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 ****

WB GIVES CGIAR GENEBANKS US$10M GRANT

The World Bank has approved a US$10 million grant to support genebanks in the Consultative Group on International Agricultural Research (CGIAR) system. “Of the many investments needed, none is more fundamental than support for genebanks, which safeguard the crop diversity on which food security depends,” noted Katherine Sierra, Vice President of the World Bank’s Sustainable Development Network and CGIAR Chair.

More than 600,000 plant samples are kept in 11 genebanks which “represent the most important international effort to conserve genetic resources of staple crops, forages and agroforestry species,” said CGIAR Director Francisco Reifschneider.

The Centers will use the new grant to further improve work on collections, increase collaboration, and contribute to the development of a global system for conservation and use of crop genetic resources.

See the CGIAR article at http://www.cgiar.org

SENESCO AND BAYER PARTNER TO DEVELOP BETTER CANOLA

Senesco Technologies, Inc. announced a new business relationship with Bayer CropScience. Senesco has given Bayer exclusive access rights to use proprietary genes that were previously demonstrated to increase the seed yield of canola. Bayer intends to use the technology in its InVigor® hybrid canola varieties.

Senesco is a U.S. biotechnology company that has developed a technology that delays cell breakdown and death. By delaying cell breakdown, plant produce can remain fresh longer after harvesting. The technology also has the potential to increase crop yield and resistance to environmental stress. Senesco also has applications of the technology in animals, including humans.

The complete press release is at
http://www.bayercropscience.com/bayer/cropscience/cscms.nsf/id/20061109_EN?open&ccm=400.

**** Africa****

STATUS OF BT COTTON CONFINED FIELD TRIALS IN KENYA

Bt cotton confined field trials in Kenya have enabled the efficacy on the African bollworm and semi-looper to be established. It was also proven that there is no impact of the Bt cotton on key natural enemies and other arthropods. Dr. Charles Waturu, Center director of the Kenya Agricultural Research Institute-Thika, gave these highlights in his presentation in Nairobi during the Open Forum on Agricultural Biotechnology in Africa. He reported on the field evaluation of

transgenic Bt cotton varieties DP448B and DP404BG for efficacy on African bollworms and its impact on nontarget species.

See his Power Point presentation at http://www.aatf-africa.org/publications/BtcottonKenya.pdf or email Charles Waturu at karithika@africaonline.co.ke.

**** Americas ****

REPORT SHOWS US GROWERS FAVOR GM CROPS IN 2005

In the recent report "Quantification of the Impacts on U.S. Agriculture of Biotechnology-Derived Crops Planted in 2005" released by the National Center for Food and Agriculture Policy (NCFAP), American growers continued to choose biotechnology-derived crops in 2005 due to significant benefits. These include enhanced crop yields, improved insurance against pest problems, reduced pest management costs, decreased pesticide use, and overall increase in grower returns. Planted acreage was mainly concentrated in 13 different applications (herbicide-resistant alfalfa, canola, corn, cotton, and soybean; virus-resistant squash and papaya; three applications of insect-resistant corn, two applications of insect-resistant cotton, and insect-resistant sweet corn).

The report also suggests that biotechnology provides a key solution to the growing demand for both food and fuel and aids in alleviating the stress on land use. With the energy crunch and surge in gas prices that loomed in the United States in recent years, interest in alternative fuels such as ethanol increased tremendously. The stress on oil production will be shouldered by biotechnology-derived corn varieties, which were shown to have higher yield of bioethanol compared with non-transgenic varieties.

For more information, visit the NCFAP website: http://www.ncfap.org/. The PDF version of the executive summary of the report is available at http://www.ncfap.org/whatwedo/pdf/2005biotechExecSummary.pdf. Readers can access the PDF version of the full report at http://www.ncfap.org/whatwedo/pdf/2005biotechimpacts-finalversion.pdf.

