

CROPBIOTECH UPDATE

A weekly summary of world developments in agri-biotech for developing countries, produced by the Global Knowledge Center on Crop Biotechnology, International Service for the Acquisition of Agri-biotech Applications SEAsiaCenter (ISAAA)

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Global

WORLD FOOD PRIZE WINNERS ANNOUNCED

The 2006 World Food Prize went to three men who played a vital role in transforming the Cerrado, a region in Brazil, from a vast infertile tropical high plain to a highly productive cropland. Sharing the prize of \$250,000 are former Brazil Minister of Agriculture H.E. Alysson Paolinelli and former Technical Director of EMBRAPA Cerrado Research Center Edson Lobato, both of Brazil; and Washington Representative of the IRI Research Institute, A. Colin McClung of the United States.

Their joint efforts enabled Brazil to benefit from advancements in soil science and policy research that helped increase agricultural production and improve socio-economic conditions in the country. World Food Prize Foundation President Ambassador Kenneth M. Quinn noted that from 1970 to 2000 agricultural production more than tripled while its area of cultivated land grew less than 1.5 times. He added that their research continues to promote agricultural development and poverty alleviation in other tropical and sub-tropical countries throughout the world.

The World Food Prize, established in 1986, is the foremost international award for achievements that significantly increase the quality, quantity, or availability of food in the world.

Read more about the World Food Prize recipients at
http://www.worldfoodprize.org/press_room/2006/June/2006Laureates.html

ACT INTERNATIONAL ADOPTS POLICY ON GMOS

The Action by Churches Together (ACT) International, a global alliance of churches and related agencies working to save lives and support communities in emergencies worldwide, has adopted a policy on the use of genetically modified organisms (GMOs) in emergencies. It will be used to guide its members when responding to humanitarian disasters.

One of the eight guidelines in the new policy on food distributions and GMOs during emergency operations recommends that "if the distribution of donated GM food is unavoidable, in order to alleviate a serious hunger situation if there is no other alternative and timely solution, ACT members will make sure that everyone benefiting from the distribution knows where the food comes from and whether

the food has been genetically modified or not. And all beneficiaries will have the right to choose and decide if they want the food or not.”

Three principles underpin the policy – 1) the precautionary principle, where the burden of proof of harmlessness of a new technology lies with the proponent rather than the consumer; 2) right to food; and 3) the right to know about the nature of the food people eat.

Details of the policy can be obtained at http://www.act-intl.org/news/dt_nr_2006/nrgmos0206.html

LESSONS ON DEVELOPING NATIONAL BIOSAFETY FRAMEWORKS

The United Nations Environment Program (UNEP)-GEF National Biosafety Framework (NBF) Development Program has released “Building biosafety capacity in developing countries: Experiences of the UNEP-GEF Project on development of national biosafety frameworks”. Among the key lessons learned from an analysis of country experiences are:

- The process of building capacity is a dynamic one, and an integral part of a capacity building project is the flexibility to ensure that the project remains responsive to the countries’ changing needs.
- There is a need for a country to balance a realistic and achievable project timeframe while creating a momentum for better pacing throughout the process.
- For sustainability, internal knowledge sharing and management systems need to be established within each country during a project’s lifetime.
- Information dissemination and sharing is a crucial ingredient of public participation.

The report notes that the lessons learned from these experiences could help those countries currently drafting their NBF and in the design of future capacity building initiatives in biosafety, as well as those in support of other multi-lateral environmental agreements.

See the full report at

<http://www.unep.ch/biosafety/development/devdocuments/UNEPGEFstudyVersion170605.pdf>

Africa

NIGERIA PRESIDENT COMMENDS, REAFFIRMS SUPPORT FOR WARDA

His Excellency Olusegun Obasanjo, President of the Federal Republic of Nigeria, commended the Africa Rice Center (WARDA) for the “wonderful job” it has been doing. He also reaffirmed the government’s full support to the Center, so that it can make more research breakthroughs like the New Rice for Africa (NERICA), which he dubbed as “a miracle rice for Africa.” This occurred during a recent private audience granted to a delegation from WARDA.

Nigeria’s government has taken a strong interest in boosting local rice production through the Presidential Rice Initiative. Obasanjo affirmed that by the end of 2007, Nigeria would be self-sufficient in rice.

