



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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BIOFUEL DEMAND HIKES AGRICULTURE PRICES

World prices for many food products could increase due to greater demand for biofuels. Long term changes in markets are also due to reduced crop surpluses and a decline in export subsidies. The Organization for Economic Cooperation and Development (OECD) and the Food and Agriculture Organization (FAO) set this scenario in OECD-FAO Agricultural Outlook 2007-2016.

The growing use of cereals, sugar, oilseed and vegetables oils for ethanol and bio-diesel are changing crop prices and indirectly through higher animal feed costs and livestock products. In the US alone, annual maize-based ethanol output is expected to double between 2006 and 2016. Added to this are temporary factors like droughts in wheat-growing regions and low stocks accounting for the recent increases in farm commodity prices.

For more information, contact Erwin Northhoff of FAO at Erwin.northhoff@fao.org or visit <http://www.fao.org/newsroom/en/news/2007/1000620/index.html>.

AFRICA

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NON-TOXIN STRAINS OF ASPERGILLUS TO FIGHT OFF TOXIC RELATIVES

A set of non-toxin producing (atoxicogenic) strains of *Aspergillus flavus* was recently assembled by scientists at the International Institute of Tropical Agriculture (IITA) to radically reduce aflatoxin in maize using the biological control approach. The team, led by Dr Ranajit Bandyopadhyay, used the highly competitive atoxicogenic strains of *Aspergillus* to eliminate their highly toxic relatives. "The atoxicogenic strains were able to reduce aflatoxin contamination by up to 99.8% in field trials", says Ranajit. In addition, the most effective atoxicogenic strain could out-compete toxigenic strains in grains by 99% after field release. The next step now is to test the efficacy of biocontrol after releasing multiple strains in large-scale field trials in several sites in Nigeria.

To read more, visit http://www.iita.org/cms/details/news_feature_details.aspx?articleid=1105&zoneid=342.

AMERICAS

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GM PLANTING IN U.S. INCREASING

A report from the United States National Statistics Service of the Department of Agriculture reveals that plantings of genetically modified (GM) crops have increased significantly in the U.S. The greatest increase has been in maize, up from 61 to 73%. Total area planted to GM maize is now 27.4 million hectares or a gain of 7.8 million over 2006 figures.

Total soy and cotton plantings have declined significantly. However, the proportion of GM varieties has increased further, totaling 91 and 87 % for soy beans and cotton respectively. These crops have replaced most conventional crops which now account for only 10% of the total production.

See the report at <http://www.nass.usda.gov>.

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NEW HIGH-YIELDING EDIBLE BEAN RESISTS BACTERIAL DISEASE

There is a new northern bean made available to farmers and breeders that can resist common bacterial blight – and it is high-yielding too. Named "ABC-Wei hing", the bean cultivar was developed by University of Nebraska bean breeder Carlos Urrea, and Phil Miklas, a geneticist at the Agricultural Research Service (ARS) using marker-assisted selection. The new bean variety resisted eight strains of bean rust and all non-necrotic strains of bean common mosaic in greenhouse tests, and also had an average seed yield of 1,869 pounds per acre.

Read the news article at <http://www.ars.usda.gov/News/docs.htm?docid=1261>.

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DUPONT COMPLETES REGULATORY FILINGS FOR OPTIMUM™ GAT™ TRAIT IN CORN

The DuPont company recently announced the completion of regulatory submissions for its Optimum™ GAT™ trait in corn to the U.S. Food & Drug Administration and the U.S. Department of Agriculture. The company also announced that it is on track to complete its submission to the U.S. Environmental Protection Agency later this year. The Optimum GAT trait is a proprietary trait with herbicide tolerance that DuPont plans to commercialize first in soybeans by 2009, pending regulatory approval. DuPont also plans to commercialize the trait in other crops.

"After completing U.S. regulatory submissions for the trait in soybeans in 2006, we are now meeting our regulatory milestones for the trait in corn. This keeps us on track for commercial introduction of the Optimum GAT trait in soybeans in 2009 and in corn in 2010", Erik Fyrwald, group vice president - DuPont Agriculture & Nutrition.

