**CROPBIOTECH UPDATE**

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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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**May 12, 2006**

In This Week's Issue:

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**NEWS**
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*** GLOBAL ***

## ALLERGEN-FREE SOYBEANS FROM CHINESE SOYBEAN LINES

Scientists from the US Department of Agricultural Research Service's Donald Danforth Plant Science Center and the University of Illinois at Urbana-Champaign have isolated two Chinese soybean lines without the primary protein linked to soy allergies. Dr. Theodore Hymowitz of the University of Illinois reports that the two soybean lines (PI 567476 and PI 603570A) contain virtually identical genetic mutations that do not contain the leading allergy-causing P34 protein. Over 16,000 soybean lines were screened.

The lines, which are adapted to Illinois-like field conditions, will be given to breeders to produce new varieties of allergy-free soybeans. Allergy to soy-based products including infant formulas has been observed in 6-8 percent of children. Adults with soy allergies have shown reactions that range from skin reactions and gastrointestinal irritation to difficulty in swallowing and fainting.

The research was funded by the Illinois-Missouri Biotechnology Alliance.

Read more on allergen-free soybeans at http://www.danforthcenter.org/newsmedia/NewsDetail.asp?nid=118.

## FAO PREDICTS FUTURE GLOBAL FOOD CRISES

The Food and Agriculture Organization (FAO) reports that 39 countries worldwide, with majority in southern and eastern Africa, will face food crises and thus need external food assistance. A slight decrease in world cereal production from last year's level is predicted. If global cereal use in 2006/2007 is similar to recent trends, it would exceed the current forecast for production and lower cereal stocks.

About 24 countries in Africa require food assistance due to adverse weather conditions, conflict, and economic problems. Nearly 8 million people are already suffering from the effects of prolonged drought in Ethiopia, Somalia, Kenya, and Djibouti. Despite good harvests in Sudan and Eritrea, conflicts have affected food availability.

Asian countries on the food crisis radar include Mongolia and Timore-Leste, Bangladesh, Afghanistan, Iraq, and Nepal. In Latin America, sharply reduced

yields have been noted in Argentina (maize), Brazil (rice), and Paraguay (soybean).

These data are reported in FAO's Crop Prospects and Food Situation, which provides information on the latest developments affecting global cereal supply and demand, as well as regional overviews of the crop prospects and food security situation.

Read more on the food crisis situation in http://www.fao.org/newsroom/en/news/2006/1000288/index.html or contact Teresa Buerkle of FAO at teresamarie.buerkle@fao.org.

**TEXTILES SOON TO BE SELF-CLEANING, THANKS TO BIOTECH**

A special feature of lotus leaves allows water and dirt particles to simply run off from the leaf surface. This “lotus effect” is due to characteristic molecular structures present on the surface of the lotus leaf, which ensures that water drops and dirt remain on the very “nano-tips” of the plant structures, minimizing the leaf's contact area with foreign objects.

This property of lotus leaves is the starting point of ITV (Institute for Textile Technology and Process Engineering) as it works on developing self-cleaning textiles. A project is currently underway, and is being done in cooperation with the NEES - Institute for Biodiversity of Plants at the University of Bonn and BASF. Such textiles would need only water to remain clean, ensuring that less money and time will be spent on washing them. Textiles utilizing the “lotus effect” would also be more resistant to wear and tear.

Another application of the “lotus effect” is in medicine. ITV scientists are investigating how they might be able to alter the surfaces of implants in order to improve the implants' coating with human cells. For more information, contact the ITV through Dr. Thomas Stegmaier at thomas.stegmaier@ITV-denkendorf.de. Read the feature article at http://www.bio-pro.de/en/region/stern/magazin/02141/index.html.

*** THE AMERICAS ***

## BRAZIL: NEW LEGAL DOCUMENT SUBMITTED FOR A LESS DOGMATIC LAW ON GURTs

The law project 5.964/2005, which proposes a less dogmatic approach to the regulation of GURTs, has been presented to the House of Representatives of Brazil in order to modify article 6 of the Biosafety Law 11.105/05.