In related news, Dr Papa Abdoulaye Seck, currently the Director General of the Senegal Agricultural Research Institute (ISRA) and Advisor to the Prime Minister of Senegal, has been appointed as WARDA’s incoming Director General. For more information, visit <http://www.warda.org>

The Americas

TEXAS PLANTS GET CHANCE TO BE BIOFUEL SOURCES

Researchers in the U.S. are worried that the current demand for biofuels may channel corn, an ethanol source, to fuel production, depleting the food supply and possibly forcing the country to import the crop. This concern has prompted scientists to search for other biofuel sources – according to one Texas Agricultural Experiment Station researcher, the native mesquite may be a good candidate.

Part of Texas is densely covered with enough mesquite to provide fuel for 400 small ethanol refineries, says Dr. Jim Ansley, who is studying the feasibility of developing the biofuel industry in rural West Central Texas. If other woods in the area, such as red berry juniper, will be considered, there may be enough fuel for as many as 1,000 refineries.

According to Ansley, one ton of mesquite wood will yield about 200 gallons of ethanol. Research is now underway to study the different sizes and densities of mesquite, and look at the time needed to harvest it, the fuel used by refinery machinery, and then factor that into the total cost per acre.

For more information, read the complete article at <http://agnews.tamu.edu/dailynews/stories/RNEC/Jun2106a.htm>, or visit <http://vernon.tamu.edu/brush>

SOY GROWERS SUPPORT NEW BIODIESEL ACT

The American Soybean Association (ASA) applauded the Renewable Fuels and Energy Independence Promotion Act, a bill meant to make permanent the biodiesel tax incentive and the small agri-biodiesel producer credits championed by the ASA. The bill was introduced by U.S. Representatives Kenny Hulshof and Earl Pomeroy, and amends the Internal Revenue Code of 1986 to make permanent important incentives for biodiesel and ethanol.

The current excise tax is extended for biodiesel, as well as biodiesel mixtures, through 2008. The small agri-biodiesel producer credit is also currently in effect through the same time, and provides producers, with annual capacity not exceeding 60 million gallons, an income tax credit worth 10 cents per gallon on up to 15 million gallons of agri-biodiesel produced in a tax year.

Soy growers can visit the ASA Legislative Action Center at <http://www.soygrowers.com> to make their voice heard on the Act. For more information contact Bob Metz, ASA President, at bobmetz@prtcl.com. Read the complete article at http://www.soygrowers.com/newsroom/releases/2006_releases/r062306.htm.

IOWA STATE U WORKS ON ITS BIOFUEL RESEARCH

Research on biofuels is now speeding up at Iowa State University: the Iowa Farm Bureau Federation has committed \$1 million to the Iowa State College of Agriculture to support the university-wide Bioeconomy Initiative, which develops technologies for converting crops and plant materials into chemicals, fuels, fibers, and energy.

Iowa State University is engaged in various projects related to biofuels. For instance, scientists are using ultrasonics to break corn pieces into finer particles, exposing more of the corn's starch to enzymes that will help convert the starch to simple sugars. Laboratory experiments have shown that this treatment can result in a nearly 30% increase in corn's release rates of sugars, which translates to more ethanol. Another laboratory is also working on a mold that produces enzymes that can aid in ethanol extraction from corn.

Other projects at the university involve creating biobased polymers from a byproduct of biodiesel production; developing enzyme-laced water systems to process soybeans to replace petroleum-based chemicals; and using corn-stover biomass to produce a nitrogen-rich substance that enriches the soil and sequesters carbon from the air.

Read more at

<http://www.iastate.edu/~nscentral/news/2006/jun/bioeconomy.shtml>,
<http://www.iastate.edu/~nscentral/news/2006/jun/ultrasonics.shtml>, and
<http://www.iastate.edu/~nscentral/news/2006/may/mold.shtml>.

Asia

PRSV OUTBREAK CAUSES PAPAYA MARKET WOES IN THAILAND

An outbreak of Papaya Ringspot Virus (PRSV) has spurred an increase in papaya prices in Thailand. According to Dr. Wilai Prasartsri, Director of Agricultural Research and Development of the country's Department of Agriculture (DOA) said that the virus can be effectively controlled by PRSV-resistant biotech papaya developed by the DOA. This papaya, however, cannot be made available to growers due to current government regulation.

