CROP BIOTECH 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), and AgBiotechNet

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DOCUMENT REMINDER

Regulation of Genetically Engineered Plants and Foods: Country specific examples

This document is taken from the report “Biosafety regulation: A review of international approaches. April 2003. The World Bank. Agriculture and Rural development department. Report No. 26028.” Go to http://www.isaaa.org/kc/Publications/pdfs/reminder/Country case studies.pdf to view a section of the document. In the section described here, which is Appendix 1 of the full report, country case studies are provided as examples of biosafety policies and practices that have been challenged with the assessment and approval of one or more genetically engineered plants. These studies exemplify the key issues that should be considered during conceptualization and implementation of a national biosafety regulatory system. It describes the regulatory frameworks of Argentina, Australia, Canada, Egypt, Japan, South Africa, UK (EU), and the USA in terms of different characteristics including whether regulatory oversight is triggered by the process of genetic engineering vs. product attribute; whether statutory instruments are employed vs. voluntary guidelines; whether new laws were passed to specifically address gene technology vs. existing statutes used; whether the decision making process includes consideration of economic and/or social factors vs. are based primarily on scicne assessment; whether the biosafety regulation is under the umbrella of an overarching national biotechnology policy vs no national strategy, etc.

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Our latest data show that the CropBiotech Update is already reaching subscribers in 189 countries. To have a better profile of our valued subscribers and to better serve you, we are currently conducting a subscribers survey. We would like to express our gratitude for those who have already responded. And, for those of you who haven’t answered the survey yet, we encourage you to do so. To view the online form, please follow this link: http://www.isaaa.org/kc/profile/subscription.asp.

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In This Issue:

* Environmental Effects of GM Crops
* GM Crops and Biodiversity
* Monsanto Realigns R&D Investments
* Accessing Genetic Resources Thru International Law
* Application of Biotech in Horticulture
* Measures to Reduce Pollen Spread
* Gene Increases Yield in Strawberry and Raspberry Fruits
* New Materials from ISAAA-KC

## ENVIRONMENTAL EFFECTS OF GM CROPS

The cultivation of genetically modified (GM) crops with their benefits and potential hazards to the environment should be considered within broader ecosystems and their effects on the environment should be assessed on a case-by-case basis. This was one of the points raised by an expert consultation group that met in Rome, Italy last year to discuss the environmental effects of GM crops. The Food and Agriculture Organization (FAO) brought the group of 16 international experts to assess the current understanding of the effects of GM crops on ecosystems, identify gaps and priorities and indicate the role of the FAO in this context.

Other important and linked aspects forwarded by the group include:

* The scientific understanding of the effects of GM crops at the agro-ecosystem level remains limited. This is partly due to the limited number of crop seasons and numbers of generations of crop-associated species for which data have been collected so far.

* The possible long-term and large-scale environmental effects of GM crops need to be quantified. Some of the main areas of interest would be: gene flow and introgression into populations of plants other than crops; changes in agricultural inputs and practices associated with GM crops; and changes beyond agro-ecosystems (e.g. other biota located within common landscapes).

* Practical tools and appropriate information are needed to evaluate and address the possible environmental effects and farm-scale management of GM crops. The potential hazards of GM crops with novel traits like pharmaceutical products need to be better characterized.

FAO was tasked to assist member countries in meeting the goals of environmental safety and sustainability through standard-setting processes, information dissemination and capacity building.

The full report of this consultation workshop is now available online at http://www.fao.org/ag/doc/EEGMCsumm.htm or contact kakoli.ghosh@fao.org to request a copy.

## GM CROPS AND BIODIVERSITY

“The spread of transgenic crops will influence crop genetic diversity, but their implications for the availability of plant genetic resources and the resilience of agricultural ecosystems are not entirely clear. Transgenic crops may increase or decrease crop genetic diversity, depending on how they are regulated and deployed,” says Terri Raney and Prabhu Pingali, of the Agricultural and Development Economics Division, Economic and Social Department, of the Food and Agriculture Organization (FAO) in Italy.

In their paper entitled “Private Research and Public Goods: Implications of Biotechnology for Biodiversity,” Raney and Pingali explored a range of policy options to ensure that private sector research and development (R&D) on genetically modified (GM) crops would enhance rather than gradually wear down crop genetic diversity.

The authors also suggested that the international community, specifically the international agricultural research centers (IARCs), could facilitate the access to biotechnology of developing countries by sharing and coordinating research activities. The IARCs and other international institutions can facilitate the developing countries’ access to biotechnology through capacity-building, or by establishing networks for research, regulation, and intellectual property rights (IPR) management.

Email Terry Raney at terri.raney@fao.org for more information. The full paper can also be downloaded at http://www.fao.org/es/ESA/pdf/wp/ESAWP04_07.pdf

## MONSANTO REALIGNS R & D INVESTMENTS

Monsanto announced that it is realigning research and development investments to accelerate the development of new and improved traits in corn, cotton, and oilseeds. Meanwhile, the company is deferring the introduction of Roundup Ready wheat pending the introduction of other wheat biotechnology traits. It estimates that it will take about four to eight years to introduce a new variety.

