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BioLines is AfricaBio's 'Biotechnology Headlines' – a quick guide to what is topical. By design, the articles are not exhaustive, but references are given to follow up points of interest. Let us know what you like and dislike about **BioLines** and what you want to see as part of this service. Articles are edited and some shortened to meet space requirements. It is not the intention of this service to infringe on copyright. **BioLines** is issued free of charge and every effort is made to acknowledge the source of information.

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AFRICA

SMALL FARMERS IN MALAWI BENEFIT FROM CASSAVA PROJECT

http://www.iita.org/cms/details/news_feature_details.aspx?articleid=986&zoneid=342

A project to produce high-yielding cassava for processing into industrial starch is raising the income of small scale farmers of the Masinda Club Factory, while also benefiting farmers from neighboring villages from their sales of raw cassava roots for processing. Farmers were trained, among other things, in cassava production, processing, factory management, and environmental sanitation.

Established in 2003 with an initial capacity to produce four tons of industrial starch monthly, the factory now produces 20 tons, and it has facilitated an increase of about 38% in cassava production after two years of operations. Following the example of the Masinda Club Factory, several companies are establishing similar cassava treatment factories in the country.

The initiative, a public- public partnership, is lead by the International Institute of Tropical Agriculture (IITA) in collaboration with the Southern African Root Crops Research Network (IITA/SARRNET), with funding from USAID.

ECOWAS MINISTERS AGREE ON BIOTECH PLAN

<http://www.voanews.com/english/2007-03-31-voa16.cfm>.

An agreement was forged by the Ministers from the Economic Community of West African States (ECOWAS) to use biotechnology to increase food production in their region. This was reached at the third ECOWAS ministerial meeting on biotechnology and biosafety held in Accra, Ghana. A communiqué issued at the end of the meeting noted that the technology will improve productivity, make the farming sector more competitive and ensure sustainable management of natural resources. However, safety measures at both the national and regional levels were deemed important as past of the implementation process.

A regional and comprehensive plan is envisioned to benefit from biotechnology developments. This will necessitate the assistance of development partners and the collaborative efforts of governments of various countries, said Marcel Nwalozie, from the west and central African Council for Agriculture Research and Development, an umbrella organization that co-ordinates agricultural research for west and central Africa.

GM CROPS CONTRIBUTED TO POVERTY ALLEVIATION

http://www.europabio.org/GreenManifesto/PRESS_RELEASE-AFRICABIO_REPORT.doc

GM crops have contributed to the alleviation of poverty for many farmers, said Prof. Diran Makinde of the University of Venda in South Africa, in his presentation to Biovision. Makinde called for new approaches to ensure sustainable food production in developing countries, especially in Africa, including using biotechnology in crop production.

Makinde referred to a study carried out in South Africa in 2002 in which Bt maize and Bt cotton were compared to non-Bt crop varieties and the Bt varieties, in both cases, were found to produce a higher yield and generate more profits to African farmers. Makinde questioned the European Union's (EU) stance on GM crops and its present policies on agricultural biotechnology which make it difficult especially to developing countries that engage in agricultural trade with the EU. European consumers generally perceive GM foods to be 'contaminated' and therefore developing countries that are dependent on the markets in Europe do not wish to grow them and are losing out on vast socio-economic benefits.

INSECT RESISTANT MAIZE FOR AFRICA

<http://www.africancrops.net/News/march07/index.htm>

The second phase of the Insect Resistant Maize for Africa (IRMA) Project has been launched by the International Maize and Wheat Improvement Center (CIMMYT) and Kenya Agricultural Research Institute (KARI). The project aims at producing stem borer resistant, locally-adapted maize varieties for various Kenyan agro-ecological zones using conventional and biotechnology-mediated

approaches. Some of the outputs of the program include the introduction of Bt maize for testing in Kenya, release of insect-resistant maize hybrids and characterizations of non-target organisms in maize systems.

NEW SEED INITIATIVE FOR MAIZE IN AFRICA

<http://www.africancrops.net/News/march07/index.htm>

The New Seed Initiative for Maize in Africa (NSIMA) Project has been helping small-scale farmers obtain superior and high-quality seeds. By using high-quality seeds, agricultural productivity is greatly improved. The project fostered the development of improved and adapted maize varieties with the National Maize Breeding Programmes in seven Southern African Development Community (SADC) countries and funded the breeding activities of the International Maize and Wheat Improvement Center (CIMMYT)-Harare. Several new maize breeding lines, open-pollinated varieties and hybrids have been released into the seed sector.

