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:

* China Seeks Commercial Planting of Biotech Rice Soon
* Law to Legalize GM Crops Approved in Brazil
* Wheat Industry Needs Biotech Says Growers Associations
* Corn Demand in Developing Countries to Surpass Wheat and Rice Needs
* CAST Paper Examines Ethics in Agriculture
* Patent Challenges in 2004 Recounted
* New RNA Polymerase Found in Plants
* New Technique for Salinity Tolerant Plants
* GM Potatoes Show Promise as Hepa B Vaccines
* Document Reminder: ISAAA Brief on Lessons from ABSP Experience
* CBT News Feature: BR Barwale
* Announcements:
  - Biotech Dialogue Slated for March
  - Implications of Biotech to be Discussed in Chennai

CHINA SEEKS COMMERCIAL PLANTING OF BIOTECH RICE SOON

After extensive field and pre-commercial trials in the past few years, China is expected to seek approval for the commercial production of its first biotech rice varieties within the year. These varieties are resistant to the stem borer pest, a major problem across Asia, including China, where rice is widely planted. "The signals are clear for their possible commercialization," says Dr. Randy Hautea, global coordinator of the International Service for the Acquisition of Agri-biotech Applications (ISAAA).

Hautea quoted reports from China that field-testing of biotech rice varieties in the provinces of Hubei and Fujian showed yield increases of around 4 percent to 8

percent and pesticide reduction of around 80 percent. This translates to an overall increase in net income by US$80-US$100 per hectare.

See a related article in http://news.xinhuanet.com/english/2005-03/02/content_2637142.htm.

LAW TO LEGALIZE GM CROPS APPROVED IN BRAZIL

The lower house of Congress in Brazil has recently approved a bill that would legalize the sales of biotech seeds in the country. The bill was passed by a vote of 352-60, and is expected to be signed into law by President Luis Inacio Lula da Silva.

Genetically modified (GM) soy has long been planted in Brazil, albeit illegally, as some farmers used smuggled RoundUp Ready (RR) seeds to cut production costs. The widespread adoption of the GM seeds, however, has also allowed soy production to expand over the last ten years, meeting the rising demand for soy products on the world market, and prompting Brazil's government to enact the bill.

With about 22 million hectares planted to soy, Brazil has the potential to become the world's largest producer of soy and soy based products. It is currently second to the United States in soy production, but that may change with Brazil's cheap land, low labor costs, and ample water supply. Other GM crops are already expected to enter the country, some of them locally developed, including corn, cotton, papaya, eucalyptus, and castor bean.

With reports from Reuters and Associated Press. For more, visit http://www.businessweek.com/ap/financialnews/D88J7E801.htm?campaign_id=apn_home_down.

WHEAT INDUSTRY NEEDS BIOTECH SAYS GROWERS ASSOCIATIONS

Participants of a North American Grain conference in Reno, Nevada, USA voiced the need for biotechnology, particularly biotech wheat, if the wheat industry is to be competitive. The US Wheat Associates, which markets American wheat to foreign buyers, also voted to approve a plan to promote biotech wheat through educational seminars, country-specific promotional programs, safety and quality demonstrations and guiding development of segregation systems.

"The hope and promise of biotechnology is so compelling and the faster we can do it, the better off we'll be," Sherman Reese, vice president of the National Association of Wheat Growers, said.

Monsanto had earlier postponed its introduction of its Roundup Ready wheat saying that it would do so until other wheat biotechnology traits were introduced.

For more information visit: http://www.foodnavigator-usa.com/news/news-ng.asp?n=58264-wheat-experts-push

CORN DEMAND IN DEVELOPING COUNTRIES TO SURPASS WHEAT AND RICE NEEDS

By 2020, demand for corn in all developing countries will be greater than its demand for other cereal crops like wheat and rice, with Asia accounting for over half of this need. Increasing demand for animal feeds as well as the growing number of households will make this situation a reality. This prediction of the International Food Policy Research Institute encouraged teams from the International Maize and Wheat Improvement Center (CIMMYT) and the International Fund for Agricultural Development to promote food security for upland farmers in Asia who depend on the crop.

