CROPBIOTECH 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)

January 12, 2007

In This Week's Issue:

NEWS

*** GLOBAL ***

GOOD AGRI PRACTICES ENABLE DEVELOPING COUNTRIES TO COPE WITH GLOBALIZATION

Changing international and domestic food markets, and different sets of standards and codes are becoming a challenge for developing countries in penetrating markets in developed countries. However, they also create opportunities for improvement. Good agricultural practices (GAP) can help developing countries cope with these globalization realities. These views were shared by experts from the Food and Agriculture Organization (FAO).

The term “good agricultural practices” is commonly used to designate codes of agricultural production methods for implementation at farm level, which are promoted by many public and private sectors said FAO expert Anne-Sophie Poisot. It can help promote sustainable agriculture and contribute to a better environmental and social development at both national and international levels. For example, improvements in agricultural practices, such as integrated production and pest management, can lead to substantial improvements not only in terms of yield and production efficiencies but also in health and safety of workers added Paola Termine from FAO’s Sustainable Agricultural and Rural Development Programme.

Read more on FAO’s news release at http://www.fao.org/newsroom/en/news/2007/1000475/index.html.

SYNGENTA AND DIVERSA FORM PARTNERSHIP TO DISCOVER ENZYMES FOR BIOFUELS

Syngenta and Diversa Corporation recently announced a new 10-year research and development partnership focused on the discovery and development of a range of novel enzymes to be utilized for biofuel production. The agreement allows Diversa to independently develop and commercialize fermentation-based enzyme combinations from its proprietary platform. Syngenta will have exclusive access to enzymes from Diversa’s platform to express in plants for enhanced cost-effective production.

Read the news release at http://www.syngenta.com/en/media/press/2007/01-08.htm.

PLANT-PRODUCED INSULIN EQUIVALENT TO COMMERCIAL INSULIN

The safflower-produced insulin by the biotech company SemBioSys Genetics, Inc. has been confirmed through analytical, in vitro and in vivo assays to be chemically, structurally and functionally equivalent to U.S. pharma grade human insulin. The results from the equivalence testing are the most recent achievement for the insulin program.

"As a result of these achievements we expect that we will be able to submit an Investigational New Drug Application (IND) later this year and initiate a Pharmacokinetic/ Pharmacodynamic study of safflower-produced insulin late in the fourth quarter of 2007 or early in the first quarter of 2008, leading to an end of Phase II meeting with the FDA in 2008", said Andrew Baum, President and

CEO of the company. Insulin is used for the treatment of diabetes, and demand for high quality insulin is projected to increase to 16,000 kilograms by 2012.

The news article is available at http://www.sembiosys.com/news2.aspx?id=5295&secId=7.

DIVERGENCE, MONSANTO TO DEVELOP NEMATODE-RESISTANT SOYBEANS

Monsanto Company and Divergence, Inc. have extended for another year their on-going collaboration agreement to develop nematode-resistant soybeans. During the past two years, the companies have made notable progress in controlling the damage inflicted by the soybean cyst nematode, which attacks roots of soybeans during the growing season.

As part of the collaboration, Monsanto gained exclusive rights to Divergence's existing technology in this area and provided funding for ongoing research by Divergence. Divergence has received milestone payments under the collaboration based on research and development successes and will receive royalties once applicable products reach the marketplace.

Read the press release at http://www.divergence.com/press/20070109.htm

CANOLA COMMISSION STUDIES BENEFITS OF EXPIRING CANOLA PATENTS

Canada's Saskatchewan Canola Development Commission (SCDC) is determining whether several canola-related patents that are expiring soon will benefit farmers. Last year the SCDC commissioned a study to determine patent issues related to herbicide canola. This involved finding out whether protected varieties can be used in research and also to explore if there are economic benefits on developing and commercializing a generic herbicide tolerant canola.

The commissioned study has determined that: a) research exemptions exist but are currently limited to the pharmaceutical industry, b) regulatory procedures for risk assessment of novel traits now takes longer (compared to 5 years ago); and c) the benefits of farmers through savings gained from reduced technology use agreement (TUA) cost is still unknown. The report also mentioned that it is possible that companies holding the current patents may extend the intellectual property protection by filing new ones that just pertain to uninventive additions.

The complete press release is at http://www.saskcanola.com/news/2007-0109-patents.html. The full report can be accessed at http://www.saskcanola.com/pdfs/scdc-patent-report.pdf.

