

## **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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**\* GLOBAL \***

**FAO: AGRICULTURE WILL BE KEY PLAYER TO STOP DEGRADATION OF VITAL ECOSYSTEMS**

With the increasing carbon emissions, rising population, rapid desertification of arable land areas, and eroding biodiversity, drastic changes in agricultural policies, institutions, and practices must take place to slow down the degradation of vital ecosystems, according to a recent report by the Food and Agriculture Organization (FAO). At present, there is a dearth of information on environmental risks associated with agriculture, and a lack of strategic framework for identifying ecologically and economically sound agricultural practices. Important issues that should be addressed include the impact of livestock production on the environment, and the effect of biofuels monoculture production on biodiversity.

Read the news release at <http://www.fao.org/newsroom/en/news/2007/1000542/index.html>.

**PLANKTON YIELD SECRETS TO ROLE IN EVOLUTION AND GLOBAL PHOTOSYNTHESIS**

Tiny green algae hold the key to one of the most fascinating paradoxes in biology: why ocean-dwelling phytoplankton exhibit great diversity that contrasts sharply with the scarcity of ecological niches available in aquatic ecosystems. It turns out that diversity and species adaptation affect how the algae assimilate hundreds of millions of tons of carbon dioxide in the global cycling of carbon.

Scientists at the United States Department of Energy Joint Genome Institute (DOE JGI), the Scripps Institution of Oceanography, University of California, San Diego, and the Pierre & Marie Curie University analyzed the DNA of two species of *Ostreococcus* plankton and found dramatic changes in genome structure and metabolic capabilities. Overlapping genes conserved across the species and species-specific chromosomes with horizontally transferred genes contribute to genetic variation.

The researchers also noted the abundance of selenium-rich proteins, which allow the organisms to hoard nutrients and reduce their appetite for iron. "From an applied perspective, we are learning some of the tricks nature has employed to 'engineer' an extremely small eukaryote to thrive in nature? which may well find applications in bioengineering," said lead author Brian Palenik.

Read the news release at [http://www.jgi.doe.gov/News/news\\_4\\_30\\_07.html](http://www.jgi.doe.gov/News/news_4_30_07.html).

**PIONEER CLEARS STATUS OF APPROVALS FOR HERCULEX® RW ROOTWORM, HERCULEX XTRA**

Pioneer Hi-Bred issued a clarifying statement on the status of approvals for Herculex® RW Rootworm and Herculex XTRA traits in the United States and in nine other countries. The Herculex® RW Rootworm Protection and the Herculex XTRA traits have full U.S. federal and all state regulatory approvals and have approval for import and for feed and food use in Japan,

Australia, New Zealand, Canada, China, Korea, Mexico, Philippines and Taiwan. Both traits are available to growers in corn hybrids from Pioneer Hi-Bred International, Inc.

"We wanted to issue this clarifying statement to avoid confusion. Herculex RW and Herculex XTRA traits have import approval in the key corn importing countries," said Dean Oestreich, Pioneer president and DuPont vice president and general manager.

Readers can access the press release at

<http://www.pioneer.com/web/site/portal/menuitem.bf5884140b13dd243cda47b2d10093a0/>.

## **\* AFRICA \***

### **CASSAVA VARIETIES BRED WITH RESISTANCE TO CASSAVA BROWN STREAK DISEASE**

Cassava varieties resistant to cassava brown streak disease (CBSD) have been developed by scientists at the International Institute of Tropical Agriculture (IITA) in collaboration with their counterparts at the National Agricultural Research Systems in Tanzania. This is good news for African farmers who suffer as much as 80% yield losses in cassava production to CBSD. This dreaded root rot-causing disease has been ravaging the cassava belt in the Great Lake region.

Dr Edward Kanju, IITA cassava plant breeder, and Mr Haji Saleh, from the Ministry of Agriculture, Kizimbani, Zanzibar, say that "The farmers involved in the participatory breeding project 'drove' the government to officially release the CBSD field-resistant cultivars. The challenge is now to replace the susceptible plants with the newly released resistant varieties."

Read the full news article at

[http://www.iita.org/cms/details/news\\_details.aspx?articleid=1004&zoneid=81](http://www.iita.org/cms/details/news_details.aspx?articleid=1004&zoneid=81).

