CROP BIOTECH 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

VIETNAM ISSUES NEW REGULATIONS ON GMO

Vietnam Prime Minister Phan Van Khai has issued a new decision on genetically modified organisms (GMOs). Decision No 212/2005/QD-TTg dated August 26,2005 on "Regulation of biosafety management to genetically modified organisms, goods and products originated from GMO" covers scientific research, technology development, production, trading and usage, import, export, transportation of GMOs and related products. It also considers the risk control and granting of biological safety certificates to such organisms and products.

The regulations specify that scientific research and development of technology on GMOs, and related products should be registered with the Ministry of Science

and Technology and relevant ministries and agencies. The decision takes effect 15 days after publication in the Government's official gazette.

Meanwhile, Hochiminh City is set to implement a field trial of two GM corn varieties. VietnamNet quotes Dr. Nguyen Quoc Binh, Deputy Director of the city's biotechnology center, as saying that the two varieties have been genetically modified with the herbicide tolerance and insect resistance traits.

For the full text of the Vietnamese regulations, email Le Hien at hienbiotechvn@pmail.vnn.vn.

KENYA TO REPEAT FIELD TRIAL FOR BT MAIZE

The Kenya Agricultural Research Institute (KARI) and the International Maize and Wheat Improvement Center (CIMMYT) are set to repeat the confined field trial for Bt maize contrary to media reports that the government has terminated it.

The trial to test the effectiveness of Bt maize that was genetically modified to resist Kenyan stem borers started in May 2005 at an open quarantine site at Kiboko, near Nairobi. It is to be repeated following an inadvertent application of Furadan, a systemic insecticide, by the technician in-charge to control white grubs.

CIMMYT and KARI project managers said the erroneous use of the insecticide effectively invalidating the trial results, prompting them to notify the National Biosafety Committee (NBC) on 18 July 2005 who recommended that the current crop be immediately harvested and destroyed under the supervision of the Kenya Plant Health Inspectorate Service (KEPHIS), which also supervised its planting.

The Insect Resistant Maize for Africa (IRMA) project, a joint undertaking of KARI and CIMMYT, will apply for the NBC's permission to repeat the trial at the same site once the Furadan has disintegrated - eight weeks from the date it was applied.

For more information, contact Daniel Otunge of the Kenya Biotechnology Information Center at dotunge@absfafrica.org.

PEW EXPLORES MARKETPLACE STANDARDS FOR AGBIOTECH

Agricultural biotechnology continues to present new market opportunities and challenges. Hence, it is necessary that tools such as standards need to be reviewed to maximize new opportunities and minimize market disruptions. The Pew Initiative on Food and Biotechnology conducted a workshop to explore how standards are used in the marketing and trade of agricultural products, and the relevance different kinds of standards might have for agricultural biotechnology. Some of the highlights of the proceedings of that workshop which Pew has made available online include:

• An outline of the fundamental concepts for standards, why they exist and how they evolve in response to technological development and changing societal values.

• A simulated negotiation of how to bring a hypothetical genetically modified crop to the consumer market, involving the individual perspectives of real-life growers, buyers, sellers and processors of segregated agricultural commodities.

• A detailed discussion of the tests now used to detect genetically modified organisms, examining the strengths and weaknesses of various methodologies as well as the limitations of these technologies for producers, shippers and food manufacturers attempting to meet international regulatory requirements and customer demands.

• An examination of the current need for, development and implementation of, international standards with respect to genetically modified products as well as the impact the introduction of standards could have on international markets. Proceedings and highlights from the workshop can be viewed and downloaded at: http://pewagbiotech.org/events/0911/standards-proceedings.pdf.

DEVELOPING COUNTRIES CAN BENEFIT FROM FOOD BIOTECH

Modern biotechnologies, such as use of molecular typing to characterize microorganisms, could be successfully applied to traditional fermentation processes to improve understanding of these processes and improve product quality and consistency in developing countries. This was one of the insights in the moderated e-mail conference on “"Biotechnology applications in food processing: can developing countries benefit?" hosted by the Food and Agriculture Organization (FAO).