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*** AFRICA ***

FACTORS FOR GREATER ACCEPTANCE OF GM BANANA

Targeting traits that reflect local production conditions and consumption preferences, and identifying local banana varieties as host plants, may lead to greater acceptability of genetically engineered (GE) banana varieties. Other factors include the appropriate design of biosafety regulatory frameworks, consumer attitudes toward biosafety risk, and potential challenges of marketing transgenic products in domestic and foreign markets. These were conclusions forwarded by "A trait-based model of the potential demand for a genetically engineered food crop in a developing economy" by Svetlana Edmeades and Melinda Smale for the International Food Policy Research Institute (IFPRI).

Using an economic model, the researchers predict the potential demand of smallholder farmers for GE banana, particularly cooking banana for East African highlands. They note that clients for transgenic banana planting material are likely to be poorer, subsistence-oriented farmers in areas greatly affected by biotic constraints.

The full article was published in the journal Agricultural Economics but is available online at http://dx.doi.org/10.1111/j.1574-0862.2006.00167.x.

*** THE AMERICAS ***

ECONOMIC IMPACT OF GM CROPS IN ARGENTINA

GM crops have positively affected Argentina's agricultural sector, as well as its economy. This is among the conclusions of Eduardo Trigo and Eugenio Cap in their report published by the Argentine Council for Information and Development of Biotechnology (ArgenBio).

Argentina is currently the second largest producer of GM crops worldwide. Trigo and Cap examined herbicide-tolerant soybean, Bt corn and Bt cotton. They reported that soybean varieties grown in the country are now all GM, indicating very rapid adoption of the technology. The gross benefits for growing herbicide-tolerant soybean total to about US$20 billion over the last ten years; for Bt corn about US$482 million; and for Bt cotton about US$21 million. Majority of this amount went to farmers, while the rest to seed suppliers, herbicide suppliers, and the Argentine government.

GM crops were cited to also have indirect positive impacts to Argentina including increasing the productivity in the livestock sector, job creation, growth in gross domestic product (GDP), and considerable savings to consumers.

Links to the press release and the full report (in Spanish and English) can be found at http://www.argenbio.com/h/nuevo_estudio/10anos.php

CANADA, INDIA TO COLLABORATE ON AGRI-BIOTECH INFORMATION EXCHANGE

Canada announced the signing of a Memorandum of Understanding (MOU) with India to facilitate the exchange of technology and expertise between the two countries in conducting research in agriculture, agri-food, and rural development. Of particular interest are agricultural biotechnology, bio-pesticides and bio-fertilizers, functional and nutraceutical foods and environmental technologies. The MOU does not involve an exchange of funding, but establishes guidelines for setting research priorities and projects.

The press release is available at http://www.agr.gc.ca/cb/index_e.php?s1=n&s2=2007&page=n70105.

BIO: BIOTECH TO ENSURE SUSTAINABLE SUPPLY OF FOOD AND FUEL

In response to a new Earth Policy Institute (EPI) report that forecasts an increase in global food prices with the advent of crop-derived fuels, the Biotechnology Industry Organization (BIO) said that agricultural biotechnology will help ensure an environmentally sustainable supply of food and raw material for biofuels. BIO's recently released report, "Achieving Sustainable Production of Agricultural Biomass for Biorefinery Feedstock," outlines current and future feedstock supply challenges for the biofuel industry and discusses incentives to spur sustainable production, harvest and delivery of agricultural cellulosic biomass.

The news release can be read at http://www.bio.org/news/newsitem.asp?id=2007_0105_01. The BIO report is available at http://www.bio.org/ind/biofuel/SustainableBiomassReport.pdf. For the EPI report "Distillery Demand for Grain to Fuel Cars Vastly Understated", visit http://www.earth-policy.org/Updates/2007/Update63.htm.

NSF FUNDS RESEARCH IN CROP COMPARATIVE GENOMICS

The National Science Foundation (NSF) doled out $14 million in new awards to advance research in comparative genomics of economically important plants. Universities that received grants from the NSF include the Iowa State University for the study of polyploidy in cotton; University of Missouri for research on polyploidy in Brassica species; and University of Georgia and the University of Arizona for developing sequence resources to study genome organization in wheat and rice.

Projects based at the University of California at Davis and Cornell University will catalog variants in pine trees and in maize, respectively, to allow researchers to link genetic variation with changes in gene function. At Washington University St. Louis, researchers will investigate the red rice genome associated with weediness, while scientists at Michigan State University will examine differences in gene expression in weedy and cultivated radishes.

Readers can access the press release at http://www.nsf.gov/news/news_summ.jsp?cntn_id=108263&org=NSF&from=news.

