wheat Improvement Center (CIMMYT) said that all wheat farms in Kenya, Uganda, and Ethiopia were affected by the new strain, and that small farmers in Kenya have already suffered yield losses. Scientists note that the disease could approach US\$1 billion in value, causing global prices to go up and lead to food shortages.

An initiative is already in place to coordinate efforts against the threat. CIMMYT and the International Center for Agricultural Research in the Dry Areas (ICARDA) launched the Global Rust Initiative (GRI) at an international summit held in 2005 in Nairobi, Kenya. The GRI is a multidisciplinary research and development consortium, which will develop and deploy appropriate wheat varieties possessing stable resistance to the new race of stem rust.

Read more on this initiative at <http://www.ifpri.org/pressrel/2006/20060502.asp>.

AFRICAN AGRICULTURE EXPERTS TACKLE BIOFORTIFICATION

Up for discussion this week in a workshop in Mombasa, Kenya are the latest research developments to develop biofortified crops in Africa which might lead to "a nutrition revolution in Africa". Policy makers, scientists, and agricultural leaders in Africa hope to integrate biofortification into national agricultural and health policy agendas. Biofortification involves breeding crops with higher levels of vitamins and minerals.

"Addressing micronutrient malnutrition requires a paradigm shift," said Howarth Bouis, director of HarvestPlus. "Agricultural research needs to move beyond increasing productivity to improving food quality as well. In this way, biofortification can play a critical role in improving health."

Co-hosting the workshop are the Forum for Agricultural Research in Africa (FARA) and HarvestPlus, an international research program that seeks to reduce micronutrient malnutrition by harnessing agricultural technology to breed staple crops for better nutrition.

For more information, visit <http://www.harvestplus.org> or <http://www.ifpri.org/media/20060502Nairobi.asp>

LITTLE FERTILIZER, BIG GAINS IN AFRICA

Fertilizer microdosing, or applying small amounts of fertilizer to crops at the right time, quantity, and spot, is making a big impact in Sub-Saharan African countries. Microdosing techniques developed by the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) and partners has allowed for yield increases between 44 and 120% for pearl millet and sorghum, important grain crops in Africa.

Microdosing has also reintroduced fertilizer use in Zimbabwe, Mozambique, and South Africa, as well as in Niger, Mali, and Burkina Faso in Western Africa.

For more information, contact Dr Steve Twomlow at s.twomlow@cgiar.org or Dr Ramadjita Tabo at r.tabo@cgiar.org. Find out more about the institute at <http://www.icrisat.org>

SYSTEM UNITES CROP PROTECTION DATA FROM INDIAN OCEAN ISLANDS

A program now makes it possible to issue pest warnings and centralize crop protection data for the Comoros, Madagascar, Mauritius, Réunion, and the Seychelles. Funded by the European Development fund, the regional crop protection program (PRPV) now has a website to which crop protection professionals have access, and which aims to build a network of various stakeholders in the phytosanitary and horticultural fields in the islands of the southwestern Indian Ocean.

Tools available include a directory of horticultural crop protection professionals in each Indian Ocean country, a glossary, documentary resources, and

downloadable books and publications. The website will also shortly be hosting a database, open to all users, on pests in the region. For more information, contact Sophie Della Mussia at sophie.della_mussia@cirad.fr.

THE AMERICAS

NEW NATIONAL GENOME LABORATORY FOR BIODIVERSITY SLATED IN MEXICO

The National Laboratory for Genomics for Biodiversity (LANGEBIO) will be built on the premises of the Center for Research and Advanced Studies (CINVESTAV) in Guanajuato, Mexico. The center will receive an investment of approximately US\$ 45 million from several national Federal donors, including the Ministry of Agriculture, Livestock, Rural Development, Fishery and Food; the Ministry of Education; and the National Council for Science and Technology.

LANGEBIO will be devoted to the partial or complete sequencing of the genome of plant, animal, and microbial species of interest, to facilitate the development of new crop varieties, medical products, and industrial applications. Some of the planned projects have already started, such as the sequencing of the maize genome.

