CropBiotech Update

INTERNATIONAL SERVICE FOR THE ACQUISITION OF AGRI-BIOTECH APPLICATIONS

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

GLOBAL

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WEEDING OUT POTATO WART FROM THE FIELDS

Potato wart is an important and serious disease of cultivated potato (*Solanum tuberosum*). The disease is caused by the fungus *Synchytrium endobioticum*, and this organism is considered to be the most important world-wide plant pathogen of cultivated potato. The potato wart pathogen is readily distributed through infested soil and by infected seed tubers.

Resistant potato cultivars have been developed in Europe and North America. Resistant plants may become infected, but symptom development is suppressed. Galls on resistant plants remain scab-like, while in some cultivars zoospores (motile asexual fungal spores) of the pathogen are killed by a hypersensitive reaction of the infected plant tissue. However, the emergence of different types of *S. endobioticum* types has compromised the efficacy of host plant resistance. In some cases, application of crushed crab shell onto the infested soil has been found to suppress the disease, although the mechanism of action is not yet known with certainty.

Potato wart is much easier to prevent than to control. Worldwide prevention is based on the control of disease spread. Once potato wart is detected, regulations generally prohibit potato production on infested soil, and also attempt to prevent soil movement from infested sites by any means. Examples include prohibiting growth of any plants destined for transplant and requiring a continuous "cover crop" to reduce movement of inoculum via wind-blown soil.

To read more about potato wart, visit http://www.apsnet.org/online/feature/potato/.

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BAYER CROPSCIENCE AND MONSANTO ENTER LONG-TERM BUSINESS AND LICENSE AGREEMENTS

Bayer CropScience AG and Monsanto Company, two of the leading agro-companies worldwide, have entered into a series of long-term business and licensing agreements. Among these, Bayer CropScience will grant Monsanto a royalty bearing, non-exclusive license for its LibertyLink® herbicide tolerance technology for use in corn and soybeans, the two largest field crops in terms of acreage in the United States.

The agreements provide Monsanto with an option to market corn and soybean seeds which contain both Monsanto's Roundup Ready® and Bayer CropScience's LibertyLink® technologies. Monsanto and Bayer CropScience also amended certain existing agreements in the area of herbicide tolerance to provide each other more favorable terms. In addition, the companies amended other agreements related to insect-protection technologies, including Monsanto's existing non-exclusive, royalty-bearing license for use of Bayer CropScience's Dual Bt technology.

As part of the agreements, Monsanto and Bayer CropScience cross-licensed each other under their respective patent estates for RNAi technology, an important enabling technology for the development of new agricultural products.

Read the full news at: http://www.bayercropscience.com/bayer/cropscience/cscms.nsf/id/20070620?Open&ccm=400020000&L=EN&markedcolor=%23003399

AFRICA

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DRY SEASON COWPEA PRODUCTION TECHNOLOGY IN NIGER REPUBLIC

With more than half a million tons of dry cowpea grain produced annually, Niger Republic is the second largest world cowpea producing country after Nigeria. This is thanks to the dry season cowpea production technology introduced by the scientists at the International Institute for Tropical Agriculture (IITA) and the Institut de la Recherche Agronomique du Niger (INRAN).

According to Dr. Hakeem Ajeigbe, Project Coordinator of the Gatsby-funded crop-livestock project, the short duration, high yielding and disease resistant dry season cowpea production technique was introduced to the farmers as an innovation in their cowpea/vegetable production systems. "This was aimed at facilitating seed production to be used by the project in the main wet season," he said. Before now, farmers in the two villages used to plant vegetables under irrigation during October/November and harvest in January/February, leaving the land to fallow until the wet season. With the double yield of grains and fodder under the new production system, many resource-poor farmers have been trouping in to buy seeds of the new chickpea varieties.

The news article is available at http://www.iita.org/cms/details/news_feature_details.aspx?articleid=1072&zoneid=342.

