

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

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GM CROPS RESULTS IN IMPROVED PRODUCTIVITY, SAYS STUDY

After a decade of genetically modified (GM) technology, important positive socio-economic and environmental benefits have been realized despite a limited range of GM agronomic traits that have been commercialized in a small range of crops. The technology has resulted in improved productivity and profitability for about 8.5 million adopting farmers who have used it in over 87 million hectares in 2005. These are among the conclusions forwarded by "GM crops: The first ten years – global socio-economic and environmental impacts" by Graham Brookes and Peter Barfoot of PG Economics Ltd., United Kingdom.

The report, published as Brief 36, by the International Service for the Acquisition of Agri-biotech Applications (ISAAA), discusses the global context of GM crops, the farm level economic impact of GM crops, and environmental impact of the technology.

The full report is available online at <http://www.isaaa.org/Resources/publications/briefs/36/default.html>.

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CISGENIC PLANTS ARGUED SIMILAR TO TRADITIONALLY-BRED PLANTS

Cisgenic plants are bred by introducing genes from the crop plants themselves or from crossable species using marker-free transformation techniques. By adopting this breeding process called 'cisgenesis', plant breeders can produce cultivars that are equivalent to classically-bred plants, said researchers in the Netherlands.

The researchers, Evert Jacobsen and Henk Schouten, mentioned that cisgenesis is comparable to the induced translocation method of improving plants. In induced translocation, the insertion site of the genes is a priori unknown like in cisgenesis. Thus, Jacobsen and Schouten recommend that plants derived through cisgenesis be treated similar to traditionally-bred plants and exempted from GMO regulations. The researchers note that they have successfully tested cisgenesis in breeding disease resistant apple and potato cultivars.

The complete review paper published by the journal Trends in Biotechnology can be accessed by subscribers at <http://dx.doi.org/10.1016/j.tibtech.2007.03.008>.

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MUSLIM PERSPECTIVES ON GENETIC MODIFICATION

"Muslims must connect scientific knowledge and ethical behavior based on faith", says Fatima Agha Al-Hayani, a lecturer and court expert on Islamic Jurisprudence. In her paper, published in the March issue of the journal of religion and science Zygon, she discussed that biotechnology and genetic modification must neither be condemned nor praised. The technology she said is a responsibility that was given by God and accepted by humans, to be applied to the betterment of all.

Al-Hayani encouraged religious communities to be actively involved in the ethical issues of the genetic engineering process and the economic and equitable use of such process.

The technology offers promise to help those most in need and help prevent world hunger. It is estimated that there are about 1.3 billion people living in poverty worldwide.

For more information, Ms. F.A. Al-Hayani can be reached by email at alhayanis@buckeye-access.com.

AFRICA

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ECOWAS CONFERENCE ON BIOTECHNOLOGY IN GHANA

Some 200 multi-sectoral representatives from the agriculture and environment sector are meeting in Accra, Ghana to deliberate on issues pertaining to biotechnology in the sub-region. This third Economic Community of West African States (ECOWAS) Ministerial Conference on Biotechnology's theme is "Adoption of 2006-2010 Action Plan for Meeting the Challenges of Biotechnology and Biosafety".

Ghana News Agency reports that the 2006-2010 Action Plan focuses on measures recommended by the Ministers to develop a regional approach to biosafety and a strategy for biotechnology information, communication and policy in sub-Saharan Africa.

See the full article at:

<http://www.ghanaweb.com/GhanaHomePage/NewsArchive/artikel.php?ID=121477>

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INSECT RESISTANT MAIZE FOR AFRICA (IRMA) II PROJECT

The second phase of the Insect Resistant Maize for Africa (IRMA) Project has been launched by the International Maize and Wheat Improvement Center (CIMMYT) and Kenya Agricultural Research Institute (KARI). The project aims at producing stem borer resistant, locally-adapted maize varieties for various Kenyan agro-ecological zones using conventional and biotechnology-mediated approaches. Some of the outputs of the program include the introduction of Bt maize for testing in Kenya, release of insect-resistant maize hybrids and characterizations of non-target organisms in maize systems.

To read more, visit <http://www.africancrops.net/News/march07/index.htm> or contact Stephen Mugo at s.mugo@cgiar.org.

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NEW SEED INITIATIVE FOR MAIZE IN AFRICA

The New Seed Initiative for Maize in Africa (NSIMA) Project has been helping small-scale farmers obtain superior and high-quality seeds. By using high-quality seeds, agricultural productivity is greatly improved. The project fostered the development of improved and adapted maize varieties with the National Maize Breeding Programmes in seven Southern African Development Community (SADC) countries and funded the breeding activities of the International Maize and Wheat Improvement Center (CIMMYT)-Harare. Several new maize breeding lines, open-pollinated varieties and hybrids have been released into the seed sector.