### **EXPERTS IN AGRICULTURE, HEALTH TO DISCUSS BIOFORTIFICATION FOR AFRICA**

Biofortification? breeding crops with higher levels of vitamins and minerals ? is the key topic in a regional workshop this week in Mombasa, attended by scientists, policymakers, and other leaders in African agriculture and health. During the workshop participants will discuss the latest research on biofortification and identify strategies to develop biofortified crops in Africa and integrate biofortification into national agricultural and health policy agendas. The workshop is co-hosted by the Forum for Agricultural Research in Africa (FARA) and HarvestPlus, an international research program that seeks to reduce micronutrient malnutrition by harnessing agricultural technology to breed staple crops for better nutrition.

Much of Africa's rural poor can only afford a diet based mostly on staple crops, which are generally low in micronutrients, particularly iron, zinc, and Vitamin A. As a result, more than a third of the population of Sub-Saharan Africa suffers the debilitating effects of micronutrient malnutrition, or diets deficient in essential vitamins and minerals. Biofortification expands the role of agriculture by using it as a tool for public health.

"Addressing micronutrient malnutrition requires a paradigm shift," said Howarth Bouis, director of HarvestPlus. "Agricultural research needs to move beyond increasing productivity to improving food quality as well. In this way, biofortification can play a critical role in improving health."

Readers can access the press release at <http://www.ifpri.org/pressrel/2006/20060502.asp>.

## **RICE HARVEST IN AFRICA REACHES RECORD HIGH, THANKS TO NERICA**

Rice production in Africa has gone up for the 6th consecutive year, according to the Food and Agriculture Rice Market Monitor. Substantial production increases were reported in Burkina Faso, The Gambia, Guinea, Mali, Niger, Nigeria, Senegal and Togo. A large part of this development is attributed to the adoption of NERICA rice varieties developed by the Africa Rice Center (WARDA). Other countries have followed suit. In Uganda, NERICA varieties will be grown by refugee families from war-torn countries in Africa as a source of income. NERICA is also being increasingly used in agricultural rehabilitation efforts in post-conflict countries, such as Sierra Leone, Liberia, Democratic Republic of Congo and Rwanda.

For more information, contact R. Raman at [R.RAMAN@CGIAR.ORG](mailto:R.RAMAN@CGIAR.ORG).

### **\* THE AMERICAS \***

## **FUNGUS RESPONSIBLE FOR AFRICA'S FOOD-RELATED DEATHS IDENTIFIED**

Scientists at the Agricultural Research Service (ARS) have positively identified the poisonous strain of fungus responsible for food-related deaths in Kenya. The "S" strain of *Aspergillus flavus* tainted Kenya's maize crop, the primary food staple, with deadly levels of poisons known as aflatoxins that killed 125 people in Kenya in 2004.

Through a special permit, the researchers were able to obtain samples of contaminated maize from affected Kenyan villages. After grinding the corn, they isolated the fungi and grew them in culture. They found the "S" strain of *A. flavus*, a potent aflatoxin producer not previously known in Africa, to be the most prevalent source of toxins in the maize.

The news article is available at <http://www.ars.usda.gov/is/pr/2007/070426.htm>.

## **THE COMMITMENT CONTINUES FOR DR. NORMAN BORLAUG**

The "Green Revolution" all began with the collaboration of Rockefeller Foundation and the government of Mexico. Norman Borlaug and a small research team in Mexico worked to improve the nation's agricultural capacity. Borlaug's responsibility was wheat. Under Borlaug's leadership, researchers overcame the rust problem and pioneered the development of short-statured, wheat. Nearly half the new plants' weight was grain, and the stems were short and strong enough to stay erect until harvest. By 1960s Mexico has been self-sufficient in wheat production.

In recent years, Borlaug has been busy promoting a technology developed by Oklahoma State University (OSU) and the International Maize and Wheat Improvement Center (CIMMYT) to help poor farmers in Africa. The technology, known as GreenSeeker, uses a special sensor to measure infrared and near-infrared light reflected from the leaves of growing plants. The approach allows farmers easily and cheaply to determine the optimum application of fertilizer for a developing wheat or maize crop. Since fertilizer resources are scarce in much of Africa, a timely application of the correct amounts can save farmers money and help produce a better crop. OSU researchers

are now taking on the challenge of producing a less expensive model that will work for the rural poor in Africa.

To read more, visit <http://www.cimmyt.org/english/wps/news/2007/apr/BorlaugCommitment.htm>.

