

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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FAO DG CALLS FOR SECOND GREEN REVOLUTION

“In the next few decades, a major international effort is needed to feed the world when the population soars from six to nine billion. We might call it a second Green Revolution.” This was stated by Jacques Diouf, Director General of the United Nations’ Food and Agriculture Organization (FAO), as he addressed a recent meeting of the World Affairs Council of Northern California in San Francisco, USA.

“The new Green Revolution will be less about introducing new, high-performance varieties of wheat or rice, important as they are, and much more about making wiser and more efficient use of the natural resources available to us,” he said. Dr. Diouf was optimistic that this could be done, as tests conducted by the organization have shown that yield increases of up to 30% could be achieved through Integrated Crop Management (ICM), or improved crop management techniques. “It may sound incredible but we actually can save water and grow more food at the same time,” the Director-General added.

Read the complete press release at

<http://www.fao.org/newsroom/en/news/2006/1000392/index.html>

JOURNAL COMMENTARIES EXAMINE FOOD BIOTECH

Two commentaries in Nature Biotechnology take a look at the promise of biotech foods, and how they might be able to improve diets, as well as allow producers and manufacturers to avoid lawsuits. Henry Miller, of Stanford University, and colleagues examine “Why spurning food biotech has become a liability.” They write on how food manufacturers have excluded genetically modified (GM) foods from their products, but how these manufacturers could face litigation, since most “all-natural” foods will contain contaminants like insect parts, toxic molds, bacteria, and viruses. GM foods are better protected from these contaminants, and authors suggest that there should be better incentives to using GM grains more widely. They do so by presenting hypothetical scenarios of litigation involved when dealing with allergen-contaminated, all-natural potatoes and baby food.

In “The breeder's dilemma—yield or nutrition?” Cindy Morris and David Sands of Institut National de la Recherche Agronomique (INRA) and Montana State University, respectively, suggest that farmers and scientists devote energy to

increasing crop nutritional value, rather than yield. By looking at problems with staple foods, such as wheat and corn, the authors recommend ways by which crops could be enhanced to improve consumers' diets.

Nature Biotechnology subscribers can read the commentaries at <http://www.nature.com/nbt/journal/v24/n9/full/nbt0906-1078.html> and <http://www.nature.com/nbt/journal/v24/n9/full/nbt0906-1075.html>.

PAPER ASSESSES MODERN BIOTECH, ISSUES

Plant biotechnology has been accelerated by advances in gene transfer technology, which can engineer new traits into plants that are very difficult to introduce by traditional breeding. Gene transfer technology, however, should supplement, and not completely replace conventional breeding techniques. This was concluded by Prem P. Jauhar of the United States Department of Agriculture's Agricultural Research Service (USDA-ARS) in "Modern Biotechnology as an Integral Supplement to Conventional Plant Breeding: The Prospects and Challenges," an article that appears in the latest issue of Crop Science.

Jauhar examines the history of plant biotechnology, from crop breeding, to the Green Revolution, to today's genetic engineering techniques. While the future seems bright for biotechnology and its possible role in creating edible vaccines or in phytoremediation, the author reminds readers that the current resistance to acceptance of novel technology "should be assessed and overcome so that its full potential in crop improvement can be realized," and that "Although some of the public concerns may not be well founded, they will need to be properly addressed."

Subscribers to Crop Science can read the complete article at <http://crop.scijournals.org/cgi/content/full/46/5/1841>.

FAO MEETS ON REDUCING CHILD LABOR IN AGRI

Reducing child labor in agriculture was on the agenda of a recent meeting in Rome, which brought together representatives from the United Nations Food and Agriculture Organization (FAO), the International Labor Organization (ILO), and other international agricultural organizations to discuss how to coordinate efforts to tackle the problem. About 70% of child labor worldwide is found in agriculture, where children are often obliged to work long hours, use sharp tools designed for adults, carry loads too heavy for their immature bodies, and operate dangerous

machinery. Children working in agriculture also risk exposure to toxic pesticides, dusts, diseases, and unsanitary conditions.

