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)

September 2, 2005

In This Issue:

NEWS
- Ghana Formulates Biosafety Framework
- Call for Biotech Development in Bangladesh
- EC Oks Biotech Rapeseed as Animal Feed

RESEARCH
- Transgenic Alfalfa Produces Isoflavones
- Findings on Mexico Maize Released
- Brassica Gene Improves Stress Tolerance in Chinese Cabbage
- Arabidopsis Lends Salt Tolerance to Potato Plants

DOCUMENT REMINDER: PRRI Guide Up For Comment

DID YOU KNOW?

ANNOUNCEMENTS

CBT NEWS FEATURE: Of Legends Written in Bamboo and Bones: Agricultural Practices During China's Hsia Dynasty

---

NEWS

GHANA FORMULATES BIOSAFETY FRAMEWORK

Christine Churcher, Ghana's Minister of Environment and Science, recently launched the country’s National Biosafety Framework in Accra, Ghana. This framework is meant to ensure an adequate level of production in the field of safe transfer, handling, and use of living modified organisms resulting from modern biotechnology.

“By the accession,” Ms. Churcher said, “We affirm our position for the safe use, handling, and transportation of genetically modified organisms that might find

[their] way to Ghana." She assured Ghanaians that all GMOs will pass through rigorous inspection to ensure that they conform to the country's regulations and standards.

Edward Nsenkyire, Chief Director of the Ministry of Environment and Science, stressed that Ghana's position on the issue is strictly based on the precautionary principle, and that every effort will be made to ensure safety in the use of GMOs. Professor Alfred Oteng-Yeboah, Chairman of the National Biodiversity Committee, said that with the national framework in place, wildlife and other organisms in Ghana would be adequately cared for and protected.

With reports from http://allafrica.com/stories/200508180613.html and http://www.ghanaweb.com/GhanaHomePage/NewsArchive/artikel.php?ID=88180 .

For more information on the framework, visit http://www.unep.ch/biosafety/partcountries/GHcountrypage.htm. Download the a copy of the document at http://www.unep.ch/biosafety/development/countryreports/GHNBFrep.pdf.

CALL FOR BIOTECH DEVELOPMENT IN BANGLADESH

Bangladesh has to focus on capability building in both public and private sectors to encourage biotechnology development in the country. This was stressed by Dr. M.A. Halim Khan, Vice Chancellor of the BSMR Agricultural University, who served as chief guest during the workshop on "Reporting biotechnology: Issues and opportunities for the news media" held at the BRAC Centre, Dhaka.

Abdul Awal Mintoo of the East-West Seed Co. in Bangladesh said that his company was committed to spend TK20 crore or more to develop a modern biotechnology laboratory in Bangladesh. Biotechnology experts who spoke during the workshop called for efforts to create greater public awareness on biotechnology particularly with regards the issue of safety. It was announced that while biotech crops are not yet commercially planted in Bangladesh, seeds of Golden Rice have already been brought into the country for experimentation at the Bangladesh Rice Research Institute. Biosafety guidelines have been set and are awaiting approval.

The two-day workshop was organized by the International Service for the Acquisition of Agri-Biotech Applications (ISAAA) Bangladesh Office, International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), and Syngenta Foundation for Sustainable Agriculture. More information about the workshop can be obtained from KM Nasiruddin, ISAAA Bangladesh country coordinator, at k.nasiruddin@isaaa.org.



Dr M A Halim Khan, Vice Chancellor of the BSMR Agricultural University, calls for greater initiatives in biotechnology.

EU OKS BIOTECH RAPESEED AS ANIMAL FEED

The European Commission has given a 10-year permission to Monsanto Co. for a herbicide resistant rapeseed to be imported into 25 nations for animal feed. This is the Commission's second approval of a Monsanto-developed product, the first being a biotech corn product resistant to rootworm also for animal feed.

Known as GT73, the rapeseed product was pronounced to be safe as conventional oilseed in a scientific evaluation conducted earlier. It is currently grown in the United States, Australia and Canada and is allowed for sale in those countries including Japan, the Philippines and South Korea.

Additional details may be obtained from http://quote.bloomberg.com/apps/news?pid=10000080&sid=a8rflmlRvF1c.

