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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In This Week's Issue:

NEWS

*** GLOBAL ***

A WHEAT GENE FOR BETTER NUTRITION

Researchers at the University of California, Davis, the U.S. Department of Agriculture and the University of Haifa in Israel have identified a gene, *Gpc-B1*, that increases the protein, iron, and zinc content of wheat kernels.

The team, who reports their findings in the Science journal, found that kernels harvested from the plants with lowered *Gpc-B1 activity* had at least 30 percent less protein, zinc and iron. *Gpc-B1* increases seed nutrient content by accelerating senescence (ageing) of the plant and thereby increasing the remobilization of nutrients from leaves to developing grains. The finding predicts that adding additional copies of the functioning gene into bread and pasta wheats will be valuable to produce food with enhanced nutritional value.

“Wheat is one of the world's major crops, providing approximately one-fifth of all calories consumed by humans. Therefore, even small increases in wheat's nutritional value may help decrease deficiencies in protein and key micronutrients,” said Professor Jorge Dubcovsky, a wheat breeder and lead researcher on the project.

According to the World Health Organization, more than 2 billion people are deficient in zinc and iron, and more than 160 million children under the age of 5 lack an adequate protein supply.

The abstract of the article “*A NAC Gene Regulating Senescence Improves Grain Protein, Zinc, and Iron Content in Wheat*” can be accessed at
http://www.sciencemag.org/cgi/content/abstract/sci;314/5803/1298
More information available at: http://www.news.ucdavis.edu/search/news_detail.lasso?id=7949.
Read ARS’ press release at www.ars.usda.gov/is/pr.

PROPANEDIOL FROM CORN

DuPont has announced the first commercial shipments of Bio-PDO™ , a product of DuPont Tate & Lyle Bio Products, LLC, an equally-owned joint venture of DuPont and Tate & Lyle. The joint venture uses a proprietary fermentation process to produce propanediol using corn instead of petroleum-based feedstocks. The production of Bio-PDO™ consumes 40 percent less energy and reduces greenhouse gas emissions by 20 percent versus petroleum-based propanediol. Production of 100 million pounds of Bio-PDO™ will save the energy equivalent of 10 million gallons of gasoline per year.

According to DuPont Tate &Lyle Bio Products President Steven Mirshak, Bio-PDO™ is a versatile ingredient for a number of products including specialty polymers and also is well suited for cosmetics, liquid detergents and industrial applications like anti-freeze.
"We are seeing strong demand for all of our grades of Bio-PDO™ due to its performance, biodegradable nature, and ability to replace petroleum-derived products. Wherever a glycol is

being used today, businesses should consider replacing it with our new renewable ingredient", said Mishrak.

The complete press release can be read at http://pioneer.mediaroom.com/index.php?s=press_releases&item=208.

*** AFRICA ***

FARMERS VISIT BT COTTON FIELD TRIALS IN BURKINA FASO

The International Service for the Acquision of Agri-biotech Applications (ISAAA), in collaboration with INERA (the Institute for the Environment and Agricultural Research of Burkina Faso), and INSAH (l'Institut du Sahel), recently organized a travel tour to visit two Bt cotton field trials in Burkina Faso. The workshop's main objective was to provide the opportunity to farmers and journalists to see by themselves the performance of genetically modified cotton in the fields. Bt cotton is genetically engineered to protect the plant against the damage by bollworms. The event was attended by farmers and journalists from Burkina Faso, Mali, Benin, Senegal and Togo.

"In view of the results obtained in the field trials, we are ready to embark in the planting of Bt cotton in Burkina" said Sessouma Tinder, farmer from the Kénédougou region. "There is a clear difference between the Bt cotton fields and the conventional varieties, as transgenic plants carry more capsules. In addition, the transgenic fields receive only two pesticide treatments instead of six, which results in an important reduction in the cost of the pesticides. My main worry now is that the transgenic seeds become available, at a good price".

Burkina Faso is the only country in West Africa that has adopted a legal biosafety regulatory system, and field trials in the country are currently in their fourth year. The Bt trait has been transferred to local Burkinabe cotton varieties, and local scientists have carried out extensive biosafety and socio-economic studies. Burkina Faso is expected to commercialize Bt cotton next year, representing the first country in the region to adopt a biotech crop.

The event was supported by the United States Agency for International Development (USAID).

For more information contact ISAAA at: knowledge.center@isaaa.org.