## **NEW PLANT ENZYMES COULD BOOST ETHANOL PRODUCTION FROM CELLULOSE**

A new enzyme found in a tomato plant by Cornell researchers could make the production of ethanol from cellulose less expensive. The class of plant enzymes allows plant materials used to make ethanol to be broken down more efficiently than is possible using current technologies.

"This is the first example of a cellulose-binding domain in a plant cell wall enzyme," said Jocelyn Rose, co-author of the paper. Rose and colleagues have evidence of a set of such plant proteins in many species that potentially could be used for biofuel production. Biofuel research may also help uncover new uses for these enzymes, according to Rose. Researchers may, for example, breed for plants with high levels of these proteins.

Read the news release at <http://www.news.cornell.edu/stories/April07/Biofuels.rose.kr.html>.

## **BRAZIL DEVELOPS BIOPESTICIDE AGAINST LIZARDS FOR CASSAVA**

Cassava is a very important crop in Brazil, the second biggest world producer, and it is also the most consumed crop by low-income population in the country. The state of Acre, in the north of the country, is one of the main producing areas, but production is affected by a lizard that attacks the leaves of cassava causing great losses in yields. EMBRAPA, the Brazilian Research Corporation, has developed a biopesticide against this plague, from extracts from lizards infected by *Baculovirus erinnys*, a naturally occurring virus in Brazilian cassava fields. The biopesticide is highly effective, especially when applied in the initial phase of the attack of the plague, killing almost 95% of the lizards.

Murilo Fazolin, a researcher from EMBRAPA, explains that the biopesticide has no effect on insects and other predators in the field, and is also harmless to humans and domestic animals. In addition, the cost of production is very low, and the extract can be frozen and kept for a year.

For more information visit: <http://www.agenciabrasil.gov.br/noticias/2007/04/27/materia.2007-04-27.9378593442/view>

**\* ASIA \***

## **SSR MARKERS: DNA FINGERPRINTS FOR CROP PLANTS**

Participants in a recent training workshop "Molecular characterization of inbred lines and populations in maize" held in India gained knowledge and skills in using simple sequence repeat (SSR) markers for analysis. Simple sequence repeat (SSR) markers are the tools of choice for molecular studies in many crop species. They require very little DNA to use but can also be misread, if the user does not have the experience to know what to look for, according to CIMMYT molecular geneticist and workshop lecturer Marilyn Warburton.

Presentations covered DNA extraction, detection, and analysis methods, particularly for bulked samples. "The bulked method allows the analysis of relationships between entire plant populations and diversity levels within populations. For maize, this means useful DNA characterization of breeding populations, improved open-pollinated varieties, and even traditional maize landraces, in a single polymerase chain reaction (PCR) reaction," says Warburton.

The news article is available at  
<http://www.cimmyt.org/english/wps/news/2007/apr/dnaFingerprint.htm>.

## **NEW HYBRID RICE IN INDIA**

Researchers from the Tamil Nadu Agricultural University (TNAU) have developed a new variety of rice that is high-yielding, drought resistant and suitable for rain-fed areas. This new variety can yield up to 3.7 tons per hectare. Conventional and molecular breeding methods following a novel participatory approach were both used to come up with this variety, said Dr. T S Raveendran, Director of Center for Plant Breeding and Genetics, TNAU. Dr. Ravendeen added that a 'super hybrid rice' needs to be developed that is resistant to the 'rice tungro virus disease' and new rice cultivars that are suitable for making 'idly', an Indian bread.

The full article is available at:  
<http://www.chennaionline.com/colnews/newsitem.asp?NEWSID=%7B142DC6D7-5ED0-408B-A1F4-27AF9B1197FA%7D&CATEGORYNAME=TAMNA>.

## **GLOBAL WARMING AND ASIAN RICE PADDIES**

Experts in climate change meeting this week in Bangkok, Thailand, have concluded that changes in rice production in Asia are essential as part of a global strategy to reduce the level of emissions of greenhouse gases. Flooded rice fields are a major source of atmospheric methane, the second largest contributor greenhouse gas to global warming. Methane is 20 times more effective than carbon dioxide at trapping infrared radiation. Improved rice production practices, together with changes in the livestock sector, could reduce agricultural emissions of methane by 15 to 56%, say the experts.

"There is no other crop that is emitting such a large amount of greenhouse gases," said Reiner Wassmann, coordinator of the rice and climate change consortium at the International Rice Research Institute (IRRI) in the Philippines. "If Asian countries are exploring possibilities to reduce greenhouse gas, they have to look at rice production", added Wassmann.