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BIOTECHNOLOGY R&D TO BENEFIT FROM DIRECT STATE FUNDING IN KENYA

Kenya's government recognizes the significant role that agricultural biotechnology can play in reducing poverty and improving the country's food security situation. According to the 2007/2008 Budget speech, the Minister for Finance Amos Kimunya has increased the Ministry of Agriculture's budget by 20 percent, from Shs 24.9 billion to Shs 29.8 billion (US$1= Shs 66), partly to fund biotechnology research and development aimed to increase food productivity and self-reliance.

The promotion of agricultural productivity and rural development for poverty reduction is central to the realization of a hunger free society, one of the Millennium Development Goals. "In this context, the Government will continue to implement a wide range of structural reforms aimed at improving efficiency and productivity in the sector," the minister said, adding that those reforms will be targeted towards encouraging value-addition in agro-processing and making agriculture the catalyst for our economic transformation and prosperity. More specifically, the government has promised to transform key agricultural institutions into complementary and high-performing entities that facilitate private sector agricultural productivity and output expansion; facilitate access to input services for farmers and pastoralists in Kenya to achieve world class benchmarks in productivity, and improve market access for small holder farmers by facilitating the establishment of aggregators, processing, packaging and branding of agricultural export products.

In addition, the Ministry of Science and Technology, working together with the private sector players, will implement a comprehensive science and technology strategy to promote efficiency and productivity in the key priority areas of agriculture development, expansion of infrastructure; healthcare and education delivery; and industrial production. Towards that end the government has allocated Shs 200 million (US$3m) to establish an Endowment Fund for innovation and research, as part of deliberate efforts to promote science, technology and innovation for higher productivity.

For more information contact ISAAA AfriCenter at: d.otunge@cgiar.org

AMERICAS

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SCIENTISTS TRACK DOWN THREAT TO GRAPEVINES AND GARDENS

Tracking down the bacterium *Xylella fastidiosa* is not an easy task. The bacterium, which causes Pierce's disease in grapes, often escapes being detected through ELISA, for "enzyme-linked immunosorbent assay." Now scientists with the Agricultural Research Service (ARS) have developed a more powerful method for quickly confirming whether an insect or plant harbors the destructive, disease-causing bacterium. The test relies on two parts: a commercially available DNA-extraction kit and a DNA-amplification protocol that uses primers—short pieces of DNA specific to the bacterium's genetic code—to serve as proof of its presence. The new method should help fill in such gaps in knowledge about transmission of different isolates of the *Xylella* bacterium.

Read the news article at http://www.ars.usda.gov/is/pr/2007/070619.htm.

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RESEARCHERS TINKER WITH MICROBE GENOME FOR BIOGAS PRODUCTION

Near the University of California, Davis there is a set of giant vats filled with hungry microbes that live on cafeteria leftovers and lawn clippings, converting them into biogas--mostly methane and hydrogen--that can be burned to generate electricity or compressed into liquid to power specialized vehicles. Scientists will be sequencing the genomes of the microbes to allow them to figure out how these organisms perform their digestive tasks, and to suggest new ways to make more-productive bioreactors.

Faster and cheaper gene-sequencing methods have enabled microbiologists to study complex microbial communities. Scientists can isolate DNA from a drop of bioreactor sludge and generate the gene sequence for the entire microbial community. The Joint Genome Institute will use this approach to sequence the genomes of the microbes next year. The results should shed light on the types of microbes living in the bioreactor and on the types of genes that predominate. "We want to compare what kind of microbes are there at different conditions and try to figure out why one [set of conditions] works better than the other," says Martin Wu, a geneticist at UC Davis who will lead the genomics part of the project.

Read the news article at http://www.technologyreview.com/Biotech/18937/.