The Biosafety Law 11.105/05 (article 6) restricts the use, commercialization, and licensing of Genetic Use Restriction Technologies (GURTs), defined as any of the processes generating genetically modified plants engineered to be sterile, or activating/deactivating genes related to fertility. However, GURTs comprise two types of applications: Variety GURTs (V-GURTs), which are used to develop sterile plants, and Trait Variety or Switch GURTS (T-GURTS), where the expression of the transgene is regulated by the application of chemicals or by a specific set of environmental conditions. T-GURTs are therefore not necessarily associated with changes in seed fertility of genetically modified (GM) crops. Farmers would be able to keep seeds for planting in the next growing season, although they may no longer have access to the benefits of the introduced trait if they chose to do so.

The biosafety law 11.105/05 therefore would apply only to V-GURTs and T-GURTs affecting plant fertility, while those GURTs that don't would fall outside the law's jurisdiction. This distinction is however not satisfactory to address the existing uncertainties related to the scope of the law, argues Reginaldo Minaré, lawyer and juridical director of ANBio, the Brazilian National Association for Biosafety.
For example, how should the development of sterile sugar cane, which is propagated through stem cuttings and not by seed, be treated?

Minaré argues that GURTs are potentially a very powerful biosafety tool, and the law in its current form will have very negative effects on agricultural research, and in the field of molecular farming: the development of pharmaceuticals in plants, such as edible vaccines. As it is now, proposed changes to the law would arrive too late for many of the projects under consideration by the National Technical Commission for Biosafety (CTNBio), the majority of which involve the development of crops without the ability to flower.

For more information, contact Reginaldo Minaré: rminare@uol.com.br. Read more at: http://www.mrweb.com.br/clientes/anbiodestaque/geral2.asp?cod=532

## BRAZILIAN AGRICULTURAL EXPERTS LEARN TO TRANSFORM SUNFLOWERS INTO BIODIESEL

About 150 agricultural experts and leaders of associations of small-scale farmers of the State of Goiás, Brazil, attended a course this week to learn the farming practices required for sunflower production for biodiesels. Biodiesels, a renewable energy source, are produced from oleaginous plants, such as soybean, oilseed rape, and sunflowers. The initiative, aimed at generating jobs and income for rural communities, is supported by the Secretariat of Familiar Agriculture from the Ministry of Rural Development (MDA), and the Brazilian Institute for New Frontiers in Cooperation (INF).

“The production of energy crops offers an opportunity for farmers to have a guaranteed market, with contracts, no intermediary agents, and with the presence of an industry sector devoted to the manufacture of biodiesels,” says Robert Land, a consultant for the Program of Biodiesel of the MDA. The course will be repeated in other biodiesel-producing states of Brazil.

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

## BIOTECH COTTON: SAME YIELD, FEWER PESTICIDES, REPORT SAYS

Bt cotton is genetically modified (GM) cotton designed to produce the Bt toxin, a naturally occurring insecticide that kills pink bollworm, a major cotton pest. Bt cotton is planted on nearly 5 million hectares all over the world. In Arizona, USA, over half the state's cotton fields are planted with Bt cotton, which controls only one of Arizona's three major cotton pests. The other two pests, sweet potato whitefly and the western tarnished plant bug, are controlled by insecticides.

Researchers at the University of Arizona in Tucson recently conducted the first large-scale study to simultaneously examine how growing Bt cotton affects yield, pesticide use, and biodiversity. The study looked at commercial cotton fields over an area of 6,600 square kilometers, with 40 of these fields planted to non-Bt cotton, 21 to Bt cotton, and 20 to Bt/herbicide-resistant cotton.

Researchers found that: 1) per pesticide application, Bt cotton produced 9% more cotton/acre than non-Bt cotton; 2) growers that planted Bt cotton used fewer applications of broad-spectrum insecticides, so that growers ended up with similar yields/acre regardless of the type of cotton grown; and 3) the type of cotton planted had no effect on insect biodiversity.