NERICA RICE INTRODUCED IN CENTRAL AFRICAN REPUBLIC

<http://www.africancrops.net/News/march07/index.htm>

Since the decline of cassava production in the 1990s, rice has been used as an alternative source of food in Central African Republic. Ten NERICA varieties were acquired from Benin Republic and three more were selected for introduction to farmers due to their better yield, resistance to disease and early maturity.

NERICA varieties showed resistance to drought and various diseases. More experiments are needed to collect dependable data on the performance of the rice varieties during periods of long rains.

WEST AFRICA TO BOOST FOOD CROPS WITH BIOTECHNOLOGY

<http://www.scidev.net/news/index.cfm?fuseaction=readnews&itemid=3535&language=1>

The 15 members of the Economic Community of West African States have agreed to use biotechnology to increase food production in the region. Ministers of Agriculture, Environment, Science & Technology met recently to discuss the issues surrounding biotechnology in agriculture at a meeting in Accra, Ghana.

They adopted a regional action plan for biotechnology development for 2006-2010, which stresses the use of public-private partnerships to increase investment in biotechnology, and the need to put safety measures in place at national and regional levels. The plan calls for a network of biotechnology experts to be established, and the promotion of networking between centres of excellence in biotechnology and the West and Central African Biosciences facility planned by the New Partnership for African Development.

The ministers also agreed to set up an independent fund for assessing the socio-economic impacts of using GM organisms. A regional policy for managing intellectual property rights to help with the acquisition, development and distribution of biotechnology knowledge and new technologies will also be developed.

Baboucarr Manneh, a Gambian researcher at the biotechnology unit of the Africa Rice Center in Benin, said it has the potential to improve agricultural productivity in West Africa. He pointed to a number of biotechnology applications needed in West African countries, such as the use of antibodies and biopesticides against crop, animal and human diseases.

Manneh indicated the necessity of producing disease-free plants such as bananas, cassava and fruit trees, and plants resistant to environmental stresses.

He also highlighted the importance of improving the nutritional qualities of existing crop varieties and animal breeds.

To address public fears about biotechnology, the ministers agreed to establish a network of national information and communication units responsible for raising public awareness of biotechnology.

The Economic Community of West African States includes Benin, Burkina Faso, Cape Verde, Côte d'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone and Togo.

NEWS FROM OTHER COUNTRIES

GENE CONTROLLING RICE GRAIN SIZE AND WEIGHT IDENTIFIED

<http://www.nature.com/ng/journal/vaop/ncurrent/abs/ng2014.html>

A team of scientists led by Prof. Hongxuan of the National Key Laboratory of Plant Molecular Genetics, Shanghai Institute of Plant Physiology and Ecology, China, have successfully cloned a gene, *GW2*, which controls the size and weight of rice grains. Rice plants that lack a functional copy of *GW2* produce bigger rice grains with more cells and wider spikelet hulls, which results in an increase in yield. *GW2* acts by restricting the rate at which cells divide during the formation of the grain. As grain size is a critical agronomic quality, *GW2* could therefore be an important tool for improving production. The research is reported in the latest issue of Nature Genetics.

CHLOROPLAST TRANSFORMATION FOR IMPROVED BIOSAFETY OF GM CROPS

<http://www.mpg.de/bilderBerichteDokumente/dokumentation/pressemitteilungen/2007/pressemitteilung200704111/index.html>

The inheritance of the chloroplasts (the organelles responsible for photosynthesis) in most plants is maternal, as these organelles are not carried by the pollen grains (which produce the sperm cells). The manipulation of the chloroplast genome for crop improvement is therefore considered a very valuable tool for improving the containment of the transgene, and enhancing in this way the biosafety of transgenic plants.

