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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NEWS

GLOBAL

IAASTD TO CONDUCT AGRI-BIOTECH ASSESSMENT

A global effort headed by the International Assessment of Agricultural Science and Technology for Development (IAASTD) is underway, to assess how science, in particular, biotechnology, can and has improved agriculture. The same initiative has also received a US$3 million grant from the World Bank, which will be supplemented with an additional US$7.5 million from other agencies such as the United Nations Food and Agriculture Organization (FAO).

The three-year project is a major global initiative, developed out of a consultative process involving 900 participants and 110 countries from all over the world. It aims to provide policymakers with information on how science can: 1) improve agriculture; 2) contribute to sustainable development; and 3) meet the Millennium Development Goals of reducing hunger and poverty, improving nutrition, health, and rural livelihoods, and facilitating social and environmental stability. Initial reports will be released at the end of 2007.

For more information, visit http://web.worldbank.org/external/projects/main?pagePK=64312881&piPK=64302848&theSitePK=40941&Projectid=P090963.

BIOTECH WHEAT STUDIES RECOUNTED IN REPORT

Wheat is one of the world's most widely used grain crops. Due to over a thousand years of domestication and selection, the wheat genome is also one of the largest and most complex of all crop species; more complex, even, than the human genome. This makes wheat genome studies, and, consequently, manipulation of the wheat genome, more difficult. In "*Triticum Aestivum* L (Wheat) - An Incredibly Complex Genetic Soup," Tracy Sayler looks at current studies on the feasibility of investing in the genetic improvement of wheat. Her

article appears in the latest issue of the Information Systems for Biotechnology newsletter.

Despite the long, tedious process of constructing a genetic road map of the wheat genome, Sayler states that the National Association of Wheat Growers urges the development of biotech wheat. She also quotes Forrest Chumley, associate director for research at Kansas State University, on the issue of the scientific cost of not pursuing the quest for biotech wheat. Chumley says that "in science, success is the best recruiting tool, and failure to develop and commercialize biotech traits may lead to a decline in wheat research investments, reduced student enrollments, and lost research opportunities in the future."

For more information, contact Tracy Sayler, Agricultural writer and ISB correspondent, at tsayler@prairieagcomm.com. Read the complete article in ISB's newsletter, available at http://www.isb.vt.edu/news/2006/news06.Apr.htm.

CIMMYT SYMPOSIUM TACKLES WHEAT BREEDING

About 130 participants from over 20 countries attended the "International Symposium on Wheat Yield Potential: Challenges to International Wheat Breeding." The symposium, held in Ciudad, Obregón, Mexico in late March 2006, was sponsored by the International Maize and Wheat Improvement Center (CIMMYT) and the Australian Center for International Agricultural Research (ACIAR).

The meeting opened with a keynote address by Dr. Norman Borlaug, who delivered his "Personal Reflections of 62 Years of Fighting Hunger." Technical presentations, a poster session, and discussions followed, all of which aimed to chart a course for wheat research in the developing world for the coming decade. As a result of the discussions, three major areas for more intensive research were cited: 1) integration of physiological trait-based approaches into conventional breeding schemes to advance progress on complex traits associated with yield and stress adaptation in wheat; 2) systematic characterization of target environments; and 3) conservation agriculture as a strategy for buffering adverse effects of the environment on yields, especially in the face of climate change and reduced water resources.

For more information, contact Matthew Reynolds at m.reynolds@cgiar.org. Read the complete article at http://www.cimmyt.org/english/wps/news/2006/mar/sympTraverses.htm.

AFRICA

REPORT SHOWS AGRICULTURAL SOIL DECLINING IN AFRICA

A recent report by the International Center for Soil Fertility and Agricultural Development (IFDC) shows that 75% of farmland in Sub-Saharan Africa (SSA) is plagued by severe degradation, and is losing basic soil nutrients needed to grow the crops that feed Africa. The highest rates of nutrient depletion were found in Guinea, Congo, Angola, Rwanda, Burundi, and Uganda, where nutrient losses are more than 60 kilograms per hectare per year. Africa's crisis in food production and battle with hunger are largely rooted in this "soil health crisis."

