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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NEWS

INITIATIVE RELEASES GENE FLOW STUDY RESULTS

The Gene Flow in Plants and Microorganisms Initiative, based in the United Kingdom, and funded by the U.K. Biotechnology and Biological Sciences Research Council (BBSRC) and the Natural Environment Research Council (NERC), recently released its findings on gene flow.

Researchers with the Initiative have found that the probability of genes flowing from genetically modified organisms (GMO) to soil bacteria is "vanishingly small" and highly unlikely. They also found that a separation distance of around 100 meters between GM and conventional crops is already enough to curtail the transfer of genetic material into the environment. The greatest frequency of genetic exchange, the researchers found, was between conventional oilseed rape and the crop's wild relative, *Brassica napa*.

The Initiative aimed to provide a greater understanding of the molecular basis of gene flow, as well as the consequences of such a phenomenon. Read its press release at http://www.nerc.ac.uk/publications/latestpressrelease/2005-29geneflowmediabrief.asp.

ECOWAS MINISTERS URGED TO IMPLEMENT BIOTECH ACTION PLAN

Ministers of Agriculture from the Economic Community for West African States (ECOWAS) gathered today in the Malian capital of Bamako to endorse a regional action plan for agricultural biotechnology development.

The Ministerial meeting was officially opened by Hon. Ahmed Diane Semega, Malian minister of Mining, Energy, and Water. He urged ECOWAS Ministers to take advantage of the new opportunities offered by science and technology especially biotechnology to play a role in addressing some of these challenges.

The meeting of experts came up with key recommendations to set the Action Plan in motion. They included increasing investment in biotechnology research and development; ratifying the Cartagena Protocol; developing and adopting national biosafety laws and biotechnology policies by 1st July 2006; facilitating harmonization of the regional biosafety systems by July 2008; cooperating with regional and international organizations to establish biotechnology information centres and to raise public awareness; creating a fund to monitor and evaluate the impact of agricultural biotechnology on the economies of the sub region; and ensuring dialogue among all stakeholders.

For more information, email dotunge@absfafrica.org

EU COUNCIL FAILS TO LIFT ILLEGAL BANS ON GM PRODUCTS

Despite the European Union's (EU) own scientific authorities' assertion that genetically modified (GM) products are safe, some five Member States still implement bans on EU-approved GM products. The EU Environmental Council was unable to lift the bans in Austria, France, Greece, Germany, and Luxembourg through a qualified majority vote.

EuropaBio, the association of bioindustries in Europe, said that this the first time that the Council has voted to reject an EU proposal to remove safeguard measures on GM products. The Scientific Committees and the European Food Safety Authority had earlier reviewed the justifications provided by the Member States and, in every case, had concluded that the bans are not justified. The vote however, does not affect any current commercial planting.

Meanwhile, "Plants for the Future", the new European agricultural research agenda, will be announced on July 5 in Strasbourg by Commissioner Potocnik, EU Research Commissioner. This will be web cast live from http://www.europabio.org.

Visit http://www.europabio.org/articles/Invite%20to%20Green%20SRA%20TP%20launch.htm for more news from Europabio.

U.S. CONGRESSIONAL REPORT ON AGRI-BIOTECH

The United States Congressional Research Service (CRS) of the Library of Congress has made available its report "Agricultural biotechnology: Background and recent issues". Authored by Geoffrey S. Becker, specialist in agricultural policy of the CRS resources, science, and industry division, the report looks into the adoption of biotechnology in agriculture, current applications, future applications, regulatory framework, agri-biotech issues, and related information.

The CRS report noted that the US Congress generally has been supportive of genetically engineered agricultural products, although some Members have expressed wariness about their adoption and regulation. The 109th Congress will likely continue to follow trade developments, particularly the US-European Union dispute, as well as US regulatory mechanisms for approving biotech foods.