Read the press release at <http://www.pioneer.com/web/site/portal/menuitem.517778ab032ab278b9b44b24d10093a0/>.

ASIA AND THE PACIFIC

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GM TRANSGENIC EVENTS APPROVED IN THE PHILIPPINES

The Philippine's Bureau of Plant Industry (BPI) Assistant Director Clarito Barron in a press conference last Tuesday (July 3) disclosed that there were 41 transgenic events that were allowed entry to the country for food, feed, and processing. These include genetically modified (GM) soybean, canola, potato, cotton, sugarbeet, and alfalfa. Dr. Choy Mamaril, also added that there are four transgenic varieties that are approved for propagation including the Bt corn developed by the U.S. agrochemical firm Monsanto Co., a herbicide tolerant corn also by Monsanto, a Bt corn variety developed by Swiss company Syngenta AG, and the Round-up Ready and Bt corn variety of Monsanto.

The press conference called by the Bureau of Plant Industry was attended by different members of the Press and the Science and Technology Review Panel of the BPI to address the health concern regarding Monsanto NK603. For details contact Dr. C. Mamaril, supervising agriculturist of the Bureau of Plant Industry, at choymamaril@yahoo.com.

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AUSTRALIA TO CONDUCT FIRST GM WHEAT FIELD TRIAL

The Australian federal authorities approved the first field trial of 30 genetically modified (GM) wheat lines that have drought resistance. The trials that will be conducted in two sites in the state of Victoria are funded by the Molecular Plant Breeding Cooperative Research Center.

The wheat lines contain one of six different genes for drought tolerance derived from wheat, thale cress, moss and yeast. The trial that will be conducted in a 0.225 hectares will determine the agronomic performance of the GM wheat lines under rain-fed and drought-prone conditions as compared with the non GM lines.

For further details: <http://www.gmo-compass.org/eng/news/messages/200706.docu.html#130>.

VIETNAM TO LINK WITH EU ON S & T

Senior official in charge of scientific affairs in Vietnam signified their interest to cooperate with the European Union on building the scientific and technological ties between the two countries. Deputy Minister of Science and Technology (MoST) Tran Quoc Thang made the affirmation during his working sessions with European Commission officials, including Director General for Research Jose Manuel Silva Rodriguez, Deputy Secretary General Herve Jouanjan, and Director of the Office of EU commissioner in charge of scientific research Peter Droll.

Tran Quoc Thang said that Vietnam will consider teaming up with the EU in hi-tech projects in such priority fields as biotechnology, information technology, automation technology, and material technology.

Viet Nam and the EU officially established a mechanism for their cooperation in science and technology through this EC visit to the Ministry of Science and Technology.

For more news from Vietnam, contact Hien Le at hienttm@yahoo.com.

EUROPE

EFSA REAFFIRMS RISK ASSESSMENT OF GM MAIZE MON 863

In March 2007, a CRIIGEN study on the safety of genetically modified (GM) maize MON863 was released, alleging that the GM maize poses health risks at the experimental dose rates. The European Commission (EC) requested the European Food Safety Authority (EFSA) to examine the statistical analysis of the 90-day rat study. After undertaking a series of actions and reviewing all available evidence, the EFSA GMO Panel concluded that the paper does not present a sound scientific justification in order to question the safety of MON 863 maize. The GMO Panel sees no reason to revise its previous Opinions that the MON 863 maize would not have an adverse effect in the context of its proposed use.

Read the press release at http://www.efsa.europa.eu/etc/medialib/efsa/press_room/press_release/pr_efsa_maize-mon863.Par.0001.File.dat/pr_efsa_mon863.pdf.

EU TRADE COMMISSIONER DEFENDS OPEN EU APPROACH TO BIOTECH, GM FOOD

The European Trade Commissioner Peter Mandelson strongly defended an open European approach to biotechnology and genetically modified (GM) food in his speech to the European Biotechnology Open day in Brussels. Mandelson argued that Europe has the appropriate risk-management systems for ensuring that biotechnology is rigorously tested, but that these systems can be badly undermined if politicians and risk-managers do not defend the science that underpins them. He added that any blanket rejection of GMOs ignores the fact that genetically modified foods have played a key part in past revolutions in agricultural productivity and will be central to providing sufficient food and feed stocks for a growing population in the developing world. He then urged the EU to be the leader in shaping "a global system of clear rules that allow exporters and importers to trade GM crops and feed in confidence". This is in the light of the increasing difficulty in sourcing animal feed approved under EU rules.