A team of researchers led by Ralph Bock from the Max-Planck Institute for Molecular Plant Physiology in Germany have recently evaluated the strictness of maternal inheritance, by measuring the rates at which chloroplasts are transmitted through the pollen. The team reports a low level of paternal inheritance (only 39 seeds were identified with chloroplasts derived from the father plant among over 2 million seeds examined). The results indicate that plastid transformation is a good tool for preventing gene flow. However, in cases where transmission of the transgene through the pollen must be totally prevented, the team recommends adopting additional containment strategies to eliminate the risk of outcrossing. The research is published in the latest issue of PNAS.

TRANSGENIC PLANTS FOR SMALLPOX VACCINE PRODUCTION

<http://www.pnas.org/cgi/content/abstract/0701451104v1?maxtoshow=&HITS=10&hits=10&RESULTFORMAT=&fulltext=Koprowski&searchid=1&FIRSTINDEX=0&resourcetype=HWCIT>

A team of scientists from the Biotechnology Foundation Laboratories, Thomas Jefferson University, Philadelphia, USA, have reported the successful production of a smallpox vaccine in transgenic tobacco plants, shown to protect mice and minipigs against infection. Smallpox, caused by the Variola virus, is a highly contagious disease unique to humans that can be lethal. These results indicate the feasibility of producing safe and inexpensive subunit vaccines by using plant production systems. Advantages of vaccine production in plants include reduced production costs; large production scale; product safety; and the possibility of oral administration.

NEW TRADE RULES TO BENEFIT SOME DEVELOPING COUNTRIES

<http://www.fao.org/newsroom/en/news/2007/1000536/index.htm>

The Food and Agriculture Organization (FAO) in its latest Annual Report on the State of Agricultural Commodity Markets 2006 says that multilateral agricultural trade policy report will stimulate trade and economic growth but that they should be compatible with the first Millennium Development Goal. It noted however, that poorer countries such as those in sub-Saharan Africa will not gain as much as more advanced exporting countries from these trade rules due to economic structures, competitiveness, and capacity to respond to new market incentives.

The report focuses on market access issues and the measures needed to ensure that trade policy reform contributes effectively to reducing poverty and food insecurity. An agreement has to be reached among countries that will lead to a less distorted agricultural trading environment and one which recognizes food security and development needs, and the priorities of developing countries.

TECHNICAL CHALLENGES FOR CROP RESEARCH

<http://news.bioversityinternational.org/index.php?itemid=1758>

Why has crop research not benefited many of the poor farmers in the developing world? What are the challenges to targeting relevant and appropriate crop research to serve those farmers? What tools can be used, or are being used, to reach this goal? These are some questions that Mauricio Bellon, Director of the Diversity for Livelihoods Program of Bioversity International, answers in a review examining the technical challenges and tools available to target poor farmers in marginal areas.

Bellon notes that bringing farmers directly into crop research is a most useful strategy. It allows farmers to identify problems, ensure that research is relevant and appropriate for their communities and cropping systems. "Developing and carrying out crop research that benefits poor farmers in marginal areas of the developing world is complex and difficult," says Bellon. "It requires not only strong technical and scientific skills but also a commitment to creating research that is targeted, relevant and appropriate for these farmers, their families and their communities."

CEREAL CROP FORECAST FOR 2007

<http://www.fao.org/newsroom/en/news/2007/1000533/index.html>.

The prospects for global cereal production this year are generally favorable, according to the United Nations Food and Agriculture Organization (FAO). World cereal production is forecast to increase 4.3% to a record 2 082 million tons. However, many countries are in crisis due to significant crop losses and low yield. In many parts of southern Africa total maize production remains about the same as last year's below-average crop. Prospects are good in eastern Africa, following above-average to bumper first season crops in the region.

Record 2007 main season maize crops are being gathered in South America, where planted area increased in response to strong demand, largely for ethanol production in the United States. A good wheat crop is being harvested in Mexico, while in Bolivia, severe weather has caused extensive losses to agriculture, livestock, and other assets, threatening the food security of rural communities.

LESS EXTENSIVE RISK ASSESSMENT OF GM STACKED EVENTS

<http://dx.doi.org/10.1016/j.tifs.2006.09.002>.

GM stacked events are products with more than one transformation event. Because they are considered as new GMOs by the European Commission, they need regulatory approval, including an assessment of their safety, similar to single events prior to marketing.

Researchers in Belgium however, assert that the risk assessment of these GM stacked events could be less extensive than the assessment of the parental GM events. The researchers proposed and enumerated several criteria for the risk assessment of stacked events that include molecular and comparative analysis data as minimum requirements. Additional analysis may be conducted in order to extrapolate data from the parental GM lines to the GM stacked event.

