

## **CROPBIOTECH UPDATE**

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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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**March 31, 2006**

In This Week's Issue:

### **NEWS:**

#### ***Global***

- Program Looks At Soil Biodiversity

#### ***Africa***

- Kenyan Farmers Advised to Grow Passion Fruit
- Multilateral Support for Congo Agri Rehab

#### ***The Americas***

- COP Workgroup Keeps Terminator Ban
- Oils Can Fight Late Blight, ARS Finds
- CIAT Works On New Biopesticide

#### ***Asia***

- CIRAD Studies Oil Palm Disease
- New Agri Boards Set Up in India
- Planning Workshop Tackles Rice, Climate Change
- PBS Presents Confinement System in Workshop
- Vietnam to Focus on Sci, Tech Development
- ICRISAT Wins Government Award

#### ***Europe***

- EU Presents Biodiversity Work to CBD

### **RESEARCH:**

- Silicon Transporter Identified in Rice
- Scientists Find Key to Fungal Friendship

### **ANNOUNCEMENTS**

### **DOCUMENT REMINDERS**

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## **NEWS**

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### **GLOBAL**

#### **PROGRAM LOOKS AT SOIL BIODIVERSITY**

A project aimed at understanding and harnessing “below ground biodiversity” is currently being coordinated by the Tropical Soil Biology and Fertility Institute (TSBF-CIAT), in cooperation with the United Nations Environment Program (UNEP), and with co-financial support from the Global Environmental Facility (GEF). The project is cataloguing the variety of below ground life forms, from worms and beetles, to fungi and bacteria, that contribute to sustaining, restoring, and improving the fertility of agricultural land.

Work in the project has so far resulted in improved crop production in Brazil, Cote d’Ivoire, Indonesia, India, Kenya, Mexico, and Uganda. For instance, farmers operating in and around the Los Tuxtlas Biosphere Reserve in northern Mexico have been testing several kinds of soil dwelling microbes that fix atmospheric nitrogen and make it available to the plant. Three years into the project, the Mexican researchers have also unearthed new species of organisms that help the roots of plants extract minerals and water from the soil, including three new species of ants, and up to 15 new species of mycorrhizal fungi.

Jeroen Huising, the project’s coordinator at TSBF, said similar findings to those in Mexico were emerging in Africa, where some types of soybean plants are able to form beneficial associations with nitrogen fixing bacteria found naturally in African soils.

Read the complete articles at <http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=471&ArticleID=5236&l=en> and [http://www.ciat.cgiar.org/tsbf\\_institute/csm\\_bqbd.htm](http://www.ciat.cgiar.org/tsbf_institute/csm_bqbd.htm). For more information contact Nick Nuttall at [nick.nuttall@unep.org](mailto:nick.nuttall@unep.org) or Elisabeth Waechter at [elisabeth.waechter@unep.org](mailto:elisabeth.waechter@unep.org).

### **AFRICA**

#### **KENYAN FARMERS ADVISED TO GROW PASSION FRUIT**

The Kenya Agricultural Research Institute (KARI) recently launched its locally developed disease-resistant yellow passion fruit, and has urged local farmers to grow the fruit. Passionfruit seed oil is highly prized in the cosmetics industry, and the fruit’s shell is used as cattle feed.

Research has shown that demand for passion fruit has high potential of growing rapidly over the next five years, due to its various uses, and can guarantee higher returns per unit area. This makes passionfruit ideal for smallholders, the majority of whom rely on their farms for livelihood.

The KARI Passion Fruit Project is supported by the Kenya Horticulture Development Program (KHDP). Read the complete article at <http://allafrica.com/stories/200603280691.html>. Visit the Institute online at <http://www.kari.org/ENGLISH/Vegesfruits.htm>.