A summary document prepared by FAO qualified that potentially useful biotechnologies require adequate funds and education to be used effectively. In

addition, there is a need for capacity building and to better integrate biotechnology in the science and technology curricula of higher institutes of learning in developing countries.

Main themes discussed in the summary document include the importance and diversity of fermented products, control and variable quality of traditional fermentation, documenting information about traditional fermented food, scaling up production of traditional fermented foods, appropriateness of individual biotechnologies, and food safety and human health.

The summary report can be viewed online at http://www.fao.org/biotech/logs/C11/summary.htm.

ICRISAT, PARTNERS IDENTIFY NEW RESEARCH PRIORITIES

The International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) recently organized a consultation meeting with the partners of the Hybrid Parents Research Consortia to identify new research priorities. The Consortia plans to strengthen linkages with the industry and markets, and attract entrepreneurs to produce value-added products from sorghum and pearl millet.

Three consortia are each devoted to research on sorghum, pearl millet, and pigeonpea. The thrust areas for renewed research and partnership identified at the consultation meeting are (1) improved grain yields; resistance to shoot fly, grain mold and aphids; diversify hybrids parents for post-rainy season adaptation; and strengthen the development of sweet stalk sorghum for ethanol production; 2) develop pearl millet hybrids for less endowed regions such as western Rajasthan; continue the development of hybrids resistant to downy mildew; and develop hybrid parents and hybrids for fodder use; 3) develop pigeonpea hybrids with improved seed color and cooking quality; resistance to pod borer, Fusarium wilt and sterility mosaic virus; and reduce the cost of hybrid seed production; and 4) find more alternate uses for sorghum and pearl millet in their respective industries.

For more information, contact S Gopikrishna Warrier, Media Officer, at w.gopikrishna@cgiar.org. Visit ICRISAT at http://www.icrisat.org.

NEW PARTNERSHIP IN BIOTECH TRAINING

The National Institute of Education (NIE) in Singapore, which is an autonomous institute of the Nanyang Technological University, has partnered with Asia

Biobusiness (ABB), to deliver training courses and primers on many topical issues of crop and biomedical biotechnology.

First offerings aimed at teachers only, include "GMOs and GM Food Issues" (http://www.nie.edu.sg/gprica/courses/ic/pc_ic_gmo.htm) and "Innovation and Enterprise in the Natural Sciences - An Introductory Course to the New Skill Sets for a Science Plus Paradigm" (http://www.nie.edu.sg/gprica/courses/ic/pc_ic_iens.htm).

For those interested in these courses who are from industry and non-teaching professions, the same courses, and one on "Risk Communication" will be offered in November and December 2005 through Asia BioBusiness (http://www.asiabiobusiness.com). NIE (http://www.nie.edu.sg), ABB and ISAAA (http://www.isaaa.org) are currently developing a 5 day training course on "Commercialization of crop biotechnology", to be offered in Kuala Lumpur in late 2005.

Further details are available from Professor Paul S. Teng (psteng@nie.edu.sg).

RESEARCH

PAPER RECOUNTS RESEARCH ON SALINITY-TOLERANT PLANTS

Saline soils and salt water have become more and more dominant through the centuries, and naturally occurring salt-affected soils are estimated to cover a billion hectares worldwide. Scientists are thus trying to duplicate – but to little success – what Nature has done for some trees, shrubs, grasses, and herbs: allow plants to be salt-tolerant. In light of this problem, T.J. Flowers and S.A. Flowers of the University of Sussex ask, “Why does salinity pose such a difficult problem for plant breeders?” Their review appears in the September issue of the Agricultural Water Management journal.