IMPROVING CROP PLANTS THROUGH GENOMICS

Agricultural Research magazine features some of the latest undertakings of the Agricultural Research Service's (ARS) U.S. Plant, Soil, and Nutrition Laboratory (PSNL) in Ithaca, New York using genomics. Computational biology, which integrates computer science with biological research, and molecular biology are generating promising results for research on plant diseases particularly on virulence-related genes and pathways.

Research is being done to develop better tasting tomatoes, melon and strawberry that meet commercial shelf-life needs. Studies on manipulating genes that regulate fruit's response to light are being done to alter fruit quality and nutritional value.

Worldwide vitamin A deficiency is being addressed by studies on carotenoids using a cauliflower gene, dubbed "Or" for the color orange, to induce accumulation of high levels of beta-carotene in food crops. Other projects include developing statistical and genetic tools for identifying natural variation in agronomically important traits in maize.

With genomic tools used on maize and rice, scientists have identified genes and associated mechanisms that help plants tolerate soil acidity and toxic metals, particularly aluminum tolerance in maize and sorghum. The goal of this research is to improve crop-plant cultivation on marginal, and even highly acidic, soils that limit crop production worldwide.

The web version of the article may be viewed at
http://www.ars.usda.gov/is/AR/archive/jan07/plants0107.htm

* ASIA *

GM FOOD TO BE LABELED IN SRI LANKA

The Sri Lanka Health Ministry rules that all genetically modified (GM) foods must be labeled. Beginning January 1, 2007 sellers or importers of GM food products should specify that their products have been genetically modified, or contain genetically modified organisms. A fine of fine of up to 10,000 rupees equivalent to US$100 is the penalty for those who fail to comply.

"GM-free foods" on the other hand should be certified by the Chief Food Authority (CFA) Dr. Athula Kahandaliyanage, the country's Director General of Health. Some government laboratories will be equipped with GM testing facilities for this.

View the news article at the following link
http://www.bernama.com/bernama/v3/news_lite.php?id=239977

PAKISTAN FACES COTTON PRODUCTION CONSTRAINTS AMIDST INCREASING LOCAL DEMAND

Cotton production in Pakistan, already grown on 7.65 million acres, has to cope with the demand of its textile industry which will require three million bales in 2008. However, problems still continue to plague the cotton industry in the country, says Ijaz Ahmad Rao in an article analyzing the cotton situation in Pakistan.

Ahmad Rao enumerates several constraints: low yield, high price of agricultural inputs, pest problems, shortage of good quality seeds, and lack of advanced technologies. Two options are proposed – increase area planted to cotton, and the other is to adopt modern technologies, such as the use of biotech cotton.

Expanding production area is no longer possible, notes Rao, while Pakistan's market with inadequate intellectual property protection and untried biosafety rules are forcing farmers to plant illegal Bt cotton seeds, thus undermining the potential of the modern varieties.

Email Ijaz Ahmad Rao at luckystarpk@yahoo.com or read his article at http://www.nation.com.pk/daily/jan-2007/8/bnews6.php.

*** EUROPE ***

STUDIES ON GM FEEDS

Researchers at the Federal Agricultural Research Center (FAL) in Braunschweig, Germany have been conducting studies with feeds from genetically modified (GM) plants (GMP) in the nutrition of swine, poultry, and cattle. The majority of the experiments were undertaken with GMP of the so-called first generation (plants with input traits and without substantial changes in composition). The fate of DNA during feed processing, in the digestive tract of animals, and in the animal body was one of the focal points of the studies.

The iso- and transgenic feeds were subjected to compositional analyses, and nutritional and safety assessment. In agreement with more than 100 animal studies available to date, results show no significant differences in the nutritional value of feeds from GMP of the first generation and that of feeds from non-GMP varieties. To date, no fragments of recombinant DNA have been found in any organ or tissue sample from animals fed with GMP.

The abstract of the article "Studies on feeds from genetically modified plants (GMP) – Contributions to nutritional and safety assessment" is available at http://www.sciencedirect.com/science?_ob=ArticleURL&_udi=B6T42-4KWTFD8-3&_user=677719&_handle=C-WA-A-AU-AU-MsSAYWW-UUA-U-U-AU-U-U-AADAUYVAVE-AAZYZZVEVE-WUZYBACDA-AU-U&_fmt=summary&_coverDate=02%2F01%2F2007&_rdoc=3&_orig=browse&_srch=%23toc%234962%232007%23998669998%23639550!&_cdi=4962&_acct=C000036823&_version=1&_urlVersion=0&_userid=677719&md5=4c227e15057f7fd6e10c9dd34694ed16.

