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:

NEWS
- World Experts Agree on Blueprint for Agri Development
- ABARE: Australia to Lose from GM-Free Stance
- Maintaining Non GM Policies Expensive, Says Report
- Vietnam Ups Support for Tech Development
- Singapore Doubles Biotech Investment

RESEARCH
- Corn Ancestor's Pollen Studied
- Mexican Maize Transgenes Issue Examined
- Wheats Managed and Examined for Best Bread, Noodles
- Virus-Resistant Sugarcane Tested
- Fungus Confers Salt-Resistance to Plants

DOCUMENT REMINDER
- Video on TC Banana in East Africa

ANNOUNCEMENTS

NEWS

WORLD EXPERTS AGREE ON BLUEPRINT FOR AGRI DEVELOPMENT

World experts have agreed on a blueprint on sustainable agricultural development to reduce hunger and poverty, and improve environmental protection in developing countries. They called on governments to prioritize public expenditures on public goods for rural areas including research, extension training and education as well as for them to recognize the vital role of agriculture and rural communities in country development. This was the gist of "The Beijing

Consensus on the future of global agriculture and rural areas" released by the Food and Agriculture Organization (FAO).

In related matters, FAO mentioned the crucial role of the Global Donor Platform for Rural Development, which it co-chairs with the German Federal Ministry for Economic Cooperation and Development. This Platform brings together donor organizations to tackle advocacy work in the development community. The focus of this initiative is to reduce poverty and enhance economic growth in developing countries through improved donor cooperation and harmonization of approaches and procedures.

Burkina Faso, Cambodia, Nicaragua and Tanzania were selected as pilot countries to assess procedures and conditions that would promote a common program and framework of support at the country level. The assessments have been completed and detailed proposals for supporting the harmonization process have been prepared. Eventually, the Platform hopes that common procedures and agreed frameworks for donor activities can be developed at the country level.

More details on the consensus report and the Global Donor Platform for Rural Development may be obtained online at http://www.fao.org.

ABARE: AUSTRALIA TO LOSE FROM GM-FREE STANCE

Australian farmers stand to lose significantly from its country's genetically modified-free stance on planting transgenic canola. This view was forwarded in the article "Transgenic crops: welfare implications for Australia" published in the September issue of Australian Commodities.

A study by the Australian Bureau of Agricultural and Resource Economics (ABARE) said that as much as $3 billion could be lost by 2015 for Australia's failure to commercialize transgenic crops. It noted that Australia will have to compete with an increasing volume of transgenic grains and oilseeds in the export market especially with Asia and South America adopting new transgenic crops. This will result in lower profitability and lower market share for conventional grain crops, which the report stated are more expensive to produce than transgenic varieties.

Although Australia has approved transgenic canola for commercial planting, state and territory legislators have established moratoriums prohibiting the growing of transgenic canola.

View the ABARE report at http://www.abareconomics.com.

MAINTAINING NON GM POLICIES EXPENSIVE, SAYS REPORT

"GM-avoidance" policies in the European Union (EU) could result in additional costs and feasibility problems for the EU food and feed sector. "The Global GM Market: Implications for the European food chain: An analysis of labeling requirements, market dynamics and cost implications" released by Brookes West and Neville Craddock Associates identifies numerous food and feed ingredients in the food chain derived using genetic modification. Among others, the report notes that:

* The availability of non GM soybeans and derivatives from Brazil (the largest supplier) is likely to decline in the next 12 months, resulting in an increase in the price differential between non GM and GM soy by as much as 25%.

* For livestock product producers (producing meat, milk and dairy products), the widening price differential, for a primary feed ingredient, could result in feed costs rising by between 6% and 10% in the next 1 to 3 years.

* For manufacturers of products such as cooking oils and margarines, their non use of GM derived ingredients could add over 16% to raw material costs.

See the full report online at http://www.pgeconomics.co.uk.

VIETNAM UPS SUPPORT FOR TECH DEVELOPMENT

The Vietnam government has agreed to invest more resources in developing information technology, biotechnology, and engineering sciences. Its Ministry of Science and Technology is providing human resource training opportunities and creating favorable conditions for scientists to conduct research to improve agricultural production and generate more jobs. Several laboratories for biotechnological research have already been established.

To support these efforts, the government has set aside an amount to promote the sales of scientific and technological products. A number of technological application projects have yielded a number of products that have helped improve health care, increase crop and animal productivity, and provide additional job opportunities.

For more news about biotechnology efforts in Vietnam, email Le Hien of Biotech Vietnam at hienbiotechvn@pmail.vnn.vn.

