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)

July 21, 2006

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NEWS

***GLOBAL ***

DANFORTH TO SPEARHEAD CASSAVA SEQUENCING PROJECT

The U.S. Department of Energy Joint Genome Institute (DOE JGI) has announced that it has selected a cassava genome sequencing project proposal organized by the Donald Danforth Plant Science Center. Heading the project is Dr. Claude M. Fauquet, Principal Investigator from the Center, who oversees a consortium comprised of over a dozen scientists from 11 institutions that submitted the proposal to the DOE JGI.

“Sequencing the cassava genome will help bring this important crop to the forefront of modern science and generate new possibilities for agronomic and nutritional improvement,” said Dr. Norman Borlaug, Nobel laureate, father of the “Green Revolution,” and Distinguished Professor of International Agriculture, Texas A&M University. “It is a most welcome development, especially for millions of the world’s poor who depend upon cassava for their sustenance.”

Cassava can grow in a wide variety of environments, and is a staple crop and an important source of starch for about 1 billion people around the world. It also costs less to produce per hectare, making it an attractive and strategic source of renewable energy.

Read about the Joint Genome Institute at http://www.jgi.doe.gov, and the Donald Danforth Plant Science Center at http://www.danforthcenter.org. The complete press release is available at http://www.danforthcenter.org/newsmedia/NewsDetail.asp?nid=122

BIOFUELS ISSUES TAKE CENTER STAGE IN JOURNAL

Various articles and an editorial in the Nature Biotechnology journal are tackling the issue of biofuels head on. From substitutes for bioethanol, to the biofuels scene in Europe, both research and debates are heating up to meet the challenge of supplying fuel needs throughout the world.

Dependency on fossil fuels is not only depleting fuel stores, but also has detrimental effects on the environment, and biofuels seem to be the answer to both problems. Bioethanol, however, is in need of a biotechnology boost, says the Nature Biotechnology editorial; although bioethanol is promising, its production has moved the US away from natural gas to coal in running biofuel

refineries. The main source of bioethanol, corn, also requires large amounts of fertilizer and pesticide to cultivate, leading to runoffs in fields that bleed into and contaminate groundwater.

Biotechnology, according to the editorial, could solve these problems by engineering crops that have greater carbon-fixing efficiency, or that require little or no fertilizer or pesticide. The editorial also speculates that biotech innovations "will be central in transitioning bioethanol production from corn grain to more sustainable, energy-efficient, but recalcitrant feedstocks, such as cellulosic biomass," which includes wood chips and switchgrass.

In a similarly themed feature, "Can Biofuels Take Center Stage?" research into lignocellulose, another biofuel feedstock, is brought to the fore. Lignocellulose is the world's most abundant biological material, comprising the woody parts of plants that can be found in wheat straw, corn husks, or discarded rice hulls. Research is now underway in both the Americas and Europe to derive the most energy from this potentially rich source: scientists at Dartmouth College, New Hampshire have engineered microbes to produce ethanol of cellulose, although at low yields; other researchers are hopeful that bacteria that convert biomass into hydrogen, and algae that yield biodiesel will soon be available.

To read the editorial, visit http://www.nature.com/nbt/journal/v24/n7/full/nbt0706-725.html. To read the feature, visit http://www.nature.com/nbt/journal/v24/n7/full/nbt0706-777.html.

*** AFRICA ***

GHANA PROJECTS TO MOVE AGRI, BIOTECH FORWARD

The Ghanaian government has provided equipment to two research institutes of the country's Council for Scientific and Industrial Research (CSIR) to enable them to undertake research into biotechnology. The Crop Research Institute, Kumasi, will serve the institutes of the Northern Sector, and will assist in the development of research and capacity building geared toward the improvement in crop yields and disease resistant crops. The Animal Research Institute, Accra, on the other hand, will serve the research institutes of Ghana's Southern Sector, and will be used to build capacity in the livestock industry. All facilities will be fully operational after Ghana's cabinet passes the country's Biosafety Framework.

