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), and AgBiotechNet

December 172004

In This Issue:

* Rice Research Gets $5M From USDA
* New Index Possible For Screening Salt Tolerant Rice Lines
* Paper Recommends Strategies for Biotech in Europe
* European Countries Must Join Forces To Strengthen Biotech Sector – Report
* Country Report Tackles Success of UK Biotech Industry
* Biotech Crop Plantings Seeing Greater Expansion In Developing Countries
* Announcement:
* Workshop on Role of Biotech in 2005
* Document Reminder:
* Document on Bt maize in Spain Released
* CBT News Feature: Gurdev Singh Khush

RICE RESEARCH GETS $5M FROM USDA

United States Department of Agriculture (USDA) Secretary Ann M. Veneman announced a $5 million grant to support research to improve rice crops using genomic- based tools. The multidisciplinary team is composed of 14 institutions – including the Agricultural Research Service, Cornell University, the California Rice Research Foundation, and the International Rice Research Institute – and will be coordinated by scientists at the University of Arkansas.

Included in the projects goals are a) a novel extension program to engage rice extension and industry personnel in agricultural genomics research, b) exploring the potential of genomic-based tools, and c) public education on the merits of applying genome information to improve agricultural crops.

Visit the USDA at http://www.usda.gov for more information. For details on the genome project, see http://www.uark.edu/ua/ricecap.

NEW INDEX POSSIBLE FOR SCREENING SALT TOLERANT RICE LINES

The concentration of glycinebetaine, a molecule produced in plants in response to salt stress, may be used as a rapid biochemical index for the screening of new salt-tolerant lines of rice. Suriyan Cha-um of the National Center for Genetic Engineering and Biotechnology and colleagues discuss this finding in an article in the latest issue of Science Asia.

Glycinebetaine (Glybet) is involved in plant stress responses to extreme salt, drought, temperature, and light conditions. Studies have shown that Glybet acts as an osmoprotective agent by stabilizing both the quaternary structures of proteins and the highly ordered structure of membranes against the adverse effects of salinity and water-deficit.

Using Thai jasmine rice seedlings, researchers found that betaine aldehyde dehydrogenase (BADH), a key enzyme in the Glybet synthesis pathway, showed progressive elevation during the first four days after growth under salt-stress conditions (342 mM NaCl), but gradually decreased thereafter (days 6-8). This increase in BADH activity was accompanied by an accumulation of Glybet. In contrast, the BADH activity and Glybet content of control seedlings (0 mM NaCl) remained at a low and constant level during the same 8-day interval.

Significant reductions in the concentrations of chlorophyll a, chlorophyll b, total chlorophyll, and total carotenoid content of salt-stressed seedlings were also observed with increasing exposure time to salt-stressed conditions.

Glybet accumulation in rice seedlings is consistent with the known defense response in plants, and assaying BADH activity and/or Glybet accumulation may be further used in screening for salt-tolerant varieties of rice.

Download the complete article, “Biochemical and Physiological Responses of Thai Jasmine Rice to Salt Stress,” at http://scienceasia.tiac.or.th/PDF/vol30/v30_247_253.pdf

PAPER RECOMMENDS STRATEGIES FOR BIOTECH IN EUROPE

In For A Competitive European Biotechnology Industry, Christian Patermann recounts the proposals set forth by the European Union (EU) Comprehensive Strategy on Life Sciences & Biotechnology, and recommends strategies by which Europe may be able to strengthen its biotechnology industry. The paper is part of the compilation Biotechnology In Europe Today, available online.

The strategy, first drafted in 2002, emphasized research, careers and mobility, linking science and society, regulations, and coordination between member states. It specifically outlined the EU-funded 6th Framework Programme for Research (2003-2006), which prioritizes Life Sciences, Genomics, and Biotechnology for Health (designated Priority 1) and Food Quality and Food Safety (Priority 5).

An outgrowth of this strategy is the European technology platform on plant genomics and biotechnology, launched in June 2004, which brought together key stakeholders from various sectors to formulate a strategic research agenda for 2005-2010. The meeting sought to define medium and long-term targets and priorities; and build up the necessary public-private-partnership, including the mechanism to mobilize private and public investments.

