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

PHILIPPINES APPROVES 4TH BIOTECH CORN

The Philippines has recently approved the sale and planting of a fourth biotech corn developed by Monsanto Co. Merle Palacpac, chief of the Plant Quarantine Service of the Bureau of Plant Industry, Department of Agriculture, said that the fourth biotech corn, referred to as stacked-trait corn, is resistant to the Asiatic corn borer pest and is tolerant to glyphosate, a herbicide. The latest approved

corn combines the traits of two earlier approved biotech corn varieties developed by Monsanto, the Round-up Ready corn and Bt maize.

For more information, email Merle Palacpac at mpalacpac@pldtdsl.net.

CHINA DOCUMENTS BT COTTON EXPERIENCE

Bt cotton, the first biotechnology crop approved for commercialization in China, now accounts for more than 60 percent of the total acreage of cotton in the country. This was a result of scientific activities on the research and development of transgenic insect resistant cotton which was incorporated as one of the key projects under the Ministry of Science and Technology's National High Tech R & D Program (863 Program) institutionalized in 1996. This perspective was discussed in the book "Transgenic Cotton" which traces Bt cotton development in China.

Transgenic Cotton presents a general situation of cotton production breeding in China, and moves on to a multidisciplinary discussion that includes molecular cloning and characterization, transformation, genetics and breeding, cultivation, entomology, pathology, biosafety assessment, and economic impacts.

More than 30 institutions collaborated on the publication of the book, which is believed to be the first of its kind in the English language. It is edited by JIA Shirong of the Chinese Academy of Agricultural Sciences and chief scientist of the 863 Program. For more information, visit http://www.lifescience.com.cn.

ISLAM AND BIOTECH ADDRESSED IN MALAYSIA

Essentially, there is no paradox between the Islam faith and biotechnology. However, the development and use of biotechnology must be governed by guidelines set by Islam from the maqasid-al-shariah ("purposes of the Islamic jurisprudence"). Shakh Mohd Saifuddeen bin Shaikh Mohd Salleh, senior fellow of the Centre for Science and Technology, Institute of Islamic Understanding Malaysia (IKIM) explained this view during a seminar on the "Sustainable utilization of biodiversity and the related issues on biosafety in an Islamic perspective" held in Bangi, Malaysia. He recommended the establishment of a National Bioethics Council composed of scientists, philosophers, ethicists, and religious scholars, to explore issues pertaining to biodiversity, biotechnology, and biosafety.

Jointly organized by the Ministry of Natural Resources and Environment, and the Malaysian Biotechnology Information Centre, the seminar attempted to discuss main concerns of Islam with such issues as biodiversity and biotechnology. Sheikh Mohd Salleh noted that Islam views knowledge as an important component for mankind. Hence, mankind should identify new resources by systematically exploring biodiversity. Use of these resources, however, must be guided by responsibility and justice to ensure sustainability and safety.

During the same seminar, Y. Bhg. Dato' Suboh bin Mohd Yassin, Deputy Secretary General of the Ministry of Natural Resources and Environment, noted that Malaysia is one of the world's 12 hotspots of biodiversity and that there is a huge potential for wealth creation. Biotechnology is one technology, she said, which has been envisaged as one key tool under the National Policy on Biological Diversity to harness such wealth.

However, it is important to get public participation and awareness on the challenges and opportunities in the use of such wealth within the context of an Islamic environment.

Additional information on the Islamic conference may be obtained by emailing Mahaletchumy Arujanan of the Malaysian Biotechnology Centre at maha@bic.org.my.

RESEARCH

CRY PROTEIN IN INDIAN BT COTTON HYBRIDS STUDIED

Dr. K.R. Kranthi and colleagues of the Central Institute for Cotton Research (CICR) document their four year in depth study of Bt cotton in India in "Temporal and intra-plant variability of Cry1Ac expression in Bt-cotton and its influence on the survival of the cotton bollworm, *Helicoverpa armigera* (Hübner) (Noctuidae: Lepidoptera)." The article appears in the latest issue of the Indian journal Current Science.

By quantifying the Cry1Ac content and activity of leaves and fruiting parts taken from eight Bt cotton hybrids, scientists found that at least 1.9 micrograms of Cry1Ac should be available per gram of tissue in order for *H. armigera* to be made susceptible to the toxin. They also found that 1) Cry1Ac expression was variable among hybrids; 2) expression of the gene declined progressively over crop growth and went below critical levels when plants turned 100-115 days old;

and 3) Cry1Ac expression was variable among different plant parts, with leaves expressing the highest amounts of the toxin, and ovary and boll rind the lowest.

Dr. Akhilesh Prasad Singh, India's Minister of State for Agriculture, said in response that the government is evolving resistant management strategies for Bt cotton technology to increase the crop's effective life span from 11-12 years to 30-40 years, with the hope that it will continuously yield bumper cotton production and ensure environmental sustainability.

Read the press release at http://pib.nic.in/release/release.asp?relid=10674 or download the article from http://www.ias.ac.in/currsci/jul252005/291.pdf. You may also Bhagirath Choudhary of ISAAA South Asia at b.choudhary@cgiar.org.