In related news, the Millennium Challenge Corporation (MCC) has approved a five-year, approximately US$547 million, anti-poverty program in Ghana. The program, Compact, will focus on rural agriculture, transportation, and community development initiatives, and will include improvement of land tenure and credit access for small farmers and agribusinesses.

With reports from the Ghana News Agency (GNA) through the Ghanaian government at http://www.ghana.gov.gh/news/article.php?id=0000016050. Read more at http://www.mcc.gov/public_affairs/press_releases/pr_071206_Ghana.shtml

CLINTON FOUNDATION IN SUPPORT OF AFRICAN FARMERS

Former US President Bill Clinton has pledged fertilizers and irrigation support systems to Rwandan farmers, in an effort to end famine in the country. He also announced his support for the country's national health and agriculture development programs, and said that the two sectors were directly inter-dependent.

According to, Mr. Ira Magaziner, Chairman the Clinton Foundation's policy board, the agriculture program would last at least ten years. "We are trying to create more productivity on the land by irrigation, trying to lower the price of fertilizers and making fertilizers more available … and such other things that increase agricultural produce," he added. The William Clinton Foundation has spent about US$30,000 million to finance its activities in Rwanda.

This is Clinton's fourth visit to Rwanda. He is also touring the countries of Malawi, Lesotho, and South Africa to check on the progress of his foundation's work.

Read more at http://www.clintonfoundation.org/071606-nr-cf-ee-cgi-hs-ai-rwa-fe-clinton-moves-to-help-out-farmers.htm.

* THE AMERICAS *

US$60M BOOST FOR BRAZILIAN AGRICULTURAL RESEARCH AND INNOVATION

The Brazilian Agricultural Research Corporation (EMBRAPA) and the Inter-American Development Bank (IDB) signed this week an agreement of US$ 60 million for the promotion of agricultural research in Brazil. The five-year project, Agrofuturo, is aimed at extending the current network of research facilities and at improving the infrastructure of existing laboratories. IDB will provide US$ 33 million, while the remaining US$ 27 million will be contributed by the Brazilian government. Of the total resources, 55% will be devoted to develop natural and genetic resources, biotechnology, and biosafety programs. Projects in the

following areas will also benefit from the funds: Intellectual Property; food quality and preservation; the sustainable use of biodiversity; and organic agriculture. Silvio Crestana, president of EMBRAPA, said Brazilian agricultural research will require additional funds, as emergent areas such as rastreability, certification, and biofuels, demand many more resources. Crestana also said that by integrating Brazilian agriculture and developing suitable agricultural biotechnology applications for the arid regions, Brazil could become a major exporter of agricultural innovation. “We have to make possible a sustainable expansion of agriculture,” he added.

With reports from Valor Econômico – SP / Agronegócios, via ANBio. More information available at: http://www.anbio.org.br/

PERU LAUNCHES NEW KIWICHA CULTIVAR

The Agrarian Experimental Station Canaán Ayacucho of the Peruvian National Institute of Agrarian Research and Extension (INIEA) has released a new improved variety of kiwicha, or amaranth grain. The Kiwicha Variety 413, “INIA Morocho Ayacuchano,” has an early germination phenotype, a yield of 3 to 4 tones/ha, and a high grain quality.

The project is in line with the policies of the Ministry of Agriculture and of the Institutional Strategic Program, and aims to introduce new technologies to the Peruvian agricultural sector. The objective is to increase the use of national genetic resources and promote the competitiveness and sustainability of the sector for the benefit of all.

Kiwicha, a natural plant from the Peruvian Andes, and a traditional Incan crop, has been under cultivation for over 8000 years. However, as kiwicha has continued to grow in the wild as a weed, this crop has a very large base of genetic diversity. Kiwicha seeds have a high caloric nutrient content, and provide, besides protein, dietary fiber and minerals such as iron, magnesium, phosphorus, copper, and manganese.