See the full report at http://fpc.state.gov/documents/organization/45199.pdf

IR-MAIZE TO BE LAUNCHED

July 5th, 2005 will mark the first day that Imidazolinone-Resistant maize (IR-maize), or the Clearfield system, will be used. Eight years of research will culminate in a launch in Kisumu, Kenya, and in a ceremony to be presided over by Kenya Agricultural Research Institute (KARI) Director Dr. Romano Kiome.

IR-maize, developed by breeding, protects the crop from *Striga*, a parasitic weed that has caused major problems for Sub-Saharan African farmers for over 70 years. Various control methods have been exercised over the years, but none have been effective in attacking the weed before its emergence. The new technology does exactly that: germinating *Striga* is killed before it can infect maize roots, and remaining seeds of the weed are destroyed, reducing weed numbers dramatically.

Read more at http://www.kari.org.

TRADITIONAL BREEDING YIELDS NEW RICE

Recent traditional breeding work has yielded a new variety of rice that is heavier with seeds, but not too tall to fall or rot in the rain. Motoyuki Ashikari of Nagoya University, and colleagues published their work, “Cytokinin Oxidase Regulates Rice Grain Production,” in the journal Science.

Researchers scoured through the rice genome, investigating areas that influenced seed productivity. They singled out *Gn1a*, which codes for cytokinin oxidase/dehydrogenase, an enzyme that degrades the plant hormone cytokinin. An inactive *Gn1a* gene keeps the hormone intact, and allows it to accumulate in the plant – this, in turn, pushes a plant to produce more seeds.

Scientists screened the DNA of thousands of plants, some of them well known for producing many seeds, and others tending to be short, in order to select the best plants to cross with each other. A successful cross finally yielded the desired breed.

Read the press release at http://www.nature.com/news/2005/050620/full/050620-13.html

GERMANY TO FUND BIOSAFETY RESEARCH

With issues such as the effectiveness of antibiotics and herbicides attached to genetically modified (GM) crops, studies are needed to evaluate the safety of these crops, in terms of their effect on health and the environment. In order to meet this need, the German government will support research into the safety of GM plants with ten million euro over the next three years.

A total of 24 projects will receive funding. Seven of them will address the replacement of antibiotics and herbicide resistance genes; nine will focus on transgenic maize varieties; while the rest of the projects will investigate safety aspects of fungus-resistant biotech crops and transgenic potatoes.

Results of the studies will soon be available at http://www.biosicherheit.de

CROP BIOTECH RESEARCH PART OF GATES FOUNDATION INITIATIVE GOALS

The Grand Challenges in Global Health Initiative has offered 43 grants totaling $436.6 million for a broad range of innovative research projects involving scientists in 33 countries. These projects aim to achieve important advances in preventing, treating, and curing diseases of the developing world.

One of the Initiative's goals is to grow more nutritious staple crops to combat malnutrition. In particular, the project will develop a more nutritious strain of cassava which will take longer to ripen, and which will be lower in naturally occurring cyanide as well.

The Initiative is a major effort to achieve scientific breakthroughs against diseases that kill millions of people each year in the world's poorest countries. It is supported by the Bill & Melinda Gates Foundation, the Wellcome Trust, and the Canadian Institutes of Health Research (CIHR), and is managed by the same donors, along with the National Institutes of Health.

For more information, visit http://www.gatesfoundation.org/GlobalHealth/Announcements/Announce-050627.htm. Read more about the projects at Details of projects at: http://www.gatesfoundation.org/nr/downloads/globalhealth/GCGH_Grants_Backgrounder.pdf

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Research

FAMILY FARMS DOCUMENTED IN RESEARCH

Family farms have proven to be good business for centuries, and have dominated agriculture in some parts of Asia and Africa. But how resilient will it be in the current era? Michael Lipton explores this in “The Family Farm in a Globalizing World: The Role of Crop Science in Alleviating Poverty.”