The report also found that: 1) About 50,000 hectares of forest and 60,000 hectares of Africa's grasslands are lost to agriculture yearly, due to low levels of soil fertility and increasing population pressures; 2) Loss of nitrogen and phosphorus through soil erosion by wind and water, and leaching of nitrogen and potassium contribute to soil nutrient depletion; and 3) About 33% of the sub-Saharan population is undernourished, and most of the undernourished live in East Africa, where nutrient mining rates are high.

To address this issue, President Olusegun Obasanjo, Chairman of the Implementing Committee of the African Union's New Partnership for Africa's Development (NEPAD), and President of the Federal Republic of Nigeria, is calling on African heads of state, ministers, donors, industry leaders, farmers' organizations, and others to support the transformation of African agriculture, beginning with the "Africa Fertilizer Summit." The summit will tackle the soil health crisis and adopt strategies to revitalize African agriculture, and will take place on the 9th-13th of June, 2006, in Abuja, Nigeria.

The summit will be implemented by the IFDC. For more information, read the press release at http://www.rockfound.org/Library/Summit_Press_Release.pdf.

BOTSWANA AGRICULTURE MINISTER CALLS FOR PUBLIC INVOLVEMENT IN GM ISSUES

Involvement of the public in decision-making processes on Genetically Modified Organisms (GMO) is critical. This was stated by Peter Siele, Botswana's Assistant Minister of Agriculture, who spoke at a consultative workshop for the country's National Biosafety Framework.

The framework is a combination of policy, legal, administrative, and technical instruments that seeks to promote the development and application of biotechnology. It also aims to address environmental and health safety issues while minimizing any adverse socio-economic impacts. Nancy Kgengwenyane,

workshop facilitator, stressed that a precautionary principle is still in place, which calls for farmers not to plant GM crops if they are uncertain of its effects. She, however, cautioned that biotechnology is an expensive process, hence the need for the public to have strong political will.

Read the complete articles at http://allafrica.com/stories/200604050700.html and http://www.mmegi.bw/2006/April/Wednesday5/5147016861926.html.

MALAWI ADVISED TO DIVERSIFY DIET FOR FOOD SECURITY

Food insecurity in Malawi can be overcome if people's high dependency on maize is reduced, according to a World Food Program (WFP) study. Malawi recently suffered one of the country's worst maize shortages; the aim of the study was to explore alternative sources of food by conducting a nine-month survey of 4,000 people in four districts around the country, to monitor the aftermath of the shortage.

The results of the survey have prompted the WFP to suggest two approaches to improving the state of Malawi's food security. These were to: 1) encourage communities, schools, health centers, and households to grow alternative crops, such as indigenous varieties of potatoes, which could provide an alternative source of carbohydrates; and 2) educate community members, students, and patients about nutrition and preparing alternative foods to improve diets. These diets, authors recommended, should include other food groups like fruits, vegetables, legumes, nuts, oil, and fats.

The findings have also been released as "Low-Input Food and nutrition Security: Growing and Eating More using Less," a manual which has become part of the WFP's diet diversification program to be implemented in all Malawi schools. To find out more, visit http://www.irinnews.org/report.asp?ReportID=52612&SelectRegion=Southern_Africa&SelectCountry=MALAWI.

THE AMERICAS

BRAZIL GEARS UP FOR BETTER AGRICULTURE, BIOTECH

Roberto Rodrigues, Brazilian Minister for Agriculture, announced yesterday an emergency financial aid package to help the ailing agricultural sector in Brazil. The government will provide R$ 1.23 billion (equivalent to US$ 577 million) to support commercialization through a policy of minimum prices and of acquisition

of products for familial agriculture. R$ 5.7 billion (about US$ 2.7 billion) will also be available for agricultural credit. Although the specific structural measures to be implemented are yet to be defined, they will fall in the areas of agricultural finance, fiscal reform, and import tariffs. Rodrigues said the package is intended to reduce production costs and increase the revenue of farmers. According to the minister, problems faced by producers, such as falling prices and the dry season, could result in a reduction of approximately 2.5 million hectares in the total cultivated area of Brazil this year. The losses to the sector are estimated to amount to R$ 30 billion (about US$ 14 billion).

