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

C4 RICE NEEDED – RICE COMMISSION SECRETARY

“The development of C4 rice or similar varieties is very much welcome and we strongly recommend that member governments and the donor community provide full support to current research based on improving the photosynthetic efficiency of the rice plant,” International Rice Commission Secretary Nguu Nguyen said in a press statement. He was commenting on recent reports about a major international scientific effort that aims to convert rice from a C3 to a C4 plant, where a plant’s ability to capture carbon for growth is increased.

The more solar energy a rice plant can efficiently capture, the more it will yield, explained Mr. Nguyen. “We need to meet the challenge of feeding a growing world population, which is projected to reach 8.3 billion in 2030, with an accompanying rice demand of 771 million tonnes,” he stressed, “The C4 rice would have the potential to out-yield the best performing existing rice varieties and hybrids by 15 to 20 percent. However, it will take several more years before the C4 rice varieties may become available. And, then we will have to make sure that they are safe for human and animal consumption as well as for the environment.”

Read the complete press release at http://www.fao.org/newsroom/en/news/2006/1000379/index.html.

DUPONT, BUNGE EXPAND COLLABORATION TO BIOFUELS

The Bunge DuPont Biotech Alliance, composed of food and feed ingredient company Bunge and chemical manufacturer DuPont, has announced the expansion of its soy collaboration, beyond food and nutrition products to include industrial applications, biofuels, and other opportunities. To reflect this, the Alliance is launching TREUS, a new brand name for its soy products. In its product pipeline are several new soy varieties that can be grown across broader geographies and maturity zones.

These new varieties, to be released in 2007, include soy oils with high oleic and a combination of high oleic and high stearic oil content. These oils can offer a low trans-fat, high solids baking ingredient for use in packaged foods requiring an extended shelf life, such as cookies, crackers, and breakfast cereals. They can also provide products with better frying performance, as well as renewable, environmentally friendly options to petroleum-based products. Research is also

underway to develop soybean varieties that produce meal with enhanced amino acid content.

Read the complete press releases at http://vocuspr.vocus.com/VocusPR30/Newsroom/Query.aspx?SiteName=DupontNew&Entity=PRAsset&SF_PRAsset_PRAssetID_EQ=102994&XSL=PressRelease&Cache=False.

IWMI RELEASES ASSESSMENT OF WORLD WATER MANAGEMENT

A third of the world is affected by water shortages, a quarter of the world lives where water is in naturally short supply and where sources tend to be over-used, but these problems still have a multitude of solutions. This was concluded by the Comprehensive Assessment of Water Management in Agriculture, a study that was launched at the recently opened World Water Week meeting in Stockholm, Sweden.

With groundwater levels declining, water sources drying up, and agriculture using up to 70 times more water than domestic activities, the report urges policymakers to formulate policies that would keep water supplies sustainable. The report is the product of a five-year assessment that brought together 700 experts in the field of water management. Spearheaded by the International Water Management Institute (IWMI), the study recommends several solutions to the current water shortage problem. This includes strategies that will allow agriculture to use half of the water currently used, while still feeding an extra 2-3 billion people.

Access the study at http://www.iwmi.cgiar.org/Assessment/files_new/newsroom/CA%20Exco%20Brochure-1-final%20version.pdf. Read a related article at http://allafrica.com/stories/200608230511.html. For more information on the meeting visit http://www.worldwaterweek.org/.

Africa

COMESA SIGNS DEAL TO IMPROVE AFRI AGRI PRODUCTION

The Common Market for Eastern and Southern Africa (COMESA) has signed a Memorandum of Understanding (MoU) with the Food Agriculture and Natural Resource Policy Analysis Network (FANRPAN) to exchange information on food, agriculture, and natural resources policy and institutional issues relevant to sub-Saharan Africa (SSA). It will also facilitate, where possible, access to relevant research and published materials on agriculture.

The MoU will enable the two organisations work together to strengthen the understanding of regional international trade agreements and support the formulation of national trade agreements on agriculture, support the formulation of national and regional policies, build shared market information and communication systems, and establish a database and promote advocacy on farmer issues.