The researchers recommend that the molecular data should include:

- evidence of the presence and the copy number of the parental inserts in the GM stack, and
- that the levels of expression of the newly expressed proteins in the GM stack is equal to that of the GM parental lines.

In addition, the combined effects of the transgenes and the effects of the potential interactions between the newly expressed proteins should also be assessed.

NEW REPORT CITES BENEFITS OF PESTICIDE USE

<http://www.croplife.org/library/documents/Crop%20protection/Pesticides%20and%20humanity%20Version%20A24.pdf>.

A report from the study conducted by researchers at the University of Greenwich in the United Kingdom stated the numerous benefits derived from pesticide use, a view that is in contrast with a number of other publications.

In their study, Jerry Cooper and Hans Dobson provided evidence that pesticides will continue to be a vital tool that will help improve living standards for the people of the world. Among the cited benefits include those categorized as 'primary benefit', for example improved crop/livestock yield and quality, and 'secondary benefits' such as improved nutrition and quality of life. The researchers further categorized these primary and secondary benefits as economic, environmental or social in nature.

EUROPEAN COMMISSION, IFAD TO INCREASE INVESTMENT IN AGRIC

<http://www.ifad.org/media/press/2007/20.htm>.

As a means of eradicating rural poverty in developing countries, the European Commission (EC) and the International Fund for Agricultural Development (IFAD) pledged an increased investment in agriculture. The outcome of the meetings between the President of IFAD and senior officials of the EC will serve as a common platform from which the two organizations can identify and develop joint programs and investment in the sector of agriculture, rural development and food security that have the highest impact on rural poverty reduction. Proposed areas of focus will include rural finance and remittances, natural resource management including land degradation and desertification, livestock management, pro-poor market access, and agricultural research.

APPLICATIONS OF BIOTECH TO FOREST PRODUCTS DEVELOPMENT

<http://www.springerlink.com/content/72072834651383I4/>

The utility of biotech in enhancing the range of forestry products ranges from development of trees with enhanced resistance to insects and diseases to producing modified wood. However, Bob Kellison of the Institute of Forest Biotechnology in the United States, believes that the applications of biotech in forestry can go a lot further.

Kellison stated that other modified traits that may have greater impact include an increased ability for photosynthesis to help increase carbon sequestration in the atmosphere, and also traits that will help increase biomass production to supply bioenergy needs. There is also a need for research to develop trees with increased tolerance to abiotic stresses such as high salinity and drought. This will allow currently unsuitable land areas to be planted with forest tree species.

Though gains from biotechnology applications in forest trees may not be realized quickly due to the longer growth cycle of many species, Kellison believes that results will ultimately help to "support health and long life in an era when conventional crops will be insufficient to meet the needs of Earth's expanding population."

NO HARMFUL EFFECT OF BT COTTON SEEDS SAYS INDIAN AGRIC MINISTER

<http://pib.nic.in/release/release.asp?relid=25794>.

While responding to parliamentary query on harmful effects of GM seeds, the Indian Minister of State for Agriculture Sh Kanti Lal Bhuria informed that "no harmful effect of Bt cotton seeds on human and animal health, plant life and environment has been reported". Bt cotton is the only GM crop approved for commercial cultivation by the Genetic Engineering Approval Committee (GEAC) in the Ministry of Environment and Forests, on the basis of environmental and bio-safety evaluations.

The Minister also informed the Parliament that there is no proposal with the Government to ban production and sale of GM seeds duly approved by the GEAC on the basis of their suitability in the various agro-climatic zones with regards to their performance.

Bt cotton seeds are being produced and marketed in the country by private seed companies. The Government has organized Public Awareness Programmes to educate the farmers about the risks and benefits associated with the GM crops, he added.

EUROPEAN FARMERS BENEFITING FROM BT MAIZE CROPS

<http://www.pgeconomics.co.uk/pdf/Benefitsmaize.pdf>

Farmers in Europe are benefiting from planting GM insect resistant (Bt) maize through higher income, improved grain quality and environmental gains associated with lower insecticide use. This is the conclusion of "The benefits of adopting genetically modified, insect resistant (Bt) maize in the EU: first results from 1998-2006 plantings" by Graham Brookes, director of PG Economics in the United Kingdom and author of the study.