£13M RESEARCH FUND TO DEVELOP BETTER CROPS IN UK

The Biotechnology and Biological Sciences Research Council (BBSRC), the primary public funding body for bioscience research in the UK, has awarded over £13M to projects that will aim to address challenges to agriculture posed by climate change and an increasing need for sustainable agriculture. New research will exploit basic plant science and plant genetics to find solutions to problems on:

- How to grow crops able to cope with climate change;
- How to breed vegetables that remain nutritious after days in the fridge;

- How to grow more effective biofuels to help reduce the UK's dependence on fossil fuels; and
- How to exploit plants more effectively to produce better bread, beer, biodegradable carrier bags and for other applications.

The press release is available at http://www.bbsrc.ac.uk/media/pressreleases/07_01_09_croplaunch.html. For more information on projects funded by the BBSRC Crop Science Initiative, visit http://www.bbsrc.ac.uk/media/briefings/crop_launch.pdf.

COPING WITH CLIMATE CHANGE FOR NEXT GENERATION OF FARMERS

Who has seen roses bloom in December? Now that the climate has been muddled up, it is no surprise to see roses flower at Christmas. Scientists studying how plants naturally evolve to cope with the changing seasons of temperate climates have made a discovery that can be useful in breeding crops able to adapt to global warming.

Researchers at the John Innes Centre (JIC) have been examining how plants use the cold of winter to time their flowering for the relative warmth of spring. This process, called vernalization, varies even within the same plant species, depending on local climate. One particular gene, named FLC, delays flowering over the winter and the research team discovered how cold turns off FLC and what keeps it off during growth in spring.

To read more, visit http://www.bbsrc.ac.uk/media/pressreleases/07_01_10_plants.html.

RESEARCH

VALENCIA ORANGES LOSE 'ORANGE SMELL' AT HIGH STORAGE TEMPERATURES

A research done by Spanish researchers at the Valencian Institute of Agricultural Research, and the Polytechnic Institute of Valencia, provides useful information on post-harvest storage of oranges. Valencia Late Frost orange varieties were found to have less acidity and orange-like flavor when stored at high temperatures (20 and 250C) compared to when stored at low temperatures (5 and 150C). The inverse relationship between Valencia oranges lose 'orange smell' at high storage temperatures
and the orange character was determined by quantifying acidity and by sensory evaluation.

During the experiments, Valencia oranges were stored for up to one month at the different temperatures. Acidity, soluble solid content, maturity index, and ethanol and acetaldehyde contents of the fruits were measured in the laboratory. Taste panelists also determined different sensory attributes including acidity, maturity index, off-flavors and orange-like flavors. Among the significant relationships found is that off-flavors reduce orange-like flavors but did not affect the acidity or the maturity index.

The open access article can be accessed at http://www.inia.es/gcontrec/pub/336-344-(119_05)-Effect_1165318134546.pdf.

GENETIC MAPPING OF FINGER MILLET

Four types of molecular markers were used to obtain the genetic map of the polyploid finger millet (*Eleusine coracana subsp. coracana*), an important cereal crop in East Africa and Southern India. Finger millet is grown mainly by subsistence farmers and serves as a food security crop because of its high-nutritional value and excellent storage qualities. To date most varieties of finger millet are from germplasm selections as there are very few breeding activities on the crop. Hybridization between cultivated types or between wild and cultivated types may have potential in improving finger millet.

The construction of the genetic map by an international group of researchers provided the first step toward mapping traits of agronomic importance. Mathews Dida and colleagues utilized several types of molecular markers to generate the genetic map from plants derived by crossing the wild progenitor of finger millet and an elite cultivar. The researchers believe that the map will ultimately help in transferring useful traits such as blast resistance, lodging resistance, drought tolerance, and nutritional value, in finger millet breeding programs.

The complete paper published by the journal Theoretical and Applied Genetics, can be accessed by subscribers at http://www.springerlink.com/content/2700114455h04131/fulltext.html.

ANTECEDENTS OF ATTITUDES TOWARDS GM AND OTHER NOVEL FOODS IN AUSTRALIA

Researchers at Australia's Commonwealth Scientific and Industrial Research Organization (CSIRO) have recommended that scientists and food manufacturers test new products derived from novel technologies for positive perception by consumers. This will help their products to be easily accepted in the marketplace and allow them to be successful.

G. Evans and D.N. Cox tested Australian consumers for antecedents to their attitudes towards four foods (yoghurt, margarine, pasta, and prawns) produced using various technologies, including genetic modification. The researchers found that there are significant differences between attitudes of consumers towards foods from the different technologies.

Australian consumers rated products - like margarine with GM Omega 3 flaxseed oil and resistant pasta - more negatively if they found out that they were derived from technologies that included words like "genetically modified" or "GM", than products produced by technologies described by less controversial words, such as pasteurization.