Both FANRPAN and COMESA have agreed to cooperate with relevant national, regional, and international institutions operating within the region in the design, implementation, and assessment of capacity building initiatives to achieve maximum impact on matters of common interest.

For more information contact Daniel Otunge through dotunge@absfafrica.org or d.otunge@cgiar.org

FERTILIZER TREES BOOST CROP YIELDS IN SOUTHERN AFRICA

Maize production is hampered by low soil fertility and nutrient mining in southern Africa, where soils are depleted of nitrogen, and where smallholders cannot afford chemical fertilizers. A solution was formulated in the early 1990's by researcher from the World Agro-Forestry Center and their national partners in Zambia. After years of work on cropping solutions, they have discovered that fast-growing, nitrogen-fixing trees, such as species of *Sesbania* and *Gliricidia*, and *Tephrosia vogelli*, can improve fallows and even change soil structure.

Soils fallowed with these "fertilizer trees" are lighter and airier, with reduced crusting, and better water infiltration and holding capacity. In southern Africa, permanent maize-*Gliricidia* intercrop systems have been found to sustain yields that are very close to a fully fertilized system. In line with this, Malawi's Ministry of Agriculture has partnered with United Nations (UN) agencies in incorporating fertilizer tree agroforestry options as a sustainable strategy in the overall programmatic approach of establishing a Millennium Global Village in the country.

For more information, read http://www.worldagroforestrycentre.org/news/default.asp?NewsID=FAA07246-6A5B-4525-AF74-AFA06E87C134 and http://www.worldagroforestrycentre.org/news/default.asp?NewsID=6E5F4A43-38BA-47BE-9F8C-58D31E0307A6.

INIBAP, TSBF-CIAT, IITA JOIN TO SAVE BANANA

The International Network for the Improvement of Banana and Plantain (INIBAP), the Tropical Soil Biology and Fertility Institute of the Centro Internacional de Agricultura Tropical (TSBF-CIAT), and the International Institute of Tropical Agriculture (IITA), along with local agricultural research services, NGOs and private sector partners, have united to help banana and plantain farmers in Africa's Great Lakes region.

Bananas and plantains are an important source of food and income for rural people throughout the humid tropics, but nowhere more so than in this part of Africa. The consortium hopes to rebuild the banana and plantain sectors through projects funded by the Directorate General for Development Cooperation of Belgium. The INIBAP-led project will develop mechanisms to access dispersed expertise and knowledge, adapt it to meet local needs, and use it to solve, on a pilot scale, problems at the farm, community, and institutional levels. TSBF-CIAT will develop a strategy integrating natural resource management, improved nutrition, and access to markets to increase the resilience of agro-ecosystems. IITA will develop and disseminate technologies to increase the sustainability of the banana production system.

Read the complete article at http://www.inibap.org/news/ressources/File/cialca(1).pdf.

ICARDA, WAGENINGEN U PARTNER FOR WANA

ICARDA and Wageningen University and Research Center, the Netherlands recently launched a partnership on short courses in the field of Plant Genetic Resources and Seeds. Different modules will be organized jointly in different parts of West Asia and North Africa (WANA); in Karaj, Iran, in November 2006; and in Addis Ababa, Ethiopia, in 2007. Wageningen UR has been running short international mid-career training programs in fields related to biotechnology, breeding, and seeds for several years. It is now stepping up its activities in different regions.

For more information, visit http://www.icarda.org/Training_opp.htm and http://www.wi.wur.nl/UK/newsagenda/agenda/Plant_genetic_resources_and_seeds_policies_conservation_and_use.htm; or contact Niels P. Louwaars of Wageningen University and Research Center at niels.louwaars@wur.nl.

The Americas

ARS TARGETS POTATO MOTH BY INSECT VIRUS

The potato tuber moth is a major problem for potato growers: larvae of this insect feed on both potato plants and tubers, ruining the crop and lowering yields. As a result, the United States Department of Agriculture's Agricultural Research Service (USDA-ARS) is turning to different methods to target the pest. One such method uses granulovirus, which is lethal to the moth. Once ingested, the virus, a highly specific pathogen which does not infect other insects, humans, or mammals, could kill larvae in 10-20 days. Only a few close relatives of the moth are susceptible to granulovirus, making it an attractive biological control method.