Antônio Ernesto de Salvo, president of the Brazilian Confederation of Agriculture and Livestock (CNA) said the measures for agriculture are positive, but insufficient. The agricultural sector generates R$ 35 billion surplus in the trade balance and R$ 200 billion in the gross domestic product. The aid package represents “a small cure for an economical giant,” said da Salvo.

In related news, President Luiz Inácio Lula da Silva of Brazil recently signed a decree which makes it possible for products produced in one municipality to be sold anywhere in the country, so long as the municipality has adhered to the Unified Inspection System of vegetable and animal products. The measure is expected to give an impulse to the agro-industrial economy, improving regional and local development based on the culture of regional production.

With reports from http://www.radiobras.gov.br/. For more information visit: http://www.biotecnologia.com.br/.

USDA AWARDS BARLEY SCIENTISTS $5M

Mike Johanns, the United States’ Secretary of Agriculture, today announced that the U.S. Department of Agriculture (USDA) is awarding $5 million to a consortium of scientists to identify genes that produce higher yielding, higher quality, and disease-resistant barley.

Programs related to the barley genetics program include: 1) the development of a detailed genetic “road map” of barley, which will allow scientists to identify genes linked to important traits in the crop; 2) the application of these findings to barley agriculture, including marker-assisted selection, which will allow breeders to select the best trait combinations for specific barley varieties; 3) education and outreach, where students will be included in all aspects of the project, to ensure that the next generation of plant breeders is well educated; and 4) documentation of results, which will be made available to scientists, growers, and industry, through http://www.barleycap.org.

For more information, read the complete press release at http://www.usda.gov/wps/portal/!ut/p/_s.7_0_A/7_0_1OB?contentidonly=true&contentid=2006/03/0112.xml.

ASIA AND THE PACIFIC

INDIA BT COTTON REVENUES HIGH, SURVEY FINDS

Indian Farmers who planted Bollgard cotton earned an additional Rs. 2100 crores (US$ 477.8 Million) in income. It also estimates that farmers planted Bollgard cotton over 3.125 Million acreage in 2005. This is according to a recent survey conducted by IMRB International, which interviewed 4799 farmers across 31 cotton growing districts in Punjab, Haryana, Rajasthan, Andhra Pradesh, Karnataka, Tamil Nadu, Madhya Pradesh, Maharashtra, and Gujarat.

Bollgard cotton is designed to provide cotton plants with built-in protection against American bollworm. It has been grown in India since its commercial launch four years ago. The survey estimates that there has been a 64% per acre increase in cotton yields when Bollgard was planted. The survey also found that: 1) Bollgard farmers received a net 118% profit increase compared with those who planted conventional cotton; and 2) Total pesticide use was reduced by 25% when Bollgard cotton was planted.

For more information, contact Mr. Nikhil Rawal of IMRB International at nikhil.rawal@imrbint.com. You may also contact Mr. Bhagirath Choudhary of the ISAAA South Asia Office at b.choudhary@cgiar.org. Read the complete article at http://www.isaaa.org/kc/CBTNews/files/IMRB2006.pdf.

MALAYSIA PLAN TO SUPPORT BIOTECH

Malaysian Prime Minister Datuk Seri Abdullah Ahmad Badawi recently unveiled a five year plan (2006 - 2010) for Malaysia. Under the Ninth Malaysian Plan (9MP), RM2 billion (~US$ 545 M) has been allocated for the development of the biotechnology industry in Malaysia. Emphasis will be placed on research, development and commercialization, strategic technology acquisition, business and entrepreneurship development, and infrastructure. The Prime Minister will also launch the National Biotechnology Implementation Council next month, followed by the formation of Malaysian Biotechnology Industry Association.

About 45% of the funds will be used for physical infrastructure development. The remaining amount will be channeled into various science-related funds, while some will be allocated to research and development in biotechnology. Focus will

be given to the use of biotechnology in agriculture, health care, industrial activities, and bioinformatics.