Mr. Nirand Rangupjai, a representative of papaya growers from Thailand's Chantaburi Province, said that PRSV was observed in every papaya field in that area. There are no effective measures to control the virus. Mr. Nivat Pakvises, a farmer from Samutsakorn Province, wants the DOA to fully test the biotech papaya, and release it for planting if it is found to be safe. "Now we have to depend on [ourselves] to solve [the] PRSV problem," he added.

With reports from Naewna, as translated by Thailand's Biotechnology Information Center (<http://www.safetybio.com/>).

INDIA TO BOOST FARM RESEARCH AND EDUCATION

The Union Cabinet of the Government of India recently approved a number of proposals, including a US\$250 Million (Rs. 1189.99 crore) National Agricultural Innovation Project (NAIP), with 75% funding from the World Bank as credit, and with the rest to be shouldered by the Government of India. The six-year project will start in July 2006, and will comprise the following: a) the Indian Council of Agricultural Research (ICAR) as the catalyzing agent for the management of change of the Indian National Agricultural Research System; b) research on production to consumption systems; c) research on sustainable rural livelihood

security; and d) basic and strategic research in the frontier areas of agricultural science.

The Union Cabinet also approved an additional Rs 200 crore to strengthen agriculture education.

For more information, visit <http://pib.nic.in/release/release.asp?relid=18613> and <http://pib.nic.in/release/release.asp?relid=18614>, or contact Bhagirath Choudhary of the ISAAA South Asia Office at b.choudhary@isaaa.org.

Europe

REPORT SEES GRAIN STRENGTH IN THREE CIS COUNTRIES

Russia, Ukraine, and Kazakhstan, members of the Commonwealth of Independent States (CIS), are growing to be an important force in the global wheat, barley, and maize markets. This is according to a recent article in World Grain, which takes a look at the CIS and how agriculture is booming in the former Soviet states.

The CIS was once plagued with decreased farming investments, which led to lower yields and crop production, but the situation has improved in recent years. Russia, Ukraine, and Kazakhstan, in particular, are the three primary exporters of grain in the CIS. Prospects for further growth as a grain exporter are “outstanding” for the CIS, the article reports.

Despite limitations, such as occasional poor grain quality, logistical restrictions, and lack of business links to new sales markets, the CIS is the world’s second largest exporter of wheat, shipping 15 to 20 million tons per year. The CIS countries play an even greater role in the global barley market, with the three principal countries accounting for about one-third of global barley trade. The CIS is also a large exporter of maize, thanks to a rise in overall production, especially in Ukraine. Rye, feed peas, and millet are also exported from the CIS countries, which have become a large supplier of oilseed products.

For more information on the article, send an e-mail to promo@agrismarket.info. Read the complete article at http://www.world-grain.com/feature_stories.asp?ArticleID=79853.

RESEARCH

POTATO LATE BLIGHT, MALARIA SHARE INFECTION STRATEGY

Most microbes can cause disease by secreting proteins into their host cells, whether plant or animal. For instance, *Plasmodium falciparum*, the causative agent of malaria, and *Phytophthora infestans*, which causes Late Blight in potato, both produce proteins that alter host cell functions. Both microbes also export these proteins to the host cell by the action of gene sequences that contain a host-targeting (HT) motif.

A recent study shows that although *P. falciparum* and *P. infestans* affect two different kinds of host cell, they share similar strategies in delivering toxic proteins to their host. Moreover, according to authors Souvik Bhattacharjee and colleagues of Northwestern University and Ohio State University, "The Malarial Host-Targeting Signal Is Conserved in the Irish Potato Famine Pathogen." The article appears in the latest issue of *Pathogens*, a journal by the Public Library of Science.

Scientists took the host targeting signal from *P. infestans*, and used it to express the green fluorescent protein in red blood cells, the host of *P. falciparum*. The protein was exported into red blood cells, indicating that export was dependent not on the infecting agent, but on a certain sequence motif that both pathogens shared. Further experimentation showed that although the host targeting signal were necessary, it was still not sufficient to determine complete export of the protein to a host cell. The equivalence of the signals in both pathogens, however, is important for plant immunology studies: the signal sequence is perceived by plant resistance proteins and induces hypersensitive plant cell death. According to the authors, their findings can allow for the possible development of new targets for therapeutics that will work against both pathogens.