Patermann, however, recommends fresh strategies for a stronger biotechnology industry in the continent. These include increasing funds for research; drafting workable intellectual property rights laws; implementing regulations more strictly; and bringing researchers, businessmen, and other stakeholders together, working to sustain momentum.

More papers are available for download at
http://www.teknoscienze.com/supplements/biotech_in_europe/Biotech_in_europe.htm

EUROPEAN COUNTRIES MUST JOIN FORCES TO STRENGTHEN BIOTECH SECTOR – REPORT

Countries in Europe must join forces, sources, and knowledge to develop a strong biotechnology sector. This was proposed in a recent compilation of country reports on the state of local biotechnology, as well as on emerging biotechnology products and techniques in the continent, entitled Biotechnology in Europe Today.

The report cited the lack of financial resources, lack of business knowledge by the science sector, delays due to a stringent regulatory framework, and low consumer acceptance as the main obstacles to growth of biotechnology in the region.

Problems are further explored in each country report. Portugal, for instance, is doing research, but has little entrepreneurial spirit amongst its researchers, as well as strong public diffidence towards biotechnology applications. On the other hand, other countries like Estonia have difficulty in attracting Venture Capital (VC), since VC's have poor information and knowledge about risk assessment regarding the biotech sector in that country, and are not interested in the sector itself because it gives no assurance of success.

More country reports are available for download at
http://www.teknoscienze.com/supplements/biotech_in_europe/Biotech_in_europe.htm

COUNTRY REPORT TACKLES SUCCESS OF UK BIOTECH INDUSTRY

Liberal regulations and research focus are behind the booming biotechnology industry in the United Kingdom. This was reported in Biotechnology In the United Kingdom: A Strong Wish To Maintain The Leadership, a paper included in the compilation Biotechnology In Europe Today, available online.

Research in the UK is dominated by pharmaceutical biotechnology, and is funded indirectly through fiscal measures from the government. These include LINK, run by the Office of Science and Technology, which provides funds for over two or three years for joint projects between universities and business for bioscience; and BIO-WISE, an on-line information service promoting awareness of biotechnology and its potential.

Other features peculiar to the UK system are a liberal regulatory framework; efficient technology transfer and business development; and clustering, where companies involved in biotechnology business are situated in the same area as universities involved in biotechnology research.

Read the full report at
http://www.teknoscienze.com/supplements/pdf/biotechnology_in_europe_today_2004/uk1.pdf

BIOTECH CROP PLANTINGS SEEING GREATER EXPANSION IN DEVELOPING COUNTRIES

The direction of global plant biotechnology suggests that major expansion in biotech crop plantings will occur in developing countries, particularly in Asia, Latin America, and parts of Africa, according to a new study, The Global Diffusion of Plant Biotechnology: International Adoption and Research in 2004, conducted by C. Ford Runge, director of the Center for International Food and Agricultural Policy, University of Minnesota.

Apart from this expansion, the range of biotech crops approved commercially will continue to grow, resulting in new markets and opportunities, especially in developing countries.

Biotech crops are now being grown in 18 countries, while another 45 countries are into research and development and field testing.

Twelve countries in the Asia-Pacific region are involved in some aspect of plant biotech research and development. The leading national programs are in Australia, China, India, Indonesia, and the Philippines.

More modest plant biotech research activities are underway in Bangladesh, Japan, Malaysia, Pakistan, Korea, and Thailand.

“Perhaps the most significant single potential actor in Asia is China, which is aggressively engaged in biotech adoption and research. There is reason to expect China to emerge as an influential force in plant biotech in the years to come”, the study says. The study foresees that in the next 10 years, about half of China’s fields will be planted to biotech crops.

Countries with biotech crop research in Africa include South Africa, Kenya, Zimbabwe, Morocco, Tunisia, and Egypt. South Africa is taking the lead with commercial production of biotech maize, soybean, and cotton, all valued at $146.9 million.

Countries in Latin America and the Caribbean are aggressively adopting biotech crops and are poised to move to adopt more varieties in the near future. The adoption process is led by Argentina, with nearly 14 million hectares planted to biotech soybean, maize, and cotton. Brazil has 3 million hectares planted to biotech soybean.