For more information, email Mahaletchumy Arujanan of the Malaysian Biotechnology Information Center (MABIC) at maha@bic.org.my or visit the MABIC website at http://www.bic.org.my

ISAAA, PHILIPPINE DA TO TRAIN GOVERNMENT OFFICIALS ON BIOTECH

The Philippine government will soon offer a special course on biotechnology for local government officials as part of the Department of Agriculture's (DA) Capability Building of Local Government Units (LGU) for Biotechnology program. Agriculture Undersecretary Segfredo R. Serrano announced that a training module for LGUs is being developed by the International Service for the Acquisition of Agri-biotech Applications (ISAAA) and the J. Burgos Media Services.

Serrano witnessed the signing of a Memorandum of Agreement (MOA) between ISAAA and the J. Burgos Media Services for the development of the modules. ISAAA was represented by its Global Coordinator and Southeast Asia Director Randy Hautea, while J. Burgos Media Services was represented by former Philippine Information Agency (PIA) Director General Joel Paredes (who signed on behalf of Executive Director Edith Burgos). The signing took place this week at the ISAAA Southeast Asia office at the International Rice Research Institute (IRRI), Los Baños, Laguna.

Under the agreement, the DA will provide technical assistance and logistical support for the training of local government officials and agricultural and planning officers. The training modules will be custom-made for LGUs so that local chief executives and their officials can have the capability to initiate development innovations and stakeholder partnerships for biotechnology development at the local level.

With reports from http://www.abs-cbnnews.com/storypage.aspx?StoryId=34605. Read the press release at http://www.biotechforlife.com.ph/news_daoffer.htm.

NEAR EAST AGRICULTURE CHALLENGES EXPLORED

A meeting of senior agriculture officials from 13 countries of the Near East has endorsed action aimed at improving water productivity in agriculture and strengthening plant protection systems in the region. Delegates to the Food and Agriculture Organization's (FAO) Agriculture and Land and Water Use

Commission (ALAWUC) meeting, in March 2006, reviewed reports on the declining availability of water for agriculture and the need to upgrade phytosanitary standards, both to protect domestic production and guarantee market access for agricultural exports.

The Near East comprises the predominantly arid or semi-arid region stretching from Mauritania to Afghanistan, where only 4.5% of the total surface area is cultivable. Agriculture in the region depends largely on rain, but food production usually drops due to extreme fluctuations in rainfall. Other constraints to agricultural production include water shortage, the expense of collecting payments for water, and the costs of desalting water meant for agriculture, which, according to reports, is "generally cost-ineffective and much less economical than the reuse of treated wastewater."

The ALAWUC recommended the following to boost agriculture in the Near East in terms of water supply: 1) water mining, or making better use of existing water resources, especially on irrigated land; 2) capacity building, not only technical training in using infrastructure, but also assistance in building strong institutions and organizations for successful irrigation development; 3) using desalted water in agriculture; and 4) strengthening plant protection and quarantine systems, as well as trade agreements amongst Near East countries.

Read the complete article at
http://www.fao.org/WAICENT/FAOINFO/AGRICULT/magazine/0603sp3.htm

EUROPE

VIENNA CO-EXISTENCE CONFERENCE OPENS

The Austrian Presidency Conference on Co-existence between GM and Non GM crops has opened in Vienna, Austria. Mariann Fischer Boel, Member of the European Commission (EC) responsible for Agriculture and Rural Development, summarized significant points of the Commission's recently released report on co-existence. She stressed that the co-existence debate is meant to ensure co-existence, not prevent it. She was skeptical about proposing European Union (EU)-wide rules on co-existence, but believed in supporting Member States in their efforts to implement co-existence systems. She stated that this would be possible by: 1) funding research initiatives to fill knowledge gaps in co-existence; 2) cooperation amongst Member States and other parties to identify best co-existence practices; and 3) completely assessing the impact of different civil liability systems on co-existence.

Stavros Dimas, Member of the EC responsible for Environment, emphasized that EU Member States should continue to be able to implement their national co-

existence measures. He likewise stressed the need for risk assessment of biotech crops, as well as freedom of choice for farmers who would decide not to grow these crops.

Also present at the conference was Simon Barber, Director of the European Association for Bioindustries' (EuropaBio) Plant Biotechnology Unit. Barber remarked that discussions so far had little bearing on co-existence issues, and that there was instead extensive debate on "Environmental risk assessments for approvals of new products, [when] co-existence is about existing approved products."