“Some agricultural activities – mixing and applying pesticides, using certain types of machinery – are so dangerous that children should be clearly prohibited from engaging in them,” Parviz Koochafkan, Director of FAO’s Rural Development Division, said. But, he adds, not all of the work that children do is harmful to their development and well-being. Agriculture could also teach children valuable skills, build their self esteem, and allow them to contribute to the generation of household income.

The challenge of eliminating of hazardous child labor is particularly daunting in Africa where agriculture is the dominant economic activity, and factors such as persistent poverty and food insecurity, poor education and HIV/AIDS compound the problem.

Read the complete press release at

<http://www.fao.org/newsroom/en/news/2006/1000394/index.html>.

Africa

SYRIA HOSTS REGIONAL TRAINING ON IPR

Syria’s Damascus University hosted a Training Program on Intellectual Property Rights (IPR). Participants from Qatar, Algeria, Tunisia, Mauritania, Jordan, Morocco, Syria, and Egypt participated in the program, which was supported by the Islamic Educational, Scientific and Cultural Organization (ISESCO) and the Standing Committee on Scientific and Technological Cooperation (COMSTECH)/

Prof. Wael Al-Malaa President of Damascus University emphasized on the importance of IPR in his welcome speech. “Such [a] training program will lead to better understanding of IPR issues,” he said, “I encourage the participants to fully benefit from this training to help their own countries to advance the innovation process.” On behalf of ISESCO, Prof. Hamed Eid focused on the effect of IPR on sustainable development and the impact of Tech Transfer on the invention. Speakers from Egypt and Syria explained the copy rights and Tech Transfer as case studies for participants.

In the closing session, participants remarked that “future training on IPR especially in Tech Transfer should be continued.” For more information, contact Dr. Ismail Abdelhamid of the Egypt Biotechnology Information Center at iamaeq@yahoo.com

The Americas

CIRAD, EMBRAPA PROJECT BRINGS AGRI TO NORDESTE, BRAZIL

A project spearheaded by the Centre De Cooperation Internationale En Recherche Agronomique Pour Le Développement (CIRAD) and the Brazilian Agricultural Research Corporation (EMBRAPA) has brought sustainable agriculture to the semi-arid Nordeste region of Brazil. Conceived as a method to increase productivity, the project has resulted in farmers having a better understanding of how their farming systems work. They have thus been able to adapt their practices accordingly.

CIRAD and EMBRAPA researchers suggested a methodology for establishing indicators of production system sustainability. It included establishing a conceptual framework, padding out that framework with field surveys, and comparing the suggested indicators with those put forward by farmers, to ensure their relevance. The conceptual framework and field surveys yielded eight indicators: changes in the area of native vegetation, mineral balance, production revenues and costs, fodder balance, the proportion of the fodder balance drawn from outside the farm, changes in animal numbers, changes in security areas, and diversification of sources of agricultural income. With farmers adopting better agricultural practices, the project's next step is to validate the sustainability indicators by taking account of the parameters that are missing: the labor resource, which is a major production factor, and water resource flows.

Read the complete article at

<http://www.cirad.fr/en/actualite/communiqu.php?id=518>

Asia and the Pacific

“SEARCH FOR NEW GENES” TO BOOST INDIA'S AGRICULTURE

While inaugurating the symposium on 'Search for New Genes' to commemorate the recent birth centenary of Dr BP Pal, Dr APJ Abdul Kalam, President of India, urged the scientific community to inculcate scientific magnanimity to motivate and nurture team spirit, which would lead to new discoveries and innovation in plant genome research.