The teams worked with farmers in the uplands of China, India, Indonesia, Nepal, the Philippines, Thailand, and Vietnam to discover ways in which corn technologies could improve livelihoods. An insight in Vietnam, for example, was the need to help farmers apply sustainable practices to avoid degrading natural resources—particularly in fragile, marginal settings—as the demand intensifies. CIMMYT has made available, on its website, publications on the results of its farm visits and participatory rural appraisals. It gives details on the sociological, agro-economical, environmental, and technological aspects of corn production on a per country basis. Read the full reports at http://www.cimmyt.org.

CAST PAPER EXAMINES ETHICS IN AGRICULTURE

The use of biotechnology in agricultural production is one area that raises ethical concerns. “By analyzing arguments and positions on ethical issues, a better understanding of the criteria or standards that should govern an individual’s actions can be evaluated and thus lead to judgments about what counts as being ethically right and wrong,” says a recent issue paper on “Agricultural Ethics” of the Council for Agricultural Science and Technology (CAST).

The issue paper discusses a method for addressing ethical issues, as well as topics and issues that general public discussion such as food safety, environmental impacts, food security, and agricultural biotechnology. It concludes with the idea that institutionalizing ethics is the responsibility of people in the food system. “Agricultural institutions need to develop a base of expertise in signaling the nature and importance of ethical concerns, with the expectation that developing the base will lead to more effective decision making in the future,” CAST added.

CAST is an international consortium of 36 scientific and professional societies that interprets and communicates science-based information on food, fiber, agricultural, natural resource, and related societal and environmental issues. The full paper can be accessed on the CAST website at http://www.cast-science.org.

PATENT CHALLENGES IN 2004 RECOUNTED

Phillip B.C. Jones, PhD of Spokane Washington recalls “Patent Challenges To Agbiotech Technologies In 2004” in an article published in Information Systems for Biotechnology News Report. Dr. Jones recounts the legal disputes of the previous year between major agricultural biotechnology companies over technologies involving Agrobacterium-mediated transformation of plants, Bt-protected crops, and glyphosate-tolerant plants.

For instance, laws covering Bt technology state that a company that has the rights to a species of Bt toxin protein can still be subject to another company’s broad patent rights on Bt toxin technology. In one such lawsuit, a judge ruled that no infringement had been committed, since the companies involved had used different codons in developing more efficient expression of Bt insecticidal proteins in corn. More Bt toxin cases are still in the offing, and a handful of these may be resolved this year.

Read more at http://www.isb.vt.edu/news/2005/news05.feb.html#feb0504

NEW RNA POLYMERASE FOUND IN PLANTS

RNA polymerase is an essential enzyme found in the cells of all living organisms, where it drives protein expression. Three kinds of RNA polymerases have been identified in eukaryotes, designated as I, II, and III. A fourth one has recently been found and reported in plants by researchers at Washington University in St. Louis, Missouri, where a team by Dr. Craig Pikaard used data from Arabidopsis thaliana, a close relative of oilseed rape (*Brassica napus*).

Pikaard first noticed the evidence for a fourth RNA polymerase when analyzing gene sequences of Arabidopsis. His research team knocked out these genes to check their function and found that, although the plants survived, there were slight delays in flowering, as well as floral defects. The team found, moreover, that knockouts resulted in DNA methylation failure. Previous research has shown that without methylation of DNA, higher organisms have a host of developmental problems, such as dwarfing in plants, tumor development in humans, and death in mice.

The results were recently published in Cell online and will appear in the March 2005 print version of the journal. In the meantime, read the article at the Washington University website at http://news-info.wustl.edu/tips/page/normal/4723.html, or visit Dr. Pikaard's page at http://www.biology.wustl.edu/pikaard/ .