RESEARCHERS STUDY SOYBEAN'S FAMILY TREE

Researchers from the U.S. Department of Agriculture – Agricultural Research Service (ARS) and the Iowa State University are interested in unlocking the soybean genome to discover its similarities and differences with its relatives in the legume family. Comparisons of DNA in related plants can help researchers understand how agronomic traits evolved and, in turn, aid plant breeders in creating improved crop varieties. "This information will be especially useful in helping plant breeders target oil and protein quality, disease resistance and other valuable traits", said Steven Cannon, a scientist working in the research project.

Of special interest to the team is uncovering how soybeans express traits that are beneficial to human health and how the plants fix nitrogen, which is used for producing protein and other bio-molecules. The genome sequence also will help determine what genes are helpful in creating resistance to common diseases such as *Phytophthora* (stem rot) and Asian soybean rust.

Aside from soybean, the genomes of two other species in the legume family are already being sequenced. This includes the legumes *Medicago truncatula* (closely related to alfalfa) and *Lotus japonicus*.

For the complete news release, readers can access http://www.ag.iastate.edu/aginfo/news/2006releases/sbtree.html.

PLANT STEROIDS FOR BETTER PLANT DEVELOPMENT

The roles that plant steroids play in plant growth and development are now being uncovered by scientists at the Salk Institute for Biological Studies, in California, and the Howard Hughes Medical Institute, Maryland. Their research, funded by the U.S. Department of Agriculture, could lead to new plant varieties with desirable growth traits. Joanne Chory and colleagues have identified a new protein that stops plant growth when there is an absence of brassinosteroids, a type of plant steroid. These steroids induce a signaling mechanism that flips a proverbial switch causing the plant to grow and develop properly.

The researchers discovered that a receptor on the plasma membrane is activated by binding to brassinosteroid. The activated receptor, in turn, interacts with a co-receptor known as BAK that continues the reception chain in the signaling process. In the absence of brassinosteroids, important enzymes in the process bind with another protein BKI1 instead of BAK; thereby shutting down the receptor and stopping the signal. This stunts growth and produces mutant dwarf plants.

BKI1-like genes are present in many plant species, including economically important crops, such as rice, maize, and soybean. Over- or under-expression of BKI1 in these species will provide a valuable tool to control the strength of brassinosteroid signaling in plant cells and will allow the creation of novel plant varieties with desirable traits.

Read the news release at http://www.csrees.usda.gov/newsroom/research/plant_development.html.

SOYBEAN GENETIC MARKER TECHNOLOGY SPEEDS YIELD ENHANCEMENT

New molecular breeding tools help increase the pace at which farmers can increase the amount of soybeans harvested per acre, according to a review of historical U.S. soybean yield. Researchers at DuPont subsidiary Pioneer Hi-Bred International, Inc. found that yields of Pioneer® brand soybean varieties developed with proprietary genetic markers improved yield three times faster than the U.S. Department of Agriculture (USDA) industry average.

Varieties developed with molecular markers showed average yield increase of 1.4 bushels per acre per year, while Non-Marker-Assisted Selection Pioneer varieties improved yields at a rate of 0.5 bushels per acre per year. On the other hand, USDA soybean yield data show yield increase at 0.4 bushels per acre per year. "The data clearly demonstrates that genetic markers have incredible potential to increase soybean yields at accelerated rates," said John Soper, Pioneer soybean research director. "They are going to go a long way in helping growers produce enough soybeans for new food, fuel and industrial applications."

Molecular markers allow plant breeders to screen many plants for genes that contribute to increased yield potential and stability. Only plants that carry the desired traits are used to develop new products.

Read the press release at http://www.prnewswire.com/mnr/pioneer/26118/.

PLANT-DERIVED MOLECULES POINT TO FUTURE CHEMOPREVENTIVE METHODS

Scientists are now turning to plant-derived compounds known as triterpenoids to fight the big C - cancer. Using genetic studies and natural chemicals, scientists can now explore the genetic and early molecular interactions that can lead to the disease. The latest studies with new and promising chemopreventive agents were presented at the recent American Association for Cancer Research's Frontiers in Cancer Prevention Research meeting.