ARS scientists are formulating granulovirus biopesticides that farmers can spray on their crops before harvest. Although granulovirus is already used in other countries, it is not commercially available to U.S. growers, and limited research has been done to investigate the pathogen's pre-harvest potential. Other potato tuber moth control methods under investigation include the use of the bacterium *Bacillus thuringiensis*; two species of insect-specific nematodes; and the fungus *Muscodor albus*, which releases natural volatile compounds that have been shown to be lethal to both adult potato tuber moths and their larvae.

Read the complete article at http://www.ars.usda.gov/is/pr/2006/060825.htm.

JAMAICA PEPPER INDUSTRY BOOMING, THANKS TO BETTER TRACEABILITY SYSTEM

The Jamaican hot pepper industry is experiencing a comeback, courtesy of a better traceability system that makes sure that export batches of the crop are free from the dangerous gall midge insect pest. This pest, which affects pepper plant stems and fruit, was once the cause of the industry's near fall; thanks to the new system, hot peppers are now a major non-traditional source of income for small farmers across the region.

The system is overseen by a national Hot Pepper Task Force, which monitors the incidence of gall midge in Jamaica using tools such as a geographical information system (GIS) to forecast midge outbreaks; global positioning system (GPS) technology to seek pest-free seasons and zones, and pest hotspots with surveys and by tagging locations; and a web-based surveillance network across 17 districts of the island. The monitoring extends to port and packing house inspections, minimizing of the use of pesticides, farmer education, and improved post-harvest management.

Read the complete article at
http://ictupdate.cta.int/index.php/article/articleview/572/1/102/.

BRAZIL, SHARING THE PROFITS

Agricultural productivity has increased significantly over the last few decades. For example, the Brazilian National Company of Supplies (CONAB) estimates that the rice production in the 2005/2006 season will be 6479 kg/ha, compared to the 2615 kg/ha harvested during 1976-1977. These increases were made possible by the Green Revolution, which modernized the agricultural sector through the introduction of improved varieties, irrigation, and the use of agrochemicals and agricultural machinery. As a result, agriculture also became the base of several sectors of the economy, and a significant proportion of the population depends on the profits derived from this activity. The yearly market for pesticides in Brazil, for instance, is worth US$4 billion.

Are the benefits of agriculture distributed fairly among all the players? Farmer representatives argue that rural workers are the ones to benefit less from the profits of agriculture, due to the high production costs. Reginaldo Minaré, legal director for the Brazilian National Association for Biosafety (ANBio), discusses some of the possible implications that the adoption of biotech crops would have on benefit sharing. With the introduction of crops engineered with resistance to insects, virus and herbicides, there is no doubt that the agrochemical sector will be the one to lose a bigger proportion of the market share, writes Minaré. Although some of the costs saved by farmers will be spend on a “technology tax” for companies, the opening of a new market worth billions of dollars could not take place without considerable debate.

This opening represents an opportunity for farmers, through their representative institutions, to promote a rigorous study of production costs with the available technologies, to allow them to make informed choices on what to buy, argues Minaré. Exercising the old skill of bargaining would increase the profit margins for farmers.

For more information visit http://www.anbio.org.br/ or write to Reginaldo Minaré (rminare@uol.com.br).

Asia

62 BT COTTON HYBRIDS COMMERCIALIZED, 106 IN LST – INDIA GEAC

India's biotech regulatory body, the Genetic Engineering Approval Committee (GEAC), has recently released the status of Bt cotton hybrids approved for commercial cultivation in various zones from 2002-2006, and the status of Bt cotton hybrids approved for first year and second year large scale trials (LST) in 2005-2006. According to the reports, there are 62 Bt cotton hybrids approved for commercial cultivation. Around 96 Bt cotton hybrids are undergoing first year

large scale trials, while 10 are undergoing second year large scale trials. It is likely that around 106 Bt cotton hybrids will get commercial approval in the next season under the GEAC's newly adopted "event-based approval system."