## **MULTILATERAL SUPPORT FOR CONGO AGRI REHAB**

The International Fund for Agricultural Development (IFAD) will provide a US\$15.5 million loan and a US\$300,000 grant to support the Agricultural Rehabilitation Program in the Democratic Republic of the Congo's Orientale Province. The Belgian Survival Fund will co-finance the program with a Euro 5.2 million grant; while the Government of the Democratic Republic of the Congo will contribute US\$3.4 million. The loan agreement was signed at the IFAD headquarters in Rome by the President of IFAD, Lennart Båge and the Chargé d'Affaires a.i. of the Embassy of the Democratic Republic of the Congo in Rome, Italy, Innocent Mokosa Mandende.

The Democratic Republic of the Congo is one of the poorest countries in the world: most rural households depend on agriculture for their survival, and continuous conflicts have had a negative impact on the country's agricultural sector. Low agricultural productivity and lack of access to markets and financial services have exacerbated the problem.

IFAD's program will enable poor farmers, fishermen, and livestock owners to increase their incomes and food security. The program will do so by: 1) providing farmers with seeds, pesticides, fertilizers, and small tools to allow them to plant new crops and restore agricultural production; 2) giving farmers' groups technical support and funding to build infrastructure and to develop economic activities; 3) building new roads and reopening others, to allow farmers and fishermen better access to markets; and 4) improving transportation along the river to make pickup and deliver of goods more efficient.

IFAD is a specialized agency of the United Nations dedicated to eradicating poverty and hunger in rural areas of developing countries. Read the complete article at <http://www.ifad.org/media/press/2006/16.htm>.

## **THE AMERICAS**

### **COP WORKGROUP KEEPS TERMINATOR BAN**

Plants and seeds produced by or utilizing genetic use restriction technologies (GURTs) will still be banned from planting and commercialization. This was decided upon after a discussion on terminator seeds by a workgroup of the 8<sup>th</sup> Conference to the Parties of the Convention on Biological Diversity (COP-8) concluded recently. GURTs include seeds which are either genetically engineered to be barren, or possess certain characteristics that are activated only when required. For instance, drought resistant plants will express a transgene that will help them cope with water shortage only when water shortage occurs. When water is abundant, such plants will not express the foreign gene.

One of the workgroup's recommendations was to open research in the field of GURTs. The group's decision will be authenticated by the meeting of Ministers of the Environment before it is moved to the plenary meeting, also within the last week of March.

Read more at <http://www.radiobras.gov.br/>.

### **OILS CAN FIGHT LATE BLIGHT, ARS FINDS**

Potatoes are an important food crop for many countries, but are constantly threatened with late blight, a disease caused by the fungus *Phytophthora infestans*. *P. infestans* can wipe out potato crops, and was responsible for the Irish potato famine of the 19<sup>th</sup> century. The fungus also quickly gains resistance to widely used systemic fungicides, prompting scientists to constantly search for remedies to the disease.

Scientists from the United States Department of Agriculture's Agricultural Research Service (USDA-ARS) are currently investigating the efficacy of plant essential oils, such as oregano, thyme, and lavender, in controlling potato late blight. Led by plant pathologist Modesto Olanya, the researchers found that oregano is showing great promise as a late blight suppressor, but is less successful in doing so in growth chamber studies than in the laboratory. Oregano oil, moreover, is volatile, and could evaporate easily from plant surfaces after application. When applied too generously, however, it can also burn plant leaves.

Researchers are now looking at the prospect of pairing essential oils with other natural products, such as beneficial microorganisms, to control *P. infestans*.  
Read more at <http://www.ars.usda.gov/is/pr/2006/060313.htm>

## **CIAT WORKS ON NEW BIOPESTICIDE**

The Colombia-based International Center for Tropical Agriculture (CIAT) has recently reported the isolation of a plant protein with broad biocidal properties against insect, fungal, and bacterial pests. The protein, finotin, was extracted from the tropical forage legume *Clitoria ternatea*, and has been shown in laboratory experiments to be effective against pathogens of beans, rice, and some tropical forage and fruit species.

Segenet Kelemu, a plant pathologist, hopes that farmers will grow *Clitoria ternatea* in their fields, collect the seeds, extract the protein, and apply it to their crop plants. "We believe natural plant and microbial compounds will play a major role in pest and disease control in both developed and developing countries," he says, "We are particularly excited about the potential of finotin for use by resource-poor farmers."