New synthetic drugs called triterpenoids which owe their origins to plant molecules have demonstrated their effectiveness in slowing the growth of lung cancer tumors, according to a research team from Dartmouth University. Following up on previous work showing strong links between inflammation and the development of cancer, Karen Liby and colleagues found that the triterpenoid CDDO-MA by Reata Pharmaceuticals, currently undergoing trials for leukemia and solid tumors significantly reduced the number and sizes of tumors in mice. In addition, a related drug developed by Ligand Pharmaceuticals called LG100268 was effective at preventing tumor growth.

Triterpenoids and the rexinoid experimental drug LG100268 were also more effective in combination against breast cancer development than either compound administered individually. The work bolsters the potential for these plant-derived compounds as a chemopreventive agent for an increasing range of cancers.

For the complete news release, readers can visit http://www.aacr.org/home/about-us/news.aspx?d=678.

**** Asia and the Pacific ****

ASIAN BIOTECH NEEDS EFFECTIVE INFO CAMPAIGN, PARTNERSHIPS

Speakers at the AsianBio2006 conference held in Manila, Philippines expressed that the Asian region need to have a strong information campaign and more public-private collaboration to help its emerging biotech industry.

In her keynote speech, Estrella Alabastro of the Philippine Department of Science and Technology said that “pro-active and relentless initiatives in disseminating accurate and science-based information on biotechnology” will help speed up the progress in the Asian region. She added that public-private collaborations are beneficial, because such partnerships can consolidate resources as well as help the transfer of technical know-how between the participating institutions.

The conference brought together representatives of different stakeholders from Asian countries to discuss issues pertaining to intellectual property rights, bioethics, and applications of biotechnology in medicine and agriculture. Specifically reviewed during the conference was the

progress in the development of edible vaccines, and of genetically modified corn, rice, eggplant, and papaya in the region.

More info at http://www.bcp.org.ph/asianbio2006.

NEW PLANT VARIETIES, A BOOST FOR MALAYSIAN AGRICULTURE

Tan Sri Datuk Hj. Muhyiddin Hj. Mohd. Yassin, Malaysia's Minister of Agriculture and Agro-based Industry, said that Malaysia sees the introduction of new plant varieties as an important component in commercial agriculture. As breeding of new varieties of plants requires substantial investment in terms of time, skills, labor, material resources and capital, it is important to provide exclusive rights to plant breeders to enable them to recover the investment and reap the benefits of their innovation.

Malaysia, being a signatory of the Trade Related Aspects of Intellectual Property Rights Agreement, is obliged to provide intellectual property rights protection for new varieties of plants either by patents or by an effective *sui generis* or a combination of both. Malaysia has enacted the Protection of New Plant Varieties Act 2004 which will be enforced next year. Under this Act, the rights of plant breeders will be protected and it will play an important role in the transformation of Malaysian agriculture. It will also encourage investment in the development of the breeding of new plant varieties in both the public and private sectors.

For more updates from Malaysia email Mahaletchumy Arujanan of the Malaysian Biotechnology Information Centre (MABIC) at maha@bic.org or visit their website at http://www.bic.org.my.

INDIA'S PRESIDENT CALLS FOR BIOTECH INITIATIVES

There is a need to deploy traditional and modern biotechnological tools in agriculture to ensure that crops have good yields, even under constraints of water and land. This was stressed by Dr. Avul Pakir Jainulabdeen (APJ) Abdul Kalam, President of India, during the inauguration of the Global Forum on Agricultural Research (GFAR) Triennial Conference 2006 in New Delhi.

The President suggested that India should intensify research not only in precision farming and post-harvest technology, but also in developing transgenic crops such as the golden rice. In addition to developing crops with enhanced quality traits, he cited that the technology can help increase crop productivity and tolerance to biotic and abiotic stresses. This was demonstrated possible by researchers at India's Kamaraj University when they developed many transgenic rice lines that overcome rice blast and sheath blight diseases.

The full speech of the President is at http://www.presidentofindia.nic.in/presentation/splangnewPDF%20Format877.pdf.