“I feel the search for new genes would always be there to meet urgent and important changing needs of the society,” said the President. He urged agriculture scientists to, among others, deploy cutting edge biotechnology; develop stress-tolerant crop varieties; develop more nutritional crop varieties rich in Vitamin A, iodine, calcium, and iron to minimize nutrition deficiency problems in developing countries; improve crop productivity and add value to agriculture

produce, particularly vegetables, fruits, flowers, and other perishables; and produce biofuels and develop designer crops.

The speech, "Impact of gene science in agriculture" is available at <http://presidentofindia.nic.in/scripts/sllatest1.jsp?id=815> and http://pib.nic.in/release/rel_print_page1.asp?relid=20456. For more information contact Bhagirath Choudhary of the ISAAA South Asia Office at b.choudhary@isaaa.org.

FIELD TRIALS FOR GM BANANA COMPLETED

Rahan Meristem, an Israeli biotech company, has successfully completed a field trial that validates the complete resistance of their transgenic banana plants to a wide range of pathogenic nematodes. Nematodes are one of the crop's most destructive pathogens. Nematicides, though effective, have been banned in large parts of the world because of their polluting effects on the environment.

Rahan Meristem is currently involved in various breeding projects using genetic engineering. The company is also working on other crops, including almonds, apples, avocado, olives, and strawberries.

Read the complete article at <http://www.export.gov.il/Eng/Articles/Article.asp?ArticleID=4115&CategoryID=399>. For additional information, visit Rahan Meristem at <http://www.rahan.co.il>.

THAI COTTON DOWN, COTTON INDUSTRY PRESIDENT SAYS

Thai cotton production is down due to lack of government support. This is according to the president of the Thai Cotton Industry, who disclosed that the country's consumption is costing it millions of Thai Baht a year, which may result in Thailand importing cotton if the situation does not improve.

Somchai remarked on how cotton growers in India are using Bt cotton, and how yields in that country have increased up to 8 times, with lower production costs. "We are importing Bt cotton from outside to meet industrial demand but we can't produce our own," said Somchai.

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

ADB, VIET GOVERNMENT SIGN AGRI GRANT PROJECT

The Asian Development Bank (ADB) and the Government of Vietnam have signed a grant project that will disseminate improved agricultural technology and information to help reduce poverty in remote and isolated mountainous parts of the country. The US\$900,000 grant is provided by the Japan Fund for Poverty Reduction (JFPR), financed by the Government of Japan. The Government of Viet Nam will contribute \$80,000 toward the project's total cost.

The project will undertake a series of community-based programs to develop agriculture and income-generating activities for local communes. It will strengthen skills of grassroots extension staff and develop farmer-to-farmer learning networks, and promote new methods of planning and evaluation. It will complement a proposed Agriculture Science and Technology (AST) Project that aims to strengthen the country's agriculture science and technology system through research, extension, and rural-based training.

With reports from Agbiotech Vietnam. For more news from Vietnam, email Le Hien of BiotechVn at lehien@agbiotech.com.vn.

MALAYSIA WORKS ON IMPROVING BIOTECH SECTOR

Recent events in Malaysia have allowed the country to further strengthen its biotechnology sector. Prime Minister Datuk Seri Abdullah Ahmad Badawi participated in the groundbreaking ceremonies of the National Institute for Natural Products, Vaccines and Biologics (9Bio). The institute's core functions include the development of halal (permissible within Islamic principles) vaccines and other health-related products. The Prime Minister also announced the BioNexus status and the Malaysian Life Sciences Capital Fund (MLSCF), which will allow biotech companies with BioNexus status to receive more incentives, including freedom of ownership, freedom to source funds globally, and unrestricted employment of knowledge workers.

The companies would also have access to shared laboratories and production facilities as well as access to an information network linking research centers of excellence. Other privileges include 10 years of tax exemption on company profits as well tax deductions on early-stage investments. The prime minister said these efforts were taken to encourage more Malaysian companies to enter the industry.

