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)

June 16, 2006

In This Week's Issue:

NEWS

Global
- Ministers Approve Declaration to Implement Plant Treaty
- Developing Countries Face Less Research Investments

Africa
- Kenya Releases New Improved Bean Varieties
- USAID to Strengthen Plant Inspection Services in Africa
- Nigeria Looks to Biotech to Aid Food Security

The Americas
- Cuba Registers First Monoclonal Antibody Made in Biotech Plants
- Brazil, Biotech Needed for Coping with Drought
- Vegetable Variety Protection Discussed in Mexico

Asia
- ICRISAT Introduces New Groundnut Variety
- Fact Sheet on Approved Bt Cotton Hybrids in India
- Molecular Farming Discussed in Malaysia

RESEARCH
- Biotech Crops That Produce Non-GM Pollen
- Plant Antibodies Show Anti-Cancer Activity in Research
- Earthworms Not Affected by Bt Corn, Research Finds

ANNOUNCEMENTS

DOCUMENT REMINDERS

FROM THE BICS

NEWS

Global

MINISTERS APPROVE DECLARATION TO IMPLEMENT PLANT TREATY

Ministers of Agriculture approved a Ministerial Declaration for countries who ratified the International Treaty on Plant Genetic Resources for Food and Agriculture to fully implement it at the national level. Representatives from 70 countries attending the Madrid meeting of the first Board meeting of the Treaty also pledged to enhance national capacities for the conservation and sustainable use of plant genetic resources.

Food and Agriculture Organization Director-General Jacques Diouf called on countries to have the political will to guarantee the Treaty's implementation. He described the international accord as "a fundamental tool in humanity's efforts to do away with hunger and malnutrition."

Diouf enumerated the following initial effects of the Treaty:

- Increased international sharing of plant genetic resources;
- Enabled developing countries to conserve and make better use of their own plant genetic resources as well as those they obtain internationally;
- Raised awareness of farmers' rights and the central role they play in the conservation and use of genetic resources.

Read more on the meeting at
http://www.fao.org/newsroom/en/news/2006/1000330/index.html

DEVELOPING COUNTRIES FACE LESS RESEARCH INVESTMENTS

The shift in balance in global agricultural research investments will have long term consequences especially for the poor. Changes in the supply and demand for agricultural technologies in many of the world's richest countries will result in a scenario where they will be unable to provide quantities of productivity-enhancing technologies suitable for adaptation and adoption in poor countries. This trend was discussed in "Shifting ground: Agricultural research and development worldwide" by Philip Pardey and colleagues.

The issue brief released by the International Food Policy Research Institute (IFPRI) noted that this trend is aggravated by reduced support by developed countries for the international agricultural research system particularly for

technologies for staple food crops. As a consequence, developing countries will have to become more self-reliant in developing applicable agricultural technologies.

A scientific and productivity gap might occur, the authors note, requiring a rethinking of some national and multinational policies. Governments can consider enhancing intellectual property rights and putting in place appropriate local policies; increasing government funding for national agricultural research systems; and introducing incentives to encourage private sector funding.

View the full report at http://www.ifpri.org/pubs/ib/ib46.pdf

Africa

KENYA RELEASES NEW IMPROVED BEAN VARIETIES

Three new climbing bean varieties and two bush bean varieties have been approved for pre-release by the Kenyan bean national variety release technical committee. Kenya is the leading bean producer in Africa, however yields are typically low, and demand for beans in the country exceeds local production levels. This is the first time that climbing bean varieties, which have yields three times higher than those of bush bean lines, are released in Kenya.

The new varieties were developed by the Kenyan Agriculture Research Institute (KARI) Kakamega Research Center, the University of Nairobi, Kenya Seed Company, and by Western Seed Company. The lines developed by the public institutions were obtained or derived from the germplasm collection of the International Centre for Tropical Agriculture (CIAT), and were distributed through the collaborative regional bean breeding program based at the University of Nairobi.

Kenya last released improved bean varieties in 1997. Read more at: http://www.africancrops.net/news/may06/bean-varieties.htm

USAID TO STRENGTHEN PLANT INSPECTION SERVICES IN AFRICA

The U.S. Agency for International Development (USAID) will provide funds to strengthen plant health inspection services required for African countries to trade fruits and vegetables in the global market. This was announced during the Fifth Annual African Growth and Opportunity Act Forum in Washington, DC. African countries will then be able to export horticultural products that meet international standards.