NEW TECHNIQUE FOR SALINITY TOLERANT PLANTS

Salinity tolerant plants are being developed throughout the world in order to maximize all types of soil for as many agriculturally important crops as possible. These plants, however, sometimes have lower yields than their conventional counterparts, especially since their growth conditions are less than ideal for any plant, whether genetically modified or not.

Dr. Narendra Tuteja and colleagues of the International Center for Genetic Engineering and Biotechnology in New Delhi, India report a new technique for producing salinity tolerant plants. Their article, "Unwinding After High Salinity Stress: Development Of Salinity Tolerant Plant Without Affecting Yield," appears in the latest issue of The Information Systems for Biotechnology News Report.

Dr. Tuteja and her team used the gene coding for DNA helicases, the enzymes responsible for unwinding DNA during genome replication or gene transcription. One helicase found in pea plants in particular, PDH45, increased in response to high salt concentrations, dehydration, and low temperatures. Expression of the PDH45 gene in tobacco by the research team resulted in transgenic tobacco

plants that not only continued to grow in high salt conditions, but also led to subsequent generations of the plant to maintain the gene and continue to resist high salt stress.

Over-expression of the gene in tobacco plants, the researchers found, likewise conferred salinity tolerance. However, despite the harsh growth conditions to which the transgenic plants were exposed, the salt-tolerant tobacco continued to grow, reach maturity, flower, and set seeds, with pod size, seed size, seed number, and seed weight statistically similar to those from wild type plants grown without salt stress.

Read the complete article at http://www.isb.vt.edu/news/2005/news05.Mar.html.

GM POTATOES SHOW PROMISE AS HEPA B VACCINES

Scientists have long targeted plants to produce vaccines against common diseases, since conventional vaccines require cold storage, which is often hard to come by in remote areas of developing countries. One recent study reports a breakthrough in the field, as Yasmin Thanavala, Charles J. Arntzen of the Boyce Thompson Institute for Plant Research, Ithaca, New York, and colleagues demonstrate the “Immunogenicity in humans of an edible vaccine for hepatitis B.” The plant this time is the potato, and findings appear in the February 22 online issue of the Proceedings of the National Academy of Sciences.

The genetically modified (GM) potatoes developed for the research contained a gene from the hepatitis B virus, to which the potatoes responded by producing the viral antigen. Researchers expected that when the potatoes would be eaten, the antigen would prompt a mild immune response from the human body, which would in turn render the individual immune to subsequent Hepatitis b infections.

Forty-two adult health care workers 25–58 years of age were enrolled in the double-blind study, with 33 assigned to eat GM potato without an adjuvant, or substance to heighten the immune response. The serum anti-Hepatitis B antigen titer, an indicator of an elicited immune response, was measured over a fixed number of days. Results showed that titers increased in none of the volunteers who ate non-GM potatoes, and in 19 of the 33 volunteers who ate transgenic potatoes – an encouraging 57.6%, as the commercial vaccine works in only 90% of subjects, even as it already contains an adjuvant.

Read the complete article at http://www.pnas.org/cgi/content/full/102/9/3378?maxtoshow=&HITS=10&hits=10&RESULTFORMAT=&fulltext=thanavala&searchid=1109842091378_15308&stored_search=&FIRSTINDEX=0&journalcode=pnas

DOCUMENT REMINDER: ISAAA BRIEF ON LESSONS FROM ABSP EXPERIENCE

“Telling Transgenic Technology Tales: Lessons from the Agricultural Biotechnology Support Project (ABSP) Experience” has just been released by the International Service for the Acquisition of Agri-biotech Applications (ISAAA) as part of its Brief series. It tells the story of “near-market” biotechnologies developed under the ABSP project and draws lessons from that experience and other publicly-funded projects and programs to propose new approaches.

Brief No. 31 also highlights the need for further research in three key areas: case studies of public/private sector collaboration in biotechnology research, product development and diffusion; studies of the key elements of national systems for biotechnology research, product development and diffusion in developing countries; and case studies of the socio-economic costs and benefits of particular biotechnology innovations.

