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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In This Issue:

* Philippines to Plant Second Biotech Maize
* Two Biotech Reports from USDA
* FAO Reports on Biotech Programs in Developing Countries
* New Hybrid Maize Fights Weed in Kenya
* Ohio Research Team Combats Corn, Soybean Viruses
* In Fruit Flavor, Light Is Might
* Sorghum Trait for Weed Control
* Report Shows Little Nucleus-Mitochondrion Coordination
* Document Reminders:
  - ES Now Available In Russian
  - Golden Rice Lectures Up For Orders
* CBTNews Feature: The International Food Policy Research Institute (IFPRI)
* Announcements

PHILIPPINES TO PLANT SECOND BIOTECH MAIZE

The Philippines has recently approved the planting and sale of its second biotech maize, this time BT-11 from Syngenta. Like Monsanto's MON810, this maize is resistant to the Asiatic corn borer, and has been extensively tested for safety and efficacy in the Philippine climate.

The Asiatic corn borer has been known to cause yield losses of up to 80%. With another biotech maize variety on the market, farmers could increase their yields by up to 40% per harvest. According to Rod Bioco, president of the Philippine Maize Federation Inc., Bt corn farmers' yields increased by 25-33% last year. However, Bt maize seeds are twice as expensive as hybrid seeds. "If there is a new competition in the market, hopefully the price of corn seeds will drop," Bioco says.

The country was also the first in Asia to commercialize genetically modified (GM) corn, but with the domestic harvest still lower than demand, the Philippines

remains a net corn importer. About 52,000 hectares were planted with BT corn last year, approximately 2% of the total 2.5 million hectares planted to corn in the country.

With information from the Bureau of Plant Industry (http://bpi.da.gov.ph/) and reports from http://www.reuters.com and http://www.agbios.com/main.php?action=ShowNewsItem&id=6504.

TWO BIOTECH REPORTS FROM USDA

The US Department of Agriculture has released two reports on biotechnology developed by USDA's Advisory Committee on Biotechnology and 21st Century Agriculture. The first report on "Global Traceability and Labeling Requirements for Agricultural Biotechnology-Derived Products: Impacts and Implications for the United States" discusses the proliferation of mandatory biotechnology traceability and labeling requirements in other countries; how different segments of the United States food and feed supply chain are addressing those requirements; and marketplace issues and tools that are relevant to these developments.

The second report on "Preparing for the Future" analyses the factors that will shape the use of biotechnology in the future. It identifies predictable trends and key uncertainties that could drive the future in different directions.
Both reports are available online at http://www.usda.gov.

FAO REPORTS ON BIOTECH PROGRAMS IN DEVELOPING COUNTRIES

A recent report by the Food and Agriculture Organization (FAO) shows that several developing countries have well-developed biotechnology programs. The preliminary assessment, entitled “Status of Research and Application of Crop Biotechnologies in Developing Countries,” is available online, and is based on a review of information in the FAO database on Biotechnology in Developing Countries (FAO-BioDeC).

The assessment covers both genetically modified (GM) crops and non-GM biotechnologies, and suggests, among others, that 1) developing countries will soon have new GM crops available, such as virus-resistant papaya, rice tolerant to abiotic stresses (salinity and drought), and soybeans with improved oil composition, 2) several developing countries have been conducting research on a wider range of crops, such as banana, cassava, rice, and sorghum, and on traits relevant for food security, such as abiotic stress tolerance and quality, and

3) no research has been reported in the field of nematode resistance or post harvest losses.

According to the report, Argentina, Brazil, China, Cuba, Egypt, India, Mexico, and South Africa are leading in biotechnology research. GMO research is also most concentrated in Latin America and Asia, which together constitute 85% of total GMO research in developing countries. About 35% of research subjects cover pathogen-resistant crops, 20% are concerned with pest resistance, and 16% take on quality traits and herbicide resistance.