To read more, visit <http://www.africancrops.net/News/march07/index.htm> or contact John MacRobert at j.macrobot@cgiar.org.

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NERICA RICE INTRODUCED IN CENTRAL AFRICAN REPUBLIC

Since the decline of cassava production in the 1990s, rice has been used as an alternative source of food in Central African Republic. Ten NERICA varieties were acquired from Benin Republic and three more were selected for introduction to farmers due to their better yield, resistance to disease and early maturity.

NERICA varieties showed resistance to drought and various diseases. More experiments are needed to collect dependable data on the performance of the rice varieties during periods of long rains.

To read more, visit <http://www.africancrops.net/News/march07/index.htm> or contact Koma D. Ben-Bala at kd_bbala@yahoo.co.uk.

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SOURCE OF REGULATED PROTEIN IN CL131 RICE IDENTIFIED

The United States Department of Agriculture Animal and Plant Health Inspection Service (APHIS) identified LLRICE604 as the source of regulated genetic material in Clearfield 131 (CL131) rice variety. LLRICE604 was developed by Bayer CropScience to be herbicide tolerant. It contains a protein phosphinothrin-N-acetyltransferase (PAT), which has a long history of safe use and is present in many deregulated products. At this time, APHIS has not received a petition from Bayer to deregulate LLRICE604. Because of this, producers will not be permitted to plant any CL131 seed that is currently on hold.

The press release is available at: http://www.aphis.usda.gov/newsroom/content/2007/03/protein_clearfield131rice.shtml.

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UPDATE ON GENETICALLY MODIFIED ALFALFA

Following the preliminary injunction order by the United States District Court for the Northern District of California, Roundup Ready (RR) alfalfa remains a regulated article until the Animal and Plant Health Inspection Service (APHIS) issues a new determination consistent with court requirements. The court did not overturn federal conclusions regarding the safety of the crop for food and feed purposes, but rather concluded that APHIS had not adequately documented potential environmental impacts. A future decision regarding the deregulation of RR alfalfa will be issued only after the completion of an appropriately documented environmental analysis.

Readers can access the update at: <http://www.aphis.usda.gov/newsroom/content/2007/03/allfalfarr.shtml>.

BLUEBERRY SKINS FOUND TO LOWER CHOLESTEROL LEVELS

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A recent study affirms the benefits of blueberry skins in controlling cholesterol. Researchers at the US Department of Agriculture Agricultural Research Service ([USDA-ARS](#)) found that feeding hamsters a diet extremely high in cholesterol, but supplemented with freeze-dried skins of rabbiteye blueberries, lowered the plasma cholesterol level in blueberry-supplemented hamsters.

In addition, the researchers also found that hamsters eating the blueberry-enhanced food fared better than hamsters fed the high-cholesterol diet augmented with the lipid-lowering drug ciprofibrate. The results may be linked to constituents in blueberry skins that can activate a protein involved in the breakdown and import of fats, according to Agnes Rimando, a chemist working with ARS. Among these constituents are resveratrol and pterostilbene, which have been cited for their antioxidant properties.

Read the news article at <http://www.ars.usda.gov/is/pr/2007/070326.htm>.

EMERGING CHALLENGES FOR BIOTECH SPECIALTY CROPS

The Pew Initiative on Food and Biotechnology and the US Department of Agriculture Animal and Plant Health Inspection Service (USDA-APHIS) co-sponsored a roundtable discussion to illuminate challenges that biotech specialty crop industry encounter with the regulatory system. According to the participants at the workshop, there are many opportunities to improve the regulatory system, and make it favorable to the biotech specialty crops sector.

Highlights of the discussion include:

- Specialty crops form a vital sector of the U.S. economy, yet the development of biotech crops face particular regulatory challenges.
- A number of options are present that could ease the regulatory burden including the development of tiered risk assessments and regulation revisions to increase transparency and predictability.

An overview of the conference agenda and the full paper from the workshop, entitled Emerging Challenges for Biotech Specialty Crops, can be viewed at <http://www.pewagbiotech.org/events/0118/>. For more information, contact Kara Flynn at kflynn@pewagbiotech.org.

ASIA AND THE PACIFIC

KOREA CONTINUES HUGE INVESTMENT ON BIOTECH

Over 851 won (or about US\$908 million) is what Korea is set to invest in biotechnology research and development. The Korean Overseas Information Service says that this amount represents a three percent increase over last year's budget.