Evan and Cox explained that the potential benefits of GM are not often recognized by consumers, because the benefits of the early GM (first generation) products were producer oriented. This attitude still persists even though the products they have used in their study belong to second generation GM that offers quality traits. Furthermore, the researchers pointed out that many other factors can affect food choice including price and familiarity with the product. They recommend that a similar study be conducted to test consumer attitudes in other cultures.

The paper published by the British Food Journal is available for subscribers at http://dx.doi.org/0.1108/00070700610709968.

ANNOUNCEMENTS

BIOINFORMATICS COURSE FOR AFRICAN SCIENTISTS

The United Nations Conference on Trade and Development (UNCTAD) will organize in collaboration with the Agricultural Genetic Engineering Research Institute (AGERI), an Introductory Course in Bioinformatics to be held at AGERI, Giza, Egypt on February 4-15, 2007. UNCTAD will select and sponsor up to 20 scientists from African countries. For additional details, contact Ms. Marie-Elise Dumans at marie-elise.dumans@unctad.org or Mr. Mongi Hamdi at mongi.hamdi@unctad.org.

6th ASIAN CROP SCIENCE ASSOCIATION CONFERENCE

The BioAsia 2007 conference will be held on November 7-9, 2007 in Bangkok, Thailand, with the theme, “Technology for self-sufficient agriculture in Asia”. The event aims to bring together agricultural scientists in Asia to share research experiences. The focus of the conference is to emphasize on addressing science and community aspects assuring the long-term survival of local, healthy, secure, sustainable food and energy in Asia. Topics for discussion include biofuels, phytobioremediation, biopharming, and cassava biotechnology.

For more information, visit http://www.biotec.or.th/BioAsia2007/home/conference.asp.

ENVIRONMENTAL AND RURAL SUSTAINABILITY THROUGH ICT

The Annual Conference of the European Federation of IT in Agriculture and the World Congress on Computers in Agriculture (EFITA/WCCA 2007) conference will examine the role and use of information and communication technologies (ICTs) in three key areas of rural and agricultural sustainability: ICT supporting on-farm business; ICT supporting rural sustainability; and ICT supporting environmental sustainability. The event will take place in Glasgow, Scotland on July 2-5, 2007.

For more information visit: http://www.efitaglasgow.org.

BIOSAFETY COURSE SLATED IN BRAZIL

The course will run 24-28 September 2007 in Belo Horizonte, Brazil. It is primarily aimed at Latin American professionals who will be in a position to review applications for the deliberate release of GM crops. The workshop aims to discuss the near term evolution and challenges in GM biosafety, namely the developments of GM crops expressing complex phenotypes, non-food applications, and gene-restriction constructs. The workshop will comprise formal lectures on biosafety, and several sessions of hands-on exercises as in actual regulatory review process.

Requests for information and applications directly to:
Dr. Leila Oda. E-mail: secretaria@anbio.org.br or l.oda@uol.com.br.

COURSES ON PGR CONSERVATION & USE

A training program for plant genetic resources researchers and genebank managers will be conducted on 21 May 2007 to 29 June 2007 in Wageningen, The Netherlands. The training aims for participants and facilitators to exchange experiences and to explore practical applications for the conservation and sustainable use of plant genetic resources in agriculture.

Six two week courses are offered which are parts of two overlapping training programs: a) Contemporary and participatory approaches in plant genetic resources conservation and use, and b) Advanced management practices towards sustainable use of plant genetic resources. Each two week course in each program will provide independent and comprehensive training. A course that will discuss the applications of biotechnology to the study of genetic diversity and plant breeding will be held on 18-29 July 2007.

For details on the individual courses within the program, and for fellowship application please visit http://www.wi.wur.nl/UK/newsagenda/agenda/Conservation__sustainable_use_of_plant_genetic_resources.htm.

WORLD SEED CONGRESS 2007

Registration to the annual World Seed Congress opened last week. The event was organized by the International Seed Federation and will be held on 21-23 May 2007 in Christchurch, New Zealand. The international congress provides opportunities for trade, debate, policy-setting and networking, and also plays a fundamental role in sustaining the present and future success of world seed industry. For more information please visit http://www.conference.co.nz/index.cfm/worldseed2007/Home.

59TH INTERNATIONAL SYMPOSIUM ON CROP PROTECTION

The 59th International Symposium on Crop Protection will be held on 22 May 2007 at the Faculty of Bioscience Engineering of the Ghent University, Belgium. The symposium will focus on new developments in all aspects of crop protection. The program will include a plenary session with two invited papers and parallel sessions with submitted papers related to phytopathology, entomology, nematology and acarology, pesticide residues, biological and integrated control of pests, diseases and weeds.

