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

CIAT LEADS AGRI PROJECT FOR LATIN AMERICA

The International Center for Tropical Agriculture (CIAT) is currently leading the Diversification Agriculture Project Alliance (DAPA) for Latin America, a public-private research partnership where small-scale producers of high-value crops are given the opportunity to collaborate with scientists, food processing specialists, and retailers. These plants include the continent's specialty crops, such as coffee and medicinal herbs.

With members of the farming, research, and business sectors working together, DAPA aims to "develop sophisticated ways of managing the agricultural product

supply chain, and to develop products with exclusive qualities that will be capable of fetching premium market prices." It also aims to identify the best environmental conditions farmers need to grow quality crops that meet specific consumer preferences.

DAPA is a three-year project supported by the German Federal Ministry for Economic Cooperation and Development (GTZ).

Find out more about DAPA at http://ictupdate.cta.int/index.php/article/articleview/534/1/96/.

EGGPLANT LICENSE AGREEMENT SIGNED

The license agreement for the ABSP II's Fruit and Shoot Borer-Resistant (FSBR) Eggplant was signed January 30, 2006 at the Conference Room of the Office of the Chancellor, University of the Philippines, Los Baños (UPLB). ABSP II is the second phase of the Agricultural Biotechnology Support Project, a wide partnership involving both private and public institutions that aim to produce high quality bio-engineered crops for target countries in the developing world.

The Agreement was signed by three institutes. These included: 1) the Maharashtra Hybrid Seed Company (MAHYCO), technology donor, represented by Director Kannan Ragunathan; 2) Sathguru Management Consultants Private Limited, as technology facilitator, represented by Dr. Brent Zehr, Joint Director for Research; and 3) UPLB, represented by Chancellor Rey Luis I. Velasco. Dr. Ronnie Coffman, co-director of ABSP II and director of the International Programs of the College of Agriculture and Life Sciences, Cornell University, signed as ABSP II witness. Dr. Desiree Hautea, director of the Institute of Plant Breeding, UPLB (IPB-UPLB) and ABSP II-Southeast Asia Regional Coordinator, signed as witness for the university.

The said agreement will expedite the transfer of the seeds of the crosses produced between the MAHYCO Bt parental line and selected Philippine varieties. Likewise, the agreement will facilitate the crop's eventual commercialization in the Philippines.

FSBR eggplant will be resistant to one of eggplant's most rabid pests, the fruit and shoot borer. Once successfully produced and assessed through regulatory channels, it will be deployed for use in the Philippines, India, and Bangladesh.

For more information, visit http://www.absp2.cornell.edu/

CASSAVA SEQUENCING URGED

"For a fraction of the cost of other, much larger genomic and postgenomic projects, sequencing cassava could bring this important crop to the forefront of modern science, generating new possibilities for its agronomic improvement." This was stated in a letter to the journal Science, by Drs. Peter Raven of the Missouri Botanical Garden, Claude Fauquet of the Danforth Plant Science Center; M.S. Swaminathan of the M.S. Swaminathan Research Foundation; Norman Borlaug of Texas A&M University; and Cristian Samper of the Smithsonian Institution.

The authors acknowledge the power that genome sequencing has been able to impart to agricultural biotechnology, but they ask that this application should be used to address the needs of majority of the world's people. In line with this, they believe that the best way to maximize the beneficial impact of the technology is to give high priority to sequencing the genomes of crops essential to resource-poor farmers in developing countries. Cassava, they note, is one such crop, as it feeds 600 million people each day, and is an important source of dietary calories in the tropics, after rice and maize.

"It's time to harness part of our technical capacity to advance crops like cassava that are central to the livelihoods and health of half a billion people," the authors added.

Download the complete letter at
http://www.sciencemag.org/cgi/reprint/311/5760/468b.pdf

CHALLENGES TO IPR AND CROP BIOSECURITY EXPLORED

Kauser Abdulla Malik of the Pakistan Atomic Energy Commission and Yusuf Zafar of the National Insitute for Biotechnology and Genetic Engineering in Pakistan establish the main challenges of developing countries in terms of intellectual property rights (IPRs) and crop biosecurity. The authors enumerate these challenges in their article, "Intellectual Property Rights in Plant Biotechnology: A Contribution to Crop Biosecurity," published in the Asian Biotechnology and Development Review.