Read more at: http://www.inia.gob.pe/eventos/evento0128/

EMBRAPA DISTRIBUTES IMPROVED SEEDS FOR SEMI-ARID CONDITIONS

The Brazilian Agricultural Research Corporation (EMBRAPA) will distribute in the next days 5000 tonnes of improved maize, rice, bean, cotton, and castor bean seeds to familiar farmers in the Brazilian State of Pernambuco. The improved seeds were developed by EMBRAPA scientists, and the project involved the

training of 175 technical specialists and 440 farmers who will work in seed multiplication units established by EMBRAPA in 22 semi-arid localities.
The initiative forms part of the National Seed Program, implemented by the Brazilian Ministries of Agricultural Development (MDA); Agriculture, Livestock, and Food Supply (Mapa); and Social Development and Hunger Combat (MDS); in collaboration with the National Center of Agricultural Training and Research (CONSEPA) and State agencies for rural extension and assistance.

The objective of the project is to improve agricultural productivity, says Nicolau Schaun of EMBRAPA, as one of the main causes of crop losses is the scarcity of genetically improved seeds better adapted to conditions of low and irregular rainfall. The goal is for farmers to produce and store their own seeds, in order to reduce dependency on the distribution by state organizations of seeds, which often have low genetic potential. In addition, the timing of the distribution often does not coincide with the best planting season, explained Schaun.

Read more at: http://www.agenciabrasil.gov.br/

*** ASIA ***

INDIA MINISTER CALLS FOR MORE BIOTECH SUPPORT

Jairam Ramesh, India's Union minister of State for Commerce, urged scientists and agricultural research institutions to take a holistic approach toward Indian agriculture. He said this as he delivered the inaugural address at the Agri-Biotech Day, part of the recent Bangalore Bio 2006.

India has the tools, technology, and potential to mitigate and solve farmers' problems, he said, "The need of the hour is effective communication between the stakeholders to create public awareness and public-private partnership," Ramesh added.

India's agri-biotech sector is the fastest growing industry in the country. According to the 4th Biospectrum-ABLE Biotech industry survey released in June 2006, the agri-biotech sector registered 81% growth in 2005-2006, with a record equivalent of US$ 133 million in revenues. This performance is driven mainly by Bt cotton. Agricultural biotechnology accounts for a 9.17% share of India's total biotech industry.

Read more at
http://www.biospectrumindia.com/content/CoverStory/10607144.asp,
http://www.biospectrumindia.com/archive/articledetail.asp?arid=85244&mode=disp, and http://www.biospectrumindia.com/content/BangaloreBio/10607144.asp.

For more information, contact Bhagirath Choudhary of the ISAAA South Asia Office at b.choudhary@isaaa.org.

BIO-PRODUCT HELPS VIETNAMESE FARMERS

A pilot project to use bio-products in rice and vegetable cultivation has brought positive results in restoring soil fertility and improving products' quality, said Vice Director of the Institute of Bio-Technology Tran Dinh Man. Under the two-year project, scientists used bio-product to turn rubbish into organic fertilizer while dipping seeds and roots into bio-product solution for disease resistance.

Tests have shown that bio-product, as well as a fertilizer made from it, have helped increase vegetable output by 15-20%, and rice yields by 7-10%. Soil quality also increased considerably. The implementation of the project is currently being expanded to create trademarks for safe rice and vegetables in two provinces in Vietnam.

With reports from the Vietnam News (http://vietnamnews.vnagency.com.vn/), July 13, 2006. For more information, visit http://www.agbiotech.com.vn/vn/

VIETNAM MOST TO SET UP ADVENTURE FUND

Vietnam's Ministry of Science and Technology (MoST) will soon form the country's first sci-tech adventure investment fund. It is now collecting opinions from over 30 related ministerial agencies, sectors, and universities, and will submit documents to the Prime Minister later this month. The adventure fund will invest in the establishment and development of hi-tech enterprises, while raising funds from local and foreign sources to develop domestic hi-tech industries.

The fund will provide start up capital and purchase stock in hi-tech companies. With reports from Tuoi Tre, July 6, 2006. For more information, visit http://www.agbiotech.com.vn/vn/

PHILIPPINE NAST RECOMMENDS MORE BIOTECH SUPPORT

The National Academy of Science and Technology of the Philippines (NAST), the country's highest advisory body to the government, presented its resolution for continuing its support of biotechnology. This was done during its Annual Scientific Meeting, which took place recently in the Philippine capital, Manila.

