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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NEWS

INDIA INTRODUCES NEW REGULATION ON GM IMPORTS

India’s Ministry of Commerce and Industry, through the Director General of Foreign Trade, has approved new rules governing the import of genetically modified (GM) products. The country’s Genetic Engineering Approval Committee (GEAC) of the Ministry of Environment and Forest (MOEF) has also been tasked to approve or reject all applications for bulk import of GM food, raw or

processed feed, or any ingredient of food, food additives, or any food product that contains GM materials.

The conditions to which the import of GM foods will be subjected include the following: 1) import of any material with GM materials used for either industrial production, environmental release, or field applications will be allowed only with approval of the GEAC; 2) any institute or company wishing to import GM materials for research purposes should submit their proposal to the Review Committee for Genetic Modification (RCGM) under the Department of Biotechnology; and 3) at the time of import, all consignments containing GM materials must carry a declaration that the product is genetically modified. If the consignment does not carry such a declaration and is later found to contain GM materials, the importer is liable to penal action under the country's 1992 Foreign Trade Act.

These rules are effective from the 1st of April, 2006. Read the complete article at http://economictimes.indiatimes.com/articleshow/1482289.cms. View the complete document on regulations at http://www.isaaa.org/kc/CBTNews/files/India_FTP.pdf.

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

POTATO GENOME SEQUENCING GETS BOOST FROM NETHERLANDS

The Dutch government has announced that it will grant the Potato Genome Sequencing Consortium (PGSC) Eu 3 million (US$3.6 million) to fund the sequencing of the potato genome's chromosome 1. The consortium is led by the Netherlands Genomics Initiative (NGI) and the Wageningen University and Research Center (WUR), with participation of research teams from North America, Brazil, Chile, Peru, Europe, Turkey, Russia, India, China, and New Zealand.

Research partners of the PGSC have each chosen a chromosome from the potato's 12 on which to concentrate their sequencing work. They aim to complete the sequence of the potato genome's 840 million base pairs by 2010. Such work will allow scientists to improve the potato, which is the world's fourth most important crop.

Read more about the initiative at http://www.potatogenome.net/

NEW FAO COMMISSION LOOKS AT GLOBAL PEST CONTROL

The Commission on Phytosanitary Measures (CPM) met for the first time in Rome, Italy, during the first week of April 2006. The meeting brought together delegates from more than 150 countries to discuss how the Commission can deal with the challenge of global pest control. The CPM is a recently established governing body of the International Plant Protection Convention (IPPC), tasked to set standards designed to prevent plant pests being spread through international trade, while ensuring that countries do not use plant protection regulations to protect, instead, their domestic producers.

Crop species host hundreds of pests, and the economic damage such pests can cause run into billions of dollars worldwide annually. As global trade and movement of people and commodities increase, natural and national barriers that were once effective against the spread of unwanted pests are now under intense pressure. According to Richard Ivess, IPPC coordinator, work on keeping pests out will begin by developing working standards on protecting produce. A Working Group of Experts established by the CPM will assess pest control standards, and hand a draft to a Standards Committee, after which the final document will be discussed through consultations, before finally moving to the annual meeting of the CPM.

When asked about how the IPPC helps in regulating international trade, Ivess answered that, “A contracting party can refuse entry to plants and plant products that don't comply with its phytosanitary standards. But it can only put in place measures that are technically justified and consistent with the risk involved.”

Find out more about the commission at http://www.fao.org/WAICENT/FAOINFO/AGRICULT/magazine/0604sp1.htm.

FEATURE LOOKS AT FOOD, OIL PRICE CONNECTION

With the rising popularity of grain crops being used as a cheap fuel alternative, African farmers must shift from subsistence agriculture to productive agriculture. This is so, Jonathan Gressel says, since, “the question: ‘should we accept transgenic maize as food aid?’ will be moot in a very short time, as such maize will no longer be available – it will be running someone’s automobile.” He makes this conclusion in his article, “A Forced Abrupt End to Food Dependency: Implications of High Oil Prices,” a special feature in the African Crop Improvement Newsletter March 2006 edition.