With this investment, the Korean government hopes to assume a more prominent role in the global arena of biotechnology. Among the countries that are members of the Organization for Economic Cooperation and Development, Korea ranks as one of the leading nations in research and development spending.

See the full press release at:

http://www.kois.go.kr/news/newsView.asp?serial_no=20070323028&part=107&SearchDay=&page=1.

ANTI-HAY FEVER GM RICE MAY GAIN JAPANESE TRUST

Hate hay fever? A new variety of transgenic rice is being developed in Japan to curb the sneezing, and it is expected to help the body's immune system develop a tolerance to allergy-causing pollen. The problem is that it would take long before the genetically modified (GM) rice becomes commercially available. GM technology is still viewed with deep suspicion by many consumers in Japan, where no GMO crops are commercially grown despite increasing a growth in global acreage.

Still, some industry officials say a biotech crop with health-enhancing characteristics may offer one of the best

chances for acceptance of GMO crops in a country that boasts one of the world's longest average life spans. "Those are the kind of products that may find greater acceptance, at least in the context of the Japanese consumers," said Randy A. Hautea, director at the South East Asia Center of the International Service for the Acquisition of Agri-biotech Applications.

Japanese researchers have been working on the project since about 2000, and the next major step would be to test on humans the effectiveness of eating the transgenic rice.

Read the news article at <http://www.growersforwheatbiotechnology.org/html/news.cfm?ID=385>.

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ORGANIC AND BIOLOGICAL FARMING ARE VIABLE SYSTEMS SAYS CSIRO

The Australian Commonwealth Scientific and Industrial Research Organization (CSIRO) continues to conduct research in organic agriculture. CSIRO supports all farming types in Australia and considers organic and biological farming as viable systems. Decisions about its research in agricultural sustainability are made through discussions with a variety of organizations including state and federal government, industry bodies, Research and Development Corporations, other agricultural funding bodies and farmers. The agricultural sustainability research portfolio includes projects on soil health and function, and carbon uptake and sequestration in agricultural systems.

Read the news article at <http://www.csiro.au/news/ps2xa.html>.

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SOON, A HUNDRED BILLION DOLLAR INDIAN TEXTILE INDUSTRY

India's Ministry of Textile has projected the value of the Indian textile industry to grow from US\$ 47 billion in 2005-2006 to US\$ 95 billion by 2010. In 2012, it is expected to rise to US\$ 115 billion comprising the domestic market of US\$ 60 billion and exports of US\$ 55 billion. The projected growth rate of 16% per annum during these years, says Minister of Textiles, E.V.K.S. Elangovan, is attributed to the implementation of the Multi Fiber Agreement (MFA) under the aegis of the World Trade Organization, and increasing raw material base with booming cotton production.

The Government of India has taken many initiatives in the past and included new schemes like the Technology Upgrading Fund Scheme, Technology Mission on Cotton, Integrated Textile Parks, Foreign Investment Promotion Scheme, Brand Promotion on Public-Private Partnership (PPP) approach to develop global acceptability of Indian apparel brands to name a few.

Read more on the role of the textile industry in Indian economy at <http://pib.nic.in/release/release.asp?relid=25886> and <http://pib.nic.in/release/release.asp?relid=23833>.

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CHALLENGES AND OPPORTUNITIES FOR CROP PROTECTION

In the recent Bayer CropScience Fungicide Symposium, experts from the Research and Development sector and the European agriculture discussed the challenges and opportunities involved in fungicide use. Global warming and its repercussions for all areas of the agricultural sector was the recurrent theme in the presentations. Global warming is changing the face of agriculture, and how plant pathogens spread disease.

According to John Lucas from Rothamsted Research Institute, United Kingdom, scientists are not the only ones who must adapt to the spread of diseases into new regions and their much greater potential for expansion. Plants, which are greatly affected by global warming, should be made adaptable as well. Lucas sees opportunities in genetic engineering. Tomato or potato plants, for example, could be equipped with properties to make them resistant against fungi.

Other major topics in the symposium include the displacement of today's agricultural regions in Europe, the higher infection rate of cereal crops because of the warmer climate, and changes in agricultural economies, with focus on bioenergy crops and sustainable raw materials.

Read the news article at http://www.bayercropscience.com/bayer/cropscience/cscms.nsf/id/EN_2007-NST-008?open&ccm=400.

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FRANCE ADOPTS NEW LEGISLATIONS ON CO-EXISTENCE

France has adopted two decrees that regulate the release of genetically-modified organisms into the environment and include specific rules for co-existence of genetically-modified (GM) crops and conventional crops. An isolation distance of 50 meters is required under the new legislation. Farmers also must provide details of their GM cultivation. These details will be collected to enable France to develop a national site register and will remain confidential.