NAST President Emil Q. Javier called on the private sector to continue and increase its investments in biotechnology research and development in the country. He also enjoined the public and private sector, especially the Departments of Agriculture (DA) and Science and Technology (DOST) to strengthen the information and communication campaign in order to enhance public understanding and appreciation of biotechnology.

Other recommendations of the resolution include: 1) continued support and investment to biotech projects involving mango, banana, abaca, coconut, corn, rice, and papaya; 2) increased support to centers of excellence that are conducting research in the applications of biotechnology in agriculture and marine sciences; and 3) further strengthening of manpower and infrastructure facilities of regulatory agencies involved in biotech monitoring.

The full text of the resolution can be viewed at http://www.bic.searca.org/docs/resolution_on_biotech.pdf. For more information, visit the SEARCA Biotechnology Information Center at http://www.bic.searca.org/.

*** EUROPE ***

UNIVERSITY FORUM FOCUSES ON BIOENERGY ISSUES

Bioenergy was the main subject of the University Day of Agriculture, an annual event organized by the University of Hohenheim, Germany. Debates, lectures, and discussions covered political objectives, legal guidelines, economic solutions, and the potential of bioenergy to meet fuel needs. About 280 visitors attended the meeting, including scientists and representatives of associations and companies dealing with the construction and operation of bioenergy facilities.

“The discussion participants agreed that in the long term, second generation synthetic fuels must be produced from biomass. The two-stage production method of such fuels has the advantage of optimal combustion and reduced environmental pollution by the waste gas produced,” said Dr. Jürgen Zeddies, Agriculture Day organizer. The discussion panel also agreed that all interested parties must work together to maintain the competitiveness of biofuel produced in Germany

For more information, contact the organizer through i410b@uni-hohenheim.de. Read the complete article at http://www.bio-pro.de/en/region/stern/magazin/02352/index.html.

RESEARCH

PLANT PROTEINS MAKE ARABIDOPSIS GROW WITH HIGH ZINC

Heavy metal pollution is a big problem worldwide. Even essential metals such as zinc are toxic for all organisms when present in excess. However, some plants are able to grow in metal contaminated soils. These metal tolerant plants are important to scientists, as they can be used in bioremediation, the cleaning up of heavy metal pollution. How these plants can tolerate in heavy metal access, however, is still not understood. Research teams from institutes in France and Belgium have discovered one more clue to the hardiness of metal-tolerant plants. In a recent issue of the Plant Journal, Marie Mirouze and colleagues write about "A putative novel role for plant defensins: a defensin from the zinc hyper-accumulating plant, *Arabidopsis halleri*, confers zinc tolerance."

Researchers screened an *A. halleri* cDNA library expressed in yeast that was grown in medium containing zinc. The screening revealed four cDNAs that encode plant defensins (PDF), a group of small proteins widely distributed in all living organisms. Defensins are known for their involvement in the plant immune system, inhibiting the growth of fungal pathogens. However, these proteins were previously unknown to play any role in metal physiology.

Researchers found that the gene induced zinc tolerance in yeast, but not cadmium tolerance. When they transferred the defensin genes to *Arabidopsis thaliana*, they found that transgenic plants were more tolerant to zinc than wild-type plants, but had not increased tolerance to cadmium, copper, cobalt, iron, or sodium. These results open up "new horizons for the investigation of defensin mechanisms of action, both with respect to fungal growth inhibition and metal physiology *in planta*," the researchers write.

Subscribers to the journal can read the complete article at http://dx.doi.org/10.1111/j.1365-313X.2006.02788.x. Other readers may view the abstract at http://www.blackwell-synergy.com/doi/full/10.1111/j.1365-313X.2006.02788.x.