RESEARCH

TRANSGENIC ALFALFA PRODUCES ISOFLAVONES

Isoflavonoids are an interesting group of compounds: they are produced mostly by legumes in response to plant stress, but have also shown potential in combating hormone-dependent cancers, cardiovascular disease, osteoporosis, and menopausal symptoms. Engineering isoflavonoid biosynthesis in plants can

thus provide a good source of these compounds, for plant-based dietary supplements, and for providing plants extra defense mechanisms.

Bettina E. Deavours and Richard A. Dixon of the Samuel Roberts Noble Foundation set out to perform “Metabolic Engineering of Isoflavonoid Biosynthesis in Alfalfa.” They engineered alfalfa leaves to produce genistein glucoside without affecting regular plant growth or the expression of other alfalfa genes. Their findings appear in the latest issue of the Plant Physiology journal.

Using the IFS gene from the model legume *Medicago truncatula*, or the barrel medic, researchers successfully generated transgenic alfalfa producing, among other isoflavonoids, genistein. Since genistein is not normally synthesized in alfalfa leaves, scientists used microarrays to track if its accumulation caused any unexpected effects on gene expression. Tests showed, however, that gene expression carried on as usual.

Plant Physiology subscribers can read more by accessing the full article at http://www.plantphysiol.org/cgi/reprint/138/4/2245. Other readers can view the abstract at http://www.plantphysiol.org/cgi/content/abstract/138/4/2245.

FINDINGS ON MEXICO MAIZE RELEASED

Sometime in 2000, scientists released research findings that stated that they had found evidence of genetically modified corn in maize landraces grown in Oaxaca, Mexico. This was significant, because transgenic maize has never been approved for cultivation in the country.

Five years later, S. S. Ortiz-García and colleagues publish their findings in the Proceedings of the National Academy of Sciences. Their article, “Absence of detectable transgenes in local landraces of maize in Oaxaca, Mexico (2003–2004),” is published in the journal’s latest electronic edition.

Researchers worked on 70 plants in 125 fields and 18 localities in the state of Oaxaca during 2003 and 2004. They performed the polymerase chain reaction (PCR) on DNA samples from 153,746 sampled maize seeds, screening for the 35s promoter of the cauliflower mosaic virus and the nopaline synthase terminator from *Agrobacterium tumefaciens*, with the PCR reaction optimized to detect at least 0.01% transgenic material. One or both of the transgene elements are present in all transgenic commercial varieties of maize.

PCR could not detect any transgenic sequences in the seeds sampled, and authors conclude that transgenic maize seeds were absent or extremely rare in the sampled fields. They, however, caution readers about the limitations of their research. For instance, their seed sampling may not have been thorough, and

the samples could be less than representative of the local maize crop. They also caution readers from extrapolating the findings to other regions of Mexico, or from considering the current situation likely to remain unchanged.

For more information, download the article at http://www.pnas.org/cgi/content/full/102/35/12338.

BRASSICA GENE IMPROVES STRESS TOLERANCE IN CHINESE CABBAGE

Late embryogenesis abundant (LEA) protein genes are expressed by plants during the later stages of seed development, but may also be expressed when plants are exposed to environmental stresses. This means that engineering LEA genes into plants could give these plants a chance to survive under environmental stresses, such as salinity and drought.

In the September issue of the Journal of Plant Science, Byong-Jin Park of Tohoku University, Japan and colleagues report the successful “Genetic improvement of Chinese cabbage for salt and drought tolerance by constitutive expression of a B. napus LEA gene.” Chinese cabbage is an important vegetable in Asia, especially in China, Korea, and Japan.

Using Agrobacterium transformation, as well as the LEA gene from *Brassica napus*, researchers transformed cabbage cells, regenerated the plants, and subjected them to various stress conditions. They found that 1) transgenic cabbage germinated even at high salt concentrations, while non-transgenic cabbage did not; 2) seedlings of transgenic plants remained healthy during high salinity stress, while those of non-transgenic plants wilted; 3) non-transgenic plants wilted after two weeks of water deprivation, while transgenic plants continued to grow; and 4) resupplying water to the plants allowed transgenic plants to keep on growing, while non-transgenic plants were no longer able to recover.

Subscribers of ScienceDirect or the Journal of Plant Science can read the article at http://dx.doi.org/10.1016/j.plantsci.2005.05.008.

ARABIDOPSIS LENDS SALT TOLERANCE TO POTATO PLANTS

Plant cells accumulate proline when under drought and salt stress, as it can protect cellular structures from drying out. The gene for pyrroline-5-carboxylate synthetase (P5CS) has been found to increase proline production. Once introduced into rice, wheat, and carrot plants, the gene has also been found to increase tolerance to salt stress.