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STUDENTS MAKE POLYMER FROM BIODIESEL, WINE PRODUCTS

At the Oregon State University, something has been brewing. A team of undergraduate engineering students has discovered that blending byproducts from biodiesel production and winemaking produces an environmentally friendly polymer that could one day replace polystyrene foam meat trays in supermarkets.
The students delved into combining glycerin, a byproduct of biodiesel production, and tartaric acid, a byproduct of wine production. They have produced a material that was moldable, though somewhat tacky, which vaporizes at 600 degrees. This may be the prototype of ash-free particle board and fire logs. “Producing biodiesel produces a lot of glycerin,” said David Hackleman, a Linus Pauling Chair at OSU School of Engineering. "Now it seems that even the waste from green industries can be put to another good use – one that can help in the solution to a global problem.”

Read the news release at http://oregonstate.edu/dept/ncs/newsarch/2007/May07/polymer.html.

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APHIS RELEASES ADVISORY ON TRANSGENIC SAFFLOWER

The United States Department of Agriculture Animal and Plant Health Inspection Service recently released an advisory on an environmental assessment that has been prepared for a proposed field release involving a transgenic safflower. The line has been genetically engineered to express, within the seeds, a carp growth hormone fused to an *Arabidopsis* oleosin. After a thorough review of pertinent scientific information, and the consideration of comments provided by the public, APHIS has concluded that these field releases will not present a risk of introducing or disseminating a plant pest, and they will not have a significant impact on the human environment.

Read the press release at http://a257.g.akamaitech.net/7/257/2422/01jan20071800/edocket.access.gpo.gov/2007/pdf/E7-11798.pdf.

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DOW AGROSCIENCES AND SANGAMO BIOSCIENCES MEET AGRIC MILESTONES

Dow AgroSciences and Sangamo BioSciences have successfully met their research milestones in their collaborative Research and Commercial License Agreement. They were able to apply Sangamo's zinc finger DNA-binding protein technology to the generation of specific traits in maize and canola.

The technology has enabled the precise placement of a gene of interest into a specific native gene in maize. Philip Gregory, Sangamo's vice president of research, said that this development has a "potentially significant impact on the cost and timelines of generating crop products with new and improved traits". In addition, Sangamo's technology holds the promise to enable gene editing of native traits and regulation of genes to influence metabolic profiles of plants.

Read the full release at: http://www.dowagro.com/newsroom/corporatenews/2007/20070619a.htm

ASIA AND THE PACIFIC

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HCM TO INVEST IN GREEN ENERGY

Ho Chi Minh City in Vietnam is set to develop its domestic bioenergy industry. Phan Minh Tan, director of the city's Department of Science and Technology, says that it has targeted its bioenergy sources to ensure a supply equivalent to 10 percent of total demand. The Department will also set up three working groups to take care of technology, policy making, and market surveys.

The University of Technology's Petrochemical and Refinery Centre in Ho Chi Minh City is currently studying ways to process biodiesel from vegetable oil waste, and is completing the final stage of the technology. Tan added that the Department is also working with the Pham Chi Company to manufacture biopetrol using sorghum.

For more news from Vietnam, email Hien Le of Biotech Vietnam at hientttm@yahoo.com.

EUROPE

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NEW REGULATION TO BOOST EUROPE'S ORGANIC FOOD SECTOR

A new set of rules on organic production and labeling was recently laid down by European Union agriculture ministers, which aims to help consumers recognize organic products throughout the EU more easily. The new rules also create the basis for adding rules on organic aquaculture, wine, seaweed and yeasts.

Under the new regulation, the use of the EU organic logo will be mandatory, but it can be accompanied by national or private logos. The place where the products were farmed has to be indicated to inform consumers. Food will only be able to carry an organic logo if at least 95 percent of the ingredients are organic. The use of genetically modified organisms will remain prohibited. The general limit of 0.9 percent for the accidental presence of authorized GMOs will also apply to organic products. There will be no changes in the list of authorized substances for organic farming.

Read the press release at http://europa.eu/rapid/pressReleasesAction.do?reference=IP/07/807&format=HTML&aged=0&language=EN&guiLanguage=en.