RESEARCH TRACKS AGBIOTECH PROGRESS FOR DEVELOPING COUNTRY FARMERS

Researchers promote agricultural biotechnology as a partial solution to reducing poverty and promoting the growth of the agricultural sector in developing countries. The path from the laboratory to the field, however, is filled with obstacles that have to be overcome in order for the potential of genetically

modified (GM) crops to be fully realized by resource-poor, small-scale farmers in the developing world. David J. Spielman and colleagues of the International Food Policy Research Institute (IFPRI) explore these problems in “Will Agbiotech Applications Reach Marginalized Farmers? Evidence from Developing Countries.” Their work appears in the latest issue of the online journal AgBioView.

Researchers conducted two studies, one in 2002, and the other in 2003-2004. Both studies surveyed experts and stakeholders on the state of biotech crop research in different countries and research organizations, and examined partnerships between private firms and the international research centers of the Consultative Group on International Agricultural Research (CGIAR).

The two studies found that agricultural biotechnology in developing countries is caught up in the early stages of research and cannot movie potential products forward into greenhouse or field trial testing stages due to: 1) regulatory environments that are bureaucratic and slow; 2) poor country-country information sharing in the later stages of product development; and 3) poor links between research organizations involved in agricultural biotechnology research and private firms that lead the industry. In order to move forward, the paper recommends that linking and communication be enhanced amongst sectors by: 1) enhancing the quantity and quality of information on safety studies of biotech crops through better information sharing among countries and researchers; 2) organizing greater dialogue between industry and public research, and countries; and 3) establishing competitive research grants and research awards.

For more information, download the complete article at http://www.agbioforum.org/v9n1/v9n1a03-spielman.htm.

ARTICLE TRACKS PESTICIDE USE EFFECTS IN BT, CONVENTIONAL COTTON

Biotech crops engineered with insect and herbicide resistance offer the promise of increased productivity and reduced chemical pesticide use. The latter promise is put to the test in the latest issue of Agricultural Systems, as Ada Wossinka and Zulal S. Denaux of North Carolina State University and Valdosta State University evaluate the “Environmental and cost efficiency of pesticide use in transgenic and conventional cotton production.”

The researchers used data envelopment analysis (DEA), a systems approach that takes account of the relationship between multiple inputs and output simultaneously, to assess the technical, environmental, and cost efficiency of

pesticide use for a sample of cotton growers in North Carolina, USA. Researchers also used Tobit regression analysis, a method that allowed them to observe the contribution of seed type to efficiency. Both analytical methods were applied to survey results of fields, cotton growers, and practices in North Carolina collected by the United States Department of Agriculture (USDA).

Researchers considered the use of herbicides, insecticides, fungicides, growth regulators, and defoliants in dollars per hectare; and took into consideration farmer characteristics as years of experience operating a farm, years of experience growing transgenic cotton, years of education, and farm business structure. By comparing three cotton varieties – herbicide-tolerant, stacked, and conventional cotton – researchers found out that: 1) production costs of conventional cotton are almost 40% higher than for stacked gene cotton; 2) however, with technology fees, average costs are highest for stacked gene, followed by conventional, then herbicide tolerant cotton; 3) on the average, growers of stacked gene cotton made better use of the economic potential of the technology than did growers of the other cotton types; 4) farmer schooling had positive impact on technical and cost efficiency; and 5) Tobit regression results confirmed the importance of stacked gene cotton for improving the environmental efficiency of pesticide use in cotton.

Further research, the authors say, will look into the farmers' motivation for adoption of biotech cotton. Subscribers to the journal can access the complete article at http://dx.doi.org/10.1016/j.agsy.2006.01.004.

ANNOUNCEMENTS

INDIA TO HOST BIOSAFETY WORKSHOP

The Asia-Pacific Consortium on Agricultural Biotechnology is organizing a workshop on "Biosafety regulations for transgenic crops and the need for harmonizing them in the Asia-pacific region" from July 31 to August 2, 2006, at the International Crop Research Institute for the Semi-arid Tropics, Hyderabad, India. Representatives from 15 Asia-Pacific countries have been invited to present reports on national biosafety regulations and participate in group discussions on harmonizing biosafety regulations in the region.
For details, contact Dr. J. L. Karihaloo at j.karihaloo@cgiar.org.