Future experiments are set to look at simple ways to extract and apply finotin to plants under greenhouse and field conditions. The research team also believes that, like Bt, the compound may have biotechnological applications. They are currently working on cloning the finotin gene. Read the complete article at <http://www.new-agri.co.uk/06-1/focuson/focuson3.html>. For more information, visit the Institute online at <http://www.ciat.cgiar.org>.

## **ASIA**

### **CIRAD STUDIES OIL PALM DISEASE**

The oil palm yields a widely produced and consumed vegetable oil, with Indonesia and Malaysia leading in world production. A soil fungus, however, can cause basal stem rot in oil palms, and devastates thousands of hectares of plantings in Southeast Asia every year. Caused by *Ganoderma boninense*, the disease does not result in symptoms until palms are at least 7-15 years old. Control has hitherto been centered on cropping techniques, such as plowing land before planting, or felling diseased plants, both of which have yielded limited results.

In response to this problem, the French Agricultural Research Center for International Development (CIRAD) conducted research into developing a test that would diagnose the disease early on, with a view of selecting sources of resistance as early as possible. Preliminary trials show that the disease can be diagnosed in as early as three months, and that there are differences in mortality rate between genetic origins and in aggressiveness between *Ganoderma* strains. What remains is to validate inoculation protocols on a large scale, and to use these in combination with genetic improvement of the oil palm, in order to supply

plantations in Southeast Asia with material with a satisfactory level of resistance to *Ganoderma*.

Read more at <http://www.cirad.fr/en/actualite/communiqued.php?id=393>. For more information contact Frédéric Breton, of CIRAD, at [frederic.breton@cirad.fr](mailto:frederic.breton@cirad.fr); or Hubert de Franqueville at [hubert.de\\_franqueville@cirad.fr](mailto:hubert.de_franqueville@cirad.fr).

### ***NEW AGRI BOARDS SET UP IN INDIA***

The Prime Minister of India, Dr. Manmohan Singh, announced the setting up of the National Fisheries Development Board (NFDB) and National Rainfed Area Authority (NRAA) during the first meeting of the newly formed Agriculture Coordination Committees. These are part of the government's efforts to double farm growth to four per cent, and prevent the country from losing self-sufficiency in food production.

The National Rainfed Area Authority, in particular, will focus on investment in rain-fed areas, offer institutional and technological support for dry land agriculture, and encourage investment in rainwater harvesting and wasteland development. Union agriculture minister, Mr Sharad Pawar, said that while foodgrain production had reached 210 million tonnes in 2005-06, by 2020 India would require 310 million tones food grain output. This order of increase will require a package of supportive policies which will have to be implemented, not just by the central government, but also by State and local governments.

The meeting was attended by government ministers, heads of national commissions, and other public officials. For more information, read the complete press release at <http://pib.nic.in/release/release.asp?relid=16806>. Interested parties may also contact Mr. Bhagirath Choudhary of the ISAAA South Asia office at [b.choudhary@cgiar.org](mailto:b.choudhary@cgiar.org).

### ***PLANNING WORKSHOP TACKLES RICE, CLIMATE CHANGE***

A "Climate Change and Rice" planning workshop held recently at the International Rice Research Institute (IRRI) in the Philippines has announced that climate change is already affecting Asia's ability to produce rice, and that this could eventually slow efforts to reduce poverty in the region, where most of the world's poor live. Participants, moreover, were warned that rice yields would have to double over the next 50 years to overcome many of the climate change-related problems facing rice production.

The new knowledge generated by sequencing efforts on the rice genome is allowing scientists to develop new rice varieties faster and with the specific characteristics needed to deal with climate change, such as tolerance of higher temperatures. Robert S. Zeigler, IRRI director general, announced at the workshop that IRRI was ready to put up US\$2 million of its own research funds as part of an effort to raise \$20–25 million for a major five-year project to mitigate the effects of climate change on rice production. “IRRI’s research has shown that even one drought year can push millions of rice farmers back below the poverty line,” Dr. Zeigler warned, “This affects the whole family for many years after the drought year, as they will have sold their livestock and withdrawn their children from school just to survive.”