The team will publish its research in an upcoming issue of the Proceedings of the National Academy of Sciences. To read the complete press release, go to

http://uanews.org/cgi-bin/WebObjects/UANews.woa/8/wa/CALSArticle?ArticleID=12616.

**REPORT SUGGESTS CELLULOSIC BIOMASS AS BIOFUEL SOURCE**

Due to the United States' rising demand for biofuels, the demand for corn is likewise rising, and may soon prompt the country to divert corn from exports. To prevent this from happening, cellulosic biomass should be developed as an alternative to corn. Allen Baker and Steven Zahniser make this conclusion as they explore how “Ethanol Reshapes the Corn Market.” Their article appears in the latest issue of Amber Waves, a publication of the United States Department of Agriculture (USDA).

The authors suggest ways by which corn production could be increased to meet the rising demand. This would entail devoting more land to planting corn, diverting lands from soybean production, and growing corn more intensively. These methods, however, may cost more in the long run, and the authors suggest that other agricultural crops should be used to produce biofuels. For instance, sugarcane and sorghum can be used to produce ethanol.

Cellulosic biomass, the authors write, can also be a viable ethanol source. Cellulosic biomass includes forest-related resources such as mill residues, pre-commercial thinnings, slash, and brush; solid wood waste materials; agricultural wastes such as corn stover; and plants that are specifically grown as fuel for generating electricity.

Read the complete article at http://www.ers.usda.gov/AmberWaves/April06/Features/Ethanol.htm.

*** ASIA ***

**BOEING CO. AND DANFORTH CENTER KEEN ON BIOTECH SUPPORT FOR MALAYSIA**

The Boeing Company has expressed interest in Malaysia's biotechnology development by conducting a study to define the creation of a plant science research facility in the country. A program will be implemented as part of an offset program commitment to the Government of Malaysia. This was explained to a delegation of senior government officials from Malaysia who visited the Donald Danforth Plant Science Center in Missouri recently.

In addition, Dr. Karel Schubert, representing the Donald Danforth Plant Science Center, expressed interest in collaborating with Malaysian scientists to develop new enhanced crops and create new products for commercialization.

For more information, visit
http://www.danforthcenter.org/newsmedia/NewsDetail.asp?nid=116.

## IRAN IS 100TH MEMBER OF PLANT GENETIC TREATY

Iran joins 99 other countries that have ratified the International Treaty on Plant Genetic Resources for Food and Agriculture. According to the Food and Agriculture Organization (FAO), the international treaty seeks the "conservation and sustainable use of plant genetic resources for food and agriculture and the fair and equitable sharing of the benefits arising out of their use, in harmony with the Convention on Biological Diversity, for sustainable agriculture and food security."

FAO Director-General Dr Jacques Diouf said that "this is a legally binding treaty that will be crucial for the sustainability of agriculture. The treaty is an important contribution to the achievement of the World Food Summit's major objective of halving the number of hungry people by 2015."

The first session of the Governing Body of the International Treaty on Plant Genetic Resources for Food and Agriculture will take place in Madrid, Spain, from 12 to 16 June 2006. Up for discussion among the contracting parties to the treaty will be implementation strategies.

See the news article at
http://www.fao.org/newsroom/en/news/2006/1000287/index.html

## VIETNAMESE SCIENTISTS PRODUCE ORCHID SEEDS

Scientists of the Da Lat Biotechnology Sub-Institute have reported successful production of seeds for *dia lan*, a species of terrestrial orchids, which promise to open a new era of production in Vietnam's agriculture.

The Da Lat Biotechnology Sub-institute's seeds were bred in a laboratory, where scientists have created fertile, single crop *dia lan* seeds, with a high sprouting percentage.

The seeds grow in a natural environment, not only in carefully engineered environments, and can be sold and cultivated at home. More importantly, such

seeds would save plants previously plundered from the woods. It is hoped that this move will contribute to preservation of rare and valuable plants.