For detailed information, download the status reports at http://www.envfor.nic.in/divisions/csurv/geac/bt_cotton_approved0506.pdf and http://www.envfor.nic.in/divisions/csurv/geac/bt_cotton_LST0506.pdf or contact Bhagirath Choudhary of the ISAAA South Asia Office at b.choudhary@isaaa.org.

INDIA'S EXPERT COMMITTEE TO LOOK INTO BT BRINJAL

Given the importance of India's first biotech food crop, the country's Genetic Engineering Approval Committee (GEAC) has set up an expert committee under the Chairmanship of Dr. Deepak Pental to review feedback and suggest measures for the approval of large scale trials of Bt Brinjal (eggplant) in India. The committee will evaluate comments received from various stakeholders vis-à-vis the biosafety data generated by the Maharashtra Hybrid Seeds Company (MAHYCO) and available scientific/technical data/literature from studies conducted by various national and international institutions; suggest additional studies (if any) to be conducted; evaluate the adequacy of the protocol proposed for large-scale trials and recommend additional safeguards; and recommend protocol for socio economic studies. The committee includes members from various ministries, scientific, and social sciences institutions in India.

For more information, visit http://www.envfor.nic.in/divisions/csurv/geac/expert_penthal.pdf, or contact Bhagirath Choudhary of the ISAAA South Asia Office at b.choudhary@isaaa.org.

PRSV STILL BIGGEST THREAT TO PAPAYA, THAI FARMER SAYS

Mr. Surachart Jitsiripanitch, a papaya grower from Thailand's Kanchanaburi Province said that demand for papaya in foreign markets is increasing, but growers are in short supply due to infections of the crop by the papaya ringspot virus (PRSV). "We are producing papayas without any support from the government as far as PRSV control is concerned. We know that GM papaya can is resistant to PRSV but we can't use it. We have no alternative," said Surachart, "Without a clear policy from the government, Thai farmers will loss the competitiveness in the export markets, as well as research and development in GM technology."

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

CIAT SCIENTIST AWARDED BY THAI GOVERNMENT

Dr. Reinhardt Howeler of the Centro Internacional de Agricultura Tropical (CIAT) was recently awarded with Third Class of the "Most Exalted Order of the White Elephant." The award is given by the Thai government, and was bestowed on Dr. Howeler in recognition of his work to develop and disseminate together with farmers improved agronomic and soil conservation practices in Thailand. Dr. Howeler is based in Bangkok, and his work on cassava has also resulted in a significant increase in cassava yields and improvement in the sustainability of cassava production, while also increasing the income of cassava farmers in the country.

Dr Howeler, along with Mr. Watana Watananonta of Thailand and Dr. Tran Ngoc Ngoan of Vietnam, will also receive the "International Service in Agronomy Award" from the American Society of Agronomy (ASA) this November. Read the complete press releases at http://www.ciat.cgiar.org/news/news.htm.

Europe

EU RESTRICTS GM SOY IN ROMANIA

Romanian farmers planted RoundUp Ready soybeans over 85,000 hectares (210,035 acres) in 2005, but European Union (EU) mandates prevent them from raising the biotech soybean when the country joins the EU on Jan. 1, 2007.

As a result, a group of Romania's largest soybean growers is lobbying to gain provisional authority from the EU to grow biotech soybean. Although their appeal may be too late to grow the crop in 2007, the group is hoping that provisional authority can be granted in 2008.

Read the complete article at http://www.agriculture.com/ag/story.jhtml;jsessionid=D510XNTSXYQMFQFIBQSCCAQ?storyid=/templatedata/ag/story/data/1156773715607.xml#continue.

RESEARCH

NAC OVEREXPRESSION MAKES RICE DROUGHT, STRESS TOLERANT

Drought and salinity are major abiotic stresses to rice production, and have long been targeted in designing better rice. To cope with such adverse conditions,

plants develop physiological and biochemical strategies, such as by activating stress-related genes and synthesizing diverse functional proteins. The expression of such proteins is regulated by specific transcription factors, designated as NAM, ATAF, and CUC (NAC).