Read more at <http://www.agricultura.com.mx/cgi-bin/modules.php?name=News&file=article&sid=3439>

IMPROVED QUINOA TO HELP ANDEAN FARMERS

The Foundation for Agricultural Innovation of the Ministry for Agriculture of Chile has announced the launch of the first crop of improved varieties of quinoa in the Chilean plateau, as part of an effort to boost the income of small scale growers that depend on this crop for subsistence. Quinoa still constitutes the most important food and feed crop for many Andean rural communities; however, it is still cultivated with little economic handling. The project aims to innovate the technology of Quinoa production, and expects to raise yields by 200-300%.

Quinoa, the sacred “mother of all grains” (*chisaya mama*) to the Inca civilization, is one of the three staple crops, along with potatoes and maize, of the Andes. Quinoa not only contains more protein than any other grain (between 11 and 20%), but also has a balanced set of essential amino acids (similar to milk), which makes it an ideal food to complement other grains which are low in lysine, such as wheat and rice.

For more information (in Spanish) visit:

http://www.fia.cl/contenido.asp?id_contenido=977&id_tipo=1

CUBA TO DEVELOP AGRI-BIOTECH, SCIENTIST SAYS

Cuba's biotech institutions have produced over 100 million genetically modified (GM) plants, and are using biotech methods to produce high-quality seeds year round, and to search for rapid cures to plant diseases. This was disclosed by Rafael Gomez Koski, organizer of the 7th International Symposium on Plant Biotechnology, which took place recently in the central Cuban province of Villa Clara. His remarks were reported by the Cuban News Agency.

With reports from the Cuban News Agency at

<http://www.ain.cubaweb.cu/idioma/ingles/2006/salud-ciencia.htm>.

ASIA AND THE PACIFIC

INDIA APPROVES 20 MORE BT COTTON HYBRIDS

The Genetic Engineering Approval Committee (GEAC), apex regulatory body of the Government of India, recently approved 20 more hybrids of Bt cotton varieties to be sold in 2006, in addition to the 20 Bt cotton hybrids approved for sale in 2005. This brings the total of Bt cotton hybrids to 40, giving farmers of India's three cotton growing zones more choices on which varieties to cultivate in 2006.

The GEAC has also approved two new events of biotech cotton: one by JK AgriGenetics Pvt Ltd, which contains the Cry1Ac gene sourced from IIT Kharagpur, India; and the other from the Nath Seeds Pvt Ltd, containing fusion genes (cry 1Ab and cry Ac) of "GFM" sourced from China.

Decisions from the GEAC meeting have been compiled, and are available at <http://www.envfor.nic.in/divisions/csurv/geac/geac-65.pdf>. For more information, contact Bhagirath Choudhary of the ISAAA South Asia Office at b.choudhary@cgiar.org.

THAI AGRICULTURE HEAD CALLS FOR LIFT OF GM TESTING BAN

Dr. Adisak Srisupakij, Director General of Thailand's Department of Agriculture, discussed the country's transgenic papaya research with reporters, and said that genetically modified (GM) papayas have no adverse health effects on humans, "But [their] impact on the environment needs more study...[This cannot be] done if the government puts the ban on field testing of GM plants."

In an article in local newspaper Naew Na, Adisak says that he would like GM crops research to continue in Thailand. "We want to inform the public that all [GM] research activities must be approved by the Biosafety Committee, which comprises experts in the field," he said, and added that, "Biosafety risks of GM plants on [humans] and [the] environment must be carefully evaluated according to the international standard. If these requirements are met, research products can then be distributed to the public or commercialized."

For more information, visit <http://www.safetybio.com>.

THAI FARMERS URGED TO PLANT CANE TO RESTORE LIVELIHOODS

Thailand's Tak province is known for its fragrant jasmine rice, which has been a source of farmers' livelihood in the region. Zinc mining in Tak, however, has caused water in the area to be contaminated with cadmium; this, in turn, has contaminated rice paddies, forcing farmers to find other means of livelihood.

The government has thus urged farmers from the region to plant sugarcane which, as a raw material for ethanol production, could be mixed with gasoline to produce biofuel. Two private companies recently closed a deal with the state Mae Tao creek development committee to help more than 800 affected farmers switch to sugarcane.