Access the article and report at http://www.fao.org/newsroom/en/news/2005/102236/index.html

NEW HYBRID MAIZE FIGHTS WEED IN KENYA

Striga, a parasitic weed, has invaded approximately 200,000 hectares of Kenyan cropland, resulting in losses of about 800 million Kenyan shillings each year. The weed is a pest of cereal crops, particularly maize.

The most recent weapon in the fight against Striga is a new hybrid maize called Ua Kayongo, which is coated with the Strigaway herbicide. Ua Kayongo is Imazapyr Resistant maize (IR-maize), also known as the Clearfield system, whose resistance is based on a naturally occurring herbicide resistance in maize, and which was later incorporated into Kenyan maize varieties by African plant breeders at the International Maize and Wheat Improvement Center (CIMMYT) and the Kenya Agricultural Research Institute (KARI). The African Agricultural Technology Foundation (AATF), in partnership with several NGOs, research organizations, and seed companies, acts as distributor.

Ua Kayongo will be distributed to over 16,000 households, and AATF's partners will conduct several farmer field days and other activities, including a traveling workshop in June 2005.

For more information, contact the AATF at aatf-information@cgiar.org, or visit http://www.africancrops.net/striga.

OHIO RESEARCH TEAM COMBATS CORN, SOYBEAN VIRUSES

Viruses on corn and soybean can be readily controlled by a viral strike team from Wooster, Ohio, comprised of scientists from the Agricultural Research Service

(ARS) and the Ohio State University (OSU) in the USA. They identify viruses from infected corn leaves sent by countries around the world, and soybean leaves from their region.

They detect viral diseases and their insect carriers; and develop virus-resistant varieties of soybean and corn. They also provide viral detection kits and plant and viral genome maps to breeders. They ensure that safe versions of viruses are used in transferring plant genes to crops to conduct their investigations.

The team has been formed since the 1960s and has addressed problems such as the maize chlorotic dwarf virus (MCDV) and the potyvirus maize dwarf mosaic virus, making it possible to develop genetic markers for genes resistant to MCDV. Currently, they are analyzing soybean aphids, determining if these cause soybean rust, the latest fungal threat to the crop.

All these efforts are seen as the beginnings of future breakthroughs in US crop protection from viral diseases.

See the full news report on http://www.ars.usda.gov/is/pr/2005/050502.htm, and details of the research on http://www.ars.usda.gov/is/AR/archive/may05/viral0505.htm

IN FRUIT FLAVOR, LIGHT IS MIGHT

Fruit firmness and flavor are important to growers and consumers alike. With consumer demands for high quality fruit, growers need to find ways and means to test their produce before putting them on the market. Current methods include sample tastings of edible crops, or stabbing fruits with a thick steel probe to check for firmness. The first method does not ensure that all fruits in a batch will taste or feel alike. The second, of course, renders fruits unmarketable.

Scientists from the Agricultural Research Service (ARS) of the United States Department of Agriculture (USDA) are now testing a machine that can predict the quality of fruits or vegetables without touching or damaging the product. Led by Renfu Lu, an agricultural engineer with the ARS Sugar Beet and Bean Research Unit in Michigan, the research team uses laser beams to detect fruit sweetness and firmness in a technique called imaging spectroscopy, or multispectral imaging.

Lu's team currently tests the machine on apples and peaches. Their technique makes use of four laser beams, each with a different wavelength, and focuses these beams into a single beam that shines into individual fruits. Laser photons then scatter all the way to the fruit's core and are reflected back. The amount of

returning photons indicates firmness. The amount of absorbed photons, on the other hand, is affected by fruit sugar levels, so that sweetness can be estimated at the same time.

Read more at http://www.ars.usda.gov/is/AR/archive/may05/apple0505.htm

SORGHUM TRAIT FOR WEED CONTROL

Because of its potent allellopathic traits, sorghum is being eyed by scientists for a natural method of weed control.