Salt-tolerance, as it turns out, is a very complex genetic trait. In the article, researchers recount most of the molecular mechanisms underlying plant defenses against salty soils or water. This is accomplished by the presence of organic compounds in plant cell cytoplasm, such as glycinebetaine, mannitol and proline. Salt tolerance also depends on plant morphology, compartmentation and compatible solutes, regulation of plant transpiration, control of ion movement, plant cell membrane characteristics, tolerating high Na/K ratios in the cytoplasm, and salt glands. With these many factors, the authors expect that salt tolerance would depend on the action of many genes.

With the rather daunting tasks ahead for bioengineers seeking to produce salt tolerant plants, researchers recommend that plant breeders “invest in other avenues such as the manipulation of ion excretion from leaves through salt glands, the use of physiological traits in breeding programs, and the domestication of halophytes.”

Subscribers to ScienceDirect can read the complete article at http://dx.doi.org/10.1016/j.agwat.2005.04.015.

BT BASMATI RICE TESTED IN FIELD

Khurram Bashir and colleagues of the University of the Punjab, Pakistan report that a “Novel indica basmati line (B-370) expressing two unrelated genes of *Bacillus thuringiensis* is highly resistant to two lepidopteran insects in the field.” Their work appears in the October issue of the Crop Protection journal.

Two of the most destructive pests of rice are the yellow stem borer (YSB) and rice leaf folder (RLF). Both are susceptible to two different Bt toxins, so that rice possessing the two traits at one time might hold the best defense against the insects. In this study, researchers expressed cry1Ac and cry2A in Indica Basmati rice, and sowed the transgenic product under artificial YSB and RLF infestation. Transgenic lines showed up to 100% and 98% resistance against YSB, with 98% additional resistant against RLF as compared with the control. Transgenic lines also produced up to 59% more grains than control plants under artificially augmented conditions, while up to an 8% increase was recorded under natural infestations. However, researchers observed that lines containing two Bt genes were shorter as compared with lines containing either cry1Ac or cry2A alone or the control.

Subscribers to ScienceDirect can read the complete article at http://dx.doi.org/10.1016/j.cropro.2005.01.008.

BT CORN COMPARED TO NEAR ISOLINES IN FIELD PERFORMANCE

Bt corn has been proven to be highly beneficial to farmers who seek maximum yield even when beset with maximum corn borer infestation. Little study, however, has been devoted to Bt corn grown under low or moderate natural infestations. B.L. Ma and K.D. Subedi of the Eastern Cereal and Oilseed Research Centre (ECORC) Canada set out to do just that, as they document the

“Development, yield, grain moisture and nitrogen uptake of Bt corn hybrids and their conventional near-isolines.”

Using pairs of commercial hybrids and their transgenic Bt near-isolines, and growing these side by side for three consecutive years in Ottawa, Canada, researchers sought to determine which hybrid had the highest yielding potential, how different responses of Bt and non-Bt hybrids were to fertilizer application, and what yield advantage Bt hybrids had during low corn borer infestation. Their work appears in the September issue of Field Crops Research.

Researchers found that (1) under the conditions tested and with natural ECB infestation, there was no yield advantage of Bt hybrids in comparison with their conventional counterparts when stalk breakage of the conventional hybrids by the borer was low to moderate, (2) Bt hybrids have a similar response to fertilizer application rates compared to non-Bt near-isoline hybrids, and (3) under low to moderate infestation conditions, Bt hybrids do not justify their premium on seed cost. Therefore, researchers concluded, it would be very important for corn growers to consider the level of pest infestation and economic threshold before deciding to use Bt hybrids.

Subscribers to ScienceDirect can read the complete article at http://dx.doi.org/10.1016/j.fcr.2004.09.021.