Malaysia and the Netherlands are also engaged in agricultural cooperation. Malaysia appointed an agricultural attaché in Amsterdam in early 2006, while the Netherlands opened a regional office for Agriculture, Nature, and Food Quality in Kuala Lumpur early this month. The Prime Minister said that Malaysia could learn

from the Dutch experience in agriculture and biotechnology to produce top quality and high-value food products.

For more information, contact Mahaletchumy Arujanan of the Malaysia Biotechnology Information Center (MABIC) at maha@bic.org.my.

RESEARCH

CO-EXISTENCE MAPPED FOR BT, CONVENTIONAL MAIZE

Most markets allow a 0.9% threshold of adventitious presence for genetically modified (GM) organisms. At what distance should GM crops be planted from conventional ones to keep within the threshold? In "Pollen-mediated gene flow in maize in real situations of coexistence," Joaquina Messeguer and colleagues from various research institutions in Barcelona and Girona, Spain conduct the first study on cross-fertilization between Bt and conventional maize in real situations of coexistence in two regions in which Bt and conventional maize were cultivated. Their findings appear in the latest issue of Plant Biotechnology.

Scientists sampled maize from transgenic fields and analyzed them for the presence of GM DNA using the real-time quantification system-polymerase chain reaction (RTQ-PCR) technique. Researchers found that: 1) in general, the rate of cross-fertilization between GM and conventional plants was higher in the borders, with decreasing rates toward the center of the field; 2) In real conditions of coexistence and in cropping areas with smaller fields, the main factors that determined cross-pollination were the synchronicity of flowering and the distances between the donor and receptor fields; 3) By establishing an index on the two variables, a distance of about 20 m would be sufficient to maintain the 0.9% threshold.

Read the abstract of the article at <http://www.blackwell-synergy.com/doi/abs/10.1111/j.1467-7652.2006.00207.x>. Subscribers to Plant Biotechnology can access the complete article through the same link.

RICE PROTEIN CHANGE MAKES CROP VIRUS RESISTANT, RESEARCH FINDS

Because the viral genome is so small, viruses often rely on host factors to assist them in infecting the host. One such factor is the eukaryotic translation initiation factor 4E (eIF4E), which interacts with the potyvirus VPg protein. VPg breaks

host resistance to viruses. In plants, both eIF4E and eIF4G appear to play a significant role in plant/virus interactions. But if host factors are mutated and cannot be recognized by viral proteins, can plants remain resistant to viral infection?

Laurence Albar and colleagues try it out on rice, and report that “Mutations in the eIF(iso)4G translation initiation factor confer high resistance of rice to Rice yellow mottle virus.” Their work is published in the latest issue of *The Plant Journal*. Researchers worked on rice resistance to the Rice yellow mottle virus (RYMV), a major pathogen of rice in Africa; as well as on the rice variety Gigante, which has a very high resistance to RYMV.

Researchers mapped the Gigante variety's genome to isolate the Rymv1 locus; this locus encodes a gene that contributes to the plant's resistance. The researchers then derived the corresponding gene from a rice variety susceptible to RYMV, and transferred it to the Gigante line. With the new gene, transgenic Gigante lost resistance to RYMV. Rymv1, the researchers found, encodes an isoform of eIF4G. This gene is mutated in Gigante, keeping it from interacting with viral proteins, and allowing the rice variety to be resistant to RYMV infections.

According to the researchers, this gene “is of outstanding interest as it is the only one controlling the high resistance of rice against RYMV that has been described so far.” They now plan to do a wider analysis of Rymv1 diversity in rice varieties and their wild relatives, particularly those that are described as being resistant to RYMV. This can pave the way for eventual use of the genes in rice breeding programs.

Subscribers to *The Plant Journal* can read the complete article through <http://dx.doi.org/10.1111/j.1365-313X.2006.02792.x> or <http://www.blackwell-synergy.com/doi/full/10.1111/j.1365-313X.2006.02792.x>. Other readers can access the abstract through <http://www.blackwell-synergy.com/doi/abs/10.1111/j.1365-313X.2006.02792.x>.