US $250M FOR THE SAFE MANAGEMENT OF PESTICIDES IN AFRICA

About US$250 million has been set aside to improve pesticide management in Africa. World Wildlife Fund (WWF) regional representative Dr. Kwame Koranteng said the money donated by the African Development Bank, Global Environment Facility, the Netherlands and Canada, would initially benefit seven African countries, including South Africa, Mali, Ethiopia, Morocco, Tanzania, Nigeria and Tunisia.

The WWF official made this announcement during the Conference of Parties to the Basel Convention on the control of transboundary movement of hazardous wastes and their disposal, at the United Nations Environment Programme (UNEP) headquarters, Nairobi, Kenya. Koranteng said poor pesticide management had affected agriculture, human health, environment, water

quality, biodiversity and soils. Most hazardous wastes are industrial and obsolete pesticides. Kenya's Permanent Secretary in the Ministry of Environment and Natural Resources George Krhoda said Kenya had 10,000 tons of obsolete pesticides and that some like DDT had found their way back into the country illegally through Tanzania.

For more information contact Daniel Otunge of ISAAA AfriCenter at d.otunge@cgiar.org.

IITA SCIENTISTS URGED TO APPLY R4D CONCEPT TO FEED AFRICA

Why do people still go to bed hungry in Africa? Why is it that Africa still depends on food importation and food aids to meet local demands? These are just some of the questions scientists at the International Institute of Tropical Agriculture (IITA), collaborators, and partners attempted to offer solutions to at a strategic planning activity held last week. DG Hartmann, IITA Director General, challenged the scientists to articulate the Research-for-Development (R4D) concept in their research design as against Research and Development (R&D). This R4D concept puts farmers at the center of scientific research planning and design.

The weeklong activity enabled IITA scientists and research administrators to brainstorm on the justification for the Institute's involvement in R4D, to determine the benefits and deliverable International Public Goods (IPGs), comparative advantage of IITA's involvement in development issues and partnerships with both public and private sectors of the economy, scaling out and exit strategies.

Readers can access the IITA press release at
http://www.iita.org/cms/details/news_feature_details.aspx?articleid=544&zoneid=342.

*** THE AMERICAS ***

U.S. DEREGULATES GM RICE

After a thorough review of scientific evidence, the United States Department of Agriculture (USDA) has approved to deregulate the herbicide tolerant rice variety LLRICE601. Deregulated items are considered safe for the environment. In the case of LLRICE601, USDA said that it is as safe as traditionally bred counterparts. The U.S. Food and Drug Administration (FDA) had also concluded that the presence of the said rice in the food and feed supply poses no safety concerns.

The biotech rice was engineered for tolerance to LibertyLink brand herbicides. Bayer CropScience reported last July that trace amounts of the variety is present in commercial supply of long-grain rice. The investigation to determine the circumstances surrounding the release of the biotech rice and whether any USDA regulations were violated will soon be completed.

The complete press release is at
http://www.aphis.usda.gov/newsroom/content/2006/11/rice_deregulate.shtml.

USDA's final environmental assessment of LLRICE601 is available at
http://www.aphis.usda.gov/brs/aphisdocs/06_23401p_ea.pdf.

DUPONT ON TRACK FOR COMMERCIALIZATION OF NEW TRAIT IN SOYBEANS

DuPont recently completed its U.S. regulatory submissions for approval of Optimum™ GAT™ trait in soybeans. This keeps the company on track for commercialization of soybean products containing the trait by 2009. The Optimum™ GAT™ trait is a proprietary herbicide-tolerance trait that DuPont plans to commercialize in corn, cotton and other crops, following its 2009 introduction in soybeans. Syngenta has the license to the trait for use in corn and soybeans while Delta & Pine Land holds the license for use in cotton. It will also be cross-licensed through GreenLeaf Genetics, a joint venture between Syngenta Seeds and Pioneer to out-license genetics and seed technology to other U.S. and Canadian seed companies. The Optimum™ GAT™ trait is the first agricultural trait developed through proprietary DuPont gene shuffling technology.

The complete press release is available at
http://pioneer.mediaroom.com/index.php?s=press_releases&item=209.

PEW ANALYSES FEDERAL REGULATORY SYSTEM FOR AGRI BIOTECH

What are the issues relating to the federal regulatory system government agricultural biotechnology in the United States (known as Coordinated Framework)? What is the appropriate role for state agriculture agencies in that system? Answers to these questions were tackled in a workshop conducted by the Pew Initiative on Food and Biotechnology and the National Association of State Departments of Agriculture.