GFAR PROPOSES PARTNERSHIP ON AFRIC KNOWLEDGE SHARING

During the Global Forum on Agricultural Research (GFAR) Triennial Conference 2006 on "Reorienting Agricultural Research to meet the Millennium Development Goals" in New Delhi, major international groups led by GFAR, Food and Agriculture Organization, and the Consultative

Group on International Agricultural Research, called for a new international partnership to support information and knowledge system in agricultural science and technology. The ultimate goal is to ensure that stakeholders benefiting from science and technology are well informed so that they make better decisions and can develop policies based on scientific evidences. This initiative will focus on building capacities at the national level to establish information networks and systems, working towards a global web-based network.

For more details visit: http://www.icar.org.in/pr/gfar091106.pdf or www.fao.org/newpartnership or email Bhagirath Choudhary of ISAAA South Asia Office at b.choudhary@isaaa.org.

IIMA STUDY ECONOMICS OF BT COTTON IN INDIA

A preliminary investigation on 'The Adoption and Economics of Bt Cotton in India" has shown considerable economic gains to Bt cotton farmers in Gujarat, Maharashtra, Andhra Pradesh and Tamil Nadu in India. The study was carried by the Indian Institute of Management, Ahmedabad (IIMA) and was supported by the Ministry of Agriculture, Government of India.

Results indicate that the yields of Bt cotton are higher and increases significantly in all the States under both irrigated and rain-fed conditions. The average increase in yield of Bt cotton over non-Bt cotton was 30.71% while reduction in the number of sprays was 38.67% or more in all states. The average national increase to farmers in profit per hectare was $250. The increase in profit was $307 for Gujarat, $185 for Maharastra, $298 for Andhra Pradesh and $210 for Tamil Nadu. The profit is found to be higher in all the states to the estimated extent of about 80-90 percent when the effects of associated inputs such as cost are included.

For further information, email Bhagirath Choudhary of ISAAA South Asia Office at b.choudhary@isaaa.org.

CHINA SETS REQUIREMENTS FOR RENEWAL OF GMO SAFETY CERTIFICATES

China's Ministry of Agriculture has released Announcement No. 736 detailing the simplified requirements to renew safety requirements for genetically modified (GM) crops that are domestically grown or imported for processing purposes. No additional tests are required for renewal of certificates.

A translation of the Announcement by the U.S. Department of Agriculture notes that the scope of application applies to GMOs having obtained a safety certificate and requiring continued use in areas specified in the certificate after its expiration. Renewal may be done with the Ministry one year before expiration. After this application is received by the Ministry, the application will be reviewed by the National Biosafety Committee.

See http://www.fas.usda.gov/gainfiles/200611/146249461.pdf for additional information.

VIETNAM PROVIDES GRANT FOR BIOTECH DEVELOPMENT

Vietnam's Prime Minister Nguyen Tan Dzung has approved a grant of over 11 billion VND (US$ 700,000) to the Ministry of Agriculture and Rural Development to implement projects on biotechnology development in agriculture. He instructed the Finance Ministry to provide the

funding that will provide international training opportunities for public officials to enable them to implement the national program on biotechnology development and applications in agriculture and rural development. Additional funds were also earmarked to purchase equipment.

Email Hien Le of Biotech Vietnam at hientttm@yahoo.com for more news on biotechnology initiatives in the country.

**** Europe ****

BIOTECH ASSOCIATIONS MEET WITH EU DECISION MAKERS

National associations of EuropaBio, Europe's association of bioindustries, and company senior executives met with over 50 national representatives from the European Parliament, European Commission and the Council during Brussels Day to discuss biotechnology issues. Delegates who attended the meeting in Brussels came from Spain, United Kingdom, France, Germany, Sweden, Hungary, Ireland, Finland, Belgium, and Norway.

Aisling Burnand, chief executive officer of the UK Bio Industry Association, said that the meeting enabled the national associations to bring across key messages to EU decision makers and to "strengthen those national voices rather than diminish them".