In related news, the United Nations Food and Agriculture Organization (FAO) has called for better forest management, as increased forest re-growth and more agro-forestry and plantations could absorb the greenhouse gas carbon dioxide and mitigate the effects of climate change. Such management could be achieved, the FAO said, by not only by preventing forests from being cut down, but through afforestation (new plantings) and reforestation (replanting of deforested areas) of non-forested lands.

For more information, contact Duncan Macintosh of IRRI at [d.macintosh@cgiar.org](mailto:d.macintosh@cgiar.org). Visit the Institute online at <http://www.irri.org>. Read more news at <http://bulletin.irri.cgiar.org>. Read the complete FAO article at <http://www.un.org/apps/news/story.asp?NewsID=17946&Cr=climate&Cr1=change>.

## **PBS PRESENTS CONFINEMENT SYSTEM IN WORKSHOP**

The Program for Biosafety Systems (PBS) presented an integrated confinement system for genetically engineered agricultural products during a Confined Field Trial workshop. The workshop was recently concluded in Bogor, Indonesia, and was organized by PBS and the Agricultural Department of Genetic Resources and Biotechnology (Balitbiogen).

The system, developed by PBS, is applicable to confined field trials and contained glasshouse experiments. In developing such a system, PBS aims to: 1) ensure safety in the testing and evaluation of genetically engineered agricultural products; 2) enable country partners to focus their energies on critical issues of biosafety and confinement; and 3) encourage a modern, comprehensive, systems-based approach to the regulation of biotech crops.

PBS is dedicated to ensuring biosafety in the testing and development of genetically engineered crops by providing support in training, capacity building, regulatory strategies and policy development for its partner countries. For more information, visit <http://www.ifpri.org/themes/pbs/pbs.htm>.

## **VIETNAM TO FOCUS ON SCI, TECH DEVELOPMENT**

Vietnamese Prime Minister Phan Van Khai has approved a new direction, objective, and mission for the development of Vietnamese science and technology from 2006 to 2010. According to this direction, Vietnam will improve the quality and effectiveness of domestic research projects; and build up qualified scientific officials who can perform nation-level scientific and technological tasks at international standards.

By 2010, the Prime Minister aims to have 50% of all key research projects at nation-level applied to production and business. Vietnam will also build the Hi-tech Park in the capital, Ho Chi Minh, and establish 100 research groups to form the basis of scientific and technological businesses. To achieve these, Vietnam will focus on highly effective research and application fields, such as biotechnology, automated machinery, energy technology, processing and preserving foods and agricultural products, and space technology.

More news is available at [http://www.vnanet.vn/default.asp?LANGUAGE\\_ID=2](http://www.vnanet.vn/default.asp?LANGUAGE_ID=2). For more information on this article, e-mail Le Hien of the Vietnam Biotechnology Information Center at [hienbiotechvn@pmail.vnn.vn](mailto:hienbiotechvn@pmail.vnn.vn).

## **ICRISAT WINS GOVERNMENT AWARD**

The Government of India has selected the Agri-Business Incubator (ABI) at the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) for the National Award for the Best Technology Incubator 2005. The ABI was awarded in recognition of the “excellent work done in promoting technology-based ventures in the agri-biotechnology sector.” According to Dr William Dar, ICRISAT director, the selection is a testimonial to the institute's success in attracting public-private sector partnerships for developing agricultural technologies into successful agri-business ventures.

Agri-business products and technologies incubated through ABI include sweet sorghum for ethanol production; *Helicoverpa*-resistant transgenic cotton; drought-resistant groundnut varieties; and higher-yielding chickpea varieties. For more information, contact Dr Kiran Sharma at [k.Sharma@cgiar.org](mailto:k.Sharma@cgiar.org). Visit the Institute online at <http://www.icrisat.org>.