For more information contact Duncan Macintosh from IRRI at [d.macintosh@irri.org](mailto:d.macintosh@irri.org)

## **STUDY ON INDONESIAN AGRICULTURE AND CLIMATE CHANGE**

Rice farming in Indonesia is greatly affected by short-term climate variability and could be harmed significantly by long term climate change, warn experts from Stanford University, the University of Washington and the University of Wisconsin. The study on the impact of climate on Indonesian rice farming since 1983 was published this week in the online version of the journal PNAS.

The researchers found that rice production since 1983 has been greatly affected by year-to-year climate variability, especially El Niño/Southern Oscillation events. "Most models predict that the rains will come later in Indonesia, that it will rain a little harder once the monsoon begins and then it will really dry up during the summer months," said study co-author David Battisti, an atmospheric scientist at the University of Washington.

The researchers recommend the use of forecasting models to anticipate and plan for El Niño events and their effects on agriculture. Long-term strategies to cope with the effects of climate change would include investments in water storage, development of drought-tolerant crops and crop diversification for farmers at greatest risk.

More information at

<http://news-service.stanford.edu/news/2007/may2/indonesia-050207.html>. The abstract of the article is available at: <http://www.pnas.org/cgi/content/abstract/0701825104v1>

## **BRINGING BACK THE FRAGRANCE TO JASMINE**

It is not uncommon to see children and women selling white garlands of flowers in the Philippines. The white jasmine, locally known as sampaguita provides income for many farmers and street-sellers and is a major peri-urban enterprise in the country. However, the industry has a darker side, including the dangerously high pesticide use against bud-borers. Finding solutions to this problem is one objective of CIP-UPWARD, (the International Potato Center's User's Perspective with Agricultural Research and Development) a network of scientists and development professionals aiming to increase the participation of farmers and other end users in research and development.

In an attempt to reduce pesticide usage, the UPWARD team and the University of the Philippines at Los Baños have introduced farmers to integrated pest management (IPM) using natural predators and pest-resistant cultivars. The results have been positive, with IPM enabling farmers to reduce pesticide applications, while significantly increasing their yields. In another development, SIUPA (the Strategic Initiative on Urban and Peri-Urban Agriculture) has initiated on-farm trials to test new varieties of sampaguita. Traditionally only one variety has been cultivated; now, a greater range of flower size and color is available, helping to boost market sales and bringing benefits not just to the growers, but to the garland makers and sellers as well.

To read more: <http://www.new-agri.co.uk/07/02/focuson/focuson7.php>

## **ICAR IDENTIFIES FIVE NEW IMPROVED RICE VARIETIES**

The Indian Council of Agricultural Research (ICAR) has identified five new improved varieties and hybrid of rice for release in different agro-climatic regions of the country. It includes four new improved varieties and one hybrid of rice. Pusa 1460 (IET 18990) a new variant of Pusa Basmati 1 will yield 37 q/ha is developed by pyramiding bacterial leaf blight (BLB) resistance genes (xa13 & Xa21) in the background of Pusa Basmati 1 through marker assisted backcross breeding. Similarly, RP BIO 226 (IET 19046) which is improved variety and provides an alternative for popular fine-grained variety Samba Mahsuri. Other includes two rice varieties MTU 1075 (IET 18482) and UPR 2870 (IET 17544) and mid-early duration hybrid rice HRI-152 is developed to best suit in cropping pattern viz. rice-wheat, thus increasing productivity of both the crops.

For detail: <http://www.icar.org.in/pr/20042007.htm>. Contact: [b.choudhary@isaaa.org](mailto:b.choudhary@isaaa.org)

## **NEW OIL PALM PLANTING MATERIAL FOR MALAYSIA**

Kumpulan Guthrie Bhd, one of the main oil palm players in Malaysia made a breakthrough by producing new planting material which is a clone between Dura and Pisifera. The launch of the bi-clonal Dura and Pisifera (DxP) was officiated by Deputy Prime Minister Datuk Seri Najib Tun Razak. DxP was developed using top performing duras and pisiferas in the form of clones compared to normal DxP that came from combination of many parental palms. The production of bi-clonal DxP is less capital intensive than producing pure clones. This gives local planters access to superior planting materials that produce higher yield at lower cost. Guthrie is also looking into advancing the knowledge in oil palm, as well as improving the competitive edge of Malaysia as a major palm oil producer. The company will explore diversification in palm oil uses, such as producing palm puree from palm fruits. This research will be undertaken by the Universiti Teknologi Mara.