Read Trade Commissioner Peter Mandelson's speech at http://ec.europa.eu/commission_barroso/mandelson/speeches_articles/sppm157_en.htm.

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SCIENTISTS STUDY ROOT GROWTH, FUNCTION, FOR IMPROVED CROPS

The Centre for Plant Integrative Biology (CPIB) at The University of Nottingham will break new ground in the current understanding of plant growth as it focuses on cutting-edge research into the little-studied area of root growth, function and response to environmental cues. A greater understanding of plant roots, particularly how they respond to different levels of moisture, nutrients and salt in the soil, could pave the way for the development of new drought-resistant crops that can thrive in arid areas and coastal margins of the developing world.

Scientists will develop a 'virtual root' using the latest mathematical modeling techniques. Through computer models that exactly mimic biological processes, researchers will be able to observe what is happening at every stage from the molecular scale upwards. The first 'virtual root' will be that of the simple weed *Arabidopsis*, a species routinely used for molecular genetic studies. CPIB researchers ultimately aim to integrate their 'virtual root' with those of other international projects that model shoot and leaf development, leading to a generic computer model of a whole plant.

Read the press release at http://www.nottingham.ac.uk/public-affairs/press-releases/index.phtml?menu=pressreleases&code=GET-116/07&create_date=27-jun-2007.

Research

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NEW ROLE OF PEA "LARGE" G-PROTEINS IN SALINITY AND HEAT STRESS TOLERANCE

The "large" G proteins function as mediators in the transfer of various signals from activated G-protein-coupled receptors (GPCR) to appropriate effectors. The first direct evidence that links the G proteins to salinity and heat stress tolerance has been presented by researchers at the International Centre for Genetic Engineering and Biotechnology in New Delhi, India in a recent issue of *The Plant Journal*.

Researchers reported the isolation of the cDNAs of two isoforms of G-alpha ($G\alpha 1$ and $G\alpha 2$) and one G-beta from pea and purification of their encoded recombinant proteins. Levels of $G\alpha$ and G-beta went up following NaCl and heat treatments. Protein-protein interaction studies showed that $G\alpha$ protein interacted with the pea G-beta. Consequently, transgenic tobacco plants overexpressing $G\alpha$ showed tolerance to salinity and heat, while G-beta overexpression showed only heat tolerance. This research uncovers a new pathway to engineer to maximize crop yield in sub-optimal conditions such as high salinity and high temperature.

For more information on the article, "Heterotrimeric G-protein complex and G-protein-coupled receptor from a legume (*Pisum sativum*): role in salinity and heat stress and cross-talk with phospholipase C", contact Dr. Narendra Tuteja at narendra@icgeb.res.in.

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PRODUCTION OF INULIN PREBIOTIC IN GM MAIZE, POTATO

Inulin is a type of fructan used in food ingredients as a low calorie sweetener or a source of a water-soluble dietary fiber. The compound has been increasingly used for improving food and feed quality as a prebiotic helping promote the growth of beneficial organisms in large intestines of animals.

Chicory root and Jerusalem artichoke tubers are the industrial sources of inulin. The paper reported that the dicot genes for inulin *1-ss1* and *1-fft* from Jerusalem artichoke were fully functional in the genetically modified monocot maize. Inulin at 1.5 - 5 mg /g fresh weight was obtained in the four generations transgenic maize kernels. This is higher than 2.6 mg/g tuber inulin in GM potato with similar genes. These inulin concentrations are within the range of values recommended for prebiotics in animal feed which requires less than 1% to improve gut microbial ecology, said the researchers.

The paper can be accessed by journal subscribers at <http://dx.doi.org/10.1016/j.plantsci.2007.04.011>.