Among the issues discussed were proposals for a new state aid program and how it could benefit research, development and innovation. Plans were presented for EuropaBio's Young Innovative Companies status into the new rules which provides major tax incentives to companies and allow them to spend up to a 15% or more of their revenues on research and development. Other programs discussed were the European Life Science Circle, a strategy to turn the EU life science sector into a "bio-zone", and the European Life Science and Biotechnology Strategy and the Mid Term Review. The Commission will adopt a communication in 2007 which will present recommendations to develop the biotech sector to the Council of Ministers.

Read the meeting highlights at http://www.europabio.org/articles/brussels%20day%202006-article_FINAL.doc.

RESEARCH

MODEL PLANT TO UNDERSTAND DISEASE RESISTANCE IN LEGUMES

Model organisms have become popular in biological research because they are generally easier to work with. In addition, the results from studying these organisms can often be extrapolated to more complex systems. In legumes, the annual forage crop *Medicago truncatula* turned out to be an ideal species to study host-pathogen interaction, says B. Tivoli and colleagues in their review published by the journal Annals of Botany.

Medicago truncatula is useful in legume biology studies due to its small diploid genome, rapid generation time, and self-fertility. Like *Arabidopsis*, it can also be easily transformed. *M. truncatula* is a host of foliar and soil-borne fungal pathogens of other *Medicago* species. The genetic control of resistance to two major necrotrophic pathogens has already been identified in *M. truncatula*.

Tivoli and colleagues believe that this will soon lead to gene isolation followed by comparative analysis of resistance expression and genetic control mechanisms in other grain and forage legumes.

The review paper is available at http://aob.oxfordjournals.org/cgi/content/full/98/6/1117.

ARTIFICIAL microRNAs: NEW DEFENSE AGAINST PLANT VIRUSES

Plants possess several innate mechanisms to resist viruses, one of which entails the production of dominant resistance gene products that can trigger acquired resistance. However, transgenic technology offers the possibility to genetically modify plants with genes encoding virus tolerance or resistance. Recently, short single-stranded RNAs known as microRNAs (miRNAs) have received considerable attention because of their role in plant developmental processes. In the October issue of *Nature Biotechnology*, scientists from Mexico and Taiwan report of using plant microRNAs to confer virus resistance in transgenic *Arabidopsis thaliana*.

Researchers modified a precursor of the microRNA miR159 in *Arabidopsis thaliana* to express artificial miRNAs (amiRNAs) targeting viral mRNA sequences encoding two gene silencing suppressors of turnip yellow mosaic virus (TYMV) and turnip mosaic virus (TuMV). Transgenic plants expressing the amiRNAs for these viruses are specifically resistant to TYMV and TuMV. The research group found that the virus resistance trait was displayed at the cell level and was heritable.
Readers can access the abstract of the article “Expression of artificial microRNAs in transgenic *Arabidopsis thaliana* confers virus resistance” at http://www.nature.com/nbt/journal/v24/n11/abs/nbt1255.html. The full article is available at http://www.nature.com/nbt/journal/v24/n11/full/nbt1255.html.

FIRST GENETIC MAP OF TARO PUBLISHED

The first quantitative trait loci (QTL) map on taro root crop (*Colocasia esculenta*) was constructed using two types of molecular markers. J. Quero-García and collaborators from three other countries used simple sequence repeats (SSRs) and amplified fragment length polymorphism (AFLPs) to get genetic maps from taro populations in Vanuatu.

The map was derived from first generation offprings that they have obtained by crossing two sets of local taro cultivars. The researchers wrote in their paper that they were able to successfully identify QTLs that are responsible for yield, corm dimensions, and yellow flesh color. They recommend that additional SSR and AFLP markers be used to produce a saturated and robust map of taro.

The abstract of the paper can be accessed at http://www.springerlink.com/content/7250141745x2480j/.

DOCUMENT REMINDERS

CIMMYT'S ONLINE MAIZE DOCTOR

The International Maize and Wheat Improvement Center (CIMMYT) is offering a test version of an online diagnosis tool for identifying maize production problems. The website, called "Maize Doctor", contains a collection of information about cultural management practices on maize, as well as taxonomic keys for helping identify its pests and diseases.

Try using Maize Doctor at http://www.cimmyt.org/english/wps/maizedoctor/index.htm.

