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)

August 19, 2005

In This Issue:

NEWS

CHALLENGES OF AGRO-BIOTECH EXPLORED

There is a need for concerted efforts on the part of the international community to link up agro-biotechnologies and intellectual property rights with development objectives. This was highlighted by Pranav Desai of the Centre for Studies in Science Policy of Jawaharlal Nehru University, New Delhi, in a paper “Challenges of agro-biotechnologies, intellectual property rights and globalization” published in Asian Biotechnology and Development Review.

Desai noted that the new economic environment of liberalized policies, increasing globalization, and the presence of emerging technologies, has shaped the direction for science and technology and its organizational structure. This reality has raised several socio-economic, ethical and political issues that need to be addressed. For example, national systems of innovations are under increasing strain due to liberalization, competition, increasing range of technologies, and uneven technological development. Similarly, strategies to maximize benefits of emerging technologies should take into account means to dovetail biotechnology with economic priorities, resource endowment and the science and technology infrastructure of a country.

Read the full article in the Volume 7, No. 2 issue of Asian Biotechnology and Development Review. Visit the journal's website at http://www.ris.org.in/abdr.html.

INDIA WORKSHOP HIGHLIGHTS MANAGEMENT OF GM FIELD TRIALS

In the recent "National Workshop on Management of Field Trials of Genetically Modified Crops" in New Delhi, India, Croplife International introduced its Model Best Practices Guideline for the Management of Confined Field Trial of Genetically Engineered Plants. The first half of the program consisted of a training session highlighting the important educational tools found in CropLife International's Field Trial Compliance Protocol. The second session included a discussion on the current state of field trials in India and related issues under the Indian regulatory system.

The workshop featured several experts and government officials concerned with GM field trials. Among them was Dr. Morven McLean of Agbios, Canada, who highlighted the key Standard Operating Protocols (SOPs) for every stage of confined field trials, from the transport and storage, to the management of the confined trial site, the harvest and disposal of materials, and the management of trial sites after harvest.

Dr. KR Koundal, director of the Indian Council of Agricultural Research's National Research Center on Plant Biotechnology (ICAR NRCPB), made a presentation on "Transgenic Crop Development and Evaluation" and highlighted ICAR's guidelines and its six stages of transgenic crop development and evaluation by All India Coordinated Trials Projects. ICAR Deputy Director General for Crop Science Gautam Kalloo had earlier advanced ICAR's support in conducting field trials of GM crops and called for suggestions to improve the existing guidelines for transgenic crop development and evaluation in the ICAR system.

The workshop's participants included a number of government officials, as well as representatives from public and private research groups.

The workshop was organized by The International Service for the Acquisition of Agri-biotech Applications (ISAAA) in collaboration with the Biotech Consortium of India Ltd (BCIL), with support from CropLife International (http://www.croplife.org) and Agbios, Canada (http://www.agbios.com). For more information, contact Bhagirath Choudhary of ISAAA South Asia at b.choudhary@isaaa.org.

NEW RESEARCH TO LOOK INTO COCOA

A research team from the United Kingdom's University of Reading will undertake a five-year, Eu 1.4 million project to study the cacao genome. The project aims, among others, to assist cocoa farmers in identifying high-yielding varieties, dealing with threats to the crop, and developing new varieties of cocoa. The research is being funded by Cocoa Research UK (CRUK) and the government of the Netherlands.

CRUK was established in 1996 to promote UK-based cocoa research. It seeks to safeguard the future of the cocoa trade and industry, guarantee that consumers receive high quality chocolate products, and ensure continuing supplies of good quality cocoa at prices which provide a worthwhile return to all those involved in the cocoa chain, from growers through to chocolate manufacturers.

For more information, visit http://www.cocoaresearch.com/ and http://www.confectionerynews.com/news/news-ng.asp?n=61909-cocoa-genes-research.