For more information write to Mahaletchumy Arujanan, Executive Director of the Malaysian Biotechnology Information Centre (MABIC) at [maha@bic.org.my](mailto:maha@bic.org.my).

**\* EUROPE \***

## **DUPONT SUBMITS PROPRIETARY SOYBEAN TRAIT FOR EU APPROVAL**

DuPont, through its subsidiary Pioneer Hi-Bred International, Inc., submitted an application for the European Union approval for the import, food and feed use of its Optimum™ GAT™ trait in soybeans. DuPont plans to commercialize the herbicide-tolerance trait in corn, cotton and other crops, following its 2009 introduction in soybeans. The Optimum GAT trait is the first-ever agricultural trait developed through proprietary DuPont gene shuffling technology.

DuPont has also completed its regulatory submissions for soybeans with the Optimum GAT trait in the United States and Canada for cultivation approval and in Mexico for import approval. Additional submissions for import approval will be made in Japan, Korea, Taiwan, and Australia-New Zealand.

The press release is available at <http://www.pioneer.com/web/site/portal/menuitem.37a86e85cc7ebae23cda47b2d10093a0/>.

## **ENGINEERED 'GOLDEN' POTATOES GIVE MORE BETA-CAROTENE**

Every year 500,000 children go blind because of lack of Vitamin A. Researchers from Italy and Germany have conducted a study that resulted to what they call 'golden' potatoes. These engineered potatoes can provide half of the recommended vitamin intake of Vitamin A.

The researchers used the mini-pathway of bacterial origin technique which can increase the beta-carotene content of potato by 3600 fold. The genes, phytoene synthase (CrtB), phytoene desaturase (CrtI), and lycopene beta-cyclase (CrtY) from the bacteria *Erwinia*, were inserted into 'golden' potatoes. Gainfranco Diretto, the lead author, said that the 'golden' potatoes have the highest carotenoid and beta-carotene content for biofortified potato.

To read more, visit: <http://nutraingredients.com/news/pirntNewsBis.asp?id=76099>

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**RESEARCH**  
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### **TRANSGENIC RICE WITH TOLERANCE TO IRON DEFICIENCY IN SOILS**

Although iron (Fe) deficiency is relatively rare in irrigated rice systems, it can lead to yield loss in alkaline or calcareous soils. Iron deficiency is the most difficult and expensive micronutrient deficiency to correct, as soil applications of inorganic iron fertilizers are often ineffective, except when application doses are large.

Rice plants utilize the iron chelators (substances that bind particular ions removing them from a solution) known as mugineic acid family phytosiderophores (MAs) to acquire iron from the soil. Researchers at the University of Tokyo, the Japan Science and Technology Corporation, and the Japan Atomic Energy Research Institute, have transformed rice plants with a chelate-reductase gene from yeast, selected for its higher performance at high pH. The resulting transgenic plants have a higher tolerance to low levels of iron in the soil, manifested by an 8-fold increase in yield when compared to control plants.

The study shows that introducing genes encoding the enzymes in the biosynthetic pathway of MAs has the potential for engineering rice plants that are even more tolerant to low-Fe conditions, thereby having increased productivity in calcareous soils.

The open-access article, published in the journal PNAS, can be accessed at <http://www.pnas.org/cgi/reprint/104/18/7373>

### **SINGLE DOMINANT GENE CONTROLS CHLOROPHYLL CONTENT IN RICE**

Past studies have shown that chlorophyll (Chl) content is positively correlated with photosynthetic rate and plant productivity. Thus, an approach that plant breeders has been considering is to increase the Chl content in crops to effect increase in biomass production and yield.

Recent research by a group of researchers at the Chongqing University revealed information that may be useful in understanding the control of Chl trait in rice. The Chinese researchers have analyzed the identified a single dominant gene, called *Gc*, that controls Chl content in rice. This observation is contrary to previous belief that the Chl content is a polygenic character and is controlled by many genes.

Introgression of the *Gc* gene from the rice mutant 'Chongqing 2' to the cultivar 'Zhenshan 97B' was performed by the researchers. The leaves of the progenies were determined to be 'dark green' and have 100% increase in Chl. The leaf coloration follows that of the 'Chongqing 2' parent. The researchers have also observed that the photosynthetic rate, biomass, and grain yield of the progenies also increased by 20%, 17% and 16%, respectively.