Key findings of the study include:

- Higher yields: In maize growing regions affected by European Corn Borer (ECB) and Maize Stem Borer (MSB), the main impact of growing Bt maize has been higher yields compared to conventional non-GM maize. Average yield benefits were 10% or even higher.
- Higher income: In 2006, users of Bt earned additional income levels of between €65 and €141/ha. This is equal to an improvement in profitability of between 12% and 21%.
- Better grain quality: In certain regions, Bt maize delivered important improvements in grain quality through significant reductions in the levels of mycotoxins found in the grain.
- Less pesticide use: Where farmers previously used insecticides to control ECB and MSB, adoption of Bt technology delivered environmental gains from less insecticide use and reduced use of fuel.

TRENDS IN ADOPTION OF NEW TECHNOLOGY BY INDIAN FARMERS – STUDY

<http://news-info.wustl.edu/tips/page/normal/8887.html>

A study published by Glenn Stone, professor of anthropology and of environmental studies at Washington University in St. Louis, sheds light on the impact of new technologies on farmers and local culture. The study focuses on cotton production in the Warangal District of Andhra Pradesh, India, one of the nation's key cotton-growing areas. Stone found several factors affecting farmers' ability to adjust to new developments by practical methods. Among them are the speed of change, the overwhelming number of choices in the seed market and the desire for novelty.

"Very few farmers were doing experimental testing, they were just using it because their neighbors were," Stone says. "There has been a breakdown in the process of farmers evaluating new seed technologies." Stone's research reveals that the increase market share of Bt cotton resulted not from traditional farming methods of testing seed for efficacy, but from a pattern of "social learning" — farmers relying on word of mouth to choose seeds.

BT, NON-BT MAIZE COEXISTENCE TESTED IN GERMANY

<http://www.blackwell-synergy.com/doi/abs/10.1111/j.1439-037X.2006.00245.x>

Results of a pre-commercial field scale trial conducted in 30 sites in Germany demonstrated that coexistence between Bt maize and the non-transgenic counterpart is possible. The study conducted by W. E. Weber and colleagues at the Martin Luther University, showed that levels of the transgene in the grains of the non-transgenic maize can be kept below 0.9%, the threshold level for labeling GM products in the European Union.

The group of Weber grew maize in field sites ranging from 0.3 to 23 hectares in size. In all areas, a Bt maize hybrid containing transgenic event MON810 was planted in the middle of the field and surrounded by non-Bt maize. The maize flowering times were overlapping. During harvesting, the researchers obtained plant samples from the non-Bt maize located 0 to 60 meters away from the Bt maize. The DNA of the samples was analyzed by two diagnostic laboratories where real-time PCR was used to detect the levels of the transgene.

The study has determined that no samples from the conventional maize collected beyond 10 meters had levels of GM above the threshold of 0.9%. The researchers recommend that planting 20 meters of conventional maize as a pollen barrier between adjacent fields is sufficient in managing the outcrossing between Bt and non-Bt maize.

GM CROPS RESULTS IN IMPROVED PRODUCTIVITY

<http://www.blackwell-synergy.com/doi/abs/10.1111/j.1439-037X.2006.00245.x>

After a decade of GM technology, important positive socio-economic and environmental benefits have been realized despite a limited range of GM agronomic traits that have been commercialized in a small range of crops. The technology has resulted in improved productivity and profitability for about 8.5 million adopting farmers who have used it in over 87 million hectares in 2005. These are among the conclusions forwarded by "GM crops: The first ten years – global socio-economic and environmental impacts" by Graham Brookes and Peter Barfoot of PG Economics Ltd., United Kingdom.

The report, published as Brief 36, by the International Service for the Acquisition of Agri-biotech Applications (ISAAA), discusses the global context of GM crops, the farm level economic impact of GM crops, and environmental impact of the technology.

CISGENIC PLANTS ARGUED SIMILAR TO TRADITIONALLY-BRED PLANTS

<http://dx.doi.org/10.1016/j.tibtech.2007.03.008>

Cisgenic plants are bred by introducing genes from the crop plants themselves or from crossable species using marker-free transformation techniques. By adopting this breeding process called 'cisgenesis', plant breeders can produce cultivars that are equivalent to classically-bred plants, said researchers in the Netherlands.