The plant inspection program is part of the $200 million African Global Competitiveness Initiative (AGCI) that aims to improve among others, the policy, regulatory and enforcement environment for private-sector led trade and investment. In addition to conducting assessments for fruits and vegetables, the Initiative also provides assistance to improve agricultural productivity, as well as safeguard plant health and the environment.

For more information on the AGCI, visit: http://www.usaid.gov/locations/sub-saharan_africa/initiatives/agci.html or read USAID's news release at http://www.usaid.gov/press/releases/2006/pr060612.html

NIGERIA LOOKS TO BIOTECH TO AID FOOD SECURITY

A series of biotechnology awareness workshops for policy makers in Nigeria is being spearheaded by the Nigeria Agriculture Biotechnology Project (NABP) to help address issues related to hunger, poverty and diseases. Noting that "Biotechnology is our time", Babatunde Solomon, Director General of the Nigerian Biotechnology Development Agency, told policy makers of the North Central States in Nigeria during a workshop in Lafia, Nasarawa State, that the country should not miss the opportunities that biotechnology can offer.

Solomon added that effective application of biotechnology has led to the emergence of small and medium, highly scientific and technologically advanced firms with a variety of linkages to public research sector, and large scale enterprises.

The NABP is being promoted by the National Biotechnology Development Agency (NABDA) representing the Federal Government of Nigeria. It is being implemented by the International Institute of Tropical Agriculture (IITA).

For more information about the Nigerian workshops, email Taye Babaleye of IITA at t.babaleye@cgiar.org.

The Americas

CUBA REGISTERS FIRST MONOCLONAL ANTIBODY MADE IN BIOTECH PLANTS

The Center for genetic Engineering and Biotechnoloy (CIGB) of Cuba has registered the first monoclonal antibody produced in transgenic plants. The antibody has been approved by the Center for the State Center for the Control of the Quality of Pharmaceuticals (CECMED), the regulating authority of the

Ministry of Public Health of Cuba, and it has also obtained approval by the National Center for Biosafety, under the Ministry for Science, Technology and the Environment.

The antibody will be used to purify the active ingredient used in the Cuban vaccine against hepatitis B, commercialized as Heberbiovac-HB, said Carlos Borroto, deputy director of CIGB. Borroto explained that, in comparison with the traditional vaccine produced mice, the vaccine obtained from biotech tobacco plants offers greater levels of security. In addition, Borrot indicated that the CIGB has taken adequate measures to avoid possible environmental risks during the cultivation of the transgenic crop, by growing the plants in confined conditions.

Read more at: http://www.cigb.edu.cu/pages/noticias.htm

BRAZIL, BIOTECH NEEDED FOR COPING WITH DROUGHT

A partnership between Brazilian and Japanese public research institutions could address some of the severe crops losses caused by drought in Brazil, said Alexander Nepomuceno, researcher of the Brazilian Agricultural Research Corporation (EMBRAPA). During the 2004/2005 growing season the Brazilian State Rio Grande Do Sul had a loss of 70% in the production of soybeans due to water scarcity, while crop losses in Paraná State amounted to 22%.

In an interview to the Brazilian National Radio, Nepomuceno explained that three-year collaborative research project between the two nations on a gene from thale cress called DREB (for Dehydration Responsive Element Binding Protein). Expression of DREB induces the activity of additional genes needed to protect the plant when water is scarce. This technology could be used to increase the tolerance of crops to drought thereby minimizing losses. Brazil, according to Nepomuceno, is the only great producer of grains that lacks legislation favorable to biotechnology, citing the United States, Argentina, Australia, Canada, and China as examples of nations active in developing and commercializing biotech crops. “It is complicated for a country such as ours, with the potential that Brazil has for agriculture, for producers not to have this option” affirmed Nepomuceno, and added that most of these technologies are intended for benefit of small scale farmers.

EMBRAPA is hoping to carry out the first field trials of drought resistant varieties in 2007, as soon as it receives approval by the Brazilian National Technical Commission for Biosafety (CTNBio).