Allellopathy in plants is the secretion of “phytotoxins” that ward off other crops, and this is exhibited in crops such as rice, black walnut, and sorghum. Sorgoleone is a compound in sorghum which fights weeds more vigorously than other similar compounds in other crops. Scientists at the Agricultural Research Service (ARS) Natural Products Utilization Research Unit are now generating essential information needed to help them increase sorgoleone in sorghum.

According to plant physiologist Stephen Duke, research leader, they must decide on which of the compounds used by sorghum would be herbicidal if manufactured, and could be secreted into the soil in adequate amounts. Moreover, there are other considerations such as weeds developing resistance to allellopathy and safety of non-target organisms such as humans.

Still, the team believes that the advantages will be significant. The use of herbicides may be lessened. Allellopathy is also a continuous source of protection, unlike herbicides. Lastly, it does not depend on weather conditions and does not harm the environment.

Sorghum is a major grain in most of the eastern hemisphere, and is notable for its drought tolerance. It originated in Africa and is now gaining popularity is the United States. This is because of its cancer-fighting compounds and digestibility for people with gluten intolerance.

For more details, visit http://www.ars.usda.gov/is/AR/archive/may05/sorghum0505.htm

REPORT SHOWS LITTLE NUCLEUS-MITOCHONDRION COORDINATION

The mitochondria of all living systems contain their own genome, which codes for proteins and RNA molecules necessary for cellular respiration. Some of these proteins and RNA molecules, however, are functional only if they are part of protein complexes. Other components of such complexes are encoded by the nuclear genome. Therefore, coordination between the nucleus and mitochondrion is important in protein expression and cellular respiration – the extent of that coordination, however, has been relatively unknown.

Philippe Giegé, of the Institut de Biologie Moléculaire des Plantes in France, and colleagues explore the "Coordination of Nuclear and Mitochondrial Genome Expression during Mitochondrial Biogenesis in *Arabidopsis*." Their findings appear in the latest issue of the Plant Cell Online.

Using *Arabidopsis* plants as their model, researchers grew their cells in a low sucrose cell culture system in order to modulate mitochondrial biogenesis in response to sugar starvation. This system would also allow them to see the extent of coordination of gene expression between mitochondrial and nuclear genes during times of plant stress.

Using dyes to track mitochondria, as well as SDS-PAGE, DNA micro-arrays, and protein blot systems to monitor protein expression, researchers found that there was no coordination of expression of the two genomes at the transcript level, and instead found that coordination could occur at the level of protein-complex assembly. They also found that even with plant cells under stress, mitochondria still continued to churn out their protein subunits, while the nucleus had already stopped doing so in order to respond to stress signals. This suggests that the mitochondrial genome, at least in this case, could not perceive stress, and could still continue expressing it proteins as though the cell were living normally – thus leading to an excess of unassembled mitochondrially-encoded (but eventually, non-functional) proteins.

Download the complete article at http://www.plantcell.org/cgi/reprint/17/5/1497.

DOCUMENT REMINDERS

ES NOW AVAILABLE IN RUSSIAN

The Executive Summary of Briefs 32 is now available in its Russian translation, and may be downloaded from the Knowledge Center site. Visit http://www.isaaa.org/kc to access the PDF file.

GOLDEN RICE LECTURES UP FOR ORDERS

A lecture on Golden Rice research, product development, and governance is now available for video streaming or DVD orders online. The lecture was delivered on the occasion of World Food Day and Year of Rice 2004, by Golden Rice inventors Ingo Potrykus and Peter Beyer, with comment by Syngenta's Adrian Dubock on private sector participation in the Golden Rice program.

Visit http://www.syngentafoundation.com/golden_rice/index.htm to view or order a DVD of the lecture.

CBT NEWS FEATURE: THE INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE (IFPRI)

Setting itself apart from other research organizations, the International Food Policy Research Institute (IFPRI) provides not only research, but also policy solutions, to their target beneficiaries: "the greatest number of poor people in greatest need in the developing world."