PAPER EXAMINES NAKED MAIZE GRAIN ORIGINS

Corn's ancestor, the wild Mexican grass teosinte, features encased kernels that are hard to remove, cook, and eat. Somewhere along the way, the kernels were freed, and corn grew on the surface of the ear, making it an easy-to-consume food source, and becoming today's maize. The steps, genetic or otherwise, which led to the change, were regarded as an evolutionary mystery, until Huai Wang of the University of Wisconsin and colleagues looked into "The origin of the naked grains of maize." The results of their work appear in the latest issue of Nature.

Armed with the maize genetic map, physical maps for maize inbreds B73 and Mo17, and the rice physical map, scientists set out to develop a set of molecular markers near tga1, which they found was to be the single controlling gene of maize domestication. Teosinte's Tga1, or teosinte glume architecture, was different from its maize counterpart by only one amino acid. With more experiments involving blotting, hybridization, and PCR, scientists also mapped tga1 expression, which was strong in immature ears, weak in husks, and nowhere in other corn tissues.

Nature subscribers can access the full article at http://www.nature.com/nature/journal/v436/n7051/full/nature03863.html. Other readers can take a look at the preview at http://www.nature.com/nature/journal/v436/n7051/abs/nature03863.html.

DOCUMENT REMINDERS

BIOTECH NEWS GOES RUSSIAN

The Russian version of the Food and Agriculture Organization's BiotechNews (FAO-BiotechNews) is now available. The newsletter is a joint initiative of the FAO Working Group on Biotechnology and the FAO Regional Office for Europe, to address information gaps and language barriers in FAO member countries of Central and Eastern Europe and Central Asia.

Updates of FAO-BiotechNews-Ru will be circulated by e-mail as a PDF attachment and will also be available from the FAO-BiotechNews-Ru webpage (http://www.fao.org/biotech/fbn-ru.htm). The first Update is available at http://www.fao.org/biotech/ru/8-2005.pdf

UNEP RELEASES ATLAS

In celebration of World Environment Day on June 3, 2005 the United Nations Environment Programme (UNEP) in cooperation with the National Aeronautics and Space Administration (NASA), United States Geological Survey (USGS), and the University of Maryland launched One Planet, Many People: Atlas of our Changing Environment, a publication that provides visual evidence of environmental change using satellite images, graphics, and text. The focus is on the status and trends over several decades, both in physical and human geography. The 334-page hardbound Atlas discusses human influences on our Earth including changes in land use, biological diversity, and climate. You may access the Atlas on line at www.na.unep.net or you may purchase a hard copy from http://www.earthprint.com.

ANNOUNCEMENTS

EBC SLATED FOR NOVEMBER 2005

The European Biotech Crossroads (EBC) is a professional event in Europe's biotechnology sector. It is next scheduled for the 28th-30th of November 2005 in Lille, France. Activities include a trade show; BiogendaT, a business and tech transfer convention; a seminar program; and BiotalentT, a recruitment convention. EBC focuses on European small and medium sized life sciences companies looking for industrial, financial, or scientific partners; and technology transfer and licensing from public-sector research institutions to private

companies. For further information, contact Perrine Moniot at pmoniot@eurasante.com.

CASSAVA MEETING DETAILS UPDATED

The First International Meeting on Cassava Plant Breeding and Biotechnology, to be held in Brasilia, Brazil on the 1st-5th of December 2006, will be sponsored by the International Society of Food, Agriculture, and Environment of Helsinki, Finland. Its theme is Cassava Improvement to Improve Livelihoods in Sub-Saharan Africa and Northeastern Brazil. Sessions during the meeting will tackle such topics as wild species and landraces to enhance nutritional content, management of reproduction and propagation systems, biotechnology tools and methods for breeding the crop, and conservation of Manihot genetic resources. Proceedings will be published and distributed in March 2007, and will contain all articles presented in the meeting. For more details, email Dr. Nagib Nassar of the University of Brasilia at nagnassa@rudah.com.br or visit the meeting website at http://www.geneconserve.pro.br/meeting/.

BIOTECHNICA FAIR, AWARD, AND FORUM 2005

This year's International Trade Fair for Biotechnology will be held in Hannover, Germany on the 18th- 20th of October. A total of 900 companies will participate in the event, which includes the Biotecnica Partnering Forum and the Third European Biotechnica Award. The award acknowledges the efforts of companies in the fields of biotechnology and the life sciences, in particular efforts in the development of innovative products and services that translate into successful concepts and business ideas. Any small or medium-sized company operating in the field of biotechnology/life sciences and based in Europe is entitled to take part. The 2005 award is valued at a total of 40,000 euros. 20,000 euros will be awarded to the winner, while the remaining 20,000 euros will take the form of tangible assets. For more information, contact Oliver Wedekind at oliver.wedekind@messe.de or visit http://www.messe.de and http://www.biotechnica.de for more information.