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BAYER CROPSCIENCE AND EVOGENE PARTNER IN CROP YIELD IMPROVEMENT

Evogene Ltd and Bayer CropScience announced recently their new partnership aimed at increasing the productivity and yield of a Bayer CropScience core crop, especially with regard to stress conditions such as drought. Bayer CropScience has exclusively licensed the rights to certain genes discovered by Evogene which have demonstrated improved plant yield and other performance enhancements in various plant species. Evogene is to receive an initial fee, success-based milestone payments and royalties on sales.

Dr. Michiel van Lookeren Campagne, Head of Research at BioScience at Bayer CropScience, welcomes the new business relationship with Evogene. “Advantages in yield and yield stability have been the basis for the fast adoption of our superior hybrids. The integration of these discovered genes into our R&D pipeline can allow us to offer further benefits to our customers, especially with regard to ensuring high yields in difficult climatic conditions.”

Read the press release at http://www.bayercropscience.com/bayer/cropscience/cscms.nsf/id/20070618?open&ccm=400.

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IGER TO DEVELOP SUPERIOR PLANT VARIETIES

The Institute of Grassland and Environmental Research (IGER) in the United Kingdom has received a grant to develop superior plant varieties that are able to adapt to climate change. Specifically, scientists will identify genes that control target traits that are important for developing new plant varieties that meet the demands of sustainable agriculture, climate change and biorenewables.

Ian King, head of the research team at the Aberystwyth- based station says that a target trait for sustainable agriculture is increased nitrogen uptake which requires less fertilizer. Examples of climate change traits are drought tolerance or changing the flowering time of a plant so that flowering occurs in cooler periods.
Visit http://www.iger.bbsrc.ac.uk/default.asp for additional information.

Research

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HOW TO BOOST RECOVERY OF FERTILE DOUBLED-HAPLOID ONIONS

Three strategies were described by Cornell University researchers to help maximize the recovery of fertile doubled-haploid (DH) onions and meet the needs of breeding programs for a large number of plants.

The strategies include 1) the use of whole basal explants from haploid plants treated with the anti-mitotic agents amiprofos methyl (APM) or oryzalin, (2) spontaneous and induced chromosome doubling in somatic regenerants from cultured flower buds, and (3) ploidy reduction through a second cycle of gynogenesis. Gynogenesis is development in which the embryo contains only maternal chromosomes.

Onion breeders may benefit from these strategies by being able to recover diploid plants and minimizing losses of gynogenic plants due to ploidy-related complications. The researchers further recommend the application of 100 to 150 mM APM to whole basal explants is an excellent initial step toward recovery of DH materials.

The paper published in Plant Science can be accessed by subscribers at http://dx.doi.org/10.1016/j.plantsci.2007.03.010.

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ISOLATION DISTANCES FOR GM MAIZE IN SWITZERLAND

After reviewing past cross-fertilization studies in maize, a group of researchers in Switzerland recommended isolation distances of 20 m and 50 m for silage and grain maize respectively, to keep GM-inputs in the final product below the 0.9% threshold set by the European Union (EU). The researchers assert that their study demonstrates that coexistence between GM and non-GM maize cultivation would be possible in European agriculture.

To determine the isolation distances, the group of Olivier Sanvido at the Agroscope Reckenholz-Tänikon Research Station reviewed studies conducted under seed production conditions, and also those performed with open-pollinated maize. They also looked at past research dealing with the dynamics and mechanisms of maize pollen dispersal.

Sanvido's group then established relevant criteria for evaluating the studies which included biological and physical parameters relevant for maize cultivation. They stated that their approach to determine the recommended distances may be useful for analyzing cross-fertilization data in other countries.

For details, the paper published in Transgenic Research can be accessed at http://www.springerlink.com/content/n561562061873351/.

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BT COTTON'S CRY1AC NO HARM TO PREDATORY BUGS

Non-target herbivores feeding on Bt cotton can bio-accumulate the Cry1Ac toxin from the transgenic plant and pass it on to natural predators. However, predatory species are not affected by the toxin, said researchers at the Universidade Federal Rural de Pernambuco, Brazil and the University of Georgia.