ANNOUNCEMENTS

NEW FAO PORTAL ON TECHNOLOGY FOR AGRICULTURE

FAO's Research and Technology Development Service has just launched a new "Technology for Agriculture" (TECA) portal. It aims to improve "access to information and knowledge about available proven technologies in order to enhance their adoption in agriculture, livestock, fisheries and forestry". The portal offers an array of tools including the TECA database currently containing over 500 entries organised in eight different categories. See http://www.fao.org/sd/teca/index_en.asp (available in English, French and Spanish) or contact Teca-editor@fao.org for more information.

BIOTECHNICA 2005 IN GERMANY

The 14th International Trade Fair for Biotechnology – BIOTECHNICA 2005 - will be held in Hannover, Germany on October 18-20, 2005. Some 900 exhibitors

are expected in this event which encourages business partnerships on biotechnology. Other activities include partnering and innovations fora as well as lectures and product presentations. For more information email Oliver Wedekind at oliver.wedekind@messe.de or view online http://www.biotechnica.de.

CONFERENCES IN EUROPE

The European Commission is organizing a conference on "The Knowledge-based Bio-economy" on September 15-16, 2005 in Brussels, Belgium in recognition of the growing importance of this emerging sector. Details are available at http://europa.eu.int/comm/research/conferences/2005/kbb/index_en.html.

Budapest, Hungary is the venue of "Biotechnology Investment Opportunities in the CEE" conference on September 20-21, 2005. Discussions will center on the current landscape, growth prospects and business opportunities in the biotech sector within the CEE region. View http://www.ibc-hungary.hu for additional information.

CBT NEW FEATURE

Amongst Rock and Blue-Green Waters: Agricultural Practices of the Havasupai

Weather-carved, wind-beaten, water-hewed rocks make the Grand Canyon true to its name: with layers of fossils and stone, and gorges as deep as eons gone by, the Canyon is the first place on earth to find history, and the last place to plant crops.

A Native American tribe, however, has long lived in what the unacquainted see as a barren wasteland. Deep in the Grand Canyon are smaller, lesser canyons, some of them bedecked in brush, others encircled by creeks. One, in particular, is surrounded by four waterfalls, whose columns and shelves anchor them to the valley below. This is Havasu Canyon, home to the Havasupai tribe.

The Havasupai – the people of the Blue-Green Waters – consider themselves the traditional Guardians of the Grand Canyon. They were originally hunters and gatherers, but with the changing seasons and passing years, they eventually took to practicing intensive agriculture. During the winter, they moved to the Havasu canyon's plateau, where the rock and bush provided them shelter. In the

summer, however, they moved to the bottom of the canyon, built mud dwellings, and planted crops in the canyon and near springs.

A lake once stood in a side canyon close to the Havasu, and the silt it had left behind also provided fertile land – a provident, rock-strewn field on which the tribe could build its village. For years, the Havasupai irrigated their main crops of corn, red and spotted pinto beans, and squash. They gathered pine nuts, mesquite pods, prickly pear, yucca, and the flower stalks of agaves. They also mined basalt and red ochre for their tools and dyes.

While the fame of the Grand Canyon spread, history was not as kind to the Havasupai. With the coming of a new age of exploration came progress, visitors, and diseases hitherto unknown to they who had long lived in isolation. Only a little over a hundred Havasupai were left at the end of the 19th century, after a series of epidemics swept through the tribe and nearly wiped them out. A federal grant, however, came a few decades later, aiding the development of a cooperative which would later build the Havasupai Reservation tourist industry, as well as improve Havasupai farmlands and farming techniques.

To farm and live amongst rock was a feat that history would not suffer to go unnoticed.

A few years ago, sunflower growers in the North American Southwest found that their crop was inflicted with blight. Research into equipping future sunflowers with blight immunity moved scientists to search in local seed banks, where they found a sunflower strain containing the blight resistant trait. This allowed scientists to breed the strain into commercial cultivars and thus saved the industry millions of dollars.

The source of the resistant sunflower? The seed reserves of the Havasupai.

For more information on the tribe, visit
http://www.public.asu.edu/~hbalasu/havasu.htm.

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.