SOY-BASED PRODUCTS ON THE RISE IN EUROPE

Demand for soy-based alternatives to dairy and meat products has resulted in a growth of 10 per cent in the European market. Market analyst Prosoy reported that the positive health impact of soya as well as changes in lifestyle contributed to this development.

Over 100 soy-based products are now readily available in European supermarkets. Innovations have been introduced particularly in improving its taste, hence boosting its acceptance by consumers. Prosoy predicts a double-digit growth in the next three years.

For more news on food related topics, visit http://www.navigator.com.

RESEARCH

IFPRI REPORTS ON AFRICA PROSPECTS FOR 2025

In “Looking Ahead: Long Term Prospects for Africa’s Agricultural Development and Food Security,” Mark Rosegrant and colleagues of the International Food Policy Research Institute (IFPRI) use scenarios to illustrate the future for Africa if current economic trends continue.

Using computer modeling to project supply, demand, price, and trade of 32 major food commodities for five regions of Sub-Saharan Africa and two regions of West Asia and North Africa through to 2025, researchers found that 1) the number of hungry children in Africa would decrease dramatically to 9.4 million by 2025, 2) West Asia and North Africa will actually see a decline of 2.3 million hungry children by 2025, and 3) agricultural production grows only modestly to 2025. To address food and nutrition security for Africa, researchers recommend common policy priorities for governments to consider. These include 1) reform of agricultural policies, trade, and tariffs; 2) increased investment in rural infrastructure, education, and social capital; 3) better management of crops, land, water, and inputs; 4) increased agricultural research and extension; and (5) greater investments in women. The report also recommends investment in both conventional breeding and biotechnology, such as genetic engineering of key crops, tissue culture, and other molecular techniques.

The report can be downloaded at http://www.ifpri.org/2020/dp/vp41.pdf. Supplements include fact sheets on child malnutrition in Africa, policy and investment priorities, and water and food security, all of which may be downloaded at http://www.ifpri.org/media/20050811Outlook2025.asp.

PAPER RECOUNTS NEW GM METHODS

One of the newest methods for introducing genes into agriculturally-important crops, as well as ensuring proper insect resistance management, is gene pyramiding, or introducing more than one resistance trait into plant cells. The techniques involved are recounted by Dr. Claire Halpin of the University of Dundee in the United Kingdom, as she looks into the future “Towards ‘stacked’

traits - prospects for multi-gene manipulation in plants." Her article appears in the latest issue of the Information Systems for Biotechnology News Report. Current strategies in stacking traits involve adding the transgenes one at a time into plant cells, which may be done by either crossing a plant containing one transgene with other plants harboring other transgenes, or re-transforming transgenic plants with additional transgenes. Another stacking method is to introduce more than one transgene at one time, say by having different multiple DNA fragments on one tungsten bullet in biolistics. Yet another method is to link the genes together into a single sequence so that they will transfer as a single entity into a plant.

The newest strategies, Dr. Halpin writes, now involve the use of bacterial operons and internal ribosome entry sites (IRESs). In this technique, scientists can introduce a multiple number of genes into one vector, along with DNA sequences which, when transcribed, attract ribosomes to different sites of the transcript. These different sites are the start sequences of different proteins, allowing different gene products to be expressed from a single transcript. Yet another method is to introduce a single gene with a single IRES, to be expressed as a single protein containing multiple domains. Once in a cell, this polyprotein could be broken down by the host cell into component proteins, all of which may code for different traits.

Read more at http://www.isb.vt.edu/news/2005/news05.aug.htm#aug0501.

GENE FOUND TO CONTROL RICE PLANT REGENERATION

Most of today's experiments with plants involve a tissue culture step, where plant tissues are transferred to a medium and made to regenerate whole plants. This regeneration is an essential step in genetic transformation of plant cells, and depends on the genetic background of the plant involved. For instance, it is not easy to culture and regenerate monocots, including rice, wheat, and maize, all of which are agronomically important crops.