The IFPRI, governed by an international board of trustees, is one of the 15 Future Harvest Centers fostered by the Consultative Group on International Agriculture Research (CGIAR). Its commitment is to provide policy solutions to reduce hunger and malnutrition. There are two key premises in this mission. The first is sound and appropriate local, national, and international public policies essential to achieving sustainable food security and nutritional improvement, second is research and the dissemination of its results to facilitate debate and formulation of sound and appropriate food policies.

IFPRI envisions a world free of hunger and malnutrition, based on the basic human right to adequate food and nutrition, in accordance with the inherent dignity of all that belong to the human family.

IFPRI conducts policy analyses to help developing-country policymakers, non-government organizations, and civil society in helping the poor. These policy analyses are also accessed by opinion leaders, donors, advisers, and media which, in turn, further influence policy changes. IFPRI's food policy research is broadcasted via four research and outreach divisions: Development Strategy and Governance (DSG), Environment and Production Technology (EPT), Food Consumption and Nutrition (FCN), and Markets, Trade and Institution (MTI). Aside from these, IFPRI has a Communications Division and an International Service for National Agricultural Research (ISNAR).

IFPRI has around 300 collaborators, including institutions, schools, research centers, and international and regional organizations from developing countries in Africa, Asia, Latin America and the Caribbean, and in the Middle East; as well as developed countries in Australia, New Zealand, Europe, and North America. These collaborations help intensify research within national research systems and also help IFPRI address the research needs of developing countries.

The institute regularly conducts impact assessments, organizes events, and puts forth publications, papers, and datasets. One of its most extensive projects to date is the 2020 Vision for Food, Agriculture, and the Environment. This initiative aims for "a world where every person has access to sufficient food to sustain a healthy and productive life, where malnutrition is absent, and where food is originated from efficient, effective, and low-cost food systems that are compatible with sustainable use of natural resources."

The Vision's activities include disseminating new information on food, agriculture, environment, and related topics; communicating the Vision's challenges and action program, facilitating dialogue, debate, information sharing, and consensus building among its members; and conducting pilot activities in research, policy communications, and capacity strengthening. The Vision's contributions have already been awarded in different fora, including the World Food Prize in 2001 to Per-Pinstrup Andersen, in part for his active role in this initiative.

For more information, visit http://www.ifpri.org

ANNOUNCEMENTS:

NABC MEETING TO BE HELD IN JUNE

The University of Kentucky and the University of Tennessee will be hosting the National Agricultural Biotechnology Council's 17th Annual Meeting. With the theme "Agricultural Biotechnology: Beyond Food and Energy to Health, and the Environment," the meeting will convene at the Renaissance Hotel in Nashville, Tennessee, June 27-29, 2005.

Four main modules will be tackled. These are Plants as New Sources of Medicinals: Production of Protein Pharmaceuticals in Food and Non-Food Plants; Bioremediation, Phytosensing, and Eco-restoration; Gene-to-Product Development; and Regulatory and Legal Challenges.

Read more at http://www.outreach.tennessee.edu/ppd/nabc/.

SEARCA HOSTS INTERNATIONAL CONFERENCE

The SEAMEO Regional Center for Graduate Study and Research in Agriculture (SEARCA) will hold an international conference on Agricultural and Rural Development in Asia: Ideas, Paradigms, and Policies Three Decades After. The conference will be held at the SEARCA building in Los Baños, Laguna, Philippines from the 10th to 11th of November 2005.

For inquiries, contact the ARD Conference Secretariat at SEARCA, College 4031, Los Baños Laguna, Philippines; or +6349536-2365 to 67, local 133 and 137; or fax +6349536-4105. You may also visit http://web.searca.org/ard/index.html for on-line registration.

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

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While we are still developing this site, feel free to e-mail (knowledge.center@isaaa.org) us for your views and comments on any crop biotechnology product and related issues.

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