

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

IPR, BIOTECHNOLOGY AND AGRICULTURAL DEVELOPMENT IN DEVELOPING COUNTRIES

Intellectual Property Rights (IPRs) have a fundamental task to play in achieving the Millennium Development Goals (MDGs), as they affect agricultural and rural development in developing countries. The main impact of IPRs is through their relationship with the transfer of traditional and novel agricultural technologies, and IPRs can both support and hinder sustainable development.

A Zakri, from the Institute of Advanced Studies of the United Nations University, explored some of the key policy issues and challenges faced by developing countries in designing IPR regimes that will promote equity. He addressed participants of the Regional Conference on IPR “Pathways to Agricultural and Rural Development: Intellectual Property Rights and Implications”, that concluded this week in the Philippines.

About 7.7 million subsistence farmers planted biotech crops in 2005, so, “regardless of what we may feel about the technology, the reality of the increasing use of biotech crops in the developing world and its contribution to the MDGs needs to be taken into account” says Zakri. Existing IPR models need to be adapted to the particular needs of developing countries if they are to support the MDGs, says Zakri.

Key policy challenges include issues regarding bioethics and the limits of IPR regimes; the patenting of life forms; broad and overlapping patents; the role of publicly-funded international germplasm banks; and poor understanding on the socio-economic and environmental impacts of IPRs.

The conference was organized by the SEAMEO Regional Center for Graduate Study and Research in Agriculture (SEARCA), the International Plant Genetic Resources Institute (IPGRI), and by the International Service for the Acquisition of Agri-Biotech Applications (ISAAA). The Conference Proceedings will be available at the SEARCA website (<http://web.searca.org/home.asp>).

IPR FOR SUSTAINABLE DEVELOPMENT: ISSUES AND STRATEGIES

What are the key challenges to the development of effective intellectual property rights (IPR) regimes for developing countries that will protect national biodiversity resources, and promote sustainable agricultural development for the benefit of all? How could these be addressed? This was the task given to participants to

the “IPR, Biodiversity and Biotechnology for the MDGs” workshop, scheduled as part of the Conference “Pathways to Agricultural and Rural Development: Intellectual Property Rights and Implications”, held this week in the Philippines.

The main challenge identified is the lack of institutional capacity for the management and use of IPR in developing countries, including technology transfer; negotiation; IPR assessments and audits; and enforcement mechanisms. Proposed strategies to promote capacity building include identifying and using available resources, institutions and expertise; and designing new appropriate resources to address specific national needs. Equally important is to sensitize and enlist national, regional and international governments to mobilize financial resources for capacity building in this area.

Inadequacies in the professional education of scientists and lawyers on IPR and biotechnology, respectively, also constitute a main challenge. The incorporation of suitable courses in law and science curricula was therefore recommended. Additional issues to address include: the lack of appropriate regulations on access and benefit sharing; the lack of authoritative studies on the effect of IP on the use of biotechnology to address MDGs; misunderstandings on the role of IPR on socio-economic, ethical, and environmental issues; and restrictive IPR regimes. Therefore, resources need to be devoted to commission studies that address these concerns, and the effective information dissemination strategies to target audiences (policy makers, media and general public) need to be developed.

More information on the workshop, will be available at:

<http://web.searca.org/home.asp>

WB STUDIES SUGGEST ADOPTION OF GM COTTON

“The gains to developing countries from the Doha Cotton Initiative will be even greater if GM cotton is adopted first, providing yet another reason not to delay approval of this new biotechnology.” These were forwarded by two World Bank (WB) reports “The World Trade Organization’s Doha cotton initiative: A tales of two issues,” and “Recent and prospective adoption of genetically modified cotton: A global computable general equilibrium analysis of economic impacts.”

In the first study, authors Kym Anderson and Ernesto Valenzuela of the WB research group note that subsidy reductions rather than tariff cuts would create the largest impact. Such impact would even be doubled if such reform provided the cash for farmers to take advantage of biotechnology.

Similarly, the other WB report by K. Anderson, E. Valenzuela, and Lee Ann Jackson, suggests that adoption of GM cotton varieties by developing countries

especially Sub-Saharan Africa could provide larger proportionate gains to farmers and national welfare.

See the full reports at:

<http://econ.worldbank.org/WBSITE/EXTERNAL/EXTDEC/0,,menuPK:577938~pagePK:64165265~piPK:64165423~theSitePK:469372,00.html>

PRRI REPORT URGES PARTIES TO REFOCUS BIOSAFETY DEBATE

The process of the Meetings of the Parties (MOPs) to the Cartagena Protocol on Biosafety needs to refocus if the Protocol is to serve its role in facilitating international collaboration on modern biotechnology. This issue was raised in a recently released report by the Public Research and Regulation Initiative (PRRI), an organization that offers public researchers a forum through which they can participate in international negotiations that are relevant for modern biotechnology.