FEATURE

BEFORE THE EMPIRE, AFTER THE FALL (AGRICULTURAL PRACTICES OF THE CUGERNI/SUGAMBRI TRIBES OF PRE-ROMAN AND ROMAN EUROPE)

Today's Germany and its nearest countries still bear the rugged beauty of old, Pre-Roman Europe. Despite the abundance of skyscrapers and sculpted modern buildings, pine forests and thick groves still dot the landscape; winters are deathly cold and summers are oppressively warm; and the rivers Danube and Rhine, witnesses to battles and the rise and fall of empires, slither sparklingly through a mix of the ancient and the new.

Such was the world that first greeted the Romans as they entered what was then Germania. Prior to colonization, Northern Europe was facing territorial change. The Germanic tribes, largely nomadic, were growing, and were pushing against the forests of North Central Europe. These herder hunters needed land to accommodate their expanding population, and were thus faced with three choices: conquer new lands, adopt agriculture, or clear out forests for their herds.

Conquering new lands was near impossible: the Roman Empire was growing in the west and south, cold winds kept the tribes from the north, and the Eastern Germanic tribes, newly displaced from Scandinavia, were continuing their herding economy. There was no choice but to adopt agriculture – and the Western Germanic tribes did so, remaining in place, and choosing not to mix with other tribes.
One of these Western tribes was the Sugambri, which lived between the rivers Ruhr and Sieg before the Romans came. In 11 BC, an attack by Caesar's army forced them to move to the left side of the Rhine, in what is now the region of Gelderland in the Netherlands. They soon became known as the Cugerni, a tribe living in farms set in a military town home to 10,000 legionaries and numerous auxiliaries for almost eighty years.

The Colonia Traiana, where the Cugerni lived, was a typical legionary town. Cugerni served as farmers and peasants, and produced food for the soldiers. A market sold food items, fodder, and drink, and provided ironworking and leatherworking services. Soon, Colonia Traiana became a major crossroads for all the tribes in the area.

Agriculture was important to the town, as it provided food for traveling soldiers, and for Rome itself. The Cugerni cultivated barley and wheat, and practiced cattle ranching. They had already been well acquainted with the latter activity; in fact, prior to Roman occupation, the Cugerni's ancestors engaged in so little commerce that cattle, rather than money, sufficed as a measure of value.

The Cugerni produced enough goods for use in their own households, to send to market or sell to surrounding people, and to feed the Roman Army. Together with Colonia Agrippinensis (present day Cologne) and Treveris (present day Trier), Colonia Traiana was an important colony for the Romans in this cold, windy part of the Empire.

Germania, in general, was Rome's – and its army's – major source of wheat. The grain was produced on the fertile loessial soils of the Walloon provinces of what is now called Belgium. To transport it, the Romans built a straight road that ran through three other major tribe colonies – Bavay, Tongeren, and Cologne – which eventually became the economic artery of the region. This was the only road on which the Roman legions depended for food.

The legionaries who settled in Germania took most of their Mediterranean tastes with them. They imported figs, olives and olive oil, garum (fish sauce), dates, and spices, especially since local fare (including one called Dutch wild cinnamon) did not quite agree with their palates. Some things did agree, however, including cherries (whose seeds the Romans brought to Germania, where they could be planted) and grapes (again, whose vines were brought from the Mediterranean world). Romans also introduced the walnut tree, and, thanks to its roving, eternally hungry, but innovative army, beets, apricots, almonds, chickpeas, medlars, pears, and plums took root in Germania. Romans introduced new spices as well, including dill, coriander, mint, celery, fennel, and rue.
With the economy booming, agriculture still remained important, although improved farming methods allowed most of the population to pursue other careers in their spare time. Some members of the tribe specialized in crafting tools; others devoted their lives to religion. The Empire was growing, and so were its colonies; Europe was also getting crowded, and the Roman Army was losing much of its former military discipline.

Caesar heaped the title "Germanic" upon most of the tribes he and his army encountered in Germania. However, the Sugambri were Celtic in origin, residing amongst tribes of other lineages, and soon, opening their doors and becoming part of a true Germanic tribe. The Cugerni formed a confederation of tribes, along with other surrounding ethnic groups, in the third century, and adopted a common name derived from either "free" or "spear." The confederation became known as the Franks.

In the 5th century, the Frankish kingdoms were united under Merovich, whose grandson Clovis led the tribes to victories in southern France and large parts of Germany. The new nations were soon joined under the leadership of the Merovingian kings (named after Clovis' grandfather), who claimed their descent from the Sicambri, and who conquered most of western and central Europe. Under the Merovingians, agriculture grew more advanced, even greater than the Romans', as the three-field system was introduced.

The reign of the Merovingians lasted until the 8th century, when Charlemagne founded the Carolingian dynasty. In the midst of change, the Cugerni were lost, once an elite tribe from whom royalty purportedly descended, an erstwhile formidable enemy even the Romans feared.

In the meantime, there were castles to be made, feudal lords to be attended to, and new farms and lands to manage. Europe had entered the dark ages, and there was a whole new tale ready to begin anew.

For more on the Sugambri and Cugerni, visit http://www.livius.org/ga-gh/germania/inferior.htm

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