To read more, visit http://www.coextra.eu/country_reports/news824.html.

Research

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RICE BT PROTEIN DEGRADES RAPIDLY IN AEROBIC PADDY SOILS

The degradation of Cry1Ab protein from Bt rice was observed to occur more rapidly in paddy soils exposed to aerobic conditions than that in flooded conditions. The observation came from a study by researchers at the Zhejiang University, China and the University of California at Riverside. This means that if there are Bt proteins left during rice harvesting, it will be rapidly degraded after the field is drained and exposed to aerobic conditions.

The researchers extracted and purified the Cry1Ab protein during the booting stage of the transgenic rice plants. The experiment was conducted under controlled conditions using 50 mL of the protein extract incubated in five types of paddy soils.

The research also determined the stability of the Bt protein expressed by the transgenic rice variety 'Ke-Ming-Dao' (KMD) under different pH conditions. It was determined that the Bt protein breaks down more rapidly with decreasing soil pH, while becoming more stable at high pH.

The abstract of the paper, with links for subscribers, can be found at http://pubs3.acs.org/acs/journals/doilookup?in_doi=10.1021/jf062924x.

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GENE FOUND TO LOWER APPLE ACIDITY

A gene called Mal-DDNA was found to be differentially expressed in apples with different acidity. Previously, almost nothing is known about apple fruit acidity at the molecular level.

The report from a group of researchers in the Shandong Agricultural University and the Liaoning Institute of Fruit Tree Science in China, describes the successful screening of Mal-DDNA by bulk segregant analysis. Using real-time PCR analysis, Mal-DDNA was found to be transcribed in low-acid fruits at both early and ripe stages of hybrids from 'Toki' and 'Fuji' apple varieties. There was no observed transcription in high- and mid-acid fruits.

The difference between low and mid to high acid fruits on Mal-DDNA transcripts was determined by RNA gel-blot hybridization. The researchers suggest that the gene exists as a single copy, as determined by Southern blot.

For the abstract, with links to the full paper, please visit <http://dx.doi.org/10.1016/j.plaphy.2007.01.010>.

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HETEROSESIS IN BT COTTON HYBRIDS ANALYZED

In two separate experiments conducted by Chinese researchers, hybrids derived from Bt cotton parents showed increased heterosis in many characters. This means that hybrids from Bt transgenic cotton parents maybe valuable for commercial utilization.

The experiments, conducted in Shandong Cotton Research Center in China, utilized four commercial Bt cotton varieties as male parents and five commercial varieties as female parents. The mid-parent heterosis observed in the Bt cotton hybrids was 21.3% in lint yield. There are also considerable heterosis detected in boll numbers, boll size and Bt protein content.

The researchers believe that the enhanced endotoxin expression in terms of Bt protein concentration in Bt hybrids is due to over-expression of heterozygous transgenes - Bt genes that are in different chromosomes of the hybrids. The heterosis in other characters was also explained to be influenced by the increased leaf area and the improved flow capacity of photosynthates at late stage of growth and development of the hybrids.

The abstract, with link to the full paper can be accessed at <http://www.blackwell-synergy.com/doi/abs/10.1111/j.1439-0523.2007.01321.x>.

Announcements

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ISAAA VIDEOS AVAILABLE ONLINE

The International Service for the Acquisition of Agri-biotech Applications (ISAAA) has developed a series of videos in DVD and CD formats that document developing country experiences on crop biotechnology. These 12-18 minute videos are on Bt corn in the Philippines, Bt cotton in India, and tissue culture banana in East Africa. The videos including a 12-minute corporate video on ISAAA are now also available for viewing online at <http://www.isaaa.org/kc/inforresources/videos/>. These are streaming videos that can be viewed while they are being downloaded. You may also view them full screen. Watch out for more upcoming ISAAA videos.

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Document Reminders

APCOAB PUBLICATION ON POTATO SEED MICROPROPAGATION

The Asia Pacific Consortium on Agricultural Biotechnology (APCoAB) has recently released a new publication titled "Micropropagation for Production of Quality Potato Seed in Asia-Pacific". The publication provides detailed information on production of virus-free potato plants, their rapid multiplication, and microtuber and minituber production. Integration of micropropagation with conventional potato seed production is also discussed. Success stories of quality potato seed production using micropropagation in some Asia-Pacific countries are also discussed.

The publication is available at: http://www.apcoab.org/documents/potato_pub.pdf, or for more information contact J. Karihaloo at j.karihaloo@cgiar.org.

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