For more information, contact Sian Hughes at sian.hughes@thecentre.eu.com, Simon Barber at s.barber@europabio.org, and Adeline Farrelly at a.farrelly@europabio.org. Read the complete article at http://www.europabio.org/ne_060404.htm. Boel's speech is available at http://europa.eu.int/rapid/pressReleasesAction.do?reference=SPEECH/06/223&format=HTML&aged=0&language=EN&guiLanguage=en, while Dimas' speech is at http://europa.eu.int/rapid/pressReleasesAction.do?reference=SPEECH/06/224&format=HTML&aged=0&language=EN&guiLanguage=en.

EUROPE'S SCIENTIFIC PUBLICATION SYSTEM STUDIED

The European Commission's (EC) Directorate-General for Research recently commissioned a study aiming to assess the evolution of the market for scientific publishing, as well as to discuss potential measures to improve access to, and dissemination and archiving of scientific publications in Europe. Preliminary results were discussed with publisher representatives, scholarly societies, research-funding organizations, and library representatives.

The study observed that there is an increasing reliance on scientific journals as the main channel for dissemination of scientific knowledge. In Europe, there is also a growing dominance of "reader-pay" or "library-pay" journals, as opposed to the "author-pay" model of journal dissemination. The study recommends that: 1) journal prices should be set such that all parties, including publishers, scientists, and research institutions, will benefit; 2) the public should be guaranteed access to publicly-funded research results shortly after publication; 3) electronic publications should be developed; 4) Unfavorable tax treatment of electronic publications should be eliminated; and 5) public funding and public-private partnerships should be encouraged.

The study was carried out by a consortium led by Professor Mathias Dewatripont of the Université Libre de Bruxelles and may be downloaded at http://europa.eu.int/comm/research/science-society/pdf/scientific-publication-

study_en.pdf. Interested parties are invited to send feedback by the 1st of June, 2006, to rtd-scientific-publication@cec.eu.int.

RESEARCH

A PLANT SHIELD AGAINST RADIATION

Stratospheric ozone depletion is a concern because the ozone layer in the stratosphere keeps 95-99% of the sun's ultraviolet radiation from striking the earth. Excessive UV radiation has negative effects on growth of almost all plants, as it induces a reduction in leaf size, limiting the area available for energy capture during photosynthesis. UV light also affects the nutrient content of plants, and has indirect effects on germination and plant fertility. A decrease of stratospheric ozone is therefore likely to lead to a loss in plant biodiversity and compromise the global food supply.

Some plants are better than others at protecting themselves from UV rays, by either developing pigments that will absorb some of the rays, by making their leaves thicker, or by repairing UV-induced damage to tissues and DNA. Research devoted to developing crops with increased resistance to UV radiation is important to offset some of the damaging effects of ozone depletion in the stratosphere.

Scientists based in the Japan Atomic Energy Agency, in the Agricultural Genetics Institute, and in the Faculty of Pharmaceutical Science of Japan report on the isolation and characterization of a gene, *UVI-4*, that protects *Arabidopsis* (thale cress) plants from UV-B rays. Plants in which *uvi-4* was mutated weighed twice as much as non-mutated controls when grown under increased UV light. Interestingly, *uvi-4* mutants did not differ in their ability to repair DNA damage, nor produced additional UV-absorbing pigments.

So, how does *uvi-4* protect the plant? Plants grow by making a new copy of their DNA (known as replication) and then dividing into two daughter cells, each with one copy of the genetic set. The authors report that *UVI-4* gene is required to promote cell division in cells that have copied their DNA, and a mutation in the gene therefore results in larger leaf epidermis cells with twice the amount of DNA. This increase in DNA content is believed to be responsible for the added protection to UV radiation conferred by *uvi-4*.

To read the abstract of the report: "A mutation in the uvi4 gene promotes progression of endo-reduplication and confers increased tolerance towards ultraviolet B light", published in the Online Early section of the Plant Journal, visit: http://www.blackwell-synergy.com/doi/abs/10.1111/j.1365-313X.2006.02696.x

RESEARCH FINDS DIETARY FIBER GENE

Grasses and commercially important cereal crops share a common trait: they have (1,3;1,4)-ß-D-glucans in their cell walls. These beta-glucans are an important component of dietary fiber, and have been found to help prevent and treat human health conditions such as colorectal cancer, obesity, non-insulin-dependent diabetes, high serum cholesterol, and cardiovascular disease. Beta-glucans are, moreover, important to the beer industry, in that they influence malting and brewing; and to the fuel industry as well, as they affect the production of bioethanol from straw. Increasing the amount of beta-glucans in plants can therefore contribute to the improvement of economy and human health.