The complete article to be published in the Journal of Plant Physiology can be accessed by subscribers at <http://dx.doi.org/10.1016/j.jplph.2006.11.006>.

## **OXO MAIZE CONFIRMED MORE RESISTANT TO CORN BORER**

The genetically modified maize containing the wheat oxalate oxidase (OxO) gene was found to be more resistant to European corn borers (ECB). The result from the recent study by a group of researchers in Ottawa, Canada confirms earlier findings about the OxO maize.

The OxO maize lines have phenolic concentrations that are significantly higher than non transgenics. In addition, the transcription of a 13-lipoxygenase gene, coding for a key enzyme involved in the regulation of secondary metabolism, is likewise higher.

The researchers believe that the high levels of soluble phenolic acids, in particular ferulic acid, contributed to the insect resistance of the OxO maize. They have found an inverse relationship between ferulic acid concentration and the ECB larval growth rate. Field testing showed that leaf consumption and stalk-tunneling damage caused by ECB were significantly reduced by 28-34 and 37-39%, respectively, on all of the OxO lines that the researchers tested.

The paper published by the Journal of Agricultural and Food Chemistry can be accessed by subscribers at <http://dx.doi.org/10.1021/jf063030f>.

## **CONSUMER ATTITUDES ON GM FOODS IN TAIWAN**

In Taiwan, the attitude of consumers toward GM foods is mainly determined by the consumer's benefit perception, said researchers in Tatung University. The researchers, Mei-Fang Chen and Hsiao-Lan Li, recommend that consumer education will help a lot in making the consumers in Taiwan form a more positive general attitude toward science and technology.

Chen and Li have determined that the general attitude toward and trust in institutes and scientists performing gene manipulation have positive impacts on the perceived benefits. In contrast, knowledge has negative impacts on the perceived risks of applying gene technology to produce food products.

The researchers tested their hypotheses using structural equation modeling (SEM) analysis, a popular method used in social sciences literature. The study of Chen and Li analyzed responses from 564 individuals located in four regions in Taiwan.

The paper published by the Food Quality and Preference journal can be accessed by subscribers at <http://dx.doi.org/10.1016/j.foodqual.2006.10.002>.

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**ANNOUNCEMENTS**  
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## **INTERNATIONAL POLLINATION SYMPOSIUM**

The 9th International Pollination Symposium will be held on 24-28 June, 2007 in Ames, Iowa, USA. The theme of the symposium and the sub-theme topics include a variety of areas that relate to gene flow, transgenes, mating system dynamics, colony collapse disorder (CCD), molecular and

statistical genetic advances, conservation of plant genetic resources as well as pollinators, gene bank management, and a variety of molecular methodologies utilizing a broad base of genetic information.

More information at <http://www.ucs.iastate.edu/mnet/plantbee/home.html>.

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## DOCUMENT REMINDERS

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### REVISED FRENCH VERSION OF POCKET K NOW AVAILABLE

The revised foldable French version of Pocket K is now available online at the ISAAA KC Website: <http://www.isaaa.org/kc/inforesources/pocketk/default.html>. Pocket Ks are Pockets of Knowledge, packages of information on crop biotechnology products and related issues. They are produced by the Global Knowledge Center on Crop Biotechnology (KC) of the International Service for the Acquisition of Agri-biotech Applications (ISAAA).

### ISAAA-KC NEWEST PUBLICATION - THE DID YOU KNOW BOOKLET

Did you know that only 2% of the world's water is fresh, and 70% of it is used for agriculture? Did you know that we have been consuming DNA, genes, and microorganisms for hundreds of years? Did you know that rice paper doesn't come from rice, and that peanuts aren't nuts at all? If not, then the Did You Know booklet will surely answer your questions on agriculture, food, and biotechnology. It is now available online at [http://www.isaaa.org/kc/inforesources/publications/didyouknow/did\\_you\\_know-booklet.pdf](http://www.isaaa.org/kc/inforesources/publications/didyouknow/did_you_know-booklet.pdf). The Did You Know booklet is divided into three volumes: Agriculture and the World, The Genome, the Cell, and the Laboratory, and Food and Crops. Did You Know is produced by the Global Knowledge Center on Crop Biotechnology (KC) of the International Service for the Acquisition of Agri-biotech Applications (ISAAA).

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