Lipton found that small farms are advantageous to developing countries, while large farms work better in developed countries. The ability of a farm to survive can be measured by land and water sustainability, a trait most threatened by crop expansion into marginal lands. It is this sustainability, and its consequent increase of farm productivity and employment income, that can reduce mass poverty. Thus, the evolution of the family farm is closely linked to economic development.

Read more at http://www.ifpri.org/2020/dp/vp40.asp.

RR WHEAT WELFARE IMPLICATIONS STUDIED

In “Welfare Implications of Introducing Biotech Traits in a Market with Segments and Segregation Costs: The Case of Roundup Ready Wheat,” William Wilson and colleagues of North Dakota State University develop a spatial partial equilibrium model of the higher-protein hard wheat market and assess the changes in the distribution of welfare associated with release and adoption of Roundup Ready Wheat (RRW).

Researchers found that in the most likely scenario – full market acceptance – total welfare would increase to US$ 787 million, producer welfare would increase by US$ 301 million, and consumer welfare would increase by US$ 252 million.

RRW is not on the market, but it was one of the first genetically modified wheat varieties submitted for review to regulatory agencies in the United States and Canada. To find out more, read the article at http://agecon.lib.umn.edu/cgi-bin/detailview.pl?paperid=16767.

ANNOUNCEMENT: IFPRI Trainings

The International Food Policy Research Institute (IFPRI) will hold two trainings in Ethiopia. One is on “Managing Agricultural Research for Development within

Innovation Systems Perspective" to be held in Addis Ababa on October 3-20, 2005. Deadline for applications is on August 25, 2005. The other is on "Law and Policy of Relevance to the Management of Plant Genetic Resources" at the Alemaya University on January 23-28, 2006. Deadline for applications is on December 7, 2005.To apply for the above workshops, download the application form from http://www.ifpri.org/training/WSAppForm.pdf or email IFPRI-ISNARLearning@cgiar.org.

DOCUMENT REMINDER: BOLIVIA AUTHORIZES GM SOYBEAN

The Crop Biotech Update's Spanish-speaking readers can read details on the latest in agricultural biotechnology developments in Bolivia. The local government has officially authorized the use and production of genetically modified soybean resistant to herbicides.

Access the article at http://www.cedib.org/pcedib/?module=displaystory&story_id=19045&format=html .

CBTNEWS FEATURE

Special Series: Agricultural Practices of Ancient Civilizations

Land of Plenty, River of Gold
Agriculture in Ancient Egypt

In a land of contradictions, men were all at once gods, grassy plains lay opposite dry patches of desert, and the river Nile flooded and receded with the seasons. Ancient Egypt was not only a land of pyramids and gold, or sun-gods and pharaohs. It was a world ruled by the cycle of life and death – a cycle that finds itself replayed in the hieroglyphs that decorate the walls of tombs, and in the careful practices the ancient Egyptians exercised in tilling their soils and harvesting their grains.

The rule of the pharaohs began sometime in 3100 BC, resulting in an absolute monarchy ruled by gods – and perhaps rightly so, as the pharaohs stood watch over a vast, fertile land that became the prize of war for civilizations to come.

Understanding this privilege requires an understanding of Egyptian geography. Cutting right across the country is the river Nile, shaped like a lotus flower, the ancient Egyptian symbol for the regeneration of life. The lower land on either side

of it is the floodplain, with rich, black soil, the most fertile in all of Egypt. Above the floodplain is the low desert, a land used to bury the dead. Higher still is the high desert, an area for caravans, and a source of minerals, as well as dates and grapes.

The river Nile was the center of Egyptian civilization. It naturally flooded the plains every year, leaving behind a layer of silt that would render the soil fertile. It became the line of communication and transport among the provinces of the kingdom, and was the means for pharaohs to monitor the activities of their subjects, or transport their armies. Egypt, even then, had little or no rainfall, and it depended largely upon the Nile as the source of water for crops and animals. If the river rose a mere twenty inches above or below normal, the Egyptian agricultural economy would be in ruins.