These challenges include the need to:

* Increase efforts to achieve greater international harmonization of the laws, rules and practices governing access.

* Remain alert to possible negative long-term consequences of restrictive gene licensing practices on crop biosecurity and plant biotechnology and on the rights of research institutions to provide access to genetic biological resources.

* Work towards international harmonization of the broad variety of laws, regulations and practices aimed at protecting the health and safety of humans, animals, plants, and the environment from potentially hazardous biological resources.

* Develop internationally compatible laws, standards, and practices regarding plant materials and data to guarantee handling of biological materials and data from plants.

The authors conclude that there is strong evidence of convergence, improved cooperation, and integration of services and functions among the food safety, plant, animal, life, health, and environmental sectors to achieve better regulation of biosecurity or sustenance of biogenetic resources among developing countries. This change is due to increasing international agricultural trade and travel, and biotechnological and information technology advances within a multicultural approach.

More articles on biosecurity and biosafety in the Vol. 8, No. 1 issue of Asian Biotechnology and Development Review. Its website is at http://www.ris.org.in/abdr.html. Email Kauser Adbullar Malik, corresponding author, at kamalik@comsats.net.pk.

BIOTECH INFO SOURCES ASSESSED

Gary J. Wingenbach and Tracy A. Rutherford of Texas A&M University conducted a survey to investigate the “Trust, Bias, and Fairness of Information Sources for Biotechnology Issues.” Their work appears in the latest issue of AgBioForum.

The researchers surveyed 50 journalists from Texas, U.S.A., and 40 national agriculture journalists representing newspapers and television media in the same country. On the whole, respondents believed that university scientists and researchers, as well as newspapers, were trustworthy, unbiased, and fair in communicating agricultural biotechnology issues. They perceived activist groups, on the other hand, as the complete opposite.

The surveyed journalists were opposed to public opinion outweighing scientists’ opinions when making decisions about scientific research. They also believed that television is untrustworthy and biased, indicating that “media professionals

as a whole have concerns with one type of their profession," the researchers write.

Find out more at http://www.agbioforum.org/v8n4/v8n4a03-wingenbach.htm.

SURVEY RESULTS ON PLANT-MADE VACCINES RELEASED

Plants are already well on their way to becoming the drugstores of the future. They have shown promise as vehicles for the production and oral delivery of vaccines, as they 1) carry no risk of the finished product being contaminated with animal pathogens, 2) provide a heat-stable environment for keeping the vaccine fresh, and 3) eliminate the risk of injection-related hazards.

This so-called "pharming" technology presents "an interesting intersection between medical treatments and the use of genetically modified (GM) food crops," as Dwayne D. Kirk and Kim McIntosh of Arizona State University write. Their article, "Social Acceptance of Plant-Made Vaccines: Indications from a Public Survey," appears in the latest issue of AgBioForum.

The researchers surveyed 706 respondents from Phoenix, Arizona, USA regarding their opinion on the use of transgenic plants as vaccines. Their results show that there is strong potential support for a plant-made vaccine (PMV). In particular, 59.8% of the respondents expressed some preference for an oral vaccine, and 68% expressed some level of acceptance for use of a PMV. However, about 40.9% of the respondents believed that most vaccines are already genetically modified, when in fact only 6% of all vaccines licensed for distribution and use are produced by genetically engineered subunit technologies.

Find out more at http://www.agbioforum.org/v8n4/v8n4a05-kirk.htm.

RESEARCH

GM TOMATOES MAKE THERAPEUTIC MOLECULE

Scientists have long studied plants as vehicles to produce vaccines, antibodies, antigens, and hormones, and their efforts are beginning to pay off. Such transgenic plants can provide a low-cost system to produce such molecules, including interleukin-12 (IL-12), which can, among others, enhance cytotoxic responses and elicit significant anti-tumor and anti-angiogenesis effects. These

stop tumors and tumor-feeding blood vessels from forming, cutting off nutrients from a potentially dangerous growth.

In a recent issue of Transgenic Research, Abel Gutierrez-Ortega, of the Centro de Investigacion y de Estudios Avanzados del I.P.N., and colleagues were able to effect “Expression of functional interleukin-12 from mouse in transgenic tomato plants.”