Highlights of workshop insights which are documented in the report “States and the federal government: What the coordinated framework for biotechnology means for working together” include:

* The Coordinated Framework does not contemplate the involvement of state government agencies in the regulatory process. It does recognize however, that some laws regarding the regulation of agricultural biotechnology require interaction between state and federal regulators.
* States do not seek to be co-equal partners with the federal government in the regulation of agricultural biotechnology, however, state agricultural officials often find they must answer to farmers, the media, state legislatures, and the interested public on these issues.
* Some state laws exist regarding biotechnology, requiring state agencies to act regardless of the actions of the federal government.

See the full paper entitled “Opportunities and Challenges: States and the Federal Coordinated Framework Governing Agricultural Biotechnology” at http://pewagbiotech.org/events/0524.

IOWA DEVELOPS SOYBEAN VARIETIES WITH HEALTHY OILS

Iowa State University, with support from the Iowa Soybean Association and the United Soybean Board, has developed improved soybean varieties that will promote the production of healthy oils good for human health.

Three of the varieties will enhance the production of oil with 1% linolenic acid. This oil increases shelf life, and has excellent frying and flavor stability since it eliminates the hydrogenation process that creates trans fats. Another variety contains twice the amount of oleic acid found in conventional soybean oil and only 1% linolenic acid. The combination oil could be used in many food products that require more stability than previous unhydrogenated soybean oils.

Visit http://www.isastate.edu for more research news from Iowa State University.

BRAZILIAN GENE BANK NOW SIXTH IN THE WORLD

One hundred thousand samples of seeds from 500 different plant species are now housed by the genebank of the Brazilian Agricultural Research Corporation (EMBRAPA), which makes this facility the sixth larger in the world. Several indigenous communities, such as the Krahô, Guarani, and Indians from the Xingu region, have benefited from the unit. Members of these groups approached EMBRAPA with seeds of local plant varieties that would no longer germinate.

“The purpose of the genebank is not only to conserve seeds and return them to the population to sustain the use of traditional, local varieties, but also to work with the genetic material to improve its quality”, said José Manuel Cabral, head of the Genetic Resources and Biotechnology Unit of EMBRAPA. “We aim to determine the characteristics, and perform studies to identify useful genes to develop novel crops with desirable characteristics, such as resistance to illnesses and tolerance to cold, adapted to the different regions of Brazil.”

Read more at: http://www.agenciabrasil.gov.br/noticias/2006/11/25/materia.2006-11-25.7108605811/view.

*** ASIA ***

A VITAL STEP TOWARDS CONTROLLING ‘CROWN ROT’

Researchers in CSIRO (the Commonwealth Scientific and Industrial Research Organisation), Australia, have mapped the family tree of *Fusarium pseudograminearum*, the fungus responsible for Crow Rot, a devastating world-wide disease that costs the wheat industry yield loses of around $50 million a year. The research team, lead by Dr Sukumar Chakraborty, collected and analyzed over 55 fungal strains of varying degrees of virulence, so as to identify which genes are essential for the disease, and allow fusarium to be such a problem.

The team identified four important genes, and determined that they all belong to a single family-group consisting of promiscuous inter-breeding members. “This means that virulent strains of fusarium can develop more easily and can share their genes with other strains of fusarium when they spread into new areas,” says Chakraborty.

The information obtained on the genetic diversity of fusarium, coupled with the identification of resistant wheats, will help in the breeding of the most effective fusarium resistant wheat varieties in the future.

Read the full press release at http://www.csiro.au/csiro/content/standard/ps2is.html.

For more information on this research visit http://www.csiro.au/files/files/pb2k.pdf.

NEW STRATEGIES TO IMPROVE ASEAN RICE PRODUCTION

Ministers of Agriculture and Forestry of the ten-nation Association of Southeast Asian Nations (ASEAN) recently endorsed new strategies to boost rice production in Southeast Asia. The new measures, namely, the development of a series of environmental indicators for rice production in the region; the further development of the Rice Knowledge Bank (RKB) for rice farmers; and the development of rice camps to encourage young Asians to consider a career in rice, will be implemented and coordinated by the International Rice Research Institute (IRRI).

"To have ASEAN member countries endorse these very important activities at the ministerial level is obviously a crucial step forward, and we are very grateful for such high-level political support," said Dr. Robert S. Zeigler, IRRI's director general. "With major Asian rice producers such as Thailand, Vietnam, Indonesia, the Philippines, and Myanmar now officially part of these activities, we hope to reach out to other countries in Asia – especially China and India – for their support also."