## **EUROPE**

### **EU PRESENTS BIODIVERSITY WORK TO CBD**

Protecting biodiversity is one of the four priorities of the [European Union's (EU)] environmental policy, and a key part of the EU approach has been to integrate biodiversity concerns into all aspects of environmental legislation. This was stated by Stavros Dimas, Member of the European Commission responsible for Environment, as he presented "The Role of the EU in Protecting Our Own and the World's Biodiversity" at the Convention on Biological Diversity (CBD) in Curitiba, Brazil.

Dimas spoke during a side event of the convention, which was organized to inform delegates about the EU's work in protecting biodiversity. He stressed on the need for biodiversity protection to counteract the loss, degradation, and fragmentation of habitats in the EU brought about by the intensification of agriculture and forestry, the spread of urban areas, and the growth of transport infrastructure.

Dimas reviewed EU's work on biodiversity conservation to date, and announced that the European Commission (EC) will soon submit a policy paper on biodiversity, as well as a detailed Action Plan, to EU Member states and the European Parliament. The Action Plan, Dimas said, will be built around four key pillars: the protection of biodiversity inside the Union, the EU's role in protecting global biodiversity, the impact of climate change on biodiversity, and improving the knowledge base.

Read the complete speech at

<http://europa.eu.int/rapid/pressReleasesAction.do?reference=SPEECH/06/208&format=HTML&aged=0&language=EN&guiLanguage=en>.

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**RESEARCH**  
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### **SILICON TRANSPORTER IDENTIFIED IN RICE**

Silicon is the second most abundant element present on the earth's crust, and is a very important element for plants. Silicon benefits plants in many ways: it improves the rate of absorption of many important plant nutrients; it decreases susceptibility to attack by fungal pathogen and insects by stimulating the plant's defense mechanisms and by contributing to the strength and thickness of cell walls; it helps plants to grow on the presence of salt and heavy metals contaminants; and it protects the plant against damage from UV rays. Silicon has

been used for centuries in agriculture as a fungicide, mainly in the form of horsetail extract.

Plants differ however widely in their silicon content, and this difference is related to varying abilities of different species to take up silicon from soil through their roots. Although silicon can represent 5% and above of the dry weight of grasses, such as rice, most dicotyledonous plants, which comprise many important crops, are unable to accumulate silicon at levels sufficient to be beneficial. How do plants absorb silicon? Until now, scientists have been unable to answer this question. This week, a collaborative effort between researchers belonging to several research institutions in Japan has provided a major breakthrough in the field of plant silicon. The team describes the first gene important for silicon uptake to be identified in higher plants: *Low silicon rice 1* or *Lsi1*. Their report, entitled "A silicon transporter in rice" is published in the latest issue of the scientific journal Nature.

Rice plants with reduced or impaired *Lsi1* gene activity are very susceptible to attack by pathogens and insects, and have a severely reduced grain yield (1/10 of the yield of non- mutants). The authors show that the *Lsi1* gene encodes a protein that is localized in the membrane of root cells and is necessary for the uptake of silicon. This discovery will have tremendous implications for agriculture, as it opens the way to crop improvement initiatives aimed at providing important food crops with the tool required to absorb silicon.

To read the first paragraph of the article "A silicon transporter in rice" access: <http://www.nature.com/nature/journal/v440/n7084/abs/nature04590.html>

## **SCIENTISTS FIND KEY TO FUNGAL FRIENDSHIP**

The interaction between plants and pathogenic fungi is the focus of numerous research activities, as fungal diseases are responsible for huge crop losses and cost the global agricultural sector millions of dollar each year. However, plants and fungi are also able to establish mutually beneficial interactions, called symbioses, where both partners gain advantages from a life spent together. One such example is the relationship between ryegrass (*Lolium perenne*) and the fungus *Epichloë festucae*. *E. festucae* is an endophyte, meaning it grows within its host plant, colonizing the intercellular spaces of the aerial parts of ryegrass. The interaction provides the fungus a home, and results in improved growth for the grass host, through better nutrient acquisition and enhanced resistance to biotic and abiotic stresses, such as drought and herbivores.