The decision came about due to the decline in the size of the spring wheat market which makes it less attractive when compared with other commercial crops. Instead, Monsanto will concentrate on biotech crop research in the areas of yield improvement and stress tolerance, agronomic pest resistance traits, and food and feed improvement traits.

See related article in Nature at http://www.nature.com/nsu/040510/040510-3.html. For more information on Monsanto, visit their website at http://www.monsanto.com.

## ACCESSING GENETIC RESOURCES THRU INTERNATIONAL LAW

The International Treaty on Plant Genetic Resources for Food and Agriculture (PGRFA), soon to become an international law, will define the rules for access

and benefit-sharing associated with most genetic resources of major food crops. While it has its ambiguities and problems in the text, it “provides the international community of researchers, plant breeders, and farmers with an opportunity to foster cooperation and further the conservation and use of plant genetic resources.” This is the conclusion of Cary Fowler in an article entitled “Accessing genetic resources: international law establishes multilateral system” published in the journal Genetic Resources and Crop Evolution (Vol. 51, 2004).

Fowler said that the PGRFA framework will have served its purpose if the legal instrument is used to “create a new and healthy culture when it comes to the exchange of plant genetic resources for food and agriculture.” The task then shifts to implementation and trust building.

The international treaty will govern access to most materials from gene banks as well as from in-situ and on-farm sources. The text of the treaty can be found at http://www.fao.org.

For more information, email Cary Fowler at c.fowler@cgiar.org.

## APPLICATION OF BIOTECH IN HORTICULTURE

The application of biotechnology to agricultural crops has been solely for soybeans, corn, cotton and canola by providing such crops with genetic resistance to herbicides and insects. However, the application of biotechnology to horticultural crops particularly fruits, vegetables, flowers and landscape plants, has been limited.

K.J. Bradford, director, University of California (UC) Davis Seed Biotechnology Center, and colleagues, discussed the challenges and opportunities for the commercialization of biotech horticultural crops. According to Bradford and colleagues, several technical, economic, regulatory and market factors have to be overcome in order to effectively utilize biotechnology for horticultural crops.

Says Bradford “regulation and monitoring are needed to ensure that novel traits are assessed for both food and environmental safety prior to commercialization. However, such prudent precautions should not be so restrictive as to present insurmountable barriers to the commercialization of horticultural products that could provide significant benefits to producers and consumers as well as to the environment.”

Read the editorial overview at http://californiaagriculture.ucop.edu/0402AMJ/pdfs/editover.pdf.

## MEASURES TO REDUCE POLLEN SPREAD

Biotech corn carrying a gene that confers protection from insects can pollinate corn plants as far as 100 feet (31 meters). Hence, measures are needed to reduce pollen spread from Bt corn to non-Bt corn fields. This was the conclusion of researchers from the University of Arizona in their paper entitled, "Contamination of refuges by Bacillus thuringiensis toxin genes from transgenic

maize," published in the May 10 issue of the Proceedings of the National Academy of Sciences.

The discovery is important because planting non-Bt corn, which is susceptible to insect attack, near Bt corn delays pest resistance to the Bt toxin. Such fields of non-Bt corn are called “refuges”.

"It's the first documentation of gene flow from a transgenic crop into a refuge," said Bruce Tabashnik, head of the entomology department at the University of Arizona in Tucson and co-author of the research paper. "This will almost certainly cause a revision of some of the regulations," adding, "I think it's a problem that once observed, recognized and accepted can be readily overcome."

For more information, contact Bruce Tabashnik at brucet@ag.arizona.edu.

## GENE INCREASES YIELD IN STRAWBERRY AND RASPBERRY FRUITS

Researchers from the Marche Polytechnic University, and the University of Verona, in Italy, recently reported that the DefH9-iaaM gene is expressed and biologically active in the Rosaceae species of strawberry and raspberry plants. Angelo Spena, Bruno Mezzetti, Lucia Landi, and Tiziana Pandolfini observed that the DefH9-iaaM gene can be used to improve fruit productivity by increasing the number of inflorescences per plant, and the number of flowers per inflorescence. This, in turn, would result in an increase in the number of fruits per plant.

DefH9-iaaM strawberry and raspberry plants, which were genetically modified and grown under standard cultivation conditions, exhibited a significant increase in the number of fruits produced, the weight and size of the fruit, and the total fruit yield. This was observed in all of the three Rosaceae species tested, namely: Fragaria vesca, Fragaria x ananassa, and Rubus idaeus. Fruit yield increase was approximately 180% in cultivated strawberry, 140% in wild strawberry, and 100% in raspberry.

The article entitled “The defH9-iaaM auxin-synthesizing gene increases plant fecundity and fruit production in strawberry and raspberry,” was published last March 2004 in the

BMC Biotechnology 2004, 4:4. Email Angelo Spena at angelo.spena@univr.it for more details about the research.

## NEW MATERIALS FROM ISAAA-KC

Updated figures for global adoption of Bt cotton and Bt maize from 1996 to 2003 (French and English versions) are now available at the ISAAA-KC website, http://www.isaaa.org/kc.

Likewise, the publication entitled “Biotechnology in Agriculture: A lot more than just GM crops,” can also be downloaded, in html format, from the same site. This publication discusses other applications of biotechnology like conventional

plant breeding, tissue culture and micropropagation, molecular breeding or market assisted selection, and plant disease diagnostics.

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