Read the press release at http://www.irri.org/media/press/press.asp?id=143.

*** EUROPE ***

CULTIVATION OF GM POTATO IN THE EU - A NEAR POSSIBILITY

Genetically modified potato EH92-527-1 could be the first genetically modified plant to be approved for cultivation in the European Union since 1998, if the European Commission (EC) accepts the proposal of the Commissioner for the Environment Stavros Dimas for the cultivation of this biotech crop under certain conditions.

The Swedish company Amyloge HB, now part of BASF Plant Science, developed the potato to produce only amylopectin in its tubers. Pure amylopectin, compared with conventional starch composed of amylose and amylopectin, is more easily applied in certain industrial processes such as paper making. The EC has already requested that commercialization of this GM potato be accompanied by post market monitoring by BASF in order to detect unanticipated adverse environmental effects which may arise.

For the news article, visit http://www.gmo-compass.org/eng/news/messages/200611.docu.html#73.

GREENOVATION BIOTECH OBTAINS 5.4 M EUROS FOR R&D

greenovation[CC2] Biotech GmbH, the German company that developed the "moss bioreactor", an innovative technology for the optimization and production of complex pharmaceutical proteins from moss cells, has recently secured 5.4 million euros for further research and development.

The “moss bioreactor” is a safe and cost-effective platform for the production of therapeutically active biopharmaceuticals with special characteristics for the improved activity of therapeutic proteins such as antibodies. Specific genetic modifications render the sugar structures of the proteins similar to human structures. This technology opens up a broader range of therapeutic applications for the proteins that are obtained from plant cells.

Read more at http://www.bio-pro.de/en/region/freiburg/meldungen/02871/index.html

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RESEARCH

VARIETY OF DIAMONDBACK MOTH FOUND TOLERANT AGAINST TOXIC SELENIUM IN PLANTS

Plants accumulate selenium (Se) as a protection against herbivory, but some plants hyperaccumulate the toxic element to extreme levels, up to 1% of dry weight. However, the function of this phenomenon is still obscure. Scientists from the Colorado State University and the Lawrence Berkeley Laboratory in the United States have discovered a variety of the invasive diamondback moth *(Plutella xylostella*) with resistance to Se. The results are reported in the recent issue of Current Biology.

The researchers found that the Se-tolerant moth accumulates a different Se compound, methylselenocysteine, in contrast to selenocysteine accumulated by sensitive moths. Selenocysteine is toxic because of its nonspecific incorporation into proteins. Although Se hyperaccumulation protects plants from herbivory by some invertebrates, it can give rise to the evolution of unique Se-tolerant herbivores and thus provide a portal for Se into the local ecosystem.

In a broader context, this study provides insight into the possible ecological implications of using Se-enriched crops as a source of anti-carcinogenic selenocompounds and for the bioremediation of Se-polluted environments.

The abstract of the article, “Selenium-Tolerant Diamondback Moth Disarms Hyperaccumulator Plant Defense”, can be viewed at http://www.current-biology.com/content/article/abstract?uid=PIIS0960982206022081.

CULTIVATED POTATO CPDNA SEQUENCED

Korean researchers announced recently that they have determined the complete chloroplast DNA (cpDNA) sequence of the cultivated potato. Their research adds another solanaceous species to the list of plants whose chloroplasts have been completely sequenced, which includes tomato and tobacco.

Chloroplasts are intracellular organelles that have their own genome, with most of the genes encoding for proteins needed for photosynthesis. Hwa-Jee Chung and colleagues wrote in the paper published by the journal Plant Cell Reports that the circular chloroplast of the cultivated

potato has about 155,000 nucleotide pairs. They have also identified 79 proteins and 34RNAs encoded in the genome.

The information will help in diversity studies and will be useful to examine the evolutionary processes in potato landraces. After comparing the sequence to that of a wild potato, the researchers found a single large deletion that discriminates the cultivated potato from the wild species.

The research abstract, with links for subscribers to the complete paper containing the chloroplast gene map, is at http://www.springerlink.com/content/b4466721826551u3.

ANNOUNCEMENTS

GENES ARE GEMS: REPORTING AGRI-BIOTECHNOLOGY

The International Crops Research Institute for the Semi-AridTropics (ICRISAT) and the International Service for the Acquisition of Agri-BiotechApplications (ISAAA) are jointly publishing a sourcebook “Genes are Gems: Reporting Agri-Biotechnology”. The book, to come off the press in early December 2006, synthesizes a series of media workshops in Asia and West Africa carried out by ICRISAT and ISAAA between 2004 and 2006 to familiarize journalists to the science behind agricultural biotechnology.