After successfully over-expressing NAC in rice japonica cultivar Nipponbare, Honghong Hu and colleagues of various research centers in Wuhan, China report that “Overexpressing a NAM, ATAF, and CUC (NAC) transcription factor enhances drought resistance and salt tolerance in rice” Their findings appear in the latest issue of the Proceedings of the National Academy of Sciences.

Scientists found that transgenic rice had better drought resistance, and 22-35% higher seed setting than controls in the field under severe drought stress conditions at the reproductive stage. The transgenic rice also showed significantly improved drought resistance and salt tolerance at the vegetative stage. In all cases, growth and productivity were not affected in transgenic rice plants, as there were no significant differences in photosynthesis rates between transgenic plants and controls. When scientists profiled gene expression patterns, they found that a large number of stress-related genes were up-regulated in the transgenic plants. All these suggest that the technique holds promise in improving drought and salinity tolerance in rice.

Read the complete article at http://www.pnas.org/cgi/content/full/103/35/12987, or view the abstract at http://www.pnas.org/cgi/content/abstract/103/35/12987.

STUDY POINTS TO miRNA FOR PLANT STRESS TOLERANCE

When confronted with environmental stress such as drought, heavy metals, or salinity, plants react in a variety of ways in order to cope with potentially damaging change. One result of such stress is the accumulation of reactive oxygen species (ROS) in the plant, which can destroy plants and result in major losses of crop productivity. ROS affect many cellular functions, such as by damaging nucleic acids or oxidizing important plant proteins. To counter ROS accumulation, some plants have a built-in antioxidant system – but what genes are involved in this system, and can other plants be engineered with this antioxidant system to protect them from the damages of environmental stress?

Research has shown that microRNAs (miRNAs) are involved in regulating diverse physiological processes in plants. miRNAs are short RNAs of about 21 nucleotides that regulate gene expression. One miRNA, designated miR398, targets two antioxidants called Cu/Zn superoxide dismutases (CSD1 and CSD2), which are produced in response to oxidative stress. How exactly CSD1 and CSD2 are produced is explored in the latest issue of The Plant Cell by Ramanjulu Sunkar and colleagues of the University of California, Riverside, as

they report that “Posttranscriptional Induction of Two Cu/Zn Superoxide Dismutase Genes in Arabidopsis Is Mediated by Downregulation of miR398 and Important for Oxidative Stress Tolerance.”

Researchers transformed different *Arabidopsis* plants with various constructs, all of them designed to express miR398 in varying levels. After subjecting the transgenic plants to oxidative stress conditions, conducting stress tolerance assays, and analyzing CSD1 and CSD2 levels in the transgenic plants, they found that: 1) miR398 targets the antioxidant enzymes’ mRNA for cleavage, keeping CSD1 and CSD2 from being expressed; 2) miR398 determines the expression pattern of CSD1 and CSD2, but is suppressed under oxidative stress; and 3) When researchers over-expressed an miR398-resistant form of CSD2, they found that the resulting transgenic plants were even more tolerant to oxidative stress than were plants over-expressing wild-type CSD2. Thus, researchers concluded relieving miR398-guided suppression of CSD2 in transgenic plants is an effective new approach to improving plant productivity under oxidative stress conditions; and because miR398 is conserved in crop plants, other scientists can use the strategy to engineer crops with enhanced stress tolerance.

Subscribers to the journal can read the complete article at http://www.plantcell.org/cgi/reprint/18/8/2051. Other readers can take a look at the abstract through http://www.plantcell.org/cgi/content/abstract/18/8/2051.