The study is available at http://www.apec.umn.edu/faculty/frunge/globalbiotech04.pdf.

ANNOUNCEMENT:

WORKSHOP ON ROLE OF BIOTECHNOLOGY ORGANIZED BY FAO FOR 2005

A workshop on The Role of Biotechnology for the Characterization and Conservation of Crop, Forestry, Animal, and Fishery Genetic Resources is slated for the 5th-7th of March, 2005, in Villa Gualino, Turin, Italy.

Organized by the FAO Working Group on Biotechnology, the Fondazione per le Biotecnologie, the ECONOGENE project, and the Società Italiana di Genetica Agraria, the workshop includes sessions on the status of the world's agro-biodiversity; the use of biotechnology for conservation of genetic resources; and genetic characterization of populations and its use in conservation decision-making.

For more information, visit http://www.fobiotech.org/FAO_2005.htm

DOCUMENT REMINDER:

DOCUMENT ON BT MAIZE IN SPAIN RELEASED

In First impact of biotechnology in the EU: Bt maize adoption in Spain, M. Demont and E. Tollens of the Katholieke Universiteit Leuven in Belgium present a bio-economic model constructed to estimate the impact of Bt maize adoption in Spain. Spain provides 11% of the European Union grain maize, and is the only country in the Union where transgenic crops are currently grown by farmers.

Bt maize has been grown in Europe since 1998. During the 6-year period from 1998-2003, a total welfare gain of 15.5 million euros was estimated from its adoption, of which Spanish farmers captured two thirds, the rest accruing to the seed industry.

Read the abstract at http://www.ingentaconnect.com/content/aab/annals/2004/00000145/00000002/art00008;jsessionid=3f25lk2tr39g6.victoria. Download the complete article at the ISAAA website.

CBT NEWS FEATURE: GURDEV SINGH KHUSH

Dr. Gurdev Singh Khush is one of the world's authorities on crop breeding, and a major force behind the development of productive rice varieties. He is often referred to as one of the fathers of the Green Revolution in rice farming.
Dr. Khush was born a son of a farmer in the village of Rurkee, in Punjab, India, in 1935. After obtaining his bachelor's degree in science, major in plant breeding, from Punjab Agricultural University, he continued his studies through a scholarship at the University of California, Davis, where he gained his Ph.D. in genetics in less than three years. Dr. Khush then spent seven years at the University of California, Davis, studying the cytogenetics of tomatoes.
In August 1967, he joined the International Rice Research Institute (IRRI) as a plant breeder and immediately began to make his mark on food production in a hungry developing world. In less than five years, he became the head of IRRI's plant breeding department and had developed his own new variety of "miracle rice." He has key roles in developing more than 300 rice varieties in IRRI's race to keep rice production ahead of population growth.

One of them, IR36, was released in 1976, and has since become the most widely adapted variety of rice. Planted on more than 11 million hectares in Asia in the 1980s, IR36 yields an additional five million tons of rice a year, boosting rice farmers' incomes. IR36 is a semi-dwarf variety that has proved highly resistant to a number of major insect pests and diseases, saving millions of dollars in insecticide costs.

IR36 matures rapidly -- 105 days compared to 130 days for IR8 and 150-170 days for traditional types -- and produces a slender grain that is preferred in many Asian countries. IR64 later replaced IR36 as the world's most popular rice variety, and IR72, released in 1990, became the world's highest-yielding rice variety.

In his 34 years at IRRI, Dr. Khush has become one of the world's most decorated scientists. Among the honors he received are the Japan Prize (1987), World Food Prize (1996), Wolf Prize from Israel (2000), Padma Shri Award from India (2000), and China International Scientific and Technological Cooperation Award (2001).
The Nobel laureate, Dr. Norman Borlaug, has summed up Dr. Khush 's career by saying, "The impact of Dr. Khush 's work upon the lives of the world's poorest people is incalculable."

http://www.worldfoodprize.org/Laureates/Past/1996.htm

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

To stop receiving this newsletter, please send an e-mail message to knowledge.center@isaaa.org and write, "unsubscribe newsletter" in the subject box.

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.