In "Isolation of a rice regeneration quantitative trait loci gene and its application to transformation systems," Asuka Nishimura of the Honda Research Institute in Japan and colleagues find a way to make a hitherto hard-to-regenerate rice strain grow well in an artificial medium. Their findings appear in the Proceedings of the National Academy of Sciences online.

By conventional crosses of low-regeneration rice strain Koshihikari with high-regeneration rice strain Kasalath, researchers identified some quantitative trait loci which control the regeneration ability in rice. Quantitative trait loci (or QTLs) are genes which code for quantifiable or measurable traits, such as plant height.

The main gene in the locus, researchers found, encodes ferredoxin-nitrite reductase (NiR), which is expressed in higher levels in Kasalath than in Koshihikari. Using the NiR gene as a selection marker, researchers succeeded in selectively transforming a foreign gene into rice.

For more, download the article at http://www.pnas.org/cgi/reprint/102/33/11940.

DOCUMENT REMINDERS

ANZFA BOOKLET ON GM SAFETY ASSESSMENT

Food Standards Australia New Zealand (FSANZ) has released a booklet "GM foods: Safety assessment of GM foods" which incorporates recent developments in safety assessment, particularly international methods. It is a follow-up to the booklet published in 2000 on GM foods and the consumer. The new publication contains a overview of safety assessment (i.e., basics of gene technology, safety assessment process, GM foods in the marketplace), a detailed look at safety assessment, and a summary of scientific data used by FSANZ to assess safety of GM foods. For a copy of the booklet, visit http://www.foodstandards.gov.au.

USDA RELEASES COUNTRY REPORTS ON AGRI-BIOTECH

The United States Department of Agriculture's Foreign Agricultural Service has released its Global Agricultural Information Network Reports of selected country situationers on agricultural biotechnology. These countries include Thailand, Japan, Indonesia, and Singapore.

The reports which were prepared by country specialists discuss country overviews on biotechnology and tackles issues such as trade and production, biotech policy, marketing issues, capacity building and outreach programs.

The full reports can be downloaded from http://www.fas.usda.gov/gainfiles/200508/146130571.pdf.

COTTON DBASE LAUNCHED

The Agricultural Research Service (ARS), in association with Cotton Incorporated (CI) and Clemson University Genomics Institute (CUGI) has launched the Cotton Microsatellite Database. This collection is the first step toward development of a

DNA marker database and creating a map of the cotton genome. Access the database at http://www.mainlab.clemson.edu/cmd.

ANNOUNCEMENTS

INTERDROUGHT II SLATED FOR SEPTEMBER

The second Interdrought Meeting is scheduled for September 24-28, 2005, in Rome, Italy. The meeting is especially concerned with the drought situation in developing countries, and aims to serve as a platform for presenting and debating key issues and strategies relevant for increasing the yield and stability of crops under drought conditions by genetic and crop management approaches.

For more information, write to Dr. Hans Bohnert at heid@lifeuiuc.edu, or visit http://www.plantstress.com/id2.

BIO-EUROPE 2005

The International Congress Center in Dresden, Germany will be the site of Bio-Europe 2005, the 11th Annual International Partnering Conference scheduled November 7-9, 2005. Last year's conference attracted over 1400 delegates and 850 companies. More information can be obtained from http://www.ebdgroup.com/bioeurope/index.htm.

ICAR TO HOLD IPR CONFERENCE

The Indian Council of Agricultural Research and the Indian Potato Association will hold a "National Conference on IPR and Management of Agricultural Research" on August 27-29, 2005 at the NASC Auditorium, Pusa, New Delhi. The Conference will be organized into 8 technical sessions on IPRs in Indian perspective, SWOT analysis for protection of intellectual property rights in India, patenting in the Indian context, patenting and IPR portfolio management, technology transfer and public-private partnership, facilitated access to genetic resources and associated knowledge, and two sessions on protection of plant varieties and farmers' rights.