RYE PROTEIN SHOWN TO BIND TO ICE

Plants that live in temperate and boreal regions have to be able to survive not only extreme temperatures, but also temperature fluctuations. In such regions, summer heat is severe, and winter cold is extreme; in the latter condition, ice crystals can form in plants, destroying cells by forcing water out of them and effectively dehydrating the plant. Freezing damage also renders plants more susceptible to pathogen attack.

Freezing-tolerant plants, which include some cereals, undergo cold acclimation, a gradual adaptation to cold but not freezing temperatures. In the process, the plants secrete antifreeze proteins (AFP) that inhibit the growth of ice crystals. Finding out what proteins keep plants frost-free can help scientists engineer other plants with cold acclimation. Mahmoud W.F. Yaish and colleagues of University of Waterloo, Canada report on "Cold-Active Winter Rye Glucanases with Ice-Binding Capacity" in the latest issue of Plant Physiology, where they characterize glucanases, pathogenesis-related proteins found in winter rye, to further examine the enzymes' roles and contributions to cold tolerance.

Glucanases were previously known to function in plant pathogen resistance, cell wall synthesis, and pollen development, but the current study shows that these enzymes can contribute to protecting plants from forming ice crystals in cold conditions. Scientists found this out by expressing two different glucanases in *Escherichia coli*, purifying the recombinant proteins, and assaying them for their hydrolytic and antifreeze activities in vitro. Glucanases, they surmised, have evolved not only to possess enzymatic activity in order to resist infection by pathogens; glucanases also inhibit the formation of large, potentially fatal ice crystals.

The next question to be addressed is whether glucanases also act as AFPs in other plant species, for which a better understanding of the additional roles that glucanases have in cold tolerance in plants is required.

Subscribers to the journal can read the complete article at <http://www.plantphysiol.org/cgi/content/full/141/4/1459>. Other readers can take a look at the abstract through <http://www.plantphysiol.org/cgi/content/abstract/141/4/1459>.

ANNOUNCEMENTS

DR. MARGARET KAREMBU APPOINTED AFRICENTER HEAD



Dr. Margaret Karembu has been appointed as the new Director of ISAAA's AfriCenter, based in Nairobi, Kenya. Dr. Karembu obtained her PhD in Environmental Sciences Education from Kenyatta University, and is experienced in both formal and non-formal training of environmentalists, farmer groups, science communicators, journalists, training of trainers (TOT), as well as use of participatory training methodologies. As Director, she will be in charge of managing and implementing selected ISAAA-facilitated projects in

Africa.

Find out more about the AfriCenter at <http://www.isaaa.org/africenter>.

INDONESIA TO HOST RISK COMM WORKSHOP

"A Risk Communication Workshop for Agricultural Biotechnology" for Indonesian scientists will be held from 21 – 22 September, 2006 at SEAMEO BIOTROP, Bogor, Indonesia. The workshop will be jointly organized by ISAAA, IndoBIC, and ABSP II, and will present speakers from Indonesia and the Philippines. The event will tackle writing a popular scientific article, preparation of written statements for the press, and presentation and analysis of written statements. To see the agenda, please visit <http://www.indobic.or.id>. For more information contact Dewi Suryani at dewisuryani@biotrop.org.

SOUTH ASIA INFOCENTER TO DISCUSS DELIVERY OF AGRICULTURAL TECHNOLOGIES

In November 2006, the SAARC (South Asian Association for Regional Cooperation) Agricultural Information Center (SAIC) is organizing a Regional Workshop on Research–Extension Linkages for Effective Delivery of Agricultural Technologies in SAARC Countries. To be held at the National Academy of Agricultural Research Management in Hyderabad, India, the workshop aims to study national policy processes providing facilitating framework and practices for establishing stronger agricultural research - extension linkages; highlight the technical, economic and institutional conditions influencing development of collaborative linkages between research and extension systems; and improve agricultural communication between research and extension organizations. The

proceedings of the workshop will be published by SAIC and widely distributed for follow-up actions by the relevant institutions.