With reports from <http://www.bangkokpost.com>. For more information, visit <http://www.safetybio.com>.

FAO VOICES CONCERN ABOUT DECREASING WILD BANANA SPECIES

The Food and Agriculture Organization (FAO) is calling for a systematic exploration of the wild bananas' remaining habitat in India due to the rapid loss of these species. There is a need, FAO says, to assess the damage and catalogue the number and types of surviving wild species, many of which are the ancestors of the Cavendish variety, which accounts for almost all of world trade of banana.

The Indian subcontinent has contributed enormously to the global genetic base of bananas, but many gene sources have been lost due to ecosystem destruction, says FAO Agricultural Officer NeBambi Lutaladio. This could cause serious problems because commercial bananas have a narrow gene pool and are highly vulnerable to pests and diseases.

In addition, FAO voiced the need for conservation efforts that focus on better land management by local populations, and research on expanding the use of wild bananas in breeding programs.

Read more on FAO's "Concern at vanishing bananas" at <http://www.fao.org/newsroom/en/news/2006/1000285/index.html>, or contact Christopher Mathews at Christopher.mathews@fao.org for additional information.

AUSTRALIA GOVERNMENT TO FUND BIOTECH STUDIES

Peter McGauran, Australia's Minister for Agriculture, Fisheries, and Forestry, announced recently that the country's government will provide over \$850,000 for eight major biotechnology studies to be conducted by the Bureau of Rural Sciences, the Australian Bureau of Agricultural and Resource Economics, and the private sector.

Among the eight are projects on: 1) studying and documenting the value of biotechnology for insect pest and weed control in the cropping sector, including experiences with genetically modified (GM) cotton; 2) developing an up-to-date information package on GM canola that covers the particular concerns of government, industry, and the wider community; 3) reviewing international market access for GM canola, including regulatory arrangements in countries important to the world canola trade; and 4) the economic impact on the organic farming industry of introducing GM crops into Australia, including the treatment of GM organisms in organic certification systems.

Read the complete press release at <http://www.maff.gov.au/releases/06/06044pm.html>.

RESEARCH

STUDY ON GENE FLOW FROM TRANSGENIC OILSEED RAPE

Since the introduction of genetically modified (GM) plants for commercial production in 1996, the global area of GM crops has continuously grown to 90 million hectares in 21 countries in 2005. What strategies should farmers adopt to ensure the coexistence of biotech crops with conventional varieties? Tristan Funk, Peter Westermeier, and Gerhard Wenzel of the Technical University of Munich carried out a monitoring study to relate distances between cultivations and frequencies of outcrossing of transgenic oilseed rape, with the objective of developing specific rules for cultivation. Oilseed rape is a high risk crop in terms of lateral gene transfer due to cross pollination by insects and by wind. The article is published in the April issue of Information Systems for Biotechnology News Report.

The study consisted of a 3-year field trial, in which outcrossing frequencies were determined between “donor” plots containing different amounts of transgenic plants (100%, 1.0%. and 0.1%) and non-transgenic “acceptor” plots separated by 1.5 m. The experiment took into account the direction and force of prevailing winds, and the occurrence of beehive colonies in the area. The number of transgenic plants in “acceptor” plots was determined by herbicide resistance and the results were confirmed by PCR. The study shows that, in these conditions, the transgenic contamination in neighboring oilseed rape crops was clearly below the EU labeling threshold of 0.9%.

To read the full article, visit:

<http://www.isb.vt.edu/news/2006/news06.apr.htm#apr0601>

PAPER LOOKS AT PLANTS, SPIDER SILK RESEARCH

Spider silk is at least five times stronger than steel, two times more elastic than nylon, waterproof, and stretchable - qualities that may make it important for the textile and construction industries. This has led scientists to try to synthesize it in the laboratory, or to isolate the genes for spider silk and transfer them to animal cells for mass production. The former method has hitherto been unsuccessful; the latter method is expensive, and the quantity produced by animal cells is limited. In order to overcome these factors, scientists are now turning to “Transgenic Plants for Spider Silk-Like Protein Production.” In an article in the latest issue of the Information Systems for Biotechnology Newsletter, P. S. Janaki Krishna looks at recent research on the feasibility of plant based silk-like protein (SLP) production.