More information is available at http://www.iscp.ugent.be.

8TH AFRICAN CROP SCIENCE SOCIETY CONFERENCE

The African Crop Science Society (ACSS) and Faculty of Agriculture, Minia University, Egypt is calling for abstracts for the 8th African Crop Science Society Conference. The conference will be held on 27- 31 October 2007 in El-Minia, Egypt. The conference theme is “Crop research, technology dissemination and adoption to increase food supply, reducing hunger and poverty in Africa”. Among the topics to be discussed at the conference include: crop improvement and physiology, biodiversity and natural resources management, post harvest handling and food sciences, crop protection, crop genetics and biotechnology, and environmental sciences.

More information on this event at http://www.africancrops.net/News/july06/acss8.htm.

XVI INTERNATIONAL PLANT PROTECTION CONGRESS

Every four years, the International Association for the Plant Protection Sciences (IAPPS) conducts its congress. The upcoming one will be held on 15-18 October 2007, Glasgow, Scotland, UK. This congress will cover a very wide subject area. In addition to the usual topics such as biological control and resistance, new sessions and specialized ones have been also added. Among the novel topics to be discussed include: biofuels and bioenergy, biosensors, biopharmaceuticals, post-harvest disease control, neonicotinoides, and semiochemicals.

More information at http://www.bcpc.org/ippc2007/

DOCUMENT REMINDERS

GRASSWEED DATABASE

Bayer's online GrassWeed Database gives details on the world's most prevalent grass weeds in cereal crops. The database contains information on 50 top grass species and a weed identification tool that can help the user to identify a grass. It also makes possible to see an infestation map for the nine most important grasses in cereal production.

The resource can be accessed at http://courier.bayercropscience.com/gwdsite/frameset.html?http://courier.bayercropscience.com/gwdsite/gwd/en/index.html

TRAINING MANUAL ON POSTHARVEST FOR TOMATO AND CHILI

The Asian Vegetable Research and Development Center (AVRDC) has published Technical Bulletin No. 38 - a postharvest training manual on tomato and chilli for Cambodia, Lao PDR and Vietnam. AVRDC's training manual is aiming help the three countries to build postharvest research capabilities. The countries are recipients of a Regional Technical Assistance (RETA) on the crops from the Asian Development Bank (ADB). The manual contains topics on postharvest physiology and technology of tomato and chilli, and also statistical procedures for analyzing research data which may be of interest to crop researchers in general.

The manual is available at http://www.avrdc.org/postharvest/training/PHT_research_training_manual-english.pdf

AFRICAN JOURNALS ONLINE

The African journals online library (AJOL) provides a central online repository for African scholarly journals, and a document delivery service. AJOL aims to give greater visibility to Africa's participating journals, and increase worldwide knowledge of indigenous scholarship. AJOL started

in 1998 as a project, supported by the International Network for the Availability of Scientific Publication (INASP), but since then has grown to become a South African not-for-profit company.

To access the African journal collection please visit http://www.ajol.info.

FUNCTIONAL GLYCOMICS GATEWAY

The Functional Glycomics Gateway is a new comprehensive and regularly updated online resource that offers free information for glycobiologists, cell biologists and biochemists. The gateway was launched last month and is being provided by the Nature Publishing Group (NPG) in collaboration with the Consortium for Functional Glycomics (CFG). The CFG is a large research initiative composed of more than 300 participating investigators and seven scientific core laboratories.

Visit the gateway at http://www.functionalglycomics.org to find out more information.

BIOFUELS SUPPLEMENT

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* NEWS AND TRENDS *

NEW STUDY HIGHLIGHTS LOW INPUT HIGH DIVERSITY GRASSLAND PERENNIALS AS BETTER BIOFUEL FEEDSTOCKS

http://www.sciencemag.org/cgi/content/full/314/5805/1598

A research team at the University of Minnesota has released a new study after its publication on the life-cycle accounting assessments of corn ethanol and soybean biodiesel as viable fuel alternatives (Biofuels Supplement 2006 November 24). In the new study, “Low Input High Diversity” (LIHD) plants have been identified as a third major class of biomass sources for biofuel production. (The first two major classes are (a) monoculture crops on like corn, soybean, sweet sorghum, etc, and (b) waste biomass like straw, baggasse, corn stover, etc).