What is the key to such relationships? Researchers in New Zealand and Japan set out to investigate the molecular signals involved in the establishment of symbiotic interactions. To do so, the team generated over 200 *E. festucae*

mutants to identify genes that would affect the ability of the fungus to recognize its host, or that would alter the character of the relationship from beneficial to detrimental to the plant. They identified a single gene, *noxA*, that when mutated would turn *E. festucae* from friend to foe. Plants infected with *noxA* mutants were severely stunted, due to the uncontrolled growth of the mutant fungus within its host tissues. Why? The gene *noxA* encodes a NADPH oxidase, which is involved in the formation of reactive oxygen species, which, in turn, act to limit the growth of *E. festucae* within its host, a requirement for a beneficial interaction.

The authors report their findings in the article entitled "Reactive Oxygen Species Play a Role in Regulating a Fungus–Perennial Ryegrass Mutualistic Interaction". The article is published in the Plant Cell Preview Section of the scientific journal The Plant Cell. Readers may view the abstract at:

<http://www.plantcell.org/cgi/content/abstract/tpc.105.039263v1>

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**ANNOUNCEMENTS**  
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**SEARCA, IPGRI HOLD TRAINING COURSE**

The Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA) and the International Plant Genetic Resource Institute (IPGRI) invite everyone to the Executive Training Course on Natural Resource Management in a Globalizing Asia, which will be held on the 8th-12th of May, 2006 at the SEARCA Headquarters, Los Baños, Laguna, Philippines. The course fee of US\$ 900 will cover tuition, training materials, full board and lodging, field trips, airport pick-up and send-off, and minor medical fees. Deadline for applications is on April 8, 2006. For more information, contact Dr. Jesus C. Fernandez at [jcf@agri.searca.org](mailto:jcf@agri.searca.org), or visit SEARCA online at <http://www.searca.org>.

**FORD FOUNDATION OFFERS RESEARCH GRANT**

The Rural Finance Committee of the Ford Foundation's Affinity Group on Development Finance has issued a Request for Expressions of Interest (REOI) to conduct a review of rural community enterprises worldwide. Concept papers are due on April 21st, 2006 by 23:00 GMT, via electronic mail. The research opportunity involves a grant of up to US\$ 50,000 to conduct a "desktop" review of the current state of rural community enterprises and their contribution to poverty reduction and rural development. Geographic areas of particular interest include Africa, Latin America, Asia, and the United States. The project will begin on July 1, 2006, and is expected to be completed by April 1, 2007. For further information

contact Ricardo Garcia-Tafur, Managing Consultant of the Ford Foundation, at [capacidades@gmail.com](mailto:capacidades@gmail.com); or visit <http://www.iascp.org>

## **CONFERENCE TO DISCUSS FOOD SAFETY, SUSTAINABILITY**

The 2nd International Conference on Agricultural Product Traceability will be held on the 10th-12th of April, 2006, in Brazil. With the theme "Food Safety and Sustainability: Measures for Verifying Conformance with Agricultural Processes," the conference aims to strengthen mechanisms for exchanging international experiences on quality systems and regulatory frameworks in agriculture, with a view to enhancing Brazil's entry into strategic international markets in a manner that ensures both quality and competitiveness. Visit the conference site at <http://conferencia.agricultura.gov.br/>.

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## **DOCUMENT REMINDER**

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## **EVENTS SECTION NOW UP AT KC SITE**

The Knowledge Center site (<http://www.isaaa.org/kc>) is now home to a special section on coming meetings, courses, and workshops related to crop biotechnology worldwide. The list will be updated regularly. Please write to [knowledge.center@isaaa.org](mailto:knowledge.center@isaaa.org) if you would like your event to be included in the list. To view the list of events for 2006, visit <http://www.isaaa.org/kc/bin/event/index.htm>

## **BCH SERVES AS INFO EXCHANGE**

The Biosafety Clearing-House (BCH) is an information exchange mechanism established by the Cartagena Protocol on Biosafety to assist Parties in implementing its provisions, and to facilitate sharing of information on, and experience with, living modified organisms (LMOs). Visit the clearing house online at <http://bch.biodiv.org/>.

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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](mailto:knowledge.center@isaaa.org)) us for your views and comments on any crop biotechnology product and related issues.

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