Anyone who could conquer Egypt conquered the Nile, as well as anyone who depended upon it for food.

With the growing season taking as long as nine months, life in Ancient Egypt promptly revolved around agriculture. Most workers were drafted through corvée, a system of forced labor by the government. Corvée was designed to increase personnel available for dredging the Nile's irrigation canals, surveying land boundaries, and preparing the ground for planting.

Egyptians also established a routine in dealing with the seasons, which likewise followed the rising and falling of the Nile. The flooding period lasted from July to December and was called *Aketo*, a time when farmlands were underwater. During this time, farmers directed their irrigation canals towards lands that could not be flooded by the river, and drove their farm animals to safer places to keep the beasts from drowning. The outflow, or *Peleto*, occurred from December to March, allowing farmers to sow their seeds and cultivate their crops. The rest of the year was a dry season known as *Syumuu*, which provided the time for harvesting and storing produce.

The time of harvest was a great affair, and demanded the participation of nearly all of able-bodied Ancient Egypt. Before the harvest began, surveyors, scribes, supervisors, and inspectors would be called in to measure the size of the fields and estimate the amount of grain that would be harvested. It was on this value that officials fixed the corresponding taxes that would have to be paid, either to the Royal Treasury or to a representative of one of the gods. Taxes were also based on the amount of flooding, and through the portable Nilometer – a tool placed vertically into the Nile to measure the water levels.

Eight principal steps outlined the cultivation of grain, and these steps are reflected in most of the hieroglyphics seen in Egypt today. First was 1) ploughing, which was accomplished with the help of an animal, or by the farmer's own

strength. Then came 2) sowing, done by hand, with goats in tow to walk over the newly sown fields and push the seeds out of reach of birds.

Once the grain was ready and fully grown, the time would come for 3) harvesting, done with sickles, after which the grain would be 4) bundled and carried on the back of donkeys to a safe and dry place. The grain would then undergo 5) threshing, where it was spread out to be trampled upon by the hooves of donkeys or cows, in order to separate the grain from the chaff. Wooden forks were then used to 6) completely eliminate the light chaff and straw from the grain, a task usually done by women. Sieves of reed and palm leaves were then used to 7) separate weeds from the grain, after which the clean grain would be 8) stored in bins until use. The well-developed, faithfully followed process led to occasional grain surpluses, so that Egypt became an exporter, and eventually "the bread basket of Rome" during the Empire's times.

Egyptians grew major grains such as emmer; barley, which was used for bread and beer; wheat; an unidentified species of corn called *pekha*; flax for cloth and ropes; papyrus for paper, boats, ropes, and mats; and the castor oil plant, whose oil was used as a payment for workmen.

The onion was first grown in Asia, where it soon made its way to the fields of Egypt. Ancient Egyptians worshipped it, believing that its shape and concentric rings symbolized eternity. They used precious metals to create likenesses of their vegetables, but only the onion was made out of gold. Some pharaohs were even buried with them, and the pyramids contain illustrations showing how the Egyptians held the vegetable in high esteem.

Egyptian gardens were also used for food crops, which included radishes, sesame, lentils, beans, chickpeas, lettuce, onions, leeks, dill, grapes, figs, pomegranates, melons, and gourds. A great variety of flowers also allowed Egypt to produce honey, which women processed to for use in desserts.

In a land teeming with grandeur, the rich and poor farm the fertile plains, the deserts are home to magnificent mausoleums for the royal dead, and still, the river Nile rises and falls with the seasons. Modern Egypt is alive with its past, as the cycle of life and death plays and continues through the years, and as the currents of mighty waters, witness to centuries of war and plenty, snake through a new world.

For more information, visit
http://nefertiti.iwebland.com/timelines/topics/agriculture.htm and
http://www.aldokkan.com/science/agriculture.htm

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