Read more at: http://www.radiobras.gov.br/

VEGETABLE VARIETY PROTECTION DISCUSSED IN MEXICO

Scientists and specialists from 15 countries met this week in Mexico to discuss the protection of new vegetable varieties, with the aim of advancing agricultural research and development and promoting the transfer of technology for the benefit of rural communities. Francisco Mayorga Castañeda, Minister for Agriculture of Mexico, said during the opening ceremony of the Session for the Technical Working Party for Vegetables of the International Union for the Protection of New Varieties of Plants (UPOV) that agricultural development is based on scientific research and knowledge. Effective protection systems for new crop varieties are therefore essential as an incentive for innovation and for promoting the transfer of technology.

“The advance of science and technology, without a social advance, is losing our way” said Mexican Governor Juan Carlos Romero. It is very important we take advantage of the possibilities science offers today to ensure food security and to raise the quality of life of rural society, added Romero.

UPOV is an intergovernmental organization aimed at promoting an effective system of plant variety with the aim of encouraging the development of new varieties of plants for the benefit of society.

Read more at: http://www.sagarpa.gob.mx/cgcs/ and http://www.upov.int/

Asia

ICRISAT INTRODUCES NEW GROUNDNUT VARIETY

The Chief Minister of Andhra Pradesh, India, Dr Y S Rajasekhara Reddy, presented the groundnut variety ICGV 91114 to the farmers of the country’s Anantapur district at a recently concluded function at the Patancheru campus of the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT). The new variety, developed by ICRISAT, will improve the income of the farmers of the district, while protecting them from drought risk.

The new groundnut variety produces yields of about 10% more than current popular variety TMV2. Farmers of Anantapur prefer to cultivate groundnut, as it can grow on the area’s rough terrain, and can survive with little rainfall.

For more information, contact Dr Shyam N. Nigam at s.nigam@cgiar.org, or visit the institute at http://www.icrisat.org.

ISAAA FACT SHEET ON APPROVED BT COTTON HYBRIDS IN INDIA

ISAAA South Asia Center has released the latest Fact Sheet on Approved Bt Cotton Hybrids in India. The document includes all recent approvals of Bt cotton in India, with dates of approval, origin, and geographical distribution of new approved varieties. The Fact Sheet is the most comprehensive information resource available on the topic. It includes a geographical map of India that graphically shows the distribution of approved Bt cotton hybrids. View the fact sheet at http://www.isaaa.org/kc/CBTNews/files/India_Btcotton_23006.pdf.

For more information, contact Bhagirath Choudhary of the ISAAA South Asia Office at b.choudhary@isaaa.org.

MOLECULAR FARMING DISCUSSED IN MALAYSIA

As Malaysia moves on to strengthen its agricultural biotechnology sector, various areas have been identified as potential generator of wealth. One of the areas of interest is using plants as factories or bioreactors to produce high value proteins and pharmaceuticals. Though, this discipline is still at an infancy stage, a group of scientists at the Centre for Research in Biotechnology for Agriculture (CEBAR) in University of Malaya is actively involved in spearheading research in this field. This week, an International Symposium on Molecular Farming in Plants: Prospects for Asia was organized by CEBAR in collaboration with Malaysian Biotechnology Information Centre (MABIC) and International Islamic University Malaysia (IIUM).

The conference is a proactive move on the part of the co-organisers in stimulating real time discussion and knowledge sharing on what could potentially be a huge growth area for biotechnology in Asia. Advantages that have been put forward for plant bio-factories include lower capital and operating costs, economic scale-ups, easy storage, production of protein products fold and assemble correctly, just like their counterparts in mammalian cell culture and the fact that plants do not host human or animal pathogens.

The symposium featured leading scientists in this field from various countries as keynote speakers. Prof. Ed Rybicki from University Cape Town, South Africa; Prof. James Dale from Queensland University of Technology, Australia; Prof. Z Nicolav from Texas A&M University, USA; Mr. Francois Arcand from Spain, Dr. Dwayne Kirk from Monash University, Australia; Prof. Rainer Fischer from Fraunhofer Institute, Germany were among some of the speakers.

The symposium was officiated by the Deputy Minister of Science, Technology and Innovation who mentioned that the Malaysian Government places great emphasis on agriculture as a major thrust in biotechnology. Under the 9th

Malaysia Plan, the Government has allocated a budget of RM 11.4 billion to transform the agricultural industry into a modern, dynamic and competitive force.

Email Mahaletchumy Arujanan of the Malaysia Biotechnology Information Center at maha@bic.org.my for additional details about the conference.