The researchers, Evert Jacobsen and Henk Schouten, mentioned that cisgenesis is comparable to the induced translocation method of improving plants. In induced translocation, the insertion site of the genes is a priori unknown like in cisgenesis. Thus, Jacobsen and Schouten recommend that plants derived through cisgenesis be treated similar to traditionally-bred plants and exempted from GMO regulations. The researchers note that they have successfully tested cisgenesis in breeding disease resistant apple and potato cultivars.

MUSLIM PERSPECTIVES ON GENETIC MODIFICATION

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"Muslims must connect scientific knowledge and ethical behavior based on faith", says Fatima Agha Al-Hayani, a lecturer and court expert on Islamic Jurisprudence. In her paper, published in the March issue of the journal of religion and science Zygon, she discussed that biotechnology and genetic modification must neither be condemned nor praised. The technology she said is a responsibility that was given by God and accepted by humans, to be applied to the betterment of all.

Al-Hayani encouraged religious communities to be actively involved in the ethical issues of the genetic engineering process and the economic and equitable use of such process. The technology offers promise to help those most in need and help prevent world hunger. It is estimated that there are about 1.3 billion people living in poverty worldwide.

FAO, USDA AGREED TO SUPPORT SUSTAINABLE GLOBAL AGRIC

<http://www.fao.org/newsroom/en/news/2007/1000509/index.html>.

The United Nations Food and Agriculture (FAO) and the United States Department of Agriculture (USDA) recently signed an agreement that will strengthen cooperation between the two in their bid to support the development of a sustainable global agriculture system. Under the terms of the framework agreement, USDA funds and resources, including human resources, can be mobilized to support FAO projects promoting sustainable agricultural development and the attainment of the United Nations' Millennium Development Goals in developing countries. The agreement was signed by FAO Director-General Dr Jacques Diouf and U.S. Secretary of Agriculture Mike Johanns.

CORPORATE DECISIONS ABOUT LABELING GM FOODS

<http://www.springerlink.com/content/q2h7872473t77452/>.

There remain many challenges to encourage various food companies to label their products as "novel", "engineered", or "food that contains genetically modified ingredients", says Canadian researchers Chris MacDonald and Melissa Whellams. Among the factors preventing a unilateral action include the absence of government intervention and of collective action on the part of the industry, and also lack of clear evidence that the foods pose risk to human health.

MacDonald and Whellams state in their paper published by the Journal of Business Ethics that situations have not yet been encountered to make labeling ethically mandatory for agri-food companies. The researchers mention that companies should not feel obligated to label their products as long as long as they are marketing a legal product which they believe poses no threat to the public.

NOTICEBOARD

JAPAN INTERNATIONAL AWARD FOR YOUNG AGRIC RESEARCHERS -

The Ministry of Agriculture, Forestry, and Fisheries (MAFF) of Japan launched the search for "Japan International Award for Young Agricultural Researchers." The award aims to increase motivation among young researchers contributing to research and development in agriculture, forestry, fisheries, and related industries in developing countries. Candidates for the award should be non-Japanese researchers under 40 years old who work for research institutions outside Japan. Winners will receive a testimonial and cash incentive of USD5000 and will be invited to Japan for the awarding ceremonies in September. For more information, visit: http://www.jircas.affrc.go.jp/english/event/h19/h19boshu_e.html

27 – 28 June 2007 - The Biodiesel Forum 2007 will be held in Jakarta, Indonesia. The two-day conference will include information from case studies, panel discussions and talks by industry experts and practitioners. After the conference, participants can also attend two additional workshops that will provide hands-on training in biodiesel project financing and gain information on how to set-up a biodiesel plant. For more information, visit <http://www.k2b.com.sg/conferences/bdf2007/>.

26 – 30 August 2007 - The 13th Australian Barley Technical Symposium will be held in Fremantle, Western Australia. The event aims to bring together all of the barley research, marketing and processing industries of the southern hemisphere. Barley researchers, members of the Australian barley industry, university students, grain marketers, and buyers of Southern Hemisphere barley are encouraged to attend. For more information, visit <http://www.promaco.com.au/2007/abts/>.