The report also urges member governments to refocus the biotech debate, to ensure that the Protocol can “provide for effective participation in biotechnological research activities” as described in Article 19 of the Convention on Biological Diversity, which is the basis for the Cartagena Protocol. The PRRI also strongly objects to repeated attempts to propose bans for scientific research that have no demonstrated scientific basis, since, “Future generations are not served by simply putting bans on possible avenues of scientific research and development if there are no clear indications that those developments will pose actual risks that outweigh the numerous benefits,” the PRRI says in its press release.

The report and further information about PRRI can be obtained from: Kim Meulenbroeks at kim.meulenbroeks@pubresreg.org. Read more about the organization at <http://www.pubresreg.org>.

Africa

AMBASSADOR URGES KENYAN GOVERNMENT TO GIVE MORE RESEARCH FUNDS

Norway's ambassador to Kenya, Elizabeth Jacobsen, urged the Kenyan government to commit more funds to research, and said that integrating research into policy making would spur development. Jacobsen chaired the plenary session of a workshop organized by the African Economic Research Consortium (AERC), which will run until the 2nd of June in Nairobi, Kenya.

“Researchers would assist the Government in making evidence-based decisions,” she added. Jacobsen presided over presentations by leading economists on the theme, “Political Economy and African Economic Development.” About 200 researchers, academicians, policy makers, and economists from across the African continent are attending the workshop.

With reports from the East African Standard, through <http://allafrica.com/stories/200605300185.html>. For more information, contact exec.dir@aercafrica.org, or read the press release for this workshop at <http://www.aercafrica.org/news/newsarticle.asp?newsid=47>.

Asia

INDIA APPROVES GM SOYBEAN OIL, MORE GM COTTON

In a recently concluded meeting, India’s Genetic Engineering Approval Committee (GEAC), the country’s main biotech regulatory body, approved 19 Bt cotton hybrids. Of these, 13 contain the BG-I event belonging to nine local seed companies; 2 contain the BG-II event of MAHYCO; 2 contain the cry1Ac gene of JK seeds; and 1 contains a fusion of cry1Ab and cryAc, a GFM event of Nath seeds. While these 18 varieties are approved for cultivation in the Southern cotton growing zone, a remaining one contains the MAHYCO BG-II event, and is approved for cultivation in India’s Central cotton growing zone. This brings India’s total to 63 new hybrids to be sold in the 2006 season, giving the country’s farmers more choices on which varieties to cultivate.

In a landmark decision, the GEAC also approved GM soybean oil derived from Round-Up Ready Soybean. According to GEAC rules, India’s oil trade industry association may seek a one-time, trait-based approval for the oil, with accompanying documentation on the soybean oil’s origin, as well as the declaration that it is derived from GM soybean. This decision is significant, as individual importers will not be required to seek GEAC permission for each consignment.

Decisions from the GEAC meeting are available at <http://www.envfor.nic.in/divisions/csurv/geac/geac-67.pdf>. For more information, contact Bhagirath Choudhary of the ISAAA South Asia Office at b.choudhary@isaaa.org.

ICAR, ICRISAT PARTNER FOR BETTER AGRICULTURE

The Indian Council of Agricultural Research (ICAR) and the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) have strengthened their partnership in the area of improving the productivity of rain-fed crops. In a recently signed agreement, Dr Mangala Rai, director general of ICAR, and Dr William D Dar, director general of ICRISAT, said the new pact would benefit dryland farmers in India. The new agreement will deal with improvement of sorghum, pearl millet, chickpea, pigeon pea, and groundnut

Under the agreement, ICAR and ICRISAT will conduct research into genetic resources conservation, evaluation, and utilization; enhancing crop productivity and sustainability under both favorable and dryland stress environments; improving system productivity and livelihood for fragile and dry environment, including socio-economic and policy options; and strengthening linkage between research and development, including training. Another project is aimed at improving rural livelihoods in select Indian states through bio-diesel plantations.

With reports from

<http://www.hindu.com/2006/05/27/stories/2006052702541400.htm>. Read more at <http://www.icrisat.org/Media/2006/media13.htm>.

INDIA PM CALLS FOR REVITALIZATION OF AGRICULTURE RESEARCH SYSTEM

Dr. Manmohan Singh, India's Prime Minister, expressed the government's commitment to revitalize the country's agricultural research system, so that the system could maintain its sense of innovation, creativity, and sense of purpose. Dr Singh stated this as he addressed the International Conference on Agriculture for Food, Nutritional Security, and Rural Growth in New Delhi, India.