SINGAPORE DOUBLES BIOTECH INVESTMENT

Faced with stiff competition from neighboring countries, Singapore is doubling its investment in biotechnology to as much as S$12 billion. About S$7 billion is projected for the next five years, up from S$5 billion earmarked between 2001 and 2005. Bloomberg's Chan Sue Ling reports that Singapore has currently an S$300 million research park built by the government that houses seven research centers, including the Institute of Bioengineering and Nanotechnology and the Genome Institute of Singapore.

Former Deputy Prime Minister Tony Tan said that "There is an urgent need for bold reforms to transform Singapore into an R&D-driven, innovative, knowledge-based enterprise economy, where we compete on knowledge and talent, in addition to efficiency and cost-effectiveness."

See the full article at
http://www.iht.com/articles/2005/09/19/bloomberg/sxsing.php

RESEARCH

CORN ANCESTOR'S POLLEN STUDIED

Today's corn was developed from a domesticated version of teosinte, a wild grass. Teosinte originated from Mexico, and is still being grown there in close proximity to corn. Since maize to maize gene flow is well documented, scientists ask if maize to teosinte gene flow is possible and if teosinte pollen can travel to corn crops. Donald and colleagues from the Connecticut Agricultural Experiment Station start the investigation by exploring "Some physical properties of teosinte (*Zea mays* subsp. parviglumis) pollen." Their work appears in the latest issue of the Journal of Experimental Botany.

Researchers measured properties of pollen, such as water potential, settling speed, germination versus water content, drying rates, and calculated pollen wall conductance. They found that the smaller size of teosinte pollen could allow it to travel longer distances from the source. However, they also found that teosinte pollen is 30-50% more susceptible to dessication, which would lessen the likelihood of teosinte outcrossing into conventional maize varieties.

The data can be helpful in establishing the main factors influencing the degree and the direction of pollination between teosinte populations and between maize and teosinte. Researchers also surmise that their findings can increase current

understanding of the gene-flow process in Mexico and Central America, where teosinte and maize populations are still being grown near each other, and flower together.

Subscribers to the Journal of Experimental Botany can read the article at http://jxb.oxfordjournals.org/cgi/content/full/56/419/2401. Other readers can take a look at the abstract at http://jxb.oxfordjournals.org/cgi/content/abstract/56/419/2401.

MEXICAN MAIZE TRANSGENES ISSUE EXAMINED

Since 2000, several studies have been undertaken in Mexico to track the presence of transgenes in the local conventional maize crop. Findings, however, have been mixed. In “Transgenes in Mexican maize: Desirability or inevitability?” Peter H. Raven of the Missouri Botanical Garden offers his opinion on these studies. His essay is published in the Proceedings of the National Academy of Sciences online edition.

Raven underscores the importance of monitoring the presence and frequency of transgenes, but asks what social significance the results of such studies may have, both in the region concerned and in the world. He puts forth statements on decades-long studies of genetically modified organisms (GMO’s), which have hitherto been found to pose no threat to human health and the environment.

He goes on to state that “the principles of population genetics certainly do not indicate that [the transgenes] would ‘disrupt’ the germplasm of the maize populations they might enter,” and concludes that the introduction of transgenes presents no danger to maize populations in Mexico, or to the people of Mexico in general.

Raven also criticizes the lack of dissemination of agronomic information amongst farmers regarding GMO’s, where not enough education has been given on the potential benefits of planting biotech crops “with the view of achieving higher levels of food production.”

Read the complete article at http://www.pnas.org/cgi/content/full/102/37/13003.

WHEATS MANAGED AND EXAMINED FOR BEST BREAD, NOODLES

Hard spring wheat is processed to make bread and noodles, and it is wheat quality that determines the end quality of these two goods. Quality characteristics for hard spring wheat include flour extraction or milling yield, flour protein concentration and composition, and dough-handling properties. Such qualities are influenced by irrigation and nitrogen fertilization of the crop. For instance, watering the crop, or undertaking any practice that enhances yield potential, can actually decrease wheat's protein content.

In trying to find the balance between high yield and high protein for the crop, Mary J. Guttieri of the University of Idaho Research and Extension Center, and colleagues describe how they carried out "Managing Irrigation and Nitrogen Fertility of Hard Spring Wheats for Optimum Bread and Noodle Quality." Their work appears in Crop Breeding.