Aida Hmida-Sayari and colleagues work on another crop this time, as they report that the “Overexpression of ?1-pyrroline-5-carboxylate synthetase increases proline production and confers salt tolerance in transgenic potato plants.” Their research appears in the October issue of the Journal of Plant Science. Researchers transferred the Arabidopsis P5CS gene to potatoes through Agrobacterium transformation, and found that the transgenic potato plants accumulated proline and grew in high salinity conditions. They also found that the high salt stress lowered tuber yield and weight by as much as 63% in non-transgenic potato lines, while tubers from transgenic lines were not as greatly affected.

Subscribers of ScienceDirect or the Journal of Plant Science can read the article at http://dx.doi.org/10.1016/j.plantsci.2005.05.025

DOCUMENT REMINDER

PRRI GUIDE UP FOR COMMENT

The Public Research and Regulation Initiative (PRRI) has updated its Guide on genetically modified crop plants, which focuses on the technical and scientific information requirements of notifications, and in particular on risk assessment. The module contains, among others, guidance on risk assessment, an Annex with an example of a summary of relevant characteristics of a crop plant, and an Annex with an example of a risk assessment.

The PRRI invites public researchers in this field to provide feedback on the usefulness of such a Guide, the overall approach, and on the details of the draft module. Public researchers are, moreover, asked to send in proposals for additions in places where the draft Guide says “to be completed,” preferably as “track changes” and “comments,” to: pietvandermeer@cs.com with copy to: kim.meulenbroeks@efbpublic.org. Download the document at http://pubresreg.org/Members/Kim/working%20groups/biosafety%20protocol/Notificationguide

---
DID YOU KNOW?

During the nine-year period 1996 to 2004, the global area of biotech crops increased more than 47 fold, from 1.7 million hectares in 1996 to 81.0 million hectares in 2004, with an increasing proportion grown by developing countries. More than one-third (34%) of the global biotech crop area of 81 million hectares in 2004 was grown in developing countries where growth continued to be strong. It is noteworthy that the absolute growth in biotech crop area between 2003 and 2004 was, for the first time, higher for developing countries (7.2 million hectares) than for industrial countries (6.1 million hectares). The increased hectarage and impact of the five principal developing countries (China, India, Argentina, Brazil and South Africa) growing biotech crops is an important trend with implications for the future adoption and acceptance of biotech crops worldwide.

For relevant information on the global status of biotech crops, visit the Global Knowledge Center's website (http://www.isaaa.org/kc). A section on the Global Status of Commercialized Biotech/GM Crops has an extensive list of resource materials including global status summaries by country, crop, trait, and adoption rates; materials for downloads; examples of biotech crops; and an extensive study on Bt cotton. Other sections include biosafety regulations, global value of GM crops, global R&D expenditures, labeling legislations, public attitudes, and position statements.

ANNOUNCEMENTS

TT WORKSHOP IN UK

The Gordon Science Education and Policy Conference on "Global Aspects of Technology Transfer: Biotechnology" will take place at Queen's College, Oxford, United Kingdom from September 4-9, 2005. Up for discussion are biotechnology impacts on World economy and how it relates to scholarly research on technology transfer between government, industry, and universities/nonprofits. Visit http://www.grc.uri.edu/programs/2005/global.htm for details of the conference.

AUSTRALIA SPONSORS BIOTECH CONFERENCE

“Contributing to a sustainable future” is the theme of the Plant Tissue Culture & Biotechnology Conference to be conducted on September 21-24, 2005 at the Ecology Centre of the Botanic Gardens and Parks Authority at Bold Park, Perth, Western Australia. This conference will discuss developments in plant tissue culture and biotechnology, highlighting contributions to sustainability in

horticulture, agriculture and forestry, and conservation of the natural environment. For more information, email Jen Mccomb of Murdoch University at jmccomb@murdoch.edu.au.

LATIN AMERICA SYMPO ON GM

The 4th Biosafety Congress and Latin American Symposium on Transgenic Products will be held September 26-29, 2005 at Porto Alegre, Brazil. Those interested to know more about the congress can visit http://www.anbio.org.br.