RESEARCH

BIOTECH CROPS THAT PRODUCE NON-GM POLLEN

The lateral gene transfer or "escape" of transgenes into the environment is a major biosafety concern. Pollen from biotech crops could fertilize conventional varieties or wild species, thereby releasing the transgene with potential adverse effects on biodiversity.

The use of Genetic Use Restriction Technologies (GURTs), which can be used both to develop sterile plants and to regulate the expression of the transgene by the application of chemicals or by a specific set of environmental conditions, have been proposed as a tool to prevent lateral gene transfer. These technologies have however met with considerable opposition.

The possibility of producing essential vaccines and medicines in biotech plants makes the need to prevent lateral gene transfer essential, especially when food crops are used for biopharming. Biopharming can potentially benefit developing countries most, where the lack of infrastructure, road access and refrigeration are often major constrains to delivering required pharmaceuticals to where there are most needed. Edible medicines would be cheaper to produce, purer, easier to transport, and would require no refrigeration.

Can we develop biotech crops that produce GM-free pollen and are also fertile? A team of researchers, lead by Jan-Peter Nap of the Wageningen University in the Netherlands, show us we can. The group generated transgenic tobacco plants that carry, in addition to the transgene of interest, a second gene that will excise the first transgene. The team ensured the second gene is only active during reproduction by using a pollen specific promoter. Transgene removal becomes therefore an integral part of the biology of pollen maturation, and does not require any external stimulus or chemical application. Highly efficient excision of transgenes from tobacco pollen was achieved with a potential failure rate of at most two out of 16 800 seeds (0.024%).

To read the abstract of the article "Directed microspore-specific recombination of transgenic alleles to prevent pollen-mediated transmission of transgenes",

published in the Plant Biotechnology Journal, visit: http://www.blackwell-synergy.com/doi/abs/10.1111/j.1467-7652.2006.00194.x

PLANT ANTIBODIES SHOW ANTI-CANCER ACTIVITY IN RESEARCH

A number of therapeutic antibodies can actually help kill cancer cells. They do this by binding to antigens expressed on the surface of cancer cells, which triggers a cell death process which leads to the eradication of abnormal cell types. For instance, one monoclonal antibody called BR55-2 recognizes the Lewis Y antigen (LeY), an antigen over-expressed on breast, lung, ovary, and colon cancers. Demand for such antibodies is growing quickly, but production methods can manufacture only limited quantities, and at high cost. As a result, scientists are exploring plants as possible antibody factories.

Robert Brodzik and colleagues of Thomas Jefferson University, Philadelphia and University Medical Center Utrecht, The Netherlands report that “Plant-derived anti-Lewis Y mAb exhibits biological activities for efficient immunotherapy against human cancer cells.” Their article, which appears in a recent edition of the Proceedings of the National Academy of Sciences, describes the production of BR55-2 in transgenic low-alkaloid tobacco plants.

The subunits of BR55-2 were expressed separately, and subsequently assembled in plant cells of tobacco plants. Researchers grew the plants, isolated the transgenic BR55-2, and assayed its activity. They found that: 1) antibody expression was high in the transgenic plants; 2) like mammalian-derived antibodies, plant antibodies bound specifically to both breast cancer and colorectal cancer cells, and also initiated cancer cell death; and 3) plant-derived BR55-2 inhibited tumor growth in immuno-suppressed mice. Together, these findings show that plant-derived antibodies have potential for efficient immunotherapy.

Read the complete article at
http://www.pnas.org/cgi/doi/10.1073/pnas.0603043103

EARTHWORMS NOT AFFECTED BY BT CORN, RESEARCH FINDS

Bt-corn is genetically engineered to express toxins that will protect corn against lepidopteran pests. Because Bt corn is widely planted, it is important to evaluate the potential risks of the Bt protein to non-target organisms, such as earthworms. Earthworms are important to the aeration and nutritional content of soils; they are also important to corn grown in reduced tillage practices, since earthworms can maintain and improve soil physical conditions.

Only a few studies have dealt with the effects of Bt protein on earthworms, and Maria Laura Vercesi and colleagues of National Environmental Research Institute, Denmark add their own research to the tally as they ask: “Can *Bacillus thuringiensis* (Bt) corn residues and Bt-corn plants affect life-history traits in the earthworm *Aporrectodea caliginosa*?” In a recent issue of Applied Soil Ecology, the authors report the effects of Bt-corn on survival, reproduction, and growth of the most widespread earthworm species in temperate agricultural soils.