The publication, made available to ISAAA for publication, was written by Carliene Brenner, biotechnology advisor and consultant based in Paris, France. The full Brief is available at http://www.isaaa.org/kc and in hard copy.

CBT NEWS FEATURE: BR BARWALE

Farmer-entrepreneur, Mr. Badrinarayan Ramulal Barwale, was the recipient of the 1999 World Food Prize by The World Food Prize Foundation, Des Moines, Iowa, U.S.A. Recognized by the Crop Science Society of America as the Father of Seed Industry in India, he transformed India’s agriculture by creating a modern seed industry that greatly supported India’s "Green Revolution." In the process, he has helped several farmers increase agricultural productivity and improve quality, quantity, and availability of food throughout India.

BR Barwale started his venture as an agricultural businessman in 1964 when he founded Maharashtra Hybrid Seeds Company, better known today as "Mahyco." Mahyco is the first private enterprise in India that develops and markets high-yielding varieties of best seed quality. Today, Mahyco produces and markets more than 300 hybrid varieties of several crops including rice, wheat, corn, sorghum, pulses, oilseeds and vegetables. It is also the first seed company in the world to successfully commercialize F1 (first generation) hybrid cotton based on the genetically modified seeds/cross-modified seeds (GMS/CMS) system. Through his company, BR Barwale has helped millions of Indian farmers increase the country’s food supply.

Aside from the World Food Prize, BR Barwale received several awards from different organizations and professional associations. In 1996, he received the prestigious award of Honorary Life Membership of the Federation of International Seedsmen (FIS) for his role in the development of the private-sector seed industry in India. FIS is the International Apex body of the Seed Industry. Business Week recognized him as The Star of Asia in 1999, and the President of India awarded him the Padma Bhushan Award in recognition of his distinguished service of high order in the field of trade and economics. On March 2002, he received the Honorary Degree of Doctor of Science (Honoris Causa) from Tamil Nadu Agricultural University.

BR Barwale also founded the Mahyco Research Foundation to provide philanthropic support to the growing needs of the population of India. In particular, the Foundation provides grants to crop research program in rice, builds educational facilities, and constructed a state-of-the-art ophthalmology centre at Jalna to provide free or subsidized eye care to the rural poor.

http://www.mahyco.com/foodprize.html
http://www.worldfoodprize.org/Laureates/laureates.htm

ANNOUNCEMENTS:

BIOTECH DIALOGUE SLATED FOR MARCH

An Interdisciplinary Dialogue on Biotechnology and Organic Farming will be held in Chennai, India, from the 7th to the 10th of March.

Organized by the M.S. Swaminathan Research Foundation (MSSRF), International Federation of Organic Agriculture Movement, and the National Commission for Farmers, the dialogue aims to answer the concerns of organic farmers regarding biotechnology. These concerns include patent rights, environmental and food safety implications, and how biotechnology may address the real problems of small farmers.

For more information, visit http://mssrf.org/events_conferences/content_events/organic_farming/of.htm

IMPLICATIONS OF BIOTECH TO BE DISCUSSED IN CHENNAI

The M.S. Swaminathan Research Foundation (MSSRF) in collaboration with National Academy of Agricultural Sciences, India; the International Food Policy

Research Institute, USA; the Italian Academy of Sciences, Italy; the Department of Biotechnology of the Government of India; and the Pugwash Movement, USA are organizing an interdisciplinary dialogue on "New biotechnology: Implications on Food, Health and Nutrition Security." The dialogue will be held on March 11-13 at the M S Swaminathan Research Foundation, Chennai, India.

Topics to be discussed include emerging issues in agricultural biotechnology, challenges in water resource management, genomics and crop improvement, biotechnology regulations, and public private partnership in biotechnology.

For more information, contact Dr. Ajay Parida, Program Director for Biotechnology of the MSSRF, at ajay@mssrf.res.in.

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