FHAO SEEKING EXECUTIVE DIRECTOR

The Future Harvest Alliance Office (FHAO), a unit of the Consultative Group on Agricultural Research (CGIAR) is seeking an Executive Director to be based in Rome, Italy. The successful candidate will be contracted by the International Plant Genetic Resources Institute (a CGIAR Centre based in Rome). Email applications to IPGRI-FHAOVACANCY@cgiar.org. For further information about the position, please contact Dr Meryl Williams, Executive Officer, at m.j.williams@cgiar.org.

CBT NEWS FEATURE

Of Legends Written in Bamboo and Bones: Agricultural Practices During China's Hsia Dynasty

The world’s largest, most densely populated country is also one of the most ancient sites of civilization. China is bound and interspersed by nearly all kinds of environments, from seas, to deserts, to forests, to mountains. In the north, its Great Plain covers more than 300,000 square kilometers, and is outlined by the Yellow River and the mighty Yangtze, making it a fertile land for agriculture, conflict, and history.

It is here, in these plains, that China first came into being. Millet came in from the north. Rice came from the burgeoning Southeast Asia in the south. The Yellow River provided silt to nearby soils, but flooded the lowlands and destroyed many plantations as well. In the midst of this constant stream of flood, rains, and harvests was born a dynasty – the first that Chinese civilization would ever know,

with its wars and kings written upon bamboo annals and oracle bones, with its tales and triumphs shrouded in the fog of legend.

For thousands of years, historians regarded the Hsia dynasty as the mere stuff of tall tales. It was only in the last few decades that excavations provided evidence of a true dynasty, of a myth finally having a basis in fact.

Chinese creation legends tell of a deity called Pangu, who created the universe and sent a dynasty of sage-emperors to rule it. These wise rulers taught the Chinese to communicate, feed, clothe, and build shelter for themselves, and established the Hsia dynasty. One of the first emperors, Yu, drained away the great flood from the Yellow River, making ancient China habitable.

History is a little less fantastic. Records and excavations show that food production and storage, development in tool technology, social organization, and the shift from nomadic communities to settled, agricultural villages was progressing in China by at least 6000 B.C. China was moving into the Bronze Age, and one group of people, the Hsia, held sway over China with their command of copper and citadel construction.

China grew in the Hsia era. People wove silk, molded fine pottery, and baked bricks to build their homes. They learned how to control floods and direct rivers to irrigate their fields. The Hsia was a slave society, governed by ruling families who used elaborate, dramatic rituals to confirm their power to govern, or communicate with spirits for help and guidance.

The Hsia were an agrarian population, and domesticated a good number of crops. Drought resistant millet first appeared in around 5000 B.C. in Northern China, while rice was being grown in the Southeastern wetlands at the same time. Wet rice agriculture predominated – a labor-intensive process which also required that farmers channel water from the Yellow River to their rice paddies. So dependent was the civilization on the river that it encouraged the need for political organization, since regular flooding likewise brought with it the need to construct dikes and dams to control its waters.

The Hsia dynasty ruled most of China, supervising the making of citadels, the harvest of rice and millet, and the flow of the Yellow River. Its last ruler, however, had none of the spirit of the sage kings, and was reputedly a drunkard and wastrel who spent his days cavorting with his concubines. The time was ripe for a revolution – after four hundred years of almost mythical wisdom and progress, the Hsia was overthrown, and succeeded by the Shang, China’s first historic dynasty. The legacy continued, however. A short dynasty called the Xia came to light a few hundred years later. These people were Huns, and claimed that they were descendants of the first Hsia.

The history of the Hsia was written as myth on bamboo, or as tall tales on bones. But its true history flows through today's harvests, and lives in the silent, mud-darkened paddies that spread like black-speckled green fire through China's landscape. Its records exist in the waters of the Yellow River, as it flows through mountains, stone, and soil, and as it rises and falls as it has done for thousands of years and generations past.

For more information on the Hsia Dynasty, read Dr. Robert Churchill's "Handbook for the Study of Eastern Literatures: Ancient China," available in electronic copy at http://mockingbird.creighton.edu/worldlit/works/churchill/china.htm, or visit http://web.ics.purdue.edu/~rauhn/anc_china.htm.

Do not hesitate to tell other colleagues/contacts about this mail list. If they wish to join, they should send an e-mail message to knowledge.center@isaaa.org leaving the subject blank and entering the one-line text message as follows: SUBSCRIBE Crop Biotech Network

To stop receiving this newsletter, please send an e-mail message to knowledge.center@isaaa.org and write, "unsubscribe newsletter" in the subject box.

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.

Copyright (c) 2005. CropBiotech Net.