Researchers planted the hard red cultivar "Westbred 936," hard white cultivars "Idaho 377" and "Lolo," and hard white breeding line "IDO523." They then varied nitrogen fertilizer levels and irrigation levels for the cultivars, and, upon harvest, evaluated the resultant wheat's bread quality, alkaline noodle color, and flour pasting properties. They found that flour pasting temperature was affected by irrigation; and less irrigation could increase protein concentration even with lower fertilizer applications.

Subscribers to the journal can read the article at http://crop.scijournals.org/cgi/content/full/45/5/2049. Other readers can take a look at the abstract at http://crop.scijournals.org/cgi/content/abstract/45/5/2049.

VIRUS-RESISTANT SUGARCANE TESTED

Sugarcane is an agronomically important crop which is also subject to a host of pathogens. Its high ploidy level also makes traditional breeding programs much harder to undertake, since they require cultivation of thousands of crosses, and eight to ten years of field testing to produce a commercial cultivar.

Genetic transformation of sugarcane is one of the few techniques available to increase yields and confer disease resistance to the crop. In view of this, R. A. Gilbert, of the University of Florida, and colleagues undertook the "Agronomic Evaluation of Sugarcane Lines Transformed for Resistance to Sugarcane mosaic virus Strain E." Their research is documented in the latest issue of Crop Science.

Sugarcane Mosaic Virus (SCMV) is a lethal pathogen of sugarcane. In the study, researchers transformed a total of 386 plants with an untranslatable form of the

SCMV strain E coat protein gene into cultivars CP 84-1198 and CP 80-1827. After field tests of several transformed lines, they found that transgenics derived from CP 84-1198 had significantly greater tonnes of sucrose per hectare (TSH) and significantly lower SCMV disease incidence than those from CP 80-1827. There were still variations amongst the crops tested, and researchers recommended more field tests for transgenic sugarcane to ensure that all plants would uniformly express the trait.

Subscribers to the journal can read the complete article at http://crop.scijournals.org/cgi/content/full/45/5/2060. Other readers can take a look at the abstract at http://crop.scijournals.org/cgi/content/abstract/45/5/2060.

FUNGUS CONFERS SALT-RESISTANCE TO PLANTS

The Indian Thar desert is home to *Piriformospora indica*, a plant-root-colonizing fungus recently found to promote plant growth. Its hosts include rice, wheat, and barley, and research has shown that "The endophytic fungus *Piriformospora indica* reprograms barley to salt-stress tolerance, disease resistance, and higher yield." Frank Waller of the University of Giessen, Germany and colleagues document their work in the latest issue of the Proceedings of the National Academy of Sciences online.

Using barley as their model organism, researchers allowed *P. indica* to colonize roots, then subjected the plants to salt stress and disease stress. Among others, they found that *P. indica* colonizes root cells and enhances yield; roots show higher antioxidant capacity; and colonization induces systemic disease resistance, protecting barley leaves from other fungal infections.

Read the complete article at http://www.pnas.org/cgi/content/full/102/38/13386.

DOCUMENT REMINDER

VIDEO ON TC BANANA IN EAST AFRICA

A video on multi-sectoral partnership efforts to introduce tissue culture banana in small farmers' fields in Kenya and Tanzania is now available for interested viewers. Produced by the International Service for the Acquisition of Agri-biotech Applications (ISAAA), the 20-minute video "Fruits of Partnerships" documents the

role of government institutions like the Kenya Agricultural Research Institute, private groups like ISAAA and the Genetic Technologies Ltd., farmer groups, and international and local donors who collaborated and complemented efforts to see through the fruition of the project.

ISAAA earlier documented the Bt corn story in the Philippines and will soon release its third video on Bt cotton in India. For more information, email m.navarro@isaaa.org.

ANNOUNCEMENTS

EUROPEAN BIOTECH SYMPOSIUM

The 6th European Biotechnology Symposium will be held at the Radisson SAS Scandinavia Hotel, Copenhagen, Denmark from November 13-15, 2005. A highlight of the symposium will be a session on "Doing the Deal" where European biobusiness experts share their insights on what makes partnerships and collaborations a success. Online registration can be done at http://www.bioconferences.com/ebs.

BIOTHAILAND 2005

The Queen Sirikit National Convention Center in Bangkok, Thailand is the venue for BioThailand 2005 on February 2-5, 2005. Ten international conferences which include the International Conference on BioNanotechnology and the Conference on Biosafety of Genetically Modified Organisms, will be held during the week. Other events include a trade exhibition, a bioeducation exhibit, and an excursion to promote collaboration. For more details on BioThailand, visit http://biothailand2005.biotec.or.th.

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