In his speech, he lauded the new developments in biotechnology, as well as new materials and their contribution to agricultural development. Research into the areas of plants as bio-factories and producers of drugs, vaccines, biofuels, and bioplastics could be beneficial to India, the Prime Minister said. He likewise recommended that a much sharper focus be given to strategic research in plant technology.

Read more at <http://pib.nic.in/release/release.asp?relid=18077&kwd=>. For more information, contact Bhagirath Choudhary of the ISAAA South Asia Office at b.choudhary@isaaa.org.

IRRI, ASEAN COOPERATE TO UP RICE PRODUCTION

The International Rice Research Institute (IRRI) and member countries of the Association of South East Asian Nations (ASEAN) are working together to develop a series of environmental indicators for rice production in the region. When implemented, the indicators will allow each country to monitor and compare the environmental impact of its rice production with that of its neighbors, and either correct any problems or improve on existing practices. These indicators focus on production, biodiversity, pollution, land degradation, and water.

This is the first time anywhere in the world that a series of indicators is being developed to monitor the impact of agricultural production on a large regional basis. According to IRRI Director General Robert S. Zeigler, "This is an exciting initiative for rice production in the region that will lead not only to a cleaner, greener rice industry in Asia but happier, healthier and wealthier rice farmers as well."

For more information, contact Duncan Macintosh of IRRI at d.macintosh@cgiar.org. Visit IRRI online at <http://www.irri.org>.

Europe

DUPONT INTRODUCES HERBICIDE-TOLERANT SUNFLOWER HYBRIDS

To meet the demand for oilseed and biofuel, science company Dupont has introduced the first sulfonylurea (SU)-tolerant sunflower hybrids in Europe — Pioneer® brand sunflower hybrids with the Express® SX Herbicide-Tolerant trait. The hybrids provide post-emergent control option for annual broadleaf weeds, a leading problem affecting sunflower yield.

Dupont reports that with the new hybrids farmers need not rely on more expensive, less effective pre-emergent options. Instead farmers have the potential for more yield advantages, more weed management flexibility, and improved control alternatives.

The Express® Herbicide Tolerant Sunflower seed is derived from traditional plant-breeding methods. A herbicide-tolerant trait, proprietary to DuPont, was integrated into the germplasm of high-yielding sunflower hybrids.

Read more on the new sunflower hybrids at http://pioneer.mediaroom.com/index.php?s=press_releases

RESEARCH

TEST BY ARS PROJECT PUTS SCAB DOWN

Scientists from the Agricultural Research Service of the United States Department of Agriculture (ARS-USDA) have successfully used a technique called Virus-Induced Gene Silencing (VIGS) to find scab-resistance genes in wheat and barley seed heads. A team headed by geneticist Steven Scofield developed the test, which temporarily incapacitates wheat or barley genes thought to be important to scab resistance, to see if the plant's scab resistance also disappears temporarily.

Developing the test is part of a wide initiative that has allowed farmers and scientists to work together to combat scab, also known as *Fusarium* head blight. Scab is one of the most devastating wheat and barley diseases worldwide, and there are only a few varieties with effective levels of resistance to the disease. This new scab test is much quicker and more efficient than previously developed ones, and can thus assure scientists that they will be able to find the resistance genes sooner.

Read the complete press release at
<http://www.ars.usda.gov/is/pr/2006/060526.htm>.

TOBACCO MAKES BETTER ANTIBODIES

Plants have the potential to be vaccine factories: they can express vaccines in large quantities, and can pave the way for the production of edible vaccines. Plants, however, express antibody genes in a different way: a structural group in antibodies, called the N-glycans, is different between plants and animals. The N-glycans of plant-derived antibodies contain xylose and fucose (named carbohydrate epitopes), which can generate an immune reaction in humans, posing a very serious problem for vaccine production.

Hans Bakker and colleagues from Wageningen University and Research Center aimed to restore function to plant-produced antibodies, by expressing along the gene encoding the antibody, a second gene, GalT, which removes the unwanted carbohydrate residues. The authors report their findings in the article "An antibody produced in tobacco expressing a hybrid -1,4-galactosyltransferase is essentially devoid of plant carbohydrate epitopes," published in a recent issue of the Proceedings of the National Academy of Sciences.

Researchers replaced a region of the gene for the human GalT enzyme with its corresponding region in *Arabidopsis*, allowing the enzyme to be expressed in plant cells. This fusion gene yielded a hybrid enzyme, xylGalT, which was

expressed in tobacco cells along with a monoclonal antibody. When scientists carried out N-glycan profiling, they found that monoclonal antibodies from the transgenic plants expressing xylGalT had fewer xylose and fucose residues. When tested with grass pollen protein and sera of allergic patients, these antibodies had much lower immunogenicity than antibodies from transgenic plants that did not express xylGalT.