Gressel, of Purdue University, USA and the Weizmann Institute of Science, Israel, asserts that since oil prices have risen, grains are already being used as biofuel, and this means Africa will have to produce more grain to feed its

population. To be able to do so, Gressel suggests that African farmers must have good seed designed to cope with local conditions, with as many built-in resistances as possible. He suggests that the "biotechnology sector must kick in," since conventional breeding has proven ineffective; and biotechnology work must be done in species other than maize.

"Biotechnology priorities should not be haphazard, but based on evaluations of need," Gressel writes, "Biotechnology will play an important role, a role that will be useless if the other institutional and infrastructural issues are not addressed." His other suggestions for greater crop productivity include making fertilizer available at near-international prices to African farmers, and providing extension services to teach farmers sustainable, cost-effective farming practices.

Read the complete article from http://www.africancrops.net/News/gressel.htm, or download it from the ISAAA KC site at http://www.isaaa.org/kc/CBTNews/files/efd.pdf. Contact the author at Jonathan.Gressel@weizmann.ac.il.

NEW GENES UNCOVERED FOR BETTER RICE

A Generation Challenge Program led by the International Rice Research Institute (IRRI) is now working on two genes that can improve rice: Saltol, which confers salinity tolerance; and Pup1, which improves phosphorous uptake. The program is featured in Rice Today, IRRI's magazine.

Saltol is on rice chromosome 1, and confers salinity tolerance at the seedling stage, which is important for good crop establishment in coastal areas. Researchers mapped Saltol's location by crossing a traditional Indian cultivar with moderate salt tolerance (Pokkali) with a saline-sensitive cultivar (IR29). Pup1, on the other hand, is on rice chromosome 12. Scientists are currently in the final stages of fine-mapping the locations of the genes, and expect to have clones of both Saltol and Pup 1 within a year or two.

Once engineered into rice, Saltol and Pup1 can increase rice productivity and improve farmer income. "Both salinity and phosphorus deficiency are widespread and often coexist, especially in the rainfed fields of the poorest farmers," explains Abdelbagi Ismail, principal investigator of the Saltol and Pup1 projects, "Globally, more than 15 million hectares of rice lands are saline, and more than half of all rice lands are phosphorus deficient."

Read the complete article at http://www.generationcp.org/sccv10/sccv10_upload/opposites_attract.pdf or http://www.irri.org/publications/today/pdfs/5-2/34-36.pdf. Read more in IRRI's magazine, Rice Today, available at http://www.irri.org/publications/today/.

PROGRAM ALLOWS AFGHAN LADY FARMERS TO REBUILD ORCHARDS

Afghanistan was once famous for its fruit orchards, but three decades of civil war and six years of drought have devastated the sector. A new food-for-work project organized by the World Food Program (WFP) is about to bring the trees back by getting women out of their homes and into the fields, in order to improve food security and boost rural incomes. The program is featured in the newsletter of the UN Office for the Coordination of Humanitarian Affairs (IRIN News).

The three-year program, which was launched in October 2005, has established two tree nurseries in the Balkh and Nahar-e-Shahi districts of Afghanistan. The nurseries are expected to produce around 1.5 million fruit and non-fruit trees each year. “The project provides training to around 800 women to give them skills in planting trees, irrigation, weeding, and other farming activities,” said Mohammad Ismail, WFP’s field monitor.

The WFP will soon extend the project to other parts of the provinces, where jobs are scarce, and women have few opportunities to earn a living. Read more about the program at http://www.irinnews.org/report.asp?ReportID=52628&SelectRegion=Asia&SelectCountry=AFGHANISTAN.