Researchers used the molecule’s gene, expressed it under the CaMV 35S promoter, and introduced the gene to tomato plants. They found that IL-12, when expressed, was functional, and accumulated to high levels in transgenic tomato fruits and leaves.

Read the abstract at http://dx.doi.org/10.1007/s11248-005-1464-8. Subscribers to Transgenic Research can download the complete article on the same page.

NEW MODEL DESIGNED TO STUDY SOYBEAN

In “A Gene-Based Model to Simulate Soybean Development and Yield Responses to Environment,” C. D. Messina and colleagues of the University of Florida develop and test a procedure meant to predict how well soybean can grow in certain environments, and with specific genetic loci. Their work appears in the latest issue of Crop Science.

An existent model called CROPGRO-Soybean predicts yields for soybean based on the crop’s surrounding environment. In this research paper, scientists combined the model with genetic data. First, a field experiment was carried out to obtain phenotypic data for a set of near-isogenic lines with known genotypes at six loci; these data were then used to estimate cultivar-specific parameters for their model; and, finally, the same parameters were expressed as linear functions of the known gene loci.

Researchers combined their gene data with CROPGRO-Soybean, and were able to more accurately predict the time to maturity and yield levels of a separate field of soybeans. Their results suggest that gene-based approaches can be used to effectively assess cultivar performance, and should thus be utilized in plant breeding.

Subscribers to Crop Science can read the complete article at http://crop.scijournals.org/cgi/content/full/46/1/456. Other readers can take a look at the abstract at http://crop.scijournals.org/cgi/content/abstract/46/1/456.

STUDIES ON BT TOXINS RECOUNTED

Biotech crops expressing Bt toxins have been used for a decade, and have allowed farmers all over the world to use reduced amounts of insecticides. The ubiquity of such crops has also allowed the Bt toxin class to become the most widely used in the world. What does this bode for regulation and safety assessment, now that more Bt crops are being developed, and will soon be released in the market?

Jorg Romeis and colleagues of the Swiss Federal Research Station for Agroecology and Agriculture offer their perspectives on "Transgenic Crops Expressing *Bacillus thuringiensis* Toxins and Biological Control." Their article appears in the latest issue of Nature Biotechnology.

The researchers look at studies already conducted on the safety of Bt crops by reviewing the results of those performed in the laboratory or glasshouse environment; experiments performed to assess the effects of the toxin on predators and parasitoids; and those conducted in a field or semi-field situation. They conclude that semi-field studies are likely to be the most accurate, as they offer some control over the environment, while at the same time keeping plants and predators in close-to-field conditions. They also perceive field studies to be less accurate, as such conditions are harder to keep under control, and their results thus cannot be interpreted conclusively.

In the studies reviewed, Bt plants have been shown to have no direct adverse effects on non-target species. Such data, however, cannot predict the effects of other insecticidal proteins in future GM crops. Thus, the writers recommend that: 1) researchers take great care in designing experiments, such that their results will be relevant for field situations; 2) insecticide treatments should be considered as the baseline for risk assessment; and 3) standards and protocols should be established regarding issues of non-target effects of Bt crops.

Subscribers to Nature Biotechnology can read the complete article at http://dx.doi.org/10.1038/nbt1180.

ANNOUNCEMENTS

TRAINING COURSE ON BIOTECH CROPS SLATED

Asia BioBusiness, in cooperation with National Institute of Education, Singapore and ISAAA, are proud to present a training course on "Commercialization of Biotechnology Crops in Asia: Moving from ideas to useful products in farmers'

fields." The course aims to provide a comprehensive, in-depth understanding of the principles, approach, regulatory requirements, information needs, awareness-building techniques, and stewardship requirements for commercializing a biotechnology seed product for widespread farmer adoption. The course hopes to provide participants with opportunities to network with experts and to become knowledgeable about supporting resources in the region and worldwide, which are relevant to the commercialization of agricultural biotechnology.

This is a 5-day, in-house, hands-on training and learning course, the first of which will take place on June 19-23, 2006, in Manila, at the Somerset Millennium Hotel, Makati, Philippines. The all-inclusive course fee is US$2,500.00 per participant, and will cover material and six nights of accommodation (including five days of specially catered meals). Cost of travel to and from the course venue in Manila, Philippines is not included.