For more information, contact Dr. J.S.Minhas, the Organizing Secretary, at minhasjs@excite.com

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CBT NEWS FEATURE

Born From an Earth of Stars: Agricultural Practices of the Mapuche

Like a slender knife set between sea and soil, Chile cuts thinly through the South American continent, with blade rich in lakes and plains, mountains and rivers. Further south of the country are marshes and forests, fringed by the snow-capped Andes Mountains, bordered by the Bio-Bio River, and home to a proud, stalwart tribe who have lived and resisted invasions for hundreds of years.

Before the Spanish came, before the Incas settled and built their palaces, there were the Mapuche, the People of the Land. All their movements, rituals, and lives revolved around the earthly elements. Even their language, Mapu-dugun, an oral Language of the Land, emerged in the wake of moving earth and the sounds of its inhabitants, from the chirps of the birds, to the patter of rain on the rocky slopes of the Andes. As one modern Mapuche poet puts it: This soil is inhabited by the stars. The water of imagination sings in this sky.

Fierce and warlike, the Mapuche seemed to be the least likely to have deep, religious ties with the earth they worked and lived upon. The men were trained to be warriors, or hunters, during days of peace. They were not cannibals, but had a customary Proculon, where a brave captive was slain with a club, and his heart cut out and eaten by the participants to acquire his courage thereby. They would also cut off limbs through the use of sharpened shells, and roast and eat them while the still living victim watched.

Whatever their strange practices, the Mapuche were linked to the earth, and their economy was based largely on hunting and slash-and-burn agriculture. They gathered wild plants; hunted and bred llamas, guanacos (small llama-like cameloids), and other minor cattle; gathered urchins, crabs, mussels and kelp; and hunted seals to make tough leather helmets and armor.

They also depended on wild plants for sustenance, and thus gathered strawberries, myrtle, berries, and pine kernels from the woods. They cleared their forests to plant corn and potatoes, while cultivating beans, quinoa (a unique Andean grain), marrowfats, chili peppers, pumpkins, and beans in their gardens.

When harvest time came, the Mapuche performed the Nguillatun, an annual celebration to thank their deities and ancestors for the blessings of the previous year. The Nguillatun would take place during the full moon, and would last for four days. It was celebrated in a ritual space molded in the shape of a “U” opening to the West, the sacred part of the world according to Mapuche legend. During the Nguillatun, priests and participants would engage in rituals, dances, prayers, sacred songs, horseback rides, and earth offerings, where they spread

tobacco and the blood of sacrificed animals over the soil that had served them well.

The Mapuche lived as such, with prayers and feasts intertwined with the land, and with wars alternating with periods of peace. In a few centuries, however, the Spanish arrived, subjugating the Incas, taking nearly all of South America, and waging war on those who resisted. The Mapuche proved to be the greatest, strongest opposition, and it was their defense that sustained the tribe against the Spaniards during the Arauco War.

Despite all invasion and attack, and despite being greatly weakened, the Mapuche endured, leaving in their wake 50,000 dead Spanish soldiers, and 60,000 injured or killed auxiliaries. Mapuche soil became known as the Spanish Soldiers' Cemetery of the Americas, and the still unyielding invaders baptized as "huinca" – the Mapu-dugun word for "thief." The Spanish eventually paid the Mapuche, but the damage had already been done, and had only just begun.

Today's Mapuche are subsistence farmers, raising cash crops such as wheat, barley, potatoes, sugar beets, and oats, but living on far less land than they ever had. They still till their soil, plough their fields, and harvest their grains – and their pride endures. They are forever the People of the Land, speaking the language of the earth. They have fought bravely for their territory, and believe that they are fighting it still. In all areas, in all the centuries that have gone, they are the farmers, molded of the stars of the earth, warriors of an ever changing world.

For more on the Mapuche, visit
http://www.soa.org.uk/resource/articles/araucanian.htm.

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.