Published in the 2006 December issue of the journal *Science*, the study shows that biofuels produced from LIHD native grassland perennials provide the following benefits: (1) more usable energy and net energy gain per hectare compared to corn ethanol, (2) net carbon-negative biofuel product (i.e., reduces greenhouse gases), in contrast with corn ethanol and soybean biodiesel which are “carbon-sources” (net increase in greenhouse gases, but lower than fossil fuels), (3) reduction of agricultural inputs (i.e., agrochemicals) compared with food-based biofuels, (4) utilization of abandoned, non-productive lands, thereby avoiding competition for fertile lands normally used for food production. The paper provides quantitative data related to the above benefits.

ALTERNATIVE GENETIC ENGINEERING APPROACH FOR OBTAINING HIGH ETHAONOL TOLERANT/HIGH-ETHANOL FERMENTING YEASTS
Abstract of research article and link to conditional access to full paper:
http://www.sciencemag.org/cgi/content/abstract/314/5805/1565?maxtoshow=&HITS=10&hits=10&RESULTFORMAT=&fulltext=yeast+ethanol+MIT&searchid=1&FIRSTINDEX=0&resourcetype=HWCIT

Related articles:
http://aiche.confex.com/aiche/2006/techprogram/P62960.HTM
http://www.biofuelreview.com/content/view/678/2/

Scientists from the Massachusetts Institute of Technology (MIT) have reported the successful engineering of a high-ethanol fermenting yeast (*Saccharomyces cerevisiae*) with improved glucose/ethanol tolerance, by a technique called "global transcription machinery engineering (gTME)".

Reported in the September issue of *Science*, the authors described global transcription machinery engineering (gTME) as "an approach for reprogramming gene transcription to elicit cellular traits (phenotypes) that are important for technological applications". By using this approach, the researchers obtained a high-ethanol tolerant yeast strain which could ferment glucose to ethanol that is 50% higher than normal yeast. The method, the authors report, can "provide a route to complex phenotypes that are not readily accessible by traditional methods".

*** ENERGY CROPS AND FEEDSTOCKS FOR BIOFUELS PRODUCTION ***

WEED IN SOYBEAN FIELDS MAY BE A POTENTIAL BIODIESEL RESOURCE
Research article: http://www.ars.usda.gov/is/pr/2006/061101.htm?pf=1

Related articles:
http://www.biofuelsjournal.com/articles/Winter_Weed_Pennycress_Could_Find_Use_as_Biodiesel_Feedstock_____11_07_2006-38858.html
http://www.biofuelreview.com/content/view/598/2/
http://power.wisconsin.gov/newsletter/index.html#9

Pennycress (*Thlaspi arvense*) is an annual winter weed in soybean fields that farmers in the Midwestern United States find little use of. However, this plant may soon be of value, due to research efforts at the U.S. Department of Agriculture, Agriculture Research Service (ARS) Center for Agricultural Utilization Research (NCAUR). The research team, headed by Terry Isbell, reports the following characteristics of pennycress seeds which make it a potential source for biodiesel: (a) an oil content of 36% to 40%, and (b) a long chain fatty acid profile comparable to well known biodiesel sources like soybean or sunflower oils. By treating pennycress as another crop rather than a weed, the researchers noted that farmers would be able to produce fuel in the winter from pennycress and food in the summer from soybeans.

Isbell and his team are doing pilot scale conversion of pennycress oil to biodiesel and will subsequently analyze the characteristics of the fuel product.

MICROBIAL BIODIESEL FROM GLUCOSE AND OLEIC ACID USING ENGINEERED *E. coli*
Research article: http://mic.sgmjournals.org/cgi/content/full/152/9/2529
News article: http://www.sciencedaily.com/releases/2006/09/060925083802.htm

German scientists have metabolically engineered *E. coli* so that it can produce biodiesel in the form of fatty acid ethyl esters (FAEE). They expressed in *E. coli*, the genes for ethanol formation (derived from *Zymomonas mobilis*) and subsequent esterification of the ethanol with acyl groups of coenzyme A thioesters of fatty acids (from *Acinetobacter baylyi*). The biodiesel product, called "microdiesel" could be produced by aerobic fermentation of the engineered *E. coli* in the presence of glucose and oleic acid. The main component of the FFAEs is ethyl oleate, with ethyl palmitate and ethyl palmitoleate as minor side products. In fed batch fermentations, a microdiesel concentration of 1.28 grams per liter FAEE was obtained. The FAEE constituted about 26% of the cell dry mass.