Pre-registrations may be made via email to info@asiabiobusiness.com by filling out the form available at http://www.isaaa.org/kc/CBTNews/files/reg_form.doc. Closing date for pre-registration is March 31, 2006. You may also download a document containing details about the course at http://www.isaaa.org/kc/CBTNews/files/Backgrounder.pdf.

INDIA TO HOLD DISCUSSION ON GM CROP IMPACT

The National Academy of Agricultural Sciences (NAAS) and International Service for the Acquisition of Agri-biotech Application (ISAAA) are organizing a national discussion on "GM Crops: Socio-Economic and Environmental Impact Assessment." This will be held at the NAAS Lecture Room, NASC Complex, DPS Marg, Pusa, New Delhi, India, on the 22nd of February, 2006. The program will feature international experts who have been evaluating and monitoring the global socio-economic impact of genetically modified (GM) crops during the first decade of their commercialization, providing an opportunity to discuss regulatory requirements for assuring their agronomic performance, environmental safety, and food safety. The program will also highlight Bt cotton and its impact in Indian agriculture.

For further information, contact Bhagirath Choudhary, ISAAA at b.choudhary@cgiar.org and M Vijaya Kumar, Executive Secretary, NAAS at naas@vsnl.com or mvijayakumar@naas-india.org

SCIENCE IN SOCIETY CONFERENCE TO BE HELD FOR AFRICA

A Science-in-Society/Society-in-Science - African Forum will be held in Port Elizabeth South Africa, on March 1-3, 2006. The conference, organized by the South African Agency for Science and Technology Advancement (SAASTA) will focus on the need to develop science communication and to establish collaborative networks on the African continent. SAASTA aims to advance public awareness, appreciation, and engagement of science, engineering, and technology in South Africa. For further information, contact ascc@saasta.ac.za or visit http://www.fest.org.za/ascc/.

CBT NEWS FEATURE

Seeds in the Snow: Agricultural Practices of the Vikings

North into the forbidding, ice-laden alleyways and byways of the Scandinavian coasts and isles once lived a tribe feared for its fierceness, but remembered for its valiant warriors. Their reputation as pirates and plunderers is well documented in the visual and written genres – but Viking society was actually based on agriculture and trade. Vikings loved war and warriors, but placed great emphasis on the concepts of honor and law. They were a contradiction, and, like the land on which they lived, they were, in turns, war-like and gentle.

The Vikings first lived in the snowy, icy climate of Northern Europe, in the Scandinavian peninsulas and isles. Winters were long, dark, and extremely cold, but the land could yield crops at the proper time of the year and with the proper urging, divine or otherwise.

The Vikings thus lived on the coasts, where farming and fishing were often good; and where the climate was less harsh, owing to the Gulf Stream, which warmed the waters free of ice during the winter months.

Viking communities consisted of large family groups, each of which was led by a patriarch or his eldest son, whose duty it was to ensure that all members of the family and community had enough food to eat. His wife was likewise granted power, as she shared in the responsibilities of keeping enough food stores to last through the winter. She was also expected to be a doctor, and to know about medicinal herbs; a nurse, who could care for the sick or wounded in battle; and an overall guard and gatekeeper of the manor, as it were, while the men went abroad to raid, trade, hunt, and plunder.

Viking women, in fact, held much authority in the community. Although girls were married as early as twelve, they were entrusted with an entire household to run, almost on their own. As the lady of the manor, the Viking wife locked all the food

in chests and trunks, and wore the keys to them at her waist. Most marriages were arranged – but none of them favored the husband's or wife's interests exclusively. Marriage was an alliance, a method to protect families and keep wealth. If the wife so wished, she could leave her husband and take all her property with her.

The concept of divorce was not unknown to the Vikings. If her husband mistreated her or her children, was too lazy to provide for the family, or insulted her or her mother or father, a wife could call some witnesses and declare that she was divorced. This would occur first at her front door, then at the foot of the couple's bed.

From then on, smaller children would automatically join their mother, while older children would be divided between the parents according to the wealth and status of the two families involved.

Although seemingly anarchistic, the Vikings were bound by a set of laws which closely resemble the models of justice today. There were trials by jury, the members of which were gathered in multiples of twelve, depending on the importance of the case. A client would be represented by a "law-sayer," who told the jury what the law said about the crime committed. In the end, the jury could either convict the accused, or declare him innocent.