The researchers investigated the movement of Cry1Ac toxin from the transgenic cotton plant to predators using three prey species fed with Bt-cotton. All three prey species were able to pass the Cry1Ac toxin to their respective predators. The researchers reported that the amount of toxin measured in the predators ranged from 4 to 17% of the amount in the herbivorous prey in their study.

Analysis of the developmental time, survival, longevity, and fecundity of the predator *Posidus maculiventris* indicated that those exposed to the Bt toxin had similar life history characteristics to those not exposed to the toxin. The researchers also reported that retention of the ingested Bt-toxins in non-target predators is relatively short. They observed that the toxin is undetectable in *P. maculiventris* after 48 hrs when it was switched back to prey fed with non-Bt cotton.

For more information, the paper can be accessed by subscribers to Transgenic Research at http://www.springerlink.com/content/6720174352336p64/.

Announcements

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CONGRESS OF THE FEDERATION OF EUROPEAN SOCIETIES OF PLANT BIOLOGY

The Federation of European Societies of Plant Biology (FESPB) will hold its 16th conference on 18-22 August 2008 in Tampere, Finland. Among the topics to be discussed at the conference include: molecular biology, plant biotechnology, photosynthesis and respiration and –omics sciences.

More info on the event is available at http://www.fespb2008.org/.

GLOBAL CONFERENCE ON GMO ANALYSIS

The first Global Conference on GMO Analysis will be held in Villa Erba, Como, Italy on June 24-27, 2008. Organized by the European Commission/Joint Research Centre, the conference deals with all aspects of GMO analysis in seed, food and feed.

Further information and registration details can be found at: http://gmoglobalconference.jrc.it/menu.htm

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Document Reminders

ISAAA'S BIOTECHNOLOGY FOR BIOFORTIFICATION PK

Pocket K 27: Biotechnology and Biofortification is now available on the web at: http://www.isaaa.org/kc/inforesources/publications/pocketk/default.html#Pocket_K_No._27.htm. This Pocket K is the latest in the Pocket K publication and presents general information on biofortification, impacts and benefits of biofortification on developing countries, and challenges for the adoption of biotech biofortified crops. 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).

BOOK NOW AVAILABLE ONLINE: Q&A ON BT-COTTON IN INDIA

The Q & A on Bt-Cotton in India, published by the All India Crop Biotechnology Association (AICBA) is now available online. Written by entomologist T.M. Manjunath, the book provides answers to more than 70 questions on all aspects of biotech cotton in India. AICBA is an industry association of the major companies engaged in agricultural biotechnology in India.

Access the book at: http://www.aicba.com/qa.pdf

AGRICULTURAL BIODIVERSITY BOOK DELIVERS COMPREHENSIVE BENEFITS

The Columbia University Press has released a new publication that looks at how farmers manage, maintain, and benefit from biodiversity in agricultural production systems. The chapters cover the assessment of farmer management practices for crop, livestock, aquatic, and associated diversity (such as pollinators and soil microorganisms); the potential role of diversity in minimizing the impact of pests and diseases; studies that exemplify the potential nutritional, ecosystem service, and financial values of agricultural biodiversity. The book features numerous case studies that show how farmers have used alternative approaches to manage biodiversity to enhance the stability, resilience, and productivity of their farms, pointing the way toward improved biodiversity on a global scale.

For more information visit http://news.bioversityinternational.org/index.php?itemid=1819.

FROM THE BICS

EGYPT'S AGRICULTURAL ENGINEERS DISCUSS BIOTECH CROPS

Egypt's Biotechnology Information Center (EBIC) and the Agricultural Genetic Engineering Research Institute (AGERI) jointly organized a one day agricultural biotechnology workshop entitled "Benefits of Biotech Crops to the Egyptian Agriculture". Over 50 agricultural engineers from different Egyptian governorates participated in the workshop.

This is the first event in a series of workshop program organized by EBIC to raise awareness in biotechnology among agricultural engineers and extension workers.

For more information please contact Dr. Ismail AbdelHamid, EBIC director at Ismail@egypt-bic.com