FARMERS, WORLD ORGS CALL FOR METHYL BROMIDE PHASE-OUT

More than 5000 farms and organizations have joined forces with the United Nations Environment Program (UNEP) to accelerate the phase-out of methyl bromide, an agricultural pesticide that damages the ozone layer. Methyl bromide has been used by farmers to kill pests in the soil before planting crops like tomatoes, strawberries, melons, and flowers. In 1992, however, it was officially controlled as an ozone-depleting substance and is scheduled to be phased-out under the Montreal Protocol, the international treaty set up to protect the ozone layer.

The partnership aims to accelerate the world-wide switch from methyl bromide to ozone-friendly alternatives. A survey has so far identified more than 5000 commercial farms in 30 countries around the world that produce tomatoes, peppers, melons, strawberries, and flowers without using methyl bromide. The Partnership includes farmers’ associations and supermarkets, as well as international organizations such as the UNEP, UN Food and Agriculture Organization (FAO), United Nations Industrial Development Organization (UNIDO), United Nations Development Program (UNDP), and the CAB

International agricultural organization. For information about the Montreal Protocol visit http://www.unep.org/ozone. Read the complete article at http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=475&ArticleID=5244&l=en

WARDA COMMENDED AS "SMALL-BUDGET CENTER OF EXCELLENCE"

At a recent meeting, the Board of the Africa Rice Center (WARDA) expressed its pride in the awards and distinctions garnered by WARDA scientists during the last few years under the leadership of Director-General Dr Kanayo F. Nwanze. The awards include Japan's International Koshihikari Prize (2006), the World Food Prize (2004), Senegal's Presidential Award (2003), Côte d'Ivoire Government Honors (2001 and 2003), and the King Baudouin Award (2000) given by the Consultative Group on International Agricultural Research (CGIAR).

The Board likewise praised WARDA's alliances with its sister centers, international non-governmental organizations (NGOs), and the private sector to increase the impact, reach and value of its technologies, especially the new rice for Africa (NERICA) varieties, across sub-Saharan Africa. For more information, read the press release at http://www.warda.org/warda1/main/newsrelease/newsrel-board-apr06.htm.

CHINA AGRICULTURAL PROGRESS FEATURED

China's central government recently announced that it is raising investment in agricultural development by nearly 8% in 2006. A feature article by the Consultative Group on International Agricultural Research (CGIAR) looks at the progress made in China's agriculture, which includes work on better rice, root crops, and livestock.

For instance, scientists from the Yunnan Academy of Agricultural Sciences (YAAS) have developed four improved rice varieties to suit the difficult upland environment of the region. To promote adoption of these varieties, YAAS provided seed and fertilizer, as well as transportation and marketing assistance to selected farmers. By the second cropping season, farmers had tripled their rice yields. Because of this, farmers have been able to grow more rice on less land, and diversify into other, higher value products, such as sugarcane, soybeans, peanuts, and livestock. Other important projects include the work of the International Livestock Research Institute (ILRI) and the International Potato Center in Sichuan province, where small upland farmers are being taught to intensify pig production by feeding them nutritious sweet potato.
Read the complete report at http://www.cgiar.org/monthlystory/april2006.html.

NEW EFFORTS TO BRING NEW WHEAT TO AUSTRALIA

New wheat genetic material containing yield enhancing traits from overseas sources is being introduced into Australia, and will be widely used in breeding programs to overcome genetic weaknesses and abiotic limitations, including environmental conditions. This was stated by Dr. Richard Richards of the Australian Commonwealth Scientific and Research Organization (CSIRO), who discussed breeding options to increase Australian wheat yields at the recent Grains Week 2006 Research Symposium in Canberra.

He says collaborative research efforts led by the CSIRO and Australia's Grains Research & Development Corporation (GRDC) would create new wheat cultivars through the application of physiology and biotechnology to traditional breeding methods. He also says that it is anticipated that the development of new wheat varieties would increase annual yield by 2%, thereby upholding current profitability levels. "While conventional breeding methods will remain the cornerstone of plant improvement in Australia's wheat industry, new varieties will evolve as a result of research to enhance grain yield and the genetic protection against diseases while retaining or improving grain quality," Dr Richards says.