*** BIOFUELS PROCESSING ***

RESEARCHERS EXPLORE NOVEL MICROBIAL COCKTAILS TO CONDITION CORN STOVER FOR ETHANOL FERMENTATION
http://aiche.confex.com/aiche/2006/techprogram/P58945.HTM

Scientists from the University of Mississippi explored the pretreatment of corn stover (lignin depolymerization) prior to ethanol fermentation by bacterial conditioning. (Bacterial conditioning can be considered as partial degradation of lignocellulosics in corn stover by the addition of bacteria with lignolytic/cellulolytic activity. This would make the ethanol fermentation step easier). The bacterial conditioning agents were inocula prepared from guts of insects that are known to digest wood. Inocula were obtained from cultures from dissected guts of termites, beetles, etc. From weight loss experiments during solid substrate fermentations (SSF), four out of 14 sources that were obtained from midgut were found to show weight loss in the pretreated corn stover; negligible weight loss was observed in untreated corn stover. Further studies are reported to be done to characterize bacterial flora in the insect guts and to determine their response to operating conditions like pH and temperature.

ULTRASONIC TREATMENT PROMOTES RELEASE OF CORN-SUGARS FOR ETHANOL FERMENTATION
Research article: http://www.ccee.iastate.edu/research/projects/projectid/1140535067
News article: http://www.sciencedaily.com/releases/2006/06/060601213717.htm

The conventional dry milling process of corn does not often convert all of the starch to available sugars which can then be fermented to ethanol. In order to improve ethanol yields, a team of scientists at the Iowa State University, led by David Grewell, are integrating ultrasonics into dry corn milling. Ultrasound (high frequency sound waves) is applied to the corn mash and cavitation (rapid collapse of gas bubbles) in the liquid causes the break-up of corn particles into much finer sizes. This exposes more of the starch to the enzymes responsible for the degradation of the starch to simple sugars. The increase in the conversion of starch to simple sugars results in increased activity of ethanol fermentation. Laboratory experiments have shown that after ultrasonic treatment, the original corn particle size was reduced 50-fold. Reduction in corn particle size exposes more surface area for enzymatic attack, resulting in a 30% increase in the rate of sugars (enzymatically) released from the corn starch. A patent application for the technology has been filed.

*** BIOFUELS POLICY AND ECONOMICS ***

TECHNOECONOMIC STUDY FORECASTS TRENDS IN BIOFUEL TECHNOLOGIES
http://www.nexant.com/news/index.html

Nexant, Inc. has published a study (based on technoeconomic modeling), which looks into the "current, emerging, and future technologies" in biofuels. Some of its findings and conclusions are: (1) biodiesel (as fatty acid methyl ester) is seen as a "transition technology", which would substitute only a small fraction of the global demand for diesel, (2) the next phase in bioethanol development would be ethanol fermentation of substrates obtained from hydrolysis of biomass feedstocks, (3) biofuels production from themochemical processing will be a major technology player for producing "gasoline and diesel range biofuels".

REPORT ANALYZES AFRICA'S BIOFUEL POTENTIAL
http://biopact.com/2006/07/look-at-africas-biofuels-potential.html

A summary of two reports related to the analysis of Africa's biofuels potential can be read at the Biopact website. Biopact is an organization of European and African citizens whose efforts are channelled toward the establishment of a "mutually beneficial 'energy relationship' based on biofuels and bioenergy".

The summary is based on the analysis by the Copernicus Institute at the University of Utrecht. The calculation of the biofuel potential was based on some factors such as "demographic trends, the demand for food, fiber and wood products, and changes in land-use patterns." Among the findings of the report were: (a) sub-Saharan Africa has the largest energy potential (estimated maximum is about 410 x 1018 joules of energy), (b) under a high productivity scenario, the biofuel production potential of the planet is said to be several times larger than the total amount of energy that can be obtained from both fossil fuels and nuclear power, (c) Africa still stands to become a large biofuels producer, even when the worst-case climate change predictions are taken into account.

*** EVENTS ***

BIOFUELS AND FEEDSTOCKS INDONESIA
30-31 January 2007, Jakarta, Indonesia
http://www.cmtevents.com/newevents.aspx?EV=070112

The conference is seen as a forum which provides useful and practical updates related to biofuel commercialization issues, feedstock markets and supply, as well as technology issues. Focus of the conference is said to be on *Jatropha* (plantation and processing, markets, etc). Other topics include biofuels outlook (Europe, U.S., Japan/Korea); ethanol prospects in Indonesia; new applications and markets for glycerine management, etc.

ASIA BIOFUELS CONFERENCE AND EXPO V
11-13 December 2007, Singapore
http://www.asiabiofuels.com/

The international conference will gather delegates involved in biofuel projects and offers topics encompassing the “complete biofuels cycle, including feedstocks, by-products, commodity markets”. More information is available at the above website.

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