Access the article through

<http://pathogens.plosjournals.org/perlserv/?request=get-document&doi=10.1371/journal.ppat.0020050> or
<http://dx.doi.org/10.1371/journal.ppat.0020050>.

STUDY TRACKS AMINO ACID CONTENT IN RICE GRAINS

Over half of the world's population relies on rice for nutrients and energy. Rice, however, is only about 7% protein, which is low compared with other cereals. Humans, moreover, cannot digest rice seed storage proteins completely. Knowing which genes are responsible for rice storage protein composition and

digestibility would allow scientists to design rice with more proteins and free amino acids, to increase the grain's nutritional qualities. Compared with proteins, free amino acids would also make rice easier to digest.

Rice seed storage proteins accumulate in special vacuoles called protein bodies. Two kinds exist in rice: protein body I (PB-I) contains prolamins and makes up 20% of milled rice protein; protein body II (PB-II), on the other hand, contains glutelins and a 26 kDa globulin that together make up 60% of milled rice protein. In the latest issue of the Journal of Cereal Science, Kanae Ashida and colleagues of the National Agricultural Research Center for Western Region, Japan, find that "Lack of 26 kDa globulin accompanies increased free amino acid content in rice (*Oryza sativa* L.) grains."

By analyzing the nitrogen content, protein composition, and free amino acid levels in six rice cultivars, researchers were also able to classify the six cultivars into two groups: One group with low levels of free amino acids and with the 26 kDa globulin, comprising rice lines Koshihikari, Nihonmasari, and LGC1; and another group with 1.4-1.5 more amino acids than the first group, and without the 26 kDa globulin, comprising rice lines Kx433, LGC-Jun, and QA28. These results suggest that the absence of the globulin results in an accumulation of free amino acids in rice grains. Researchers are now studying the molecular mechanism underlying the 26 kDa globulin deficiency.

Subscribers to the Journal of Cereal Science can read the complete article at <http://dx.doi.org/10.1016/j.jcs.2006.01.002>.

NOW IN THE WORKS: SELF-FERTILIZING PLANTS

Plants need nitrogen in order to grow: some plants will receive it in the form of applied fertilizer, while others will acquire it through the assistance of soil bacteria. When soil bacteria known as *Rhizobia* enter the roots of leguminous plants (such as beans or peanuts), the plant will develop nodules, or small root lumps in which the *Rhizobia* are housed. These bacteria take nitrogen from the air, then "fix" it into ammonia that feeds the plant. These nitrogen-fixing bacteria provide a clean way for plants to gain nitrogen, since chemical fertilizer production pollutes waterways, and also accounts for an estimated half of the fossil fuels burnt by agriculture.

Scientists from the John Innes Center, United Kingdom and the University of Aarhus, Denmark report on "Nodulation independent of rhizobia induced by a calcium-activated kinase lacking autoinhibition" and that "Deregulation of a Ca²⁺/calmodulin-dependent kinase leads to spontaneous nodule development." Their letters are published in the latest issue of Nature, and show that plants can be induced to produce their own fertilizer.

Scientists worked on cells of *Lotus japonicus*, a legume. They found that by replacing only one amino acid in the plant enzyme Ca²⁺/calmodulin-dependent protein kinase (CCaMK), they could induce *L. japonicus* root cells to be converted into nodule-forming cells even without the presence of nitrogen-fixing bacteria. This may pave the way for the engineering of plants that need little or no industrial fertilizers; the fact that a single mutation is sufficient to result in nodule formation also shows the possibility that the trait can be transferred to important, non-leguminous crops, such as wheat or rice.

The feature article can be accessed by Nature Subscribers through <http://www.nature.com/news/2006/060626/full/060626-7.html>. Read the letters at <http://www.nature.com/nature/journal/v441/n7097/abs/nature04812.html> and <http://www.nature.com/nature/journal/v441/n7097/abs/nature04862.html>

ANNOUNCEMENTS

BIO SAFETY SYMPOSIUM SLATED FOR SEPTEMBER

The International Symposium on Biosafety of Genetically Modified Organisms (ISBGMO) will be held from the 24th-29th of September 2006, in Jeju, South Korea.