One such project was reported by Jianjun Yang and co-authors, of Du Pont de Nemours & Co, USA. Scientists introduced the DP1B gene into *Arabidopsis* plants by an Agrobacterium-mediated floral transformation method. DP1B is a synthetic gene for spider dragline silk protein, which can be spun to form silk fiber.

After growing and evaluating transgenic plants, researchers found that: 1) transgenic plants engineered with mechanisms targeting DP1B production to the cell's endoplasmic reticulum (ER) were able to accumulate SLP in their seeds to a level greater than 15% of total soluble protein; 2) DP1B was heritable after one or two cycles of sexual reproduction; and 3) accumulation levels of the DP1B fusion protein were stable. The next step may now be to search for an industrially important crop which can support large-scale, plant-based production of DP1B SLP.

For more information, contact the author at jankrisp@yahoo.com, or read the complete article at <http://www.isb.vt.edu/news/2006/news06.May.htm>. Subscribers to Transgenic research may read the related research article at <http://dx.doi.org/10.1007/s11248-005-0272-5>.

ANNOUNCEMENTS

INDONESIA TO HOST BIOFUELS SEMINAR

A workshop and seminar on "Biofuels and Carbohydrate Acting Enzymes" will be held in Bandung, Indonesia on the 20th of June, 2006. The seminar will cover current research in the uses of carbohydrate-based resources, as well as other resources for renewable biofuels. For more information, download the brochure at http://www.indobic.or.id/kegiatan_detail.php?id_kegiatan=20 or send an email to dessy@chem.itb.ac.id or zeily@chem.itb.ac.id.

INTERNATIONAL SYMPO ON MOLECULAR FARMING IN PLANTS

Kuala Lumpur, Malaysia is the venue for the International Symposium on Molecular Farming in Plants: Prospects for the Asia Pacific" to be held June 13-15, 2006. Organized by University Malaya, Center for Research in Biotechnology for Agriculture (CEBAR), Malaysian Society for Molecular Biology and Biotechnology (MSMBB) in collaboration with MABIC and the International Islamic University Malaysia (IIUM), the symposium seeks to promote the exchange of information on molecular farming which encompasses the production of pharmaceuticals and technical proteins in plants.

For more information on this symposium and to register as participants, please visit <http://www.cebar.um.edu.my>.

CONFERENCE ON PLANT STRESSES SLATED

A conference on "Salt and Water Stress In Plants" will be held at Magdalen College, Oxford, United Kingdom, on the 3rd-8th of September, 2006. The conference will focus on the most recent innovative research in cellular and molecular events that determine the response of plants to salinity and water deficit, with particular emphasis on stress metabolism and integration of stress response pathways. The topics will cover aspects from the genome to the protein level, ranging from molecular and biochemical approaches to whole plant physiology and plant breeding. The conference will also address the question how knowledge from model plants can be transferred to crop plants. For more information, visit <http://www.grc.uri.edu/programs/2006/salt.htm>.

SOIL SCIENCE CONGRESS TO BE HELD IN JULY

The 18th World Congress of Soil Science (WCSS) will be held on the 9th-15th of July 2006 in Philadelphia, Pennsylvania, USA. With the theme "Frontiers of Soil Science: Technology and the Information Age," the congress will focus on multi-disciplinary soil science advances. WCSS activities include cultural tours, educational workshops, and scientific exhibits. To browse sessions and events, go to: <http://crops.confex.com/crops/wc2006/techprogram/index.html>. Additional information and registration can be found at <http://www.18wcsc.org> or <http://www.colostate.edu/programs/IUSS/18wcsc/index.html>.

DOCUMENT REMINDER

CBU AVAILABLE IN VARIOUS LANGUAGES

Recent issues of the Crop Biotech Update have been translated into Mandarin Chinese, Bahasa Indonesia, Bangla, Vietnamese, French, Brazilian Portuguese, and Spanish. To read and download these documents, visit http://www.isaaa.org/kc/bin/CBT_trans/index.htm

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