The techniques can thus be used to produce more efficient antibodies, with much lower immunogenicity, without compromising their therapeutic efficacy. For more information, read the complete article at <http://www.pnas.org/cgi/content/full/103/20/7577>.

SOYBEAN QTL FOUND TO BACK UP BT

Scientists working on improving soybean have faced several obstacles when working on insect resistance for the crop. Resistance to insects in soybean is a quantitatively inherited trait – that is, more than one gene is involved in the insect resistance process, and simple backcrossing will not transfer all insect resistance genes. Genetic engineering could assist in making soybeans resistant to pest, but Bt genes are widely used, raising issues about the evolution of resistance in susceptible insect populations. To engineer insect resistance into soybean, scientists have to not only introduce Bt genes into soybean cells, but to find, characterize, and use native soybean insect resistance genes to manage insect resistance, as well as broaden the resistance of plants with Bt genes.

S. Zhua and colleagues from the University of Georgia, USA undertake the “Fine Mapping of a Major Insect Resistance QTL in Soybean and its Interaction with Minor Resistance QTLs.” Their article, published in a recent issue of Crop Science, mapped a major quantitative trait locus (QTL-M) for insect resistance from soybean, which controls antibiosis (the ability of a crop to excrete one or several metabolites that can harm organisms) and antixenosis (the ability of a plant to keep pests from colonizing it).

The study aimed to fine map QTL-M, as well as to evaluate the effects on and interactions between it and other resistance QTLs using the Benning soybean cultivar, which is susceptible to defoliating insects. These QTLs were introgressed into the Benning cultivar using marker-assisted backcrossing to produce eight near-isogenic lines (NILs). These NILs were then tested for antixenosis and antibiosis.

Scientists found that two minor resistance QTLs provided insect resistance only when QTL-M was also present. This is important, since QTL-M has also been shown to increase the effectiveness of the Bt transgene in soybean, and can thus be used in future resistance engineering efforts.

Subscribers to Crop Science can read the complete article at <http://crop.scijournals.org/cgi/content/full/46/3/1094>.

ANNOUNCEMENTS

MALAYSIA TO HOST INTERNATIONAL BIOTECH CONFERENCE

Malaysia will host the 3rd International Biotechnology Asia 2006 Conference from August 10 to 11, 2006 with the theme "Convergence of biotechnology and nanotechnology." Putra World Trade Center, the conference venue, expects over 150 delegates. comprising corporate leaders, policy makers, academicians, researchers, and entrepreneurs. For more information, visit <http://www.biotechexpo.com.my>.

HEALTH SCIENCE CONFERENCE SLATED IN BELGIUM

"Innovations in Bioscience for Animal and Human Health" will take place on June 7, 2006 in Brussels, Belgium. The conference will highlight major bioscience developments and scientific solutions that could prevent diseases and reduce animal and human health risks in Europe. Included are parallel sessions on "Plant-Cell-Produced Technologies - Cutting edge approach to bringing highly novel and differentiated solutions to the market." Admission is free. Online registration and the detailed programme are available at <http://www.isc-europe.com/dasconference/registration.php>. For more information, visit <http://www.isc-europe.com/dasconference/index.php>.

WARDA LAUNCHES NEW WEBSITE

In celebration of 35 years of research partnership dedicated to improving the lives of smallholder rice farmers in Africa, the Africa Rice Center (WARDA) has launched its new website, with a stronger focus on partnership success. Visit WARDA at its new home online, at <http://www.warda.org>.

DOCUMENT REMINDERS

POCKET K'S UPDATED

The Knowledge Center has released the latest versions of several of its Pocket K's. These include Pocket K's 10 (Herbicide Tolerance Technology: Glyphosate and Gluphosinate), 17 (Genetic Engineering and GM Crops), and 19 (Molecular Breeding and Marker Assisted Selection), and are available for free download online. Visit <http://www.isaaa.org/kc>.

Pocket Ks are Pockets of Knowledge, packages of information on crop biotechnology products and related issues. They are produced by the Global Knowledge Center on Crop Biotechnology (KC) of the International Service for the Acquisition of Agri-biotech Applications (ISAAA). Twenty other topics are available at <http://www.isaaa.org/kc/bin/pocketk/index.htm>.

OECD RELEASES BIOTECH STATS

The Organization for Economic Co-operation and Development (OECD) has recently released the "OECD biotechnology statistics – 2006." Written by B. van Beuzekom and A. Arundel, the report includes data for 23 OECD countries and 2 observer countries, plus China (Shanghai). Various aspects of biotechnology are included, such as employment, patents, venture capital, and genetically modified (GM) crop hectares and field trials. Download the report at <http://www.oecd.org/dataoecd/51/59/36760212.pdf>.

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