The symposium will explore the relationship between biosafety research and environmental risk assessment, and will be comprised of invited speakers in the fields of biosafety research and risk assessment, as well as contributed posters. For more information, visit <http://isbgmo.niab.go.kr> or email Andrew F Roberts of the United States Department of Agriculture (USDA) at andrew.f.roberts@usda.gov.

TROPICAL CROP BIOTECH CONFERENCE

“New horizons for the tropics” is the theme of the Tropical Crop Biotechnology Conference 2006 to be held August 16-19, 2006 at Cairns, Queensland, Australia. The conference will be a venue to review progress and prospects in plant biotechnology for the tropics. For more information, visit <http://www.tcbc2006.com.au>.

INDIA TO HOST BIOINFORMATICS CONFERENCE

The Department of Biotechnology (DBT), Jawaharlal Nehru University (JNU), and Indian Institute of Technology Delhi (IITD) are jointly organizing an International Conference on Bioinformatics (InCoB 2006). This Exhibition & Conference is an opportunity to showcase current developments in the area of Computational Biology and Bioinformatics along with the latest development in hardware and software, technology, products, databases, etc. It is a one-stop venue to make new alliances, expand business frontiers, enter into joint ventures, meet buyers, and find new avenues to expand your distribution network. The event will offer a platform for technology transfer to, from, and within the industry.

For more information, visit <http://www.incob2006.in>, or contact Dr T. Madan Mohan at madhan@dbt.nic.in.

DOCUMENT REMINDERS

BT COTTON IN INDIA: A STATUS REPORT

The Asia-Pacific Consortium on Agricultural Biotechnology (APCoAB) has published “Bt Cotton in India – A Status Report, which gives details of the events that led to commercialization of Bt cotton in India, adoption of Bt hybrids in cotton growing zones, performance of the commercialized hybrids under experimental and farmer managed conditions, and the economic benefits realized from the adoption of Bt technology in India. Based on the experiences gained, strategies have been suggested for achieving improved pest resistance in cotton, revised protocols for large-scale field trails, and better economic benefits especially to small and marginal farmers.

Access the full report at http://www.apcoab.org/documents/bt_cotton.pdf.

For more information, contact j.karihaloo@cgiar.org.

STUDIES ON SMALLHOLDER FARMERS AND BIOTECH IN AFRICA

The International Food Policy Research Institute has released “Promising crop biotechnologies for smallholder farmers in East Africa: Bananas and maize”. Edited by Melinda Smale, Svetlana Edmeades, and Hugo de Groote, the publication contains synopses of two case studies about the potential for pro-

poor crop biotechnologies. Briefs available for download are: Assessing the impact of crop genetic improvement in Sub-Saharan Africa: Research context and highlights; Crucial determinants of adoption: Planting material systems for banana and maize; Gauging potential based on current adoption of banana hybrids in Tanzania; Predicting farmer demand for transgenic cooking bananas in Uganda; Predicting farmer demand for Bt maize in Kenya; Biodiversity of bananas on farms in Uganda; Biodiversity of maize on farms in Kenya; and Biosafety and biodiversity risks.

See the full briefs in <http://www.ifpri.org/pubs/rag/br1004.asp>.

FROM THE BICS

BANGLADESH SEMINAR TACKLES FIELD TRIAL REQUIREMENTS

Participants at a recent seminar in Bangladesh agreed that if transgenic crops are found safe after trials, then there should be no controversy in releasing them. The seminar, "Biosafety and Field Trial Requirements of Transgenic Crops," was held at the Bangladesh Agricultural University (BAU), and was attended by 120 participants from the academe, research, and private sectors.

Prof. Shahidul Haque, Head of the BAU Department of Biotechnology, chaired the seminar. Dr. M.A Razzaque of the Bangladesh Agricultural Research Council (BARC) presented a paper on the status of biotechnology in Bangladesh, while Don MacKenzie, Executive Vice Chairman of AGBIOS, Canada, spoke on field trial requirements and procedures for transgenic crops.

The seminar was organized by the International Service for the Acquisition of Agri-biotech Applications (ISAAA), South Asia Biosafety Program (SABP), and Biotechnology Department of Bangladesh Agricultural University (BAU). For more information, contact Prof K M Nasiruddin of the Bangladesh Biotechnology Information Center (BdBIC) at k.nasiruddin@isaaa.org. Visit the BdBIC at <http://www.bdbic.org>.

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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