As a convict, a criminal was either fined, or sent out to live in the wilderness, out of reach of the law. This "out-law" status meant that no one was allowed to help the criminal in any way, and he was as good as game, to be hunted down and killed by his enemies.

Norse mythology tells us that the northern European tribes believed in a pantheon of gods and goddesses, and a heaven for warriors called Valhalla. This Promised Land for the brave in battle may perhaps explain the Vikings' war-like nature, although their tendency to plunder and pillage may be ascribed more to their need for food and provisions. As there was little land to farm on the Scandinavian coasts, the Vikings made the most of what they had, while raiding neighboring tribes' villages if they needed to acquire more land.

If the land was ready and weather permitted, planting began in the spring. During this time, Viking farmers or their slaves spread manure over their hayfields, to prepare them for growing grass, which, in turn, would be used for grazing. They broke their crop soil with "ards," or oxen-drawn ploughs, then sowed their seeds by hand. Once this was completed, they would dig a hole in the middle of their field, fill it with pieces of bread and some eggs, and pour beer on top of the food heap. This was their offering to their god Frey, who, it was thought, would ensure the Vikings a great harvest.

The Vikings also rotated their crops between wheat, root, and livestock, which resulted in medium-grade soil.

Summer was spent preparing for the long, dark winter. Cattle were brought to graze in the mountain pastures, while their milk was churned into butter or turned into cheese. Weak animals were killed, and their meat was salted or pickled, to keep them for the winter stores.

All this preparation, sowing, and harvesting was not without festivity, however. Vikings, in fact, loved to feast, and had big feasts or holidays three times in one year. The first, Sigrblot, took place in early summer; Vetrarblot occurred after the harvest, and Jolablot marked the middle of winter. In every feast, there would be two weeks of eating, drinking, dancing, singing, and story-telling – the last a favorite of the Vikings, as it allowed the elders to tell of the exploits and bravery of the great Viking warriors, and the honors that awaited them in Valhalla.

Foremost amongst Viking crops was grain. Smaller versions of today's barley, wheat, rye, and buckwheat grew on the Scandinavian coasts. The Vikings used their grains to make bread and porridge, or to enrich soups and meat. Aside from grains, farmers kept home gardens, where they planted peas, beans, onions, angelica, hops, parsnips, wild carrots, cabbage, and garlic.

Vikings also took to the woods and groves to gather acorns, seeds, nuts, and berries, such as cherries, elderberries, blackberries, raspberries, and strawberries. Children were often sent out to gather cress, wild apples, herbs, mustard, and mushrooms for the winter stores. With the threat of cold and scarcity forever looming, every tree and plant was used, either to make homes, herbal drinks, or the famed Viking boats.

The Vikings also used onions to gauge how deep stomach wounds were. They fed their wounded warriors onion, then smelled the man's belly afterward. If the stench could pierce through the gash, then the wall of the stomach had already been cut, indicating that death was imminent, and no treatment would be effective. This allowed herbal remedies to be saved, and to be used only when necessary.

The Vikings were excellent mariners, and their ships were engineered in such a way that they could perform efficient hit-and-run attacks with minimal injury to their sailors. They could also sail in shallow waters, and could run at 14-15 knots, an exemplary speed for their time.

The Vikings worked well on their nautical skills, yielding exceptionally accurate distance tables for their sea voyages. Their measurements differ only 2-4% from modern satellite measurements, and cover Viking routes through the British coasts, France, Spain, some areas of Russia and the Mediterranean – and across the Atlantic, in North America.

So wide was the reach of the Vikings that they reached even the icy continent of Greenland – which so earned its name after the exile Erik the Red called it so, to attract people from Iceland to settle there with him. So remarkable were their capabilities, that they reached North America in 986 A.D.

So unforgiving were the times, however, that when a miniature Ice Age swept from the north, and when The Plague broke out in Europe, the Greenland and North American colonies were kept from further expanding, and thus disappeared.
The Vikings did not stop their expansion, however, and their successors, the Normans, moved south to the warm Mediterranean. With their voyages came more tales of brave warriors and dark-browed gods – and into the centuries sank their culture. Today's Vikings live on: their spirits persist in language, like plants in the wilderness; and lie dormant in myth, like seeds in the snow.

Find out more about the Vikings at http://en.wikipedia.org/wiki/Viking_Age, http://www.viking.no/e/index.html, and http://www.regia.org/flora.htm.

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