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FLOWERING ONSET IN OIL PALMS, CONTROL GENES REVIEWED

A model showing the possible roles of various genes in the determination of flower structure in African oil palm was presented by researchers at the French Agricultural Research Centre for International Development (CIRAD). The researchers reported general information about the reproductive development in oil palms as well as specific ones pertaining to their research on genes controlling flower development.

Helene Adam and colleagues said that the molecular basis of flower structure in oil palm, a monocot, follows those reported by past studies on dicot species. Adam's group discussed this apparent conserved function in relation to the MADS-box genes that they have identified and characterized. MADS-box transcription factors are known to play homeotic roles in flower development. The researchers provided evidence that difference of expression of MADS-box genes determines petal and sepal identities in oil palm. They also mentioned that investigation on gene expression in oil palm is challenging. This is due to the large size and long life cycle of the plant, with flowering occurring only about 3 years from germination.

The review paper published in the Annals of Botany can be accessed by subscribers at <http://aob.oxfordjournals.org/cgi/content/abstract/100/1/1>.

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BACTERIA TO HELP PRODUCE WATER AND NITROGEN USE EFFICIENT PLANTS

Cyanobacteria, often referred to as blue green algae, may help produce transgenic plants that use water and nitrogen more efficiently. Cyanobacteria possess active uptake systems for the acquisition of carbon dioxide (CO₂) that are notably absent in many plants. These CO₂-concentrating mechanisms (CCM) may help increase photosynthetic efficiency of plants, especially those that follow the C₃ pathway, reports the group of G. Dean Price at the Australian National University.

Price and colleagues discussed some prospects for introducing cyanobacterial CCM components into C₃ plants. Their paper, published in the Journal of Experimental Botany, indicates that among the possible approaches that target plant chloroplasts include the expression of a cyanobacterial transporter and the establishment of a more elaborate form of the cyanobacterial CCM in the organelle.

There has been considerable interest in the objective of moving significant parts of the C₄ cycle into C₃ plants, however, moving parts of the cyanobacterial CCM into C₃ plants has received little attention, wrote the

researchers. C4 plants follow a more complex but efficient carbon fixation strategy than C3 plants. C4 plants, such as maize and sugarcane, have a competitive advantage over C3 plants in cases of drought, high temperatures and nitrogen or carbon dioxide limitation.

The journal article can be accessed by subscribers at <http://jxb.oxfordjournals.org/cgi/content/abstract/erm112v2>.

Announcements

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INTERNATIONAL SYMPOSIUM OF RICE FUNCTIONAL GENOMICS

The 5th International Symposium of Rice Functional Genomics is slated on October 15-17, 2007 in Tsukuba, Japan. The event will bring together rice researchers from all over the world, as well as researchers of other cereal crops, to tackle diverse areas of functional genomics based on structural, comparative, evolutionary and bioinformatics approaches. Deadline for submission of an abstract for oral and poster presentation is August 15, 2007.

For more information visit <http://www.isrfg2007.com>.

HARNESSING THE POTENTIAL OF AGRICULTURAL BIOTECHNOLOGY FOR EUROPE

A new forum, "Harnessing the Potential of Agricultural Biotechnology for Europe" is scheduled on July 9-11, 2007 in Amsterdam, The Netherlands. This event will as a forum for discussion of the current key topics in European agricultural biotechnology and will present a message of how best to move the industry forward in Europe. The speaker panel will comprise decision makers from the most influential companies, leading thinkers from public sector and academic groups, key experts on regulatory, safety and R&D aspects of plant biotech, industry lobby groups and representative bodies, and, crucially, important representatives of the central European and national regulatory agencies and governments.

For more information visit <http://www.iir-events.com/IIR-conf/LifeSciences/EventView.aspx?EventID=1011>.

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Document Reminders

REVISED POCKET K 2: PLANT PRODUCTS OF BIOTECHNOLOGY NOW AVAILABLE

The revised edition of Pocket K 2: Plant Products of Biotechnology is now available online at: http://www.isaaa.org/kc/inforesources/publications/pocketk/default.html#Pocket_K_No.2.htm

The latest additions include biotech rice and alfalfa. 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).

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