With reports from Le Thu Hien (hienbiotechvn@pmail.vnn.vn) from AG Biotech Vietnam. For more information, visit: http://www.agbiotech.com.vn/vn/

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**RESEARCH**
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**GM TOBACCO HOUSES PLAGUE VACCINE**

The Plague, both in its bubonic and pneumonic forms, has played a great part in human history. Its causative agent is a bacterium called *Yersinia pestis*, and although it has largely been eradicated from most of the world, it is still endemic in certain places in Africa, Asia, the Americas, and the former Soviet Union, especially where people live in close proximity to rodents. Y. pestis is most fatal when inhaled, as bacteria can invade the lungs and cause death.

Antibiotics for plague are available but are effective only if the disease is diagnosed early. Some *Y. pestis* strains are also resistant to antibiotics, prompting scientists to search for ways to mass produce more varieties of the plague vaccine. Luca Santi and Hugh S. Mason, in particular, explore a "Protective Plague Vaccine Produced in Tobacco Leaves" in an article that appears in a recent issue of the newsletter of the Information Systems for Biotechnology. Transgenic plants present a convenient alternative vaccine-producing system, as they can express a large variety of proteins, as well as perform the modifications necessary for proteins to function. Plant systems are also less likely to harbor microbes that are pathogenic to animals. They can also be easily scaled up to produce large amounts of vaccine.

The researchers report a recent study that analyzed the expression in plants of two proteins from *Y. pestis*: the F1 antigen, which form part of a protective capsule that surrounds *Y. pestis* cells; the V antigen, which is involved in the bacterium's pathogenic process; and a fusion of both F1 and V. The genes for these antigens were delivered to tobacco plant cells by *Agrobacterium tumefaciens* transformation. The proteins produced were then analyzed for antigenicity, and subsequently tested as vaccines on guinea pigs.

Researchers found that: 1) all three antigens were expressed in high levels in transgenic tobacco leaves; 2) all proteins elicited an immune response in the guinea pigs; and 3) after animals were challenged with an aerosol dose of *Y. pestis* considered 100% lethal to unvaccinated controls, sham-immunized

animals were dead within six days, while all antigen-vaccinated groups showed significant rates of survival at 21 days post-exposure.

Read the complete article at http://www.isb.vt.edu/news/2006/news06.apr.htm.

## RESEARCH EXPLORES WEED CONTROL MEASURES FOR HT SOYBEAN

One type of herbicide tolerant soybeans can grow in the presence of glyphosate, the active ingredient in some weed killers. Glyphosate-based week killers cannot control broadleaved and grass weeds, so that other weed killers are employed on a need-basis to control such weed species. This entails that a weed control regimen be formulated to maximize yield, and such an endeavor is undertaken by María C. Arregui and colleagues of the Universidad Nacional del Litoral, Argentina. They describe a system of "Improved weed control with broadleaved herbicides in glyphosate-tolerant soybean (*Glycine max*)" in the July 2006 issue of the Crop Protection journal.

Researchers conducted field studies in 2001, 2002, and 2003, and determined soybean yields as they controlled various weeds with several types of soil and foliar-applied broadleaved herbicides. They found that: 1) under good growing conditions, as much as 99% of the weeds *S. sisymbrifolium* and *S. rhombifolia* were successfully controlled by glyphosate, while *C. erecta* and *P. debilis* were controlled by metribuzin, imazaquin, and imazethapyr; 2) soil applied herbicides were best for glyphosate-resistant crops, as they reduced early season competition of weeds, particularly those inherently more tolerant to glyphosate, such as *P. debilis* or *C. erecta* which survive pre-seeding glyphosate applications; and 3) when dry conditions are observed during vegetative soybean growth, glyphosate applications could be less effective for weed control, and the resulting competition could reduce soybean yields.

Subscribers to Crop Protection can read the complete article at http://dx.doi.org/10.1016/j.cropro.2005.09.006.

## PAPER TRACKS COCOA BEAN BORING, RELATION TO INSECT RESISTANCE

The cocoa pod borer (CPB) is an important pest of cocoa. It attacks the crop by boring into cocoa beans, causing them to clump and stop developing. In severe infestations, cocoa pods ripen prematurely, leading to unextractable beans, or beans of inferior quality, and leading, in turn, to economic losses for cocoa farmers. CPB can be controlled by insecticides, but there is growing concern that

over time, CPB may be resistant to such control measures. Insecticides also pose great risks to farmers, consumers, and the environment.