AFRICA SYMPOSIUM SCHEDULED FOR NOVEMBER

The Innovation Africa Symposium will take place on the 20th-23rd of November, 2006, in Kampala, Uganda. It will convene a group of internationally recognized experts on innovation systems to share their latest thinking with agricultural researchers and development partners. The Symposium will also provide an opportunity for participants to share their achievements in enhancing innovation processes. Within the broader framework of agricultural research and development, the main topics to be addressed in the Symposium will include: conceptual and methodological developments in agricultural innovation systems; enhancing local innovation processes; and building capacity for integrating innovation systems approaches into agricultural research and development. For more information, send an email to s.kaaria@cgiar.org or p.anandajayasekeram@cgiar.org.

DOCUMENT REMINDERS

POCKET K'S IN MANDARIN CHINESE NOW AVAILABLE

The following Pocket Ks have been translated to Mandarin Chinese, and are now available online: Pocket Ks No. 1 (Q and A About Genetically Modified Crops); 2 (Plant Products of Biotechnology); 3 (Are Food Derived from GM Crops Safe?); 4 (GM Crops and the Environment); 6 (Bt Insect Resistant Technology); 7 (Labeling GM Foods); 8 (Cartagena Protocol on Biosafety); 10 (Herbicide Tolerance Technology: Glyphosate and Gluphosinate); 16 (Global Status of Commercialized Biotech/GM Crops in 2005); 17 (Genetic Engineering and GM Crops); and 19 (Molecular Breeding and Marker-Assisted Selection).

Pocket Ks are Pockets of Knowledge, packages of information on crop biotechnology products and related issues. They are available in 12 languages. Pocket Ks 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

NEW BOOK ON INDIA BIOTECH RELEASED

A new book, "Science, Agriculture and the Politics of Policy: The Case of Biotechnology in India," has been released. The book examines the intersections of globalization, technology, and politics through a detailed, empirically-based examination of agricultural biotechnology in India, with a focus on the biotech hubs of Bangalore and Karnataka. For more information, email Ian Scoones at

I.Scoones@ids.ac.uk; or visit
http://www.ntd.co.uk/idsbookshop/details.asp?id=882 for international sales, or
http://www.orientlongman.com/display.asp?isbn=81-250-2944-3 for India sales.

DIGITAL LIBRARY OF WATER, AGRI AVAILABLE ONLINE

An online publications database devoted to agriculture and water is now available online. Managed by the National Agricultural Library (NAL), the website contains many useful documents produced by state and federal agencies, extension services, and other organizations involved with water issues. While most of the documents cover water and agriculture issues in the U.S., information on topics such as drinking water, urban runoff, and water pollution in general, in addition to information on specific water bodies, is also available. Visit the library at http://www.nal.usda.gov/news/water0606.shtml.

WEBSITE HIGHLIGHTS AG-ECON RESEARCH

AgEcon Search: Research in Agricultural and Applied Economics is a website that collects, indexes, and electronically distributes full text copies of scholarly research in the field of agricultural economics, including sub-disciplines such as agribusiness, food supply, natural resource economics, environmental economics, policy issues, agricultural trade, and economic development. Visit the site at http://agecon.lib.umn.edu/about.html.

ICGEB WEBSITE HOUSES LIBRARY

Information and direct access to the library of the International Center for Genetic Engineering and Biotechnology (ICGEB) is available online, and features books and journals housed in the ICGEB collection. A document delivery service is also offered.

ICGEB publishes results of its research in international, peer-reviewed journals. To access publications, visit http://www.icgeb.org/~librasrv/.

Do not hesitate to tell other colleagues/contacts about this mail list. If they wish to join, they should send an e-mail message to knowledge.center@isaaa.org leaving the subject blank and entering the one-line text message as follows:
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While we are still developing this site, feel free to e-mail (knowledge.center@isaaa.org) us for your views and comments on any crop biotechnology product and related issues.

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