GATEWAY TO RESOURCES IN 'OMICS' SCIENCES

The Nature Publishing Group (NPG) launched a website where researchers can access publications relevant to the large-scale, data-rich biology, commonly known as the omics sciences. Examples of such sciences are metabolomics, proteomics, and transcriptomics. The one-stop web portal called "Omics Gateway" contains papers and web documents that are categorized by organism and by subject area. NPG's gateway is solely sponsored by Applied Biosystems, a company that provides products for a vast array of life science applications worldwide.

The gateway can be accessed at http://www.nature.com/omics/index.html.

INFORMATION PORTAL ON BIOSAFETY OF GM PLANTS

Http://www.gmo-safety.eu is the URL of an information portal on biosafety of genetically modified plants commissioned by the German Federal Ministry of Education and Research. The site focuses on maize, oilseed rape, potatoes and cereals. A comprehensive database provides information about current and completed research projects, their aims and results. The research information is supplemented by background reports, interviews and insights into the day-to-day work of researchers. The site also presents major international studies on the environmental safety of GM plants.

PUBLICATION RE UNDERUTILIZED PLANT SPECIES

The International Center for Underutilized Crops (ICUC) has released the publication of the "Strategic Framework for Underutilized Plant Species Research and Development". It reviews current activities, provides examples of success and emphasizes the need to improve resource mobilization in support of underutilized plant species research and development, including urgent work to collect baseline information and formulate meaningful indicators to guide future action. The printed copy is available by mid-November.

For more information, visit http://www.egfar.org/knowledge/spotlights/spotlight-48.shtml.

ANNOUNCEMENTS

FARMERS TO SHARE AGRIC EXPERIENCES IN MANILA

Farmers from Southeast Asia (Indonesia, Malaysia, Philippines, Thailand, and Vietnam) will be joined by colleagues from India and the United States in a workshop on "Farmer Biotech Outreach: Strengthening the Competitiveness of Small Farmers" from December 4-7, 2006 in Manila, Philippines. Sponsored under the auspices of the Asia-Pacific Economic Cooperation and implemented by the (APEC), International Service for the Acquisition of Agri-biotech Applications (ISAAA), and the Biotechnology Information Center of the SEAMEO Regional Center for Graduate Study and Research in Agriculture (SEARCA), the workshop will allow farmers and farmers leaders to engage in a dialogue on how agricultural biotechnology application and market access can enhance greater returns.

Email Randy Hautea of ISAAA at r.hautea@isaaa.org or Sonny Tababa of SEARCA at spt@agric.searca.org for additional workshop details.

6th INTERNATIONAL CONGRESS ON PLANT BIOTECHNOLOGY AND AGRICULTURE BIOVEG2007

The 6th International Congress on Plant Biotechnology and Agriculture BIOVEG2007 will be held on May 7-12, 2007 in Ciego de Avila, Cuba. Topics to be discussed include biotechnology-assisted plant propagation, biotechnology-assisted plant genetic improvement and conservation of germplasm, and metabolic engineering and plant natural products. Registration and submission of manuscripts starts on Nov.1, 2006 and ends on Feb. 28, 2007.

For more information, visit: http://bioveg.bioplantas.cu.

INTERACTIVE DIALOGUE ON TRANSGENIC PRODUCTS IN INDONESIA

The Faculty of Biology of the National University in Indonesia will hold an interactive dialogue entitled "Is Transgenic Product Safe?" on 22 November 2006 at Ambhara Hotel, Kebayoran Baru, Jakarta Selatan. Speakers include Dr. Endang Sukara (Indonesian Institute of Sciences), Ir. Thomas Darmawan (General Chief of Indonesian Alliance of Food and Beverages Entrepreneurs), Dr. Husniah Rubiana Thamrin (Director of National Agency of Drug and Food Control) and Ir. Husna G. Zahir (Chief of Indonesian Consumers Organization).

Email inquiries regarding the dialogue to product_transgenik@yahoo.com.

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: SUBSCRIBE Crop Biotech Network

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