Chong-Lay Teha and colleagues of Golden Hope Research, Malaysia monitor the "Variation of the response of clonal cocoa to attack by cocoa pod borer *Conopomorpha cramerella* (Lepidoptera: Gracillariidae) in Sabah." Their article appears in the July 2006 issue of the Crop Protection journal.

Researchers counted the holes made by CBP in eight cocoa bean clones, and monitored the clones for variation in resistance to the pest. By obtaining the ratio of the number of larva exit holes to the number of larva entry holes (exit/entry) they found two clones, designated PBC123 (ratio of 5.42) and IMC23 (ratio of 6.39), to be particularly resistant to larval infestation. They recommended that this ratio be used to screen cocoa bean clones for resistance to CPB should a selection program be started for cocoa.

These natural variations in the cocoa beans may also be used in the future to search for the genetic basis of such insect resistance. Subscribers to Crop Protection can read the complete article at http://dx.doi.org/10.1016/j.cropro.2005.10.009.

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## ANNOUNCEMENTS

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### WORKSHOP TO ADDRESS BIOTECH IN HORN OF AFRICA

A workshop tackling biotechnology in the Horn of African countries (Djibouti, Eritrea, Ethiopia, Somalia, and Sudan) will be held on June 29, 2006 in Addis Ababa, Ethiopia. "Workshop on Present Status, Challenges and Future Opportunities" organized by the Horn Biotechnology Forum (HBF). The workshop aims to raise biotechnology awareness in Horn of African countries, as well as to facilitate the better understanding of the current status, challenges and future opportunities of biotechnology applications for the region. For more information, contact Dr. Tilahun Zeweldu at tila@apepuganda.org, zeweldu@msu.edu, and tilazew@yahoo.com.

### PHILIPPINES TO HOST REGIONAL CONFERENCE ON IPR

Intellectual property rights (IPR) and their relation to agriculture will be explored in "Pathways to Agricultural and Rural Development: Intellectual Property Rights and Implications Regional Conference on IPR." This will be held in Makati, Philippines on the 30th-31st of May, 2006. A registration fee of PhP4, 500 for

local participants and US $100 for foreign participants will cover meals and a conference kit. To download details in PDF, visit http://www.bic.searca.org/events/IPR_2006.pdf

## YOUTH CONGRESS TO BE HELD IN GHANA

The 2nd African Regional Youth Congress on Science and Technology is scheduled for June 2006 in Accra, Ghana. The Congress is an annual event designed to provide a forum for young professionals and leaders to share expertise and experiences, as well as contribute to the major policy discussions affecting Africa's development. The emphasis will be on, but not limited to, health, agriculture, science, technology, and innovation issues. For more information, visit http://www.atpsnet.org or download the application form at http://www.atpsnet.org/Application%20form%20-%20youth%20congress%202006.doc.

## JAPAN TO HOLD 5th BIOFORUM AND BIOEXPO

The 5th Bio Expo Japan Technical Conference will be held in conjunction with the Bio Academic Forum, which will present studies by universities, and national and public institutes. This will be held on May 17-19, 2006 at the Tokyo Big Sight, Japan. To see the list of presenters and find out more about the conference, visit http://www.bio-expo.jp/bio/english/academia/index.phtml.

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# DOCUMENT REMINDER

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## BBSRC RELEASES NEW PUBLICATION

Biotechnology and Biological Sciences Research Council (BBRSC) recently published “The Bioscience behind: Cancer prevention, diagnosis and treatment,” which explains how plant and food science at the John Innes Centre and the Institute of Food Research, neighboring BBSRC-sponsored institutes, is leading to the development and licensing of nutritionally enhanced broccoli containing high levels of natural potentially cancer-fighting compounds. This is the first in a new series of publications to highlight the role of bioscience research in society. For more information, visit http://www.bbsrc.ac.uk/media/pressreleases/06_04_19_cancer.html.

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