Further details can be obtained at <http://www.saic-dhaka.org/Regional%20Workshop.html>

AOAD 2006 PRIZE FOR SCIENTIFIC INNOVATION IN THE AGRICULTURAL AREA

The Arab Organization for Agricultural Development (AOAD) Prize aims to encourage agricultural research on the following topic: "Developing natural resources, protection of environment, bio-diversity and desert combating." Details of the competition can be obtained by contacting AOAD headquarters in Khartoum, or from the AOAD website: http://www.aoad.org/index_en.asp.

NIGER: COURSE ON ECOLOGICAL IMPACT OF BIOTECH CROPS

The Permanent Inter-State Committee for Drought Control in the Sahel (CILSS) has embarked on a process of harmonization of GMO regulations since 2001 to facilitate and secure trade between sub-regional countries. The course "The Bio-safety of Genetically Modified Plants, with Special Reference to Ecological Impacts" intends to address the environmental aspects of GMO utilization, and is slated for November 3 - 8 in Niamey, Republic of Niger. The workshop will bring together about twenty participants working in the fields of agricultural products and by-products, seed, and/or GMO quality control. Applicants must be citizens of the following CILSS Member States: Burkina Faso, Cape Verde, The Gambia, Guinea Bissau, Mauritania, Niger, Mali, Senegal, and Chad. Some places are reserved for self-sponsored candidates. Closing date for receipt of applications: October 6th, 2006. More information on how to apply is available at http://www.agrhymet.ne/PDF/Atelier_biodiversite_eng.pdf.

AGRIC INFO SPECIALISTS FROM LATIN AMERICA TO MEET IN MEXICO

The 14th Inter-American Meeting of Agricultural Librarians, Documentalists and Information Specialists (RIBDA): "Toward a new culture of knowledge: change and development" will take place in Mexico. The event aims to promote prosperity in the rural communities of the Americas, and focuses on the on the new role professionals in the field of information must assume in "the knowledge era," to become agents for change in their organizations and to contribute to the

development of their countries by devising more effective processes for managing information. The main topics of the meeting are: development of capabilities and skills in information services: education, extension, research and marketing; management of library services: quality and certification; new skills for professionals in the field of agricultural information; information and communication technologies; and best practices in agricultural information: global, regional and national initiatives.

The meeting, initially slated for September in Oaxaca, will now take place in Mexico City on 6-10 November, 2006. More information is available at

<http://www.14ribda.org> and

http://www.iica.int/noticias/detalles/2006/CP31-2006_eng.pdf

TRAINING PROGRAMS ON PLANT GENETIC RESOURCES SCHEDULED

Three one-week workshops of the International Training Program on Plant Genetic Resources will address topics in conservation and the use of plant genetic resources and seeds. These will be held in Iran, and will include in situ and ex situ conservation strategies (November 4-8, 2006); Support of local seed supply and small-scale seed enterprises (November 11-15, 2006); and genetic resources, rights, and institutional policies (November 18-22, 2006). For more information, visit

<http://www.aarinena.org/rais/documents/Conferences/TrainingW/IPGRI2006Iran/IPGRIWS2006iran.htm>.

MEETING ON NATURAL PRODUCTS SLATED

“Plant-derived Natural Products: A Resource for Bioactive Compounds” will be held on the 28th of November 2006, in Bracknell, Berkshire, United Kingdom. This meeting will discuss the opportunities for optimizing naturally-based remedies in medicine, new plant-based approaches to crop protection and how vitamin deficiencies can be alleviated simply, cheaply and effectively. It is an opportunity to debate these issues and identify the way forward, assess the opportunities, applaud the successes and look to the promises for the future. Read more at <http://www.soci.org/SCI/events/details.jsp?eventID=EV858>.

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