For more information, visit
http://www.csiro.au/csiro/content/standard/ps1jd,,.html.

RESEARCH

PAPER STUDIES TARTARIC ACID, VITAMIN C IN GRAPE

Vitamin C and L-tartaric acid are plant-derived metabolites which are of value to viticulture and human health. Grapes, in particular, accumulate tartaric acid, which affects berry taste. Wine aging potential is also linked to tartaric acid levels in the fruit, as the acid contributes important aspects to wine taste. The production of tartaric acid begins with vitamin C, but although scientists know the chemical intermediates that convert vitamin C to tartaric acid, they have not yet identified the enzymes responsible for the conversion. Identifying such enzymes may hold the key to increasing the levels of vitamin C in grapes, or altering the amount of tartaric acid in berries to contribute to making better wine.

In "L-Tartaric acid synthesis from vitamin C in higher plants," Seth DeBolt of the University of Adelaide, along with colleagues from the University of California,

Davis and Australia's Cooperative Research Center for Viticulture analyzed samples from 28 species of Vitaceae, and found a candidate gene whose protein product may be involved in tartaric acid synthesis.
Scientists identified one species, *Ampelopsis aconitifolia*, which did not produce tartaric acid, and accumulated instead three times more vitamin C than other related species. Therefore, the enzyme catalyzing the conversion of vitamin C to tartaric acid was assumed to absent in *A. aconitifolia*. Scientists thus proceeded with transcript and metabolite profiling of the samples to identify candidate genes expressed at developmental times and in tissues appropriate for L-tartaric acid biosynthesis in grape berries. Further analysis by PCR confirmed that one candidate gene was absent from the *A. aconitifolia* genome.

The candidate gene, contig 1029130, was introduced to and over-expressed in E. coli. Expression yielded a soluble, 40 kDa protein, which was found to be part of the tartaric acid biosynthesis pathway.

Read the complete article at http://www.pnas.org/cgi/content/full/103/14/5608

BITTER FOR GRAZERS

Herbivores are plant eating animals and insects. Although herbivory generally has a minor effect on an ecosystem's productivity, occasionally insect outbreaks result in severe defoliation (loss of leaves) and great reductions in yield. Although no plant is completely immune from herbivores, virtually all plants have developed traits that will reduce the intensity of grazing. These defenses include the production of secondary chemicals, which are synthesized by specialized metabolic pathways in plant cells. Secondary chemicals may reduce the palatability of the plant to herbivores, interfere with their digestion or reproduction of grazers, and may also be toxic. Similarly, specialist herbivores have adapted their feeding habits to adjust to plant defense mechanisms, a phenomenon termed coevolution.

What is the genetic basis of plant defenses to herbivory? A research team from the Boyce Thompson Institute for Plant Research, Ithaca, USA, explores the role of two genes, TGG1 and TGG2, which encode the enzyme myrosinase, required to degrade glucosinolates to produce toxins against grazers. Glucosinolate breakdown is induced in damaged or crushed tissues. The researchers report that Arabidopsis plants carrying a mutation in either TGG1 or TGG2 did not differ from un-mutated plants in terms of glucosinolate breakdown. However, if both genes were inactivated, the plant lost its ability to produce myrosinase and break down glucosinolates in attacked tissues. And the effect of the mutation on herbivory? Generalist insects (those feeding in many different types of plants) significantly increased in weight when feeding on mutant plants, when compared to insects fed on controls. Interestingly, while the myrosinase mutations had no

effect on several specialist insects, one insect species actually performed better in non-mutated plants, perhaps due to the presence of feeding stimulants.