ANNOUNCEMENTS

VACANCY: PLANT BREEDING, GENETICS, AND BIOTECHNOLOGY POSTDOC FELLOW

The International Rice Research Institute (IRRI) is seeking a postdoctoral fellow for its biotechnology research program in the Plant Breeding, Genetics, and Biotechnology Division to develop tools and to study gene regulatory network and epigenetic mechanisms. Candidates should have 1) a PhD in molecular biology/genetics with strong emphasis on epigenetics and transgenic technologies; 2) excellent background in genetics, molecular biology, and bioinformatics; 3) outstanding knowledge of PCR methodologies; and 4) proven ability to work in multidisciplinary and multicultural environments. Fluency in written and spoken English or experience in an English-speaking country is required. Previous postdoctoral experience is preferred. Background in plant sciences is not required. Applicants should send via email a comprehensive curriculum vitae and names and email addresses of three referees to Ms. Selene

M. Ocampo at s.ocampo@cgiar.org. For more details, visit http://www.irri.org/jobs/international.asp.

MALAYSIA TO HOST BIOTECH SEMINAR

"A Seminar on Biotechnology: Wealth Creation and Planning for Prosperity in Malaysia" will be held on September 21, 2006 at the Putra World Trade Center (PWTC), Kuala Lumpur, Malaysia. The program will explore the links between business development and technology, covering intellectual property, technology commercialization, and funding plus capital formation. Download the brochure at http://www.bic.org.my/downloads/Biotechnology-gtim.pdf.

INNOVATIONS SYMPOSIUM SLATED FOR SSA

The 2nd Networking Symposium on innovations in Agricultural Advisory Services (AAS) is part of efforts to foster and enhance experience and lesson-sharing on AAS in the Sub-Saharan African (SSA) region. It will be held September 24-27, 2006 in Hotel Africana, Kampala, Uganda. The Symposium will bring together 140 participants from 19 African countries implementing innovative approaches and experiences in agricultural extension delivery. The theme for this second symposium will be "Enhancing Innovations in Agricultural Advisory Service Provision with Special Focus on Farmer Empowerment and Market Orientation. For more information, visit http://www.naads.or.ug/news.php?id=75.

SRI LANKA TO HOLD GIAM WORKSHOP

The "International Workshop on Global Irrigated Area Mapping (GIAM)" will take place September 25-27, 2006 in Colombo, Sri Lanka. The workshop aims, among others, to gather a group of experts on global application of remote sensing and GIS to present, discuss, and refine products and associated methodologies, with specific focus on mapping irrigated areas; disseminate GIAM products, data, methods, techniques, and protocols to a wide group of users and experts; and define future work programs to refine and improve products and methodologies. More information is available at http://www.iwmidsp.org/iwmi/giam-workshop/.

INDIA ORGANIZES INTERNATIONAL AGRI-BIOTECH CONFERENCE

The ILSI-India and ILSI International Food Biotechnology Committee in collaboration with the government of India are organizing the International Conference on Recent Scientific Developments in Agricultural Biotechnology: Sharing Experience and Knowledge, to be held September 29-30, 2006 in New Delhi, India. The conference will review the latest developments in agriculture biotechnology, with a view to assess how traditional breeding methods can be supplemented by the modern technological tools in breaking yield barriers in different crops, as well as in improving quality and nutritional value of foods with the objective of achieving food security for India. For more information, visit http://india.ilsi.org/About+Us/forthcomingactivities.htm or contact Ms. Rekha Sinha at ilsiindia@nda.vsnl.net.in.

MAGAZINE ANNOUNCES WRITING CONTEST

The German/English magazine entwicklung & laendlicher raum (e+lr)/agriculture & rural development (a+rd) invites young post graduate and PhD students to enter an article writing contest focusing on 8 topical issues in the field of agriculture and rural development. The 7 most outstanding papers will be published in the January 2007 edition of e+lr, and will be rewarded with € 400. The overarching question to be addressed is: “What agricultural policies do we need to reach the poor (MDG 1)?” For more information on the topics, visit http://www.agricta.org/about/020806_Wettbewerb%20Ausschreibg1.pdf. Deadline for submission is on October 6, 2006.

DOCUMENT REMINDERS

DATABASE OF AGRI RESEARCHERS RELEASED

A database of information on agricultural researchers in the Western Asia Sub-region (Iran, Pakistan, and Turkey) has been released online. This is useful in facilitating information exchange among researchers in the sub-region. Scientists can still fill out forms through http://www.aarinena.org/database/form.htm. Access the database through http://www.aarinena.org/database/index.htm.

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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