Increasing beta-glucans would mean manipulating the gene or genes that control their production. But what gene should scientists use? In "Cellulose synthase-like CslF genes mediate the synthesis of cell wall (1,3;1,4)-beta-D glucans," Rachel Burton and colleagues of the Australian Center for Plant Functional Genomics find that the CslF genes mediate beta-glucan synthesis. Their findings appear in the latest issue of the journal Science.

Scientists used comparative genomics to search for the gene required for beta-glucan synthesis in rice. Their mapping studies revealed a high level of conservation of genome structure and gene order in species of common cereals. Once the field was narrowed down to the CslF genes, they introduced rice CslF genes to *Arabidopsis* plants, since *Arabidopsis* walls contain no beta-glucans, and no CslF genes are present in the *Arabidopsis* genome. This approach resulted in the production of beta-glucans in the walls of transgenic *Arabidopsis*, which scientists detected using monoclonal antibodies and enzymatic analysis.

The research team is now working on increasing beta-glucans in grains, in particular for human and animal consumption. They, however, caution that their observations so far do not preclude a requirement for other enzymes, proteins, or co-factors in beta-glucan synthesis.

Subscribers to Science can read the complete article at http://www.sciencemag.org/cgi/content/full/311/5769/1940. Other readers can access the press release at http://www.acpfg.com.au/files/mediaReleases/betaglucanrelease.pdf.

ANNOUNCEMENTS

IFPRI LAUNCHES E-LEARNING PROGRAMS

The International Food Policy Research Institute's (IFPRI) Virtual Learning Room is launching a Global e-Learning Program designed to provide free e-learning opportunities for professionals around the world. The Program will initially comprise two separate e-learning courses on "How to Write a Convincing Proposal" (April 15-August 15, 2006) and "How to Communicate Scientific Research" (October 1, 2006-Junary 31, 2007). The methods and materials for both courses were developed by experienced international specialists and were tested extensively in two successful pilot e-learning programs carried out in 2005. Participants can choose to take either or both of the courses. For further information and registration for the courses, please visit IFPRI Virtual Learning Room at http://learning.ifpri.org/

SYMPOSIUM ON MOLECULAR FARMING SLATED

An "International Symposium on Molecular Farming in Plants" will be held on the 13th-15th of June, 2006, at the Boulevard Hotel, Kuala Lumpur, Malaysia. The symposium aims to promote the vital exchange of knowledge, ideas, and information on the newest developments and applied technologies in field of the molecular farming. Representatives from universities, research institutes, and industry worldwide are invited to attend. For more information, contact the Center for Research in Biotechnology for Agriculture (CEBAR) at cebar@um.edu.my and cebar@yahoo.com, or visit their website at http://www.cebar.um.edu.my.

DOCUMENT REMINDERS

SPANISH CBU NOW AVAILABLE

Readers from Spain and Latin America may now download the Crop Biotech Update in Spanish, available at http://www.isaaa.org/kc/CBTNews/spanish_pdf/Marzo_2006.pdf. The Crop Biotech Update is also available in Mandarin Chinese, French, Italian, Portuguese, Bahasa Indonesia, and Bangla.

ECA FOOD SECURITY TRENDS DISCUSSED IN PAPER

Steven Were Omamo looks at recent trends in agricultural growth and food security in Eastern and Central Africa (ECA), and makes recommendations on how current situations may be improved. “Back to the Future: Reversing Recent Trends for Food Security in Eastern Africa” is composed of briefs, which deal with individual countries in the ECA region. The documents, in particular, seek to answer the question: What do the ECA countries need to do to effectively exploit the potential of agriculture and meet the needs of their burgeoning populations? Read the briefs at http://www.ifpri.org/pubs/ib/ib45.asp.

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