This sourcebook primarily provides insights to readers on the various biotechnological options in improving crop productivity and promoting sustainable agriculture in the dry tropics. At the same time, it also introduces journalists to the nuances of agri-biotechnology reporting and editing.

For more information, email Rex Navarro of ICRISAT at rex.navarro@cgiar.org.

BIOTECH CONFERENCE IN BANGALORE

The University of Agricultural Sciences, GKVK Bangalore, the Institute for Social and Economic Change, Bangalore and Iowa State University, Ames, USA are jointly organizing an International Conference on "21st Century Challenges to Sustainable Agri-Food Systems, Biotechnology, Environment, Nutrition, Trade and Policy" from 15-17th March 2007 at Bangalore, Karnataka. The conference will bring together education leaders, researchers, and specialists in extension, policy makers, agri business and development practitioners to draw up a strategy and action plan for dealing with the issues of sustainable agriculture.

For detail information, contact: Prof PG Chengappa at chengappapg@gmail.com or visit http://www.sustainagri.org.

INTERNATIONAL CONFERENCE ON BIOTECHNOLOGY ENGINEERING (ICBioE ’07)

The International Islamic University Malaysia will be organizing the International Conference on Biotechnology Engineering (ICBioE ’07), scheduled on May 8-10, 2007 in Kuala Lumpur, Malaysia.

The theme of the conference is Harnessing Nature to Enhance Quality of Life, and topics such as biomolecular engineering, biopharmaceutical engineering, agricultural and natural biotechnology products, food and process engineering, and bioenergy will be covered. Submission of papers for the conference is until December 15, 2006.

For more, contact through icbioe@iiu.edu.my or visit http://www.iiu.edu.my/icbioe/index.php?option=com_content&task=view&id=33&Itemid=44.

CANOLA CONFERENCE

A conference entitled “CANOLA – Growing Great 2015” will bring together various sectors of the canola industry will be held 20-23 March 2007 in Victoria, BC, Canada. The event aims to map out the future for canola as food and fuel and determine a strategic action to profitably grow all segments of the canola industry. The expected participants include canola input suppliers, processors, exporters, researchers, regulators, marketers and retailers.

More information on this event: http://www.canola-council.org/conference/index.htm.

INTERNATIONAL HORTICULTURE SYMPOSIUM

The International Society for Horticultural Science (ISHS) will have its fourth international symposium in San Antonio, Texas, U.S.A. on 3-6 December, 2006. The theme for the 4th ISHS International and the concurrently held 8th National Symposium on Seed, Transplant and Stand Establishment of Horticultural Crops is "Translating seed and seedling physiology into technology". The symposium will focus on vegetable and ornamental species, including competing weeds. Among the topics to be discussed are seed biotechnology and genetics, and plant responses to biotic and abiotic stresses.

More information at http://sest2006symposium.tamu.edu.

AFRICAN SCIENCE COMMUNICATION CONFERENCE

The South African Agency for Science and Technology Advancement (SAASTA) will be hosting an African Science Communication Conference on 4-7 December 2006, in Port Elizabeth, South Africa. The conference will focus specifically on the need to establish Africa as an international role player in the field of Science Communication. In addition, the conference aims to establish collaborative networks on the African continent to facilitate collaboration and share best practices.

More information at http://www.saasta.ac.za/ascc/index.shtml.

DOCUMENT REMINDERS

APPLIED ECONOMICS LITERATURE ON GM IMPACT

The International Food Policy Research Institute has released a review on “Applied economics literature about the impact of genetically engineered crop varieties in developing economies” authored by Melinda Smale and colleagues with an emphasis on methods. The review seeks to define a "best practices" methodology for national researchers who seek to produce relevant information about emerging crop biotechnologies for national policymakers.

Download the paper at http://www.ifpri.org/divs/eptd/dp/eptdp158.asp.

JOURNAL OF VISUALIZED EXPERIMENTS

The Journal of Visualized Experiments (JoVE) is an online journal publishing visualized (video-based) biological research studies. The online resource aims to enable the transparency and reproducibility of biological experiments and also make learning of experimental techniques easier. Submission and viewing of video-articles in JoVE are free.

Access JoVE at http://www.myjove.com.