Researchers tested the effects of finely ground Bt corn cultivar MEB307 leaves in soil on *A. caliginosa*, including concentrations that would be considered “worst case scenario.” They also tested the effects of Bt protein on earthworms by raising juveniles in soils in potted corn plants. After statistical analysis of their results, researchers recorded the following: 1) no earthworm adults died in the reproduction experiments with finely ground corn leaves; 2) there were no significant differences in juvenile growth curves between Bt and non-Bt exposed earthworms, but earthworm growth was drastically reduced in non-Bt plants treated with benomyl, a fungicide toxic to earthworms; and 3) there was slightly reduced cocoon hatchability of earthworms exposed to Bt corn.

Despite the decreased hatchability, scientists concluded that Bt corn residues had no detrimental effects on growth or development in *A. caliginosa*. This was because scientists added fresh Bt-corn material to the soil every 28 days; Bt-protein in corn leaves is degraded with a half-life of about 20-40 days.

Subscribers to Applied Soil Ecology can read the complete article at http://dx.doi.org/10.1016/j.apsoil.2005.07.002

ANNOUNCEMENT

UNESCO-L’OREAL LIFE SCIENCES FELLOWSHIPS FOR WOMEN

The 2007 cycle for the UNESCO-L’OREAL Fellowships program, targeting young women pursuing vocations in the life sciences is now underway. Ninety young scientists from all continents have already received these fellowships, which aim to stimulate life sciences research and promote active participation in research projects by young women students (up to age 35) in fields including biology, biochemistry, biotechnology and physiology. The value of the fellowships is US$ 40,000, and their duration is two years. Deadline for submission of applications is 15 September 2006.

For more information, and for details on how to apply, visit:
http://portal.unesco.org/en/ev.php-URL_ID=33268&URL_DO=DO_TOPIC&URL_SECTION=201.html

---

DOCUMENT REMINDERS

OECD RELEASES BIOTECH STATISTICS

The Organization for Economic Cooperation and Development (OECD) has published the 2006 edition of the OECD Biotechnology Statistics. It includes data from 23 OECD countries and two observer countries. This edition has improved comparability of biotechnology indicators among countries based on the Framework for Biotechnology Statistics developed by OECD and national experts. For further information visit the website http://www.oecd.org or contact brigitte.vanbeuzekom@oecd.org

---

FROM THE BICs

MEDIA WORKSHOP IN INDONESIA

"Move on Biotechnology Workshop for Media: An Effort to Build Positive Perception for Biotechnology Application in Indonesia" was held in Bogor, Indonesia on June 14-15, 2006. The workshop was conducted by the Indonesian Biotechnology Information Centre (IndoBIC) and the Agricultural Biotechnology Support Project II (ABSP II). Thirty-four participants from 30 media companies were updated on biotechnology issues and given a briefing on local research and development initiatives, particularly in ICABIOGARD and Biotechnology Research Institute (LIPI - Cibinong).

Email IndoBic director, Bambang Purwantara at b.purwantara@biotrop.org for details about the workshop. A press release in Bahasa Indonesia on the workshop can be read at http://www.indobic.or.id/berita_detail.php?id_berita=1599

Click here to view picture.

BANGALOREBIO 2006

Over 2000 students, farmers, government officials and industry representatives visited the International Service for the Acquisition of Agri-biotech Applications (ISAAA) stall at BangaloreBio 2006, an annual event to showcase biotechnology initiatives. Organized by the Government of Karnataka in Bangalore, India, the event provided an opportunity for ISAAA South Asia to orient different stakeholders on communication outreach activities related to crop biotechnology. A quiz competition on crop biotech conducted during the said event revealed moderate understanding of biotechnology and genetically modified crops.

Fore more information, please contact: b.choudhary@isaaa.org.

Click here to view pictures.

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

To stop receiving this newsletter, please send an e-mail message to knowledge.center@isaaa.org and write, "unsubscribe newsletter" in the subject box.

Please visit CropBiotech Net web pages (http://www.isaaa.org/kc) to view previous issues of this newsletter and see other available resources for download.

While we are still developing this site, feel free to e-mail (knowledge.center@isaaa.org) us for your views and comments on any crop biotechnology product and related issues.

Copyright (c) 2006. CropBiotech Net.