To read the abstract of “Arabidopsis myrosinases TGG1 and TGG2 have redundant function in glucosinolate breakdown and insect defense,” visit: http://www.blackwell-synergy.com/doi/abs/10.1111/j.1365-313X.2006.02716.x

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ANNOUNCEMENTS

ISPP TO CONDUCT ONLINE TEACHING SYMPOSIUM

A “Plant Pathology Teaching Symposium” will be held online from the 15th of May to the 4th of June, 2006. The meeting is organized by the International Society for Plant Pathology (ISPP), and will have the theme “Active Learning in Plant Pathology.” This symposium provides a unique opportunity for anyone involved in teaching plant pathology to share ideas with colleagues from all over the world without incurring the hefty expense of conference fees or travel. The first part will comprise submitted papers on the general themes of tools and techniques, learning theory, and distance education. The second part of the symposium will feature weekly discussion forums. More information is available at http://www.ispp-teaching-symposium.org/.

ICABR TO HOLD BIOTECH CONFERENCE

The 10th International Conference on “Agricultural Biotechnology: Facts, Analysis and Policies” will be held on the 29th of June to the 2nd of July, 2006 in Ravello, Italy. The conference aims to discuss the impact of biotechnology in international trade; biotechnology and developing countries; public acceptance; regulation of biotechnology; governance issues for the sector; property rights; biotechnology, trade and development; and implications of biotechnology on the environment. The event will also discuss developments in the scientific research field that have important implications on crop biotechnology, specifically in developing countries. The conference is organized by the International Consortium on Agricultural Biotechnology Research (ICABR), with contributions from the Catholic University of Leuven, University of Rome Tor Vergata, and Yale University.

For more information visit the conference website at http://www.economia.uniroma2.it/conferenze/icabr2006/call_for_paper.asp.

EMBRAPA OFFERS CROP IMPROVEMENT COURSE

The Brazilian Institute for Agricultural Research EMBRAPA (Empresa Brasilerira de Pesquisa Agropecuária) will offer an international course in Brasilia, Brazil on the 18th-27th of October, 2006. The course aims to encourage better use of the genetic variation found in germplasm collections of peanut, cassava, cotton, and other crops for genetic improvement initiatives to increase yield and enhance resistance to pests and pathogens in important crops in Latin America. The event is supported by the Inter-American Institute of Agricultural Cooperation (IICA) and the United Nations Food and Agriculture Organization (FAO). For more information (in Portuguese) visit:
http://www.cenargen.embrapa.br/cenargenda/cenargenda.html

DOCUMENT REMINDERS

IFPRI BLOG DOCUMENTS WORLD HUNGER

"Blog World Hunger," an Internet blog facilitated by the International Food Policy Research Institute (IFPRI), is an open global food and nutrition security diary. It aims to help the effort to identify and analyze alternative national and international strategies, as well as policies for meeting world food needs in ways that conserve the natural resource base. Visit the blog at http://www.ifpriblog.org/.

NEW RESOURCE CENTER OPENS

The Inclusive Workplace is an online resource center designed for sharing best recommendations for diversity policies and practices considered essential for good people management, with a special focus on the Consultative Group on International Agricultural Research (CGIAR). It is designed to help create workplaces built on the core values of inclusion, dignity, well-being, and opportunity. Visit the center at
http://www.genderdiversity.cgiar.org/inclusiveworkplace/index.htm

PEW RELEASES FORUM PROCEEDINGS

In December 2005, the Pew Initiative on Food and Biotechnology and the University of Illinois at Urbana-Champaign Agricultural Genome Science and Public Policy Program hosted an invitational roundtable discussion entitled “A Future for Animal Biotechnology?” Over the course of the full day event, scientists, academicians, ethicists, consumer advocates and members of industry and government gathered to consider the future of cloned or genetically engineered animals and their products. The proceedings are now available at http://pewagbiotech.org/events/1205. For more information, contact